

WILLIAM L. SLOVER
C. MICHAEL LOFTUS
JOHN H. LE SEUR
KELVIN J. DOWD
ROBERT D. ROSENBERG
CHRISTOPHER A. MILLS
FRANK J. PERGOLIZZI
ANDREW B. KOLESAR III
PETER A. PFOHL
DANIEL M. JAFFE

OF COUNSEL
DONALD G. AVERY

SLOVER & LOFTUS
ATTORNEYS AT LAW
1224 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C. 20036-3003



WRITER'S E-MAIL:

December 8, 2006

rdr@sloverandloftus.com

218238

BY HAND

The Honorable Vernon A. Williams
Secretary
Surface Transportation Board
Case Control Unit
1925 K Street, N.W.
Washington, D.C. 20423-0001

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Office of Proceedings
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Re: STB Ex Parte No. 664, Methodology to be Employed
in Determining the Railroad Industry Cost of Capital

Dear Secretary Williams:

Enclosed please find an original and ten (10) copies of the Comments of the Western Coal Traffic League in the above-referenced proceeding. Also enclosed are three CDs, each containing the main filing, the Verified Statement of Dr. James E. Hodder, and Dr. Hodder's electronic workpapers.

If there are any questions concerning this matter, please contact the undersigned.

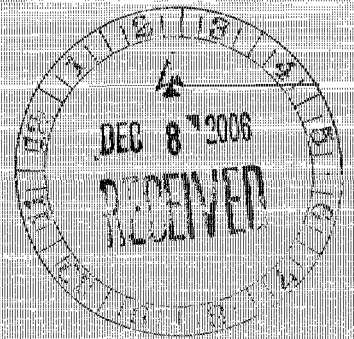
Respectfully submitted,

Robert D. Rosenberg

Robert D. Rosenberg
An Attorney for the Western
Coal Traffic League

RDR:tda
Enclosures
cc: Service List-w/encl.

218238



BEFORE THE
SURFACE TRANSPORTATION BOARD

In the Matter of:

METHODOLOGY TO BE EMPLOYED
IN DETERMINING THE RAILROAD
INDUSTRY COST OF CAPITAL

STB Ex Parte No. 664

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COMMENTS OF THE WESTERN COAL TRAFFIC LEAGUE

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: December 8, 2006

William L. Slover
C. Michael Loftus
Robert D. Rosenberg
Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Its Attorneys

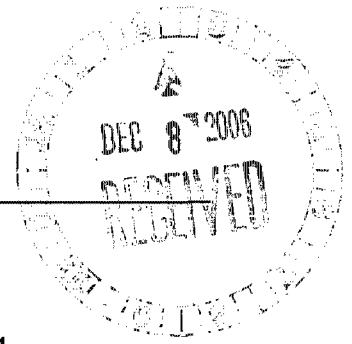
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BEFORE THE
SURFACE TRANSPORTATION BOARD



In the Matter of:)

METHODOLOGY TO BE EMPLOYED)
IN DETERMINING THE RAILROAD)
INDUSTRY COST OF CAPITAL)

STB Ex Parte No. 664

COMMENTS OF THE WESTERN COAL TRAFFIC LEAGUE

The Western Coal Traffic League (“WCTL” or “League”)¹ hereby submits the following comments in response to the Advance Notice of Proposed Rulemaking (“ANPR” or “Notice”) that the Surface Transportation Board (“STB” or “Board”) served in the above-captioned proceeding on September 20, 2006.

SUMMARY

The railroad industry cost of capital, and especially its most pivotal element, the cost of equity (“COE”) component, may properly be calculated in a variety of ways, including the Discounted Cash Flow (“DCF”) and Capital Asset Pricing Model (“CAPM”) methods. The problem with the STB’s current approach to calculating COE is its mechanical application of the DCF model, especially its use of the truncated five-year Institutional Brokers Estimate System (“IBES”) analysts’ forecasts to calculate a long-term, *i.e.*, perpetual, COE that is not sustainable or even plausible since, for example, the projected railroad earnings eventually exceed those of the economy as a whole.

¹WCTL is a voluntary association, whose regular membership consists entirely of shippers of coal mined west of the Mississippi River that is transported by rail. WCTL members presently ship and receive in excess of 140 million tons of coal by rail each year. A list of WCTL’s members is attached as Exhibit A.

A far more realistic estimate, one closely in line with what is reported to be the 9.5% consensus figure used by the investment community for the railroad industry cost of capital, can be derived by using the CAPM method. However, very similar results are realized by utilizing a multi-phase or stage DCF model, one that incorporates the IBES forecasts for the first five years (the first stage), but then uses a transition phase of varying duration (up to fifteen years) when the growth rate reflects a mix of the initial forecast and the rate of growth in the general economy (the second stage), and then a terminal value reflecting the general economy growth rate (the third stage). This three-stage model directly addresses what is otherwise a major flaw in the DCF method as employed by the Board.

The League is particularly concerned by the Board's apparent desire to maintain a mechanical approach to calculating the cost of capital. A more reasonable approach would consider more than one methodology and seek to investigate and reconcile divergent results, which is exactly what the Board eschewed in its 2005 determination. Mechanical use of the DCF approach, as the Board did in 2005, is particularly suspect because the Board is in large part relying on analysts' forecasts of what the Board will do (or, more accurately, not do) in terms of regulation, thus creating a fatal circularity.

The Board should also modify its derivation of the relative weighting of debt and equity so as to adjust for the excessive weighting given to equity in the 2005 determination because of the steep run-up in railroad stock prices. Specifically, the Board should consider what is an appropriate capital structure and, at the very least, should use a

multiple-year average (from three to five years) to avoid artificial fluctuations. In addition, the Board should capitalize operating leases (convert the operating leases from an expense to debt). Such an adjustment is done by the investment community and by at least two of the railroads (BNSF and UP) in their non-GAAP presentations to the investment community.

The League notes that adoption of a reasonable approach to calculating the cost of capital would result in a finding that the railroad industry as a whole is now earning its cost of capital and is thus revenue adequate and that even Union Pacific and CSX are on pace to achieve this status shortly. Such a conclusion has already been reached by significant elements of the investment community, which the Board should recognize.

BACKGROUND

The Board issued its ANPR on the same day that it issued its decision in STB Ex Parte No. 558 (Sub-No. 9), *Railroad Cost of Capital – 2005* (STB served Sept. 20, 2005) (the “Decision”), and the ANPR appears intended to consider issues that the League raised in its comments on the 2005 cost of capital calculation. On October 10, 2006, the League filed a petition for reconsideration of the Decision, noting, *inter alia*, that the Board should have conditioned its Decision on the outcome of its rulemaking proceeding, and that the Decision did not accurately characterize, much less cogently address, the issues raised in the League’s comments.

In particular, the League explained that its concern was not simply that the DCF approach used for calculating the cost of equity was too “subjective,” but instead

that it yielded results, *i.e.*, a cost of capital for 2005 that represents a very substantial increase from the 2004 cost of capital, that were simply not credible in view of the lack of underlying change in inflation or risk. Furthermore, the methodology as applied had the perverse effect of increasing the cost of capital, and thus the rates that the railroads would be able to charge their captive customers, at a time when the railroads were already earning more and should thus have less need for further rate increases. Such an outcome is not economically rational, nor does it constitute sound regulatory policy.

Having been faulted by the Board in the past for having criticized the Board's status quo without offering a specific, quantitative alternative, the League submitted alternate cost of equity calculations using CAPM, which is an established approach long utilized in the investment community, and data that was available from Ibbotson Associates, a respected financial data firm. The CAPM analysis, as presented in the Verified Statement of Thomas D. Crowley ("Crowley V.S.") submitted as part of the League's comments, demonstrated that the railroads enjoyed a cost of capital substantially lower than that claimed by Association of American Railroads ("AAR") in its filing and adopted by the Board in its Decision.

There is, as noted in the Decision, some potential for dispute as to the underlying inputs for the CAPM method, *i.e.*, the risk-free rate of return, the derivation of beta, and various additional refinements that might be added. *Cf.*, *Railroad Cost of Capital--1982*, 367 I.C.C. 662, 680 & n.50 (1983) (citing "numerous assumptions needed to implement the CAPM and our inability to examine data inputs," including a lack of computer software and access to the data base, as basis for concluding "that the CAPM

should [not] be used as the primary basis of determining the cost of equity in this proceeding”). But decades of experience with CAPM and its standard use in the investment community should help to narrow substantially the range of potential disagreement. Just as the AAR relies upon independent reports prepared by IBES for data inputs to its DCF approach, the STB may likewise rely upon data inputs from independent sources of CAPM data, such as Ibbotson Associates, for the sources of data for a CAPM calculation of cost of equity to resolve concerns noted previously.

Significantly, the AAR’s rebuttal comments concerning the 2005 data did not express any disagreement with any of the specific inputs utilized by Mr. Crowley in his CAPM calculations. Moreover, the CAPM inputs are implicit, rather than non-existent, in the DCF model. The CAPM approach thus constitutes a rigorous analysis that focuses on what determines the return required for equity investors.

The Board should also harbor no illusion that the IBES analysts’ projections used in the DCF analysis reflect a broad, strong, clear, or even stable consensus across a narrow range of deviation or that the earnings projections are free from very major disparities and substantial volatility. For example, AAR’s opening submission for the 2005 cost of capital determination shows that for Union Pacific (Appendix C, p. 4) there were five analysts’ earnings growth estimates in January, four estimates in eight of the remaining months, and only three estimates in three of the months. Since truncation consists of dropping out the high and low estimate, the result is that two estimates governed in eight of the months, and in three months the truncated “average” consisted of

the forecast of a single analyst.² Moreover, there was a vast disparity in the range of estimates: in seven of the months, the high estimate was at least triple the low estimate, and in four of the months, the high estimate was more than quadruple the low estimate. In addition, the monthly truncated averages ranged from 8.5% to 17%, reflecting substantial volatility within the course of even a single year.³ The vast disparity in the individual and even would-be “consensus” estimates and associated lack of consistency and stability strongly suggest that the forecast activity is highly subjective and confirms that the analysis is of dubious credibility, especially for determining a long-term cost of equity. The criticisms previously raised against CAPM (*e.g.*, inability to review numerous assumptions and examine data inputs) apply with more force to the DCF inputs. An agency interested in reasoned decision-making would thus logically be very interested in reviewing the results of other forms of analysis.

As the League explained in its comments and the accompanying materials, there is no single right way to calculate the cost of capital. Rather, there are several ways, including the DCF and CAPM methods, and various variants and refinements thereof, for calculating the COE, each is capable of yielding accurate and meaningful results, and,

²In contrast, the AAR’s cost of capital submission for 2004 showed that there were more than five estimates for UP in all months except September (although CSX had one month with only three estimates, and BNSF, CSX, and NS had months with only four estimates). Furthermore, there was a maximum spread in the UP earnings growth estimates of only 9 percentage points except for one month, where one analyst supposedly had a 0% estimate.

³In contrast, in 2004, the UP monthly truncated average estimates varied only by 1.34 percentage points, and the CSX estimates varied within a similar range. Even for BNSF and NS, the variation did not exceed 4.5 percentage points.

ideally, the results should converge. In those years when the results do converge, it matters relatively little which method is utilized.

However, when, as in 2005, the results do not converge, further analysis and refinement should be undertaken so that the differences can be reconciled and/or the more probative approach can be determined and adopted. Indeed, the sharp increase in the cost of capital from 2004 to 2005 should have, by itself, been sufficient to prompt the Board to consider the underlying reason for the increase and the soundness of its methodology and underlying assumptions. Unfortunately, the Board did the opposite in its Decision, essentially rejecting the CAPM data submitted by the League on the grounds that it represented a departure from the Board's past practice, without considering the plausibility of the DCF results. While the Board did issue the ANPR, it appears limited to considering potential changes for the future. Moreover, the ANPR suggests that the Board is looking for a single method to govern for the future.

The League respectfully submits that the Board has misapprehended its proper function. Determining the cost of capital should not be reduced to a mechanical exercise, one where the Board blindly follows a single financial model without regard to the reasonableness and integrity of the results. All models make simplifying assumptions, and the Board is responsible for verifying the reasonableness of the assumptions that it utilizes, *e.g.*, the proposition in its 2005 cost of capital determination that the earnings of the railroads will grow -- in perpetuity -- at a rate over double that of the economy as a whole. It should be readily apparent that the DCF method is subject to distortions under certain circumstances, *e.g.*, rapidly increasing railroad earnings, profits, and stock prices,

the very conditions that tainted the 2005 data.⁴ No doubt CAPM is also capable of yielding inappropriate or less than ideal results on occasion. The Board's function should include considering fairly the data and methodologies submitted to it and deciding what approach makes the most sense under the circumstances, rather than blindly following a particular approach on the basis that it has been used in the past, when conditions were quite different.

If, however, the Board saw fit to limit its function to simply selecting which of the two evidentiary submissions was more persuasive,⁵ the only rational course available to the Board was to adopt the League's submission, as the AAR's submission simply lacked credibility under the circumstances (especially as the AAR's rebuttal comments did not address the substantive points noted by the League). Most tellingly, the AAR did not respond to the observations from a former UP cost of capital witness that

⁴See, e.g., http://pages.stern.nyu.edu/~adamodar/New_Home_Page/lectures/ddm.html (pp. 1-3), noting, *inter alia*, that a single-stage DCF model such as deployed by the Board works best for firms with thorough regulation, stable growth rates, and stable leverage. These conditions might have perhaps been applicable to the railroad industry around the time of the Staggers Act. However, these conditions do not apply at all to the railroad industry at the present time as evidenced by the surge in earnings, virtually non-existent rate regulation, and reduced leverage (due to the rise in stock prices). The lecture notes discuss use of two and three-stage DCF models, which are addressed *infra*.

⁵The Board has recently reaffirmed that it is "not the prisoner of the party's submissions" or "a passive arbiter" that "blandly call balls and strikes," but is instead the active "guardian of the public interest." STB Docket No. 42057, *Public Service Co. of Col. d/b/a Xcel Energy v. The Burlington N. and S.F. Ry. Co.* (STB served Jan. 19, 2005) at 3-4, citing, *inter alia*, *Baltimore & Ohio R.R. v. U.S.*, 386 U.S. 372, 429 (1967) (Brennan J., concurring), *Harlem Valley Transp. Ass'n v. ICC*, 500 F.2d 328, 335 (2d Cir. 1974), and *Isbrandtsen Co. v. U.S.*, 96 F. Supp. 883, 892 (S.D.N.Y. 1951).

the analyst forecasts of railroad earnings growth for 2004 were unrealistically high. The 2005 forecasts were roughly 2% higher than the 2004 forecasts that were deemed unrealistic by UP's former cost of capital witness. And if the Board was of the view that only the previously-used methodology would be considered or would be considered superior on the basis of precedent, then it was incumbent of the Board to have given clear notice of that fact in advance.

MATERIALS SUBMITTED BY THE LEAGUE

The League's substantive submission consists in large part of attachments, primarily statements from expert witnesses and the investment community.

Since the Board appears to have initiated this proceeding to provide further consideration of issues raised by the League in its filings, the League is resubmitting as Exhibit B its April 28, 2006 comments in Ex Parte No. 558 (Sub-No. 9), including the Crowley V.S. that develops the 2005 cost of capital using CAPM and presents criticism of the DCF method as presented by the AAR and adopted by the Board. In the interest of completeness, the League is also resubmitting its October 10, 2006 petition for reconsideration in that docket as Exhibit C.

In addition, the League is submitting, as Exhibit D, a verified statement from Dr. James E. Hodder ("Hodder V.S."), the Wisconsin Distinguished Professor of Business and the Charles and Laura Albright Professor of Finance at the School of Business of the University of Wisconsin-Madison. As noted in his statement, Dr. Hodder previously submitted expert testimony to the Board regarding the cost of capital in

Wisconsin Power & Light Co. v. Union Pacific Railroad Co. and *PPL Montana, LLC v. Burlington Northern and Santa Fe Ry. Co.*

Dr. Hodder's statement reviews the relevant features of the DCF and CAPM methods and explains that their results should converge, that it is thus useful to consider more than one approach and to seek to reconcile their results when they diverge, and that the CAPM method, as employed in the Crowley V.S., yields far more plausible and thus superior results for 2005, especially as the analysts' projections for 2005 are simply not sustainable for the long-term as they cause railroad earnings to eventually exceed the scope of the economy as a whole.

Dr. Hodder explains that if the DCF model is to be utilized, it should be applied in more than one stage, *i.e.*, the analysts projections might be utilized for five or even more years, but thereafter railroad earnings should be projected to grow at the rate of the economy as a whole. Making this adjustment causes the DCF to yield COE results that are consistent with, and in a number of applications lower than, those calculated the CAPM method. Dr. Hodder also undertakes his own CAPM calculations, and his analysis results in a COE slightly lower than Mr. Crowley's, thus confirming the conservatism of the analysis previously submitted by the League. Moreover, the minor differences between the Crowley and Hodder CAPM analyses pale in comparison to the major disparities in the analysts' projections used in the DCF analysis discussed *supra*.

The League notes that the Federal Energy Regulatory Commission ("FERC") uses such a two-stage method to calculate the cost of equity component for natural gas pipelines. As FERC explained in a recent decision:

The Commission uses the five-year Institutional Broker's Estimate System (IBES) growth projections for each proxy group company for the short-term growth projection. The Commission uses the growth rate of the Gross Domestic Product (GDP) as its long-term growth rate, since the Commission has found that pipeline-specific projections of long-term growth cannot reasonably be developed based on available data sources.

Kern River Gas Transmission Co., 117 FERC ¶ 61,077 (Oct. 19, 2006), at P 121. The League notes that the FERC uses a different approach for calculating COE for electric utilities, but that approach reflects "critical" differences between electric utilities and pipelines (and railroads), specifically, that electric utilities do not have projected growth rates that are two to three times that of GDP, and that electric utilities have less reinvestment of earnings and instead issue greater dividends. *See, e.g., Southern California Edison Co.*, 92 FERC ¶ 61,070 (2000), at 61261-62 and notes therein, including n.30.

In its cost of capital submissions, the AAR routinely claims, based on a 1996 publication of the National Association of Regulatory Utility Commissioners, that the DCF method is the most widely used method for determining the cost of equity. Notwithstanding the AAR's claims, "CAPM is the dominant model for estimating the cost of equity." R. Bruner, K. Eades, R. Harris, and R. Higgins, "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," *Financial Practice and Education* (Spring/Summer 1998) at 15 (available at <http://207.36.165.114/JAF/fpess982.pdf>). Dr. Hodder's statement also notes that CAPM has long been viewed as the preferred model. In its Decision 04-09-063 (Oct. 1, 2004), involving Revised Unbundled Network Element Rates for Pacific Bell Telephone Company DBA SBC California, <http://www.cpuc.ca>.

gov/Published/Final_decision/40308-05.htm#P881_267483, the California Public Utilities Commission considered both DCF and CAPM approaches, found a three-stage DCF “in which a company’s growth rate regresses toward the same growth rate as the overall economy in the long-run” to be preferable to a constant growth approach, and ultimately found that “[w]hen setting the cost of equity, we prefer to use CAPM model results, rather than the DCF model.”

Moreover, the AAR gives no indication whether the DCF model is utilized elsewhere on a single-stage or multi-stage basis, which substantially undermines its claim to be relying on common practice. In any event, the 2005 COE figure proposed by the AAR and accepted by the Board in its Decision substantially exceed the COE figures accepted elsewhere. In particular, *Public Utilities Fortnightly* conducts an annual survey of COE authorized by state public utility commissions, and recently published the results of determinations since September 1, 2005. Phillip S. Cross, “Regulators Trust, But Verify,” *Public Utilities Fortnightly* (Nov. 2006) at 42-46 (copy of the article is attached as Exhibit E). The survey reveals no COE determinations in excess of 12.0% and relatively few in excess of 11.2%. While the reviewed COE determinations relate to state electric and (distribution) gas utilities, railroads are generally perceived to have a risk level that is lower than and/or not significantly higher than that of the electric and gas

utility industries.⁶ All things being equal, the lower risk (and lower leverage) translates into a lower cost of equity.

To be clear, the League submits that the five-year analysts' projections, showing projected earnings growth in excess of 13% per year (which means that earnings are projected to nearly double over the course of the five years covered by the projections), are unrealistic and unsuitable for the Board's regulatory purposes. Earnings growth of that magnitude implies massive rate increases, and the analysts are thus in large part forecasting the outcome of future Board policy and decisions, which the Board is then incorporating into its policy and decisions. The result is a fatal circularity as the Board is effectively relying on analysts' forecasts of the Board's regulatory actions to help guide the regulatory actions themselves, *i.e.*, the analysts are projecting the extent to which the railroads will exploit their monopoly power, and then the Board is adopting those projections of market exploitation as the target for what the railroads need to earn "to cover total operating expenses" and provide a reasonable return under 49 U.S.C. § 10704(a)(2). Under these circumstances, the DCF approach is inherently inappropriate for the Board's regulatory purposes, and the CAPM method becomes especially desirable because the risk-free rate of return and risk premium are addressed explicitly as explained by Dr. Hodder, rather than implicitly (and tautologically) under the DCF model.

⁶Information on the relative riskiness (beta) and cost of equity of the railroad and gas and electric utility industries is available from various sources. *See, e.g.*, <http://pages.stern.nyu.edu/~adamodar/pc/archives/wacc04.xls>, showing that for 2004, the last year for which data is posted, eighteen railroad firms had a beta of 0.67 and a cost of equity of 7.47%, lower than that for each of three regions of electric utilities and just slightly higher (0.02 and 0.11%, respectively) than that for natural gas distribution utilities.

ADDITIONAL MATERIALS FROM THE INVESTMENT COMMUNITY

The League is also submitting various materials from the investment community, including several reports from “Wall Street” financial analysts that follow the railroad industry. These reports serve to confirm the soundness of the League’s cost of capital submissions.

The first report, attached as Exhibit F, is from UBS Investment Research, “When Pigs Fly III: Silk Purses from Sow’s Ears,” dated April 18, 2006. This report states that “[t]he exact WACC [weighted average cost of capital] of these [railroad] companies is debatable, and the closest thing we can find to a consensus among CFOs and investors is about 9.5%.” The UBS Report’s reference to an industry-consensus cost of capital of 9.5% is thus much more supportive of the League’s figure for the current cost of capital than that of the AAR or the STB. Furthermore, the implication of the railroads’ use of an internal figure of 9.5% raises significant questions about the AAR’s candor in claiming a cost of capital of 12.2% for 2005.

The second report, attached as Exhibit G, is also from UBS Investment Research, “When Pigs Fly IV: Ad Astra Per Alla Proci,” dated August 9, 2006. (The Latin translates as “To the Stars on the Wings of a Pig.”) The report notes that the railroad industry ROIC exceeded its cost of capital on a trailing 12-month basis as of the second quarter of 2006.⁷ Significantly, BNSF, NS, and CN are all depicted as having exceeded the 9.5% benchmark as of the second quarter of 2006, CSX is projected to reach

⁷UBS defined ROIC (Return on Invested Capital) as “Post-tax EBIT (using flat 35% rate) divided by invested capital.” Invested capital is in turn defined as “net debt (interest bearing debt less cash) plus shareholders’ equity.”

the benchmark in the second quarter of 2007, and Union Pacific is projected to reach the benchmark in the third quarter of 2007.

The third report, excerpts of which are attached as Exhibit H, is from Stifel Nicolaus (in Baltimore, Maryland), entitled "The U.S. Freight Transportation Industry: Where We Are Now and What We Can Expect Over the Next Five Years," and dated October 4, 2006. The report states at page 13 that:

All Class I's will earn their cost of capital: Currently, CN leads the pack earning about 450-500 basis points in excess of its cost of capital. BN and NSC also earn their cost of capital. We believe CSX and UP will also get to that point quickly.

The League respectfully submits that, in light of the items noted above, as well as the substantial increase in railroad profits, earnings, and associated stock prices, the time has come for the Board to recognize that a substantial segment of the railroad industry (*i.e.*, at least NS and BNSF, which comprise about 57% of the 2005 market capitalization of the Class I's according to the Decision) has achieved revenue adequacy and that most of the carriers that have not so far are on the verge doing so shortly.

The League adds that the disconnect between the Board's revenue (in)adequacy findings and the financial health of the railroad industry as perceived by the financial investment community is hardly new. *See* STB Ex Parte No. 552 (Sub-No. 1), *Railroad Revenue Adequacy* (STB served Aug. 28, 1997) (Vice Chairman Owen concurring) ("Specifically, but for the Board's determination of 'adequacy', which is based, I believe, on methodologies that are outdated, no one really doubts that the industry, as a whole, is doing far better economically than our determination suggest.").

Accordingly, actions by the Board that have the effect of increasing the industry's cost of capital as the industry becomes ever more profitable, or postponing the day when the industry is deemed to be revenue adequate, are completely at odds with the financial realities of the railroad industry as perceived by the investment community.

PROPER WEIGHTING OF RAILROAD DEBT AND EQUITY

The League is also concerned that the Board's current procedures give an excessive weighting to the equity portion of the capital structure when, as here, there is a sharp rise in the stock prices of the railroads. Because the Board takes a mechanical approach to calculating relative weights of debt and equity, a steep run-up in the price of stock will cause equity to take on a larger share of the total capitalization, and since equity is the more expensive portion of the capital, the result is a further increase in the cost of capital.⁸ If, as is the case at least for 2005, the cost of equity is overstated, the effect is an additional overstatement in the cost of capital, potentially enabling the railroads to exploit excessive rate power, leading to further increases in the cost of equity and the overall cost of capital, thus establishing an additional dimension of fatal circularity. Moreover, the railroads are in a position to control or "game" their capital structure, *e.g.*, by not rebalancing their capital structure when there has been a major increase in equity due to the run-up in their stock prices.

⁸The League recognizes that, in theory, there should be an offsetting decrease in risk and/or the cost of capital due to the relative reduction in debt, but such effects are not in evidence, at least in the short-term, *e.g.*, the increased percentage of equity in the 2005 determination was accompanied by the substantial increase in the cost of equity even though there was only a modest increase in general inflation and no apparent increase in risk in railroading. Under 49 U.S.C. § 10704(a)(2)(A), railroad earnings are to cover "a reasonable level of debt."

Further evidence that railroad debt-equity ratios are understated arises from the fact that the major railroads have not issued new stock in recent memory. Indeed, three (BNSF, CSX, and Norfolk Southern) of the four railroads included in the Board's industry sample have quite significant stock repurchase programs. For example, BNSF has, according to its 10-K for the third quarter of 2006, http://www.bnsf.com/investors/secfilings/10Q_Corp_3Q_2006.pdf (p. 6) repurchased about 164 million shares, amounting to about 45.6% of the 359 million shares outstanding.

Understated debt-equity ratios might logically be addressed by considering evidence of the optimal debt-equity ratios for the industry. It stands to reason that the corporate finance departments of the Class I railroads have developed relevant information, for example, in conjunction with their stock repurchase programs, and they should be required to submit that information for Board review as part of the AAR's annual cost of capital submission. Other parties should also have the opportunity to submit evidence, including expert testimony, as to what constitutes a proper capital structure.

As a minimum alternative, the Board should consider basing the debt-equity ratio on a multiple-year average, rather than a current year "snapshot," as is the current approach. Use of such an average would tend to isolate the effect of momentary aberrations, while still giving full recognition for the ultimate trend. A similar rationale applies to use of a multiple-year average for calculating productivity for the rail cost adjustment factor.

In addition, the debt portion of capital should be adjusted to reflect the capitalization of operating leases (converting the lease expense to a debt obligation). The need to adjust the balance sheet to reflect substantial railroad operating leases is well-recognized. "Debt for all railroads is underreported on the balance sheet because of the use of off-balance-sheet financing activities, including the extensive use of operating leases for all railroads and the use of accounts-receivable sales programs at some." Standard Poor's Ratings Direct, "A Solid Report Card for Railroads," Apr. 24, 2006, as available at http://www.businessweek.com/print/investor/content/apr2006/pi20060424_603854.htm. A UBS Report, North American Railroads Weekly, dated March 27, 2003, discusses the railroads' extensive use of off-balance sheet financing and notes two standard methods for capitalizing the lease costs to derive meaningful debt-to-capital ratios. Excerpts of the UBS report are included as Exhibit I.

Significantly, BNSF and UP both make non-GAAP financial presentations to depict their operations that capitalize operating leases pursuant to Regulation G of the Securities and Exchange Commission, 17 CFR Part 244. In particular, BNSF's annual report for 2005, available at <http://www.bnsf.com/investors/annualreports/2005annrpt.pdf> (excerpts included as Exhibit J), begins with a letter from Chairman, President, and CEO Matthew K. Rose that states:

In a highly capital-intensive business such as a railroad, return on invested capital (ROIC) is one of the most important measures of the value of our company to our shareholders. In 2005, our ROIC was 10.1%, the highest level since merger. (For more information on ROIC, see the calculation following Item 6 in our attached Form 10-K).

Page 17 of the attached 10-K addresses “Calculation of Return on Invested Capital,” references Mr. Rose’s letter and discussion of ROIC, notes that it “is a non-GAAP measure,” and includes qualifications in accordance with Regulation G. The first entry in the table is “Average Capitalization” (a figure that is obviously required to calculate return on invested capital) and footnote (a) states that:

Average capitalization is calculated as the average of the sum of stockholders’ equity, net debt (total debt less cash and cash equivalents), **the net present value of future operating lease commitments,**⁹ and the receivables sold under the accounts receivable sales program for the most recent preceding 13 month ends. [Emphasis added.]

Significantly, the third entry in the adjustments is entitled “Financing charges” and constitutes an addition to income; footnote (b) explains that “Financing charges represent the estimated interest expense included in operating lease payments and A/R sales fees.”

BNSF’s own ROIC calculation, which it presents to the investment community with the expectation that it will be relied upon (and favorably so, given Mr. Rose’s letter), thus makes precisely the calculation proposed by the League, *i.e.*, operating lease is treated as debt and the corresponding expense is eliminated. Moreover, the result, at least in part, is a ROIC of 10.1% for 2005, which is higher than the 9.76% calculated by the Board in its errata in Ex Parte No. 552 (Sub-No. 10), *Railroad Revenue Adequacy - 2005 Determination* (STB served Oct. 26, 2006).

⁹Information on the discount rate used by BNSF and UP for calculating the net present value calculation might also be relevant for determining the cost of capital. Whether the railroads internally use the same cost of capital that they claim before the Board is also of relevance.

In addition, the BNSF 2005 10-K pro forma analysis depicts results for prior years, including 2004, where the adjustments also include a reversal of a \$465 million charge taken in the third quarter of 2004 for a change in estimated unasserted asbestos and environmental charges. The charge was included in BNSF's regular GAAP expenses under "Materials and other" and not even as a special charge. BNSF's ROIC calculations, with the adjustment for operating leases and reversal of asbestos and environmental charges, are presumably the same ROIC calculations that BNSF uses to determine long-term incentive compensation for its senior managers (see p. 83 of BNSF's 2005 Annual Report, included in Exhibit J). BNSF's decision to exclude the charge from its ROIC analysis thus undermines the Board's stated basis for including such costs in its revenue adequacy determinations. *Railroad Revenue Adequacy--1988 Determination*, 6 I.C.C.2d 933, 945-46 (1990) (inclusion of special charges "is necessary to give us the most accurate picture of each railroad's financial condition"), *aff'd sub nom. Association of Amer. Railroads v. ICC*, 978 F.2d 737 (D.C. Cir. 1992).

BNSF has also recently (as of at least November 14, 2006) projected its 2006 ROIC at approaching 10.9% on a GAAP basis and approaching 11.0% on a Regulation G basis, making the same adjustments for operating leases. BNSF's projection is available at http://www.bnsf.com/investors/presentations/pdf/pro_forma_regg.pdf and included as Exhibit K.

Similarly, Union Pacific Corporation's "2005 Analyst Fact Book," available at <http://www.up.com/investors/attachments/factbooks/2005/factbook.pdf>, at p. 34, excerpts included as Exhibit K, presents "Financial & Operating Statistics," including

“Debt to Capital (%)” and “Lease Adjusted Debt to Capital (%)” The difference, noted by comparing footnotes (d) and (e), is that the latter includes “net present value of operating leases” and is higher than the former (43.6% compared to 35.1%).¹⁰

Under the circumstances, the adjustment to debt appears clearly warranted. Indeed, failure to make the adjustment would effectively allow the railroads to keep two sets of books, one (for the Board) showing a higher cost of capital and lower return, and the other (for the investment community) showing a lower cost of capital (or at least more debt) and a higher rate of return (by virtue of elimination of the operating lease expense).

CONCLUSION

For the reasons stated above, the League calls upon the Board to fulfill its regulatory responsibilities and propose and adopt a reasoned and reasonable, and not merely mechanical, approach for determining the railroad industry cost of capital, not just for the future, but also for 2005.

Respectfully submitted,

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: December 8, 2006

William L. Slover

C. Michael Loftus

Robert D. Rosenberg

Slover & Loftus

1224 Seventeenth Street, N.W.

Washington, D.C. 20036

(202) 347-7170

Its Attorneys

¹⁰The League notes that Union Pacific documents reference a long term plan for compensation based on return on invested capital, but counsel has been unable, so far, to locate a copy of that plan to determine how return on invested capital is defined.

LIST OF EXHIBITS

Exhibit	Description
A	List of Western Coal Traffic League Members
B	WCTL April 28, 2006 Comments on 2005 Cost of Capital
C	WCTL October 10, 2006 Petition for Reconsideration of the 2005 Cost of Capital Decision
D	Verified Statement of Dr. James E. Hodder
E	Public Utilities Fortnightly (November 2006) on Survey of Cost of Equity
F	UBS Report, When Pigs Fly III, April 18, 2006
G	UBS Report, When Pigs Fly IV, August 9, 2006
H	Excerpts, Stifel Nicolaus, Report on Railroads, October 4, 2006
I	Excerpt, UBS Report, Railroad Operating Leases, March 27, 2003
J	Excerpts, BNSF 2005 Annual Report
K	BNSF Projected 2006 Pro Forma Analysis
L	Excerpts, UP 2005 Analyst Fact Book

WESTERN COAL TRAFFIC LEAGUE MEMBERS

Alliant Energy
Ameren Energy Fuels and Services
Arizona Electric Power Cooperative, Inc.
Arizona Public Service
CLECO Corporation
City of Austin, Texas
CPS Energy
Kansas City Power & Light Company
Lower Colorado River Authority
MidAmerican Energy Company
Minnesota Power
Nebraska Public Power District
Omaha Public Power District
Texas Genco, LP
Texas Municipal Power Agency
Western Farmers Electric Cooperative
Western Fuels Association, Inc.
Wisconsin Public Service Corporation
Xcel Energy

EXHIBIT B

April 28, 2006 Comments
of the Western Coal Traffic League
on the 2005 Cost of Capital

WILLIAM L. SLOVER
C. MICHAEL LOFTUS
JOHN H. LE SEUR
KELVIN J. DOWD
ROBERT D. ROSENBERG
CHRISTOPHER A. MILLS
FRANK J. PERGOLIZZI
ANDREW B. KOLESAR III
PETER A. PFOHL
DANIEL M. JAFFE
KENDRA A. ERICSON

OF COUNSEL
DONALD G. AVERY

SLOVER & LOFTUS
ATTORNEYS AT LAW
1224 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C. 20036-3003



TELEPHONE:
(202) 347-7170

FAX:
(202) 347-3619

WRITER'S E-MAIL:

April 28, 2006

rdr@sloverandloftus.com

BY HAND

The Honorable Vernon A. Williams
Secretary
Surface Transportation Board
Case Control Unit
1925 K Street, N.W.
Washington, D.C. 20423-0001

Re: STB Ex Parte No. 558 (Sub-No. 9),
Railroad Cost of Capital-2005

ENTERED
Office of Proceedings

APR 28 2006

Dear Secretary Williams:

Part of
Public Record

Enclosed please find an original and ten (10) copies of the Reply Comments of the Western Coal Traffic League in the above-referenced proceeding. Also enclosed is a CD containing the filing. Workpapers are included within the filing itself.

If there are any questions concerning this matter, please contact the undersigned.

Respectfully submitted,

Robert D. Rosenberg

Robert D. Rosenberg
An Attorney for Western
Coal Traffic League

RDR:tda

Enclosures

cc: Service List-w/encl. (hardcopy only)

BEFORE THE
SURFACE TRANSPORTATION BOARD



ENTERED
Office of Proceedings

APR 28 2006

Part of
Public Record

In the Matter of:

RAILROAD COST OF CAPITAL –
2005

Ex Parte No. 558 (Sub-No. 9)

REPLY COMMENTS OF THE WESTERN COAL TRAFFIC LEAGUE

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

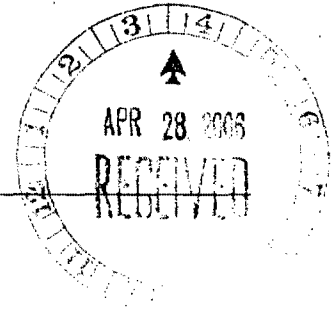
Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: April 28, 2006

William L. Slover
C. Michael Loftus
Robert D. Rosenberg
Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Its Attorneys

BEFORE THE
SURFACE TRANSPORTATION BOARD



In the Matter of:)

RAILROAD COST OF CAPITAL –)
2005)

Ex Parte No. 558 (Sub-No. 9)

REPLY COMMENTS OF THE WESTERN COAL TRAFFIC LEAGUE

Pursuant to the notice of the Surface Transportation Board (“STB” or “Board”) served in the above-captioned proceeding on December 20, 2005, the Western Coal Traffic League (“WCTL” or “League”)¹ submits these reply comments in response to the comments filed by the Association of American Railroads and its member railroads (“AAR” or “Railroads”) on March 31, 2006.

I. SUMMARY

The League has long been concerned that the STB’s method for calculating the railroad industry cost of capital yields figures that are unrealistically high and biased in favor of the railroads. The League has previously submitted comments explaining “that the Board’s procedures for calculating the cost of capital produces a figure that is too high given current economic conditions, the financial condition of the railroads, and the regulatory purposes of the cost of capital calculation.” Railroad Cost of

¹WCTL is a voluntary association, whose regular membership consists entirely of utility shippers of coal mined west of the Mississippi River that is transported by rail. WCTL members presently ship and receive in excess of 100 million tons of coal by rail each year. A list of WCTL’s regular members is attached as Exhibit A.

Capital-1997, 3 S.T.B. 176, 177 n.1 (1998). However, the STB faulted the League for not having introduced specific evidence concerning the computation of the cost of capital. Id. The League's instant filing is intended to respond directly to the Board's prior criticism.

As explained below, the cost of capital for the railroad industry proposed by the AAR's filing for 2005 is entirely too high and is devoid of rational support. The AAR's filing entails a massive increase in the cost of equity and the resulting overall cost of capital that rests entirely on projections by investment analysts of the expected growth in railroad earnings. Those projections do not provide a defensible means for calculating the cost of equity in light of the recent run-up in railroad stock prices and earnings.

As explained more fully below and in the accompanying Verified Statement of Thomas D. Crowley of L.E. Peabody & Associates, Inc. ("Crowley VS") attached as Exhibit B, the STB should instead calculate the cost of equity using the Capital Asset Pricing Model ("CAPM"), which enjoys broad acceptance in both the academic and financial communities.

Utilizing CAPM and publicly-available data from recognized sources, Mr. Crowley has calculated a 2005 railroad industry cost of equity of 10.41% and a 2005 railroad composite cost of capital of 8.87%. The STB should use these figures instead of the much higher figures proposed by the AAR.

II. THE AAR PROPOSES A MASSIVE INCREASE IN THE INDUSTRY COST OF CAPITAL THAT IS DEVOID OF MEANINGFUL SUPPORT

The AAR's comments propose a massive increase in the industry average composite after-tax cost of capital from the 10.1% that applied in 2004² to the 12.2% that the AAR seeks to apply for 2005. The increase amounts to 20.8%. On a before-tax basis, which is utilized under URCS for variable cost and jurisdictional purposes, the increase is even larger – 23.7% (17.9% ÷ 14.47%).³

Notwithstanding the enormity of the increase, the AAR's comments are purely technical and provide no explicit explanation or justification, or even acknowledgment for the massive change. The reader is left to discover on his own that: (a) the change in the cost of debt is minimal (from 5.25% in 2004 to 5.36% in 2005); (b) the weight assigned to equity, the most expensive capital cost component, has increased substantially from 61.5% to 69.6% (an increase of 13.17%); and (c) the cost of equity has increased even more, from 13.16% to 15.19% (an increase of 15.4%).

The AAR does not discuss the significance of these changes, nor does it address the underlying cause – the dramatic increase in railroad earnings and associated

²Ex Parte No. 558 (Sub-No. 8), Railroad Cost of Capital – 2004 (STB served June 30, 2005).

³The after-tax cost of capital is converted a before-tax cost of capital by dividing the after-tax cost of equity by 1 minus the statutory corporate tax rate of 35%. Accordingly, the 13.16% after-tax cost of equity proposed by the AAR for 2005 equates to 20.25% on a before-tax basis.

stock prices.⁴ The increase in railroad stock prices drives the increase in the cost of capital in two ways. First, the increase in stock prices increases the equity portion of the market capitalization, which means that a greater percentage weight is assigned to equity, the most expensive component of the cost of capital, as noted supra. Second, the increase in profits and stock prices fuels investor expectations that the growth in earnings will continue in the future. In particular, the truncated growth rate, which was 11.0% in 2004, is calculated at 13.67% for 2005,⁵ thus accounting for more than 100% of the increase in the cost of equity.⁶

The available data thus indicates that the cost of equity as calculated by the AAR is increasing not because the Railroads are suddenly viewed as riskier enterprises or have greater capital needs that are more likely to go unmet.⁷ Instead, the complete (but

⁴ For example, for the period from January 3, 2005 through February 14, 2006, the S&P Rail Index increased 46% compared to 5% for the S&P 500; for the period from December 31, 2002 through October 31, 2005, the seven major railroads on a capital-weighted basis increased 109% compared to 49% for the S&P 500. UBS, UBS Railroads Weekly, Feb. 16, 2006, and Nov. 17, 2005.

⁵The 13.67% growth rate implies that railroad earnings will double in slightly more than every five years, which is a further indication that the AAR's methodology does not yield a meaningful approximation of the industry cost of capital at this time.

⁶Somewhat ironically, the increase in the stock prices causes a decrease in the average current dividend yield (from 1.64% to 1.42%), the other cost of equity component, because the divided yield is expressed as a percentage of the stock price. This aspect would be offset or reversed if the Railroads used their increased earnings to increase their dividends.

⁷The AAR's filing indicates, in fact, that the cost of equity should be declining because the railroads are less risky now than they were in years past. The AAR indicates

entirely tacit) explanation is that simply because the railroads are making greater revenues and profits, investment analysts expect the growth in railroads revenues and earnings to continue.

This condition might be acceptable if the railroads were unregulated businesses or if the STB's annual cost of capital determination pursuant to 49 U.S.C. § 10704(a)(2) had no regulatory significance whatsoever. However, this condition is not acceptable, and certainly becomes arbitrary and capricious, when the cost of capital is used for such purposes as to determine the revenue adequacy of individual railroads, to adjudicate the reasonableness of the common carrier rates paid on individual movements, to regulate the railroad industry more generally, and to govern various aspects of private rail transportation contracts. The cost of capital should not be allowed to increase just because the railroads have been able to increase their rates, revenues, and earnings. Such developments should make the railroads revenue adequate or at least come significantly

that increases (or decreases) in the debt/equity ratio cause corresponding increases (or decreases) in the cost of equity that result in a constant current cost of capital. The underlying theory is that increasing the proportion of debt in the capital structure increases the cost of equity due to increased risk. Rockey VS at 3-4.

The STB's decision in Ex Parte No. 558 (Sub-No. 8), Cost of Capital-2004 (STB served June 20, 2005), determined the railroad industry had a capital structure mix of 38.5% debt and 61.5% equity. For 2005, the AAR calculates that the proportion of debt in the railroad industry declined to 30.4%, precipitating a decline in the industry's debt to equity ratio over 2004 levels. The decline in the railroad's debt/equity ratio indicates that the overall industry is less risky in 2005 than in 2004, and its cost of equity should decline. Instead, the AAR advocates a steep increase in industry's cost equity, contrary to its own musings on finance theory.

closer to achieving that goal, whereas the impact of the AAR's calculations will likely be to make the railroads appear further away from achieving that objective. In other words, the effect of increasing railroad earnings should not be to allow them to charge still higher rates. Such an outcome is the antithesis of meaningful economic rate regulation.

The AAR's implicit defense of its evidentiary submission is that it is simply doing what it has done before and that its chosen approach is used generally in other regulatory contexts. See, e.g., the Verified Statement of Craig F. Rockey submitted on behalf of the AAR at 8. However, the AAR's approach ignores altogether the change in the underlying economic conditions of the railroad industry and the impact of those changes on the results of the analysis. As such, the AAR's submission is entirely deficient and inadequate and does not provide reasonable evidentiary support for adoption of its calculations by the Board.

Further confirmation of the unreasonableness of the AAR's approach is obtained by considering the ratio of market-to-book ratios. See, e.g., A. Kahn, The Economics of Regulation (1988) at 48 n.68 (sharp increase in stock prices results when utilities are "permitted to earn considerably more than their cost of capital"). In that regard, it is significant that as of April 14, 2005, according to Yahoo Finance (<http://biz.yahoo.com/p/776prid.html>), the railroads had price to book value ratios of 3.26

(BNSF), 2.38 (NS), 1.78 (CSX), and 1.82 (UP), all sufficient to indicate that they are earning more than sufficient revenues to sustain their net book values.

III. THE STB SHOULD INSTEAD UTILIZE A CAPM APPROACH

What is then required for the Board to discharge its statutory duties is some alternative model of analysis that is not so utterly dependent on projections that railroads will continue to achieve growth in revenues, earnings, and stock prices that exceeds market levels.⁸ Fortunately, there is a standard methodology for calculating the cost of equity that can be used for this purpose, namely, the Capital Asset Pricing Model ("CAPM").

The STB is no stranger to CAPM. The predecessor Interstate Commerce Commission ("ICC") long ago considered CAPM and found that "the approach appears to be a useful one" and "conclude[d] that its results merit consideration along with the results of other types of studies." Adequacy of Railroad Revenue (1978 Determination), 361 I.C.C. 79, 92 (1978). For sometime thereafter, the AAR continued to rely on the CAPM "as a verification of the cost of equity developed using the DCF method," but the

⁸Stated differently, the problem with the AAR's methodology is that it relies upon relatively short-term market expectations, *i.e.*, analysts' forecasts of earnings, that are not sustainable and that do not reflect the levels of long-term risk facing the railroad industry. Normally, a more risky investment equates to a higher required return. Given the size of their asset bases, the make-up of their customer bases, and their low levels of debt, the Class I railroads, by their very nature, are not very risky investments. During periods of stability, the low rate of growth may reflect the low risk of the industry, but this is not a time of such stability, which makes the DCF equity approach especially inappropriate for calculating the industry's cost of capital under present circumstances.

ICC noted "the CAPM is quite complex" and its consideration and/or use, along with various other methods, was abandoned some time ago. See, e.g., Railroad Cost of Capital -1986, 3 I.C.C.2d 948, 958-59 (1987).⁹

Since that time, CAPM has attracted a considerably broader following. In particular, Dr. William F. Sharpe was awarded a share of the 1990 Nobel Prize in Economics for his work in developing the CAPM method. Indeed, there is abundant evidence that outside of the regulatory context, "CAPM is the dominant model for estimating the cost of equity." R. Bruner, K. Eades, R. Harris, and R. Higgins, "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," Financial Practice and Education (Spring/Summer 1998) at 15 (available at <http://207.36.165.114/JAF/fpess982.pdf>).

In contrast, the AAR submission is devoid of any suggestion that financial investment analysts or the railroads themselves actually make any use of the DCF method for calculating their cost of equity. The AAR has provided no evidence that it believes

⁹One of the concerns with using the CAPM approach for calculating the cost of equity for a fully regulated entity is that the rate regulation and the calculation of the beta can become circular or tautological activities. (The DCF approach is also subject to this same criticism.) This argument might have some merit if the railroad were still fully regulated entities, but they are not. In the 25 years since deregulation, the markets have had more than adequate opportunity to digest impact of deregulation's impact on the railroads and accurately price the railroads' stock in a deregulated environment comparable to that of other firms.

that the results of its analysis are at all realistic or have any credibility or utility outside of the regulatory context.

Under more ideal circumstances, one would hope to find substantial convergence among different measures of the cost of capital including DCF, CAPM, and market-to-book ratios.¹⁰ However, the present circumstances, with the rapid increase in railroad earnings and stock prices, are plainly not normal in this regard. Under the present circumstances, it is appropriate to apply the CAPM method and see if it produces more reasonable and appropriate results.

IV. CALCULATION OF THE COST OF EQUITY USING THE CAPM APPROACH

Accordingly, the League has asked Mr. Crowley to calculate the cost of equity for the four largest Class I Railroads (BNSF, NS, UP, and CSX) using CAPM and independently-prepared, publicly-available materials. Mr. Crowley explains that he has applied CAPM using data from readily-available sources, including information published by Ibbotson Associates. Ibbotson Associates is a leading provider of financial data and was acquired on March 1, 2006 by Morningstar, Inc., a leading provider of independent investment research.

¹⁰For example, Railroad Cost of Capital-1982, 367 I.C.C. 662, 680 (1983), found only an 0.8% difference between the DCF and CAPM calculations of the cost of equity, notwithstanding "the numerous assumptions needed to implement the CAPM and our inability to examine the inputs."

As explained in the Crowley VS, use of the Ibbotson Associate data in the application of the CAPM methodology shows that the railroad industry has a cost of equity of 10.41%. This figure is below the 13.16% cost of equity that the Board (and the AAR) calculated in 2004, indicating that even the 2004 composite cost of capital of 10.1% was too high. Moreover, if the other elements of the AAR's submission are adopted, then the resulting overall composite cost of capital for the industry for 2005 is 8.87%.

The League respectfully submits that the Board's 2005 cost of capital findings should utilize an average cost of equity of 10.41%, which translates into a composite cost of capital of 8.87%, assuming that the other elements of the AAR's calculations are accepted. The League further notes that such a figure would be generous for the Railroads. In particular, the figure does not entail any adjustment to the capital structure, especially the run-up in the percentage of equity attributable to the run-up in their stock prices. The Board's governing statute, 49 U.S.C. § 10704(a)(2), calls for a calculation to be made that reflects "honest, economical, and efficient management," and it would be economical and efficient for the Railroads to visit their debt-equity structure in light of their high stock prices. Nor does the analysis reflect any adjustment for the capacity problems plaguing the railroad industry and its shippers that would not have occurred with more thoughtful management by the railroad industry.

V. CONCLUSION

Accordingly, the League urges the Board to adopt the 2005 composite cost of capital figure of 8.87% as calculated in the attached Crowley VS. The figure submitted by the AAR in its March 31, 2006 submission is plainly unacceptable, and so the figure submitted by the League should be utilized as the best evidence of record.

Respectfully submitted,

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: April 28, 2006

William L. Slover

C. Michael Loftus

Robert D. Rosenberg

Slover & Loftus

1224 Seventeenth Street, N.W.

Washington, D.C. 20036

(202) 347-7170

Its Attorneys

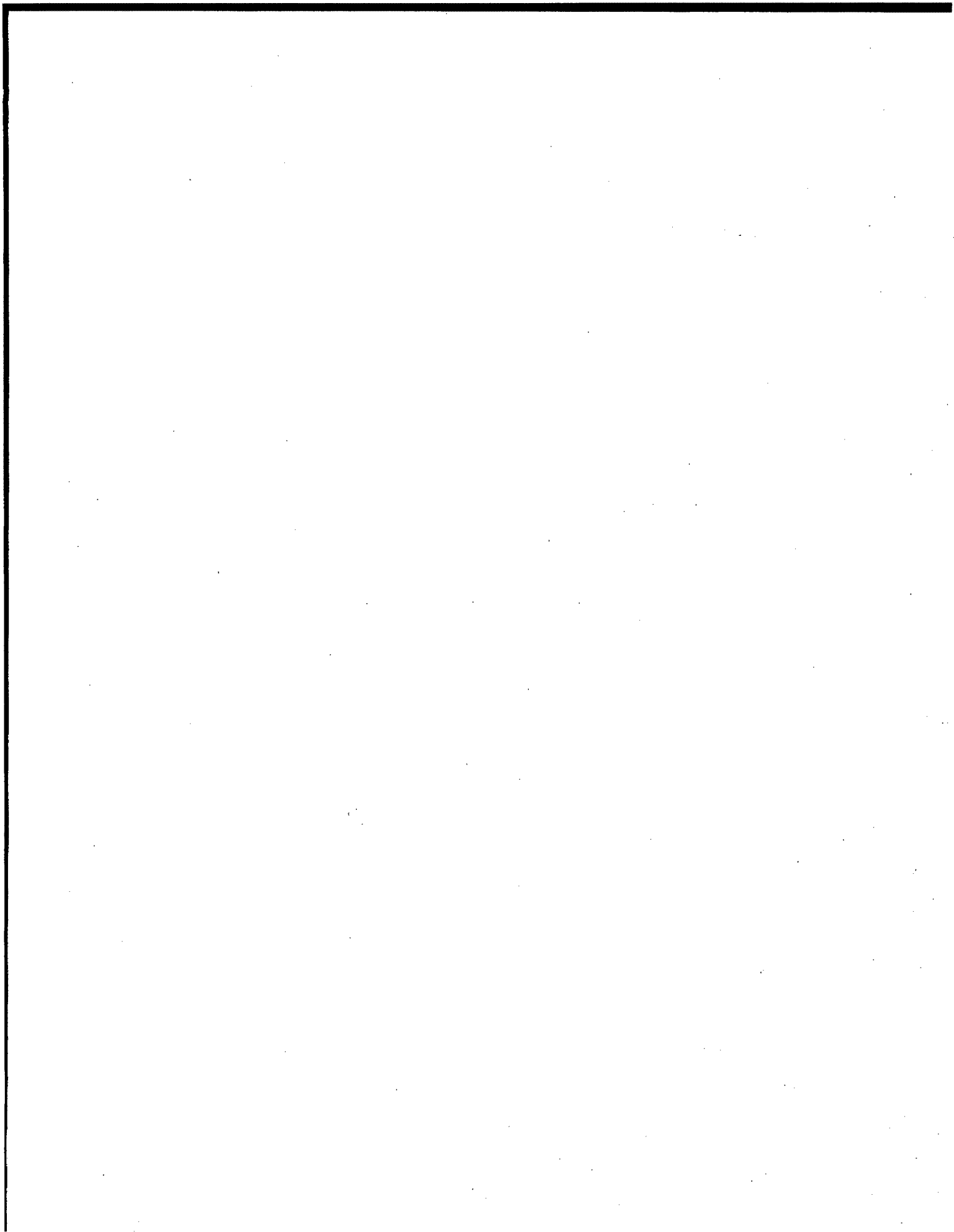


EXHIBIT A

WESTERN COAL TRAFFIC LEAGUE MEMBERS

Alliant Energy

Ameren Energy Fuels and Services

Arizona Electric Power Cooperative, Inc.

Arizona Public Service

CLECO Corporation

City of Austin, Texas

CPS Energy

Kansas City Power & Light Company

Lower Colorado River Authority

MidAmerican Energy Company

Minnesota Power

Nebraska Public Power District

Omaha Public Power District

Texas Genco, LP

Texas Municipal Power Agency

Western Farmers Electric Cooperative

Western Fuels Association, Inc.

Wisconsin Public Service Corporation

Xcel Energy

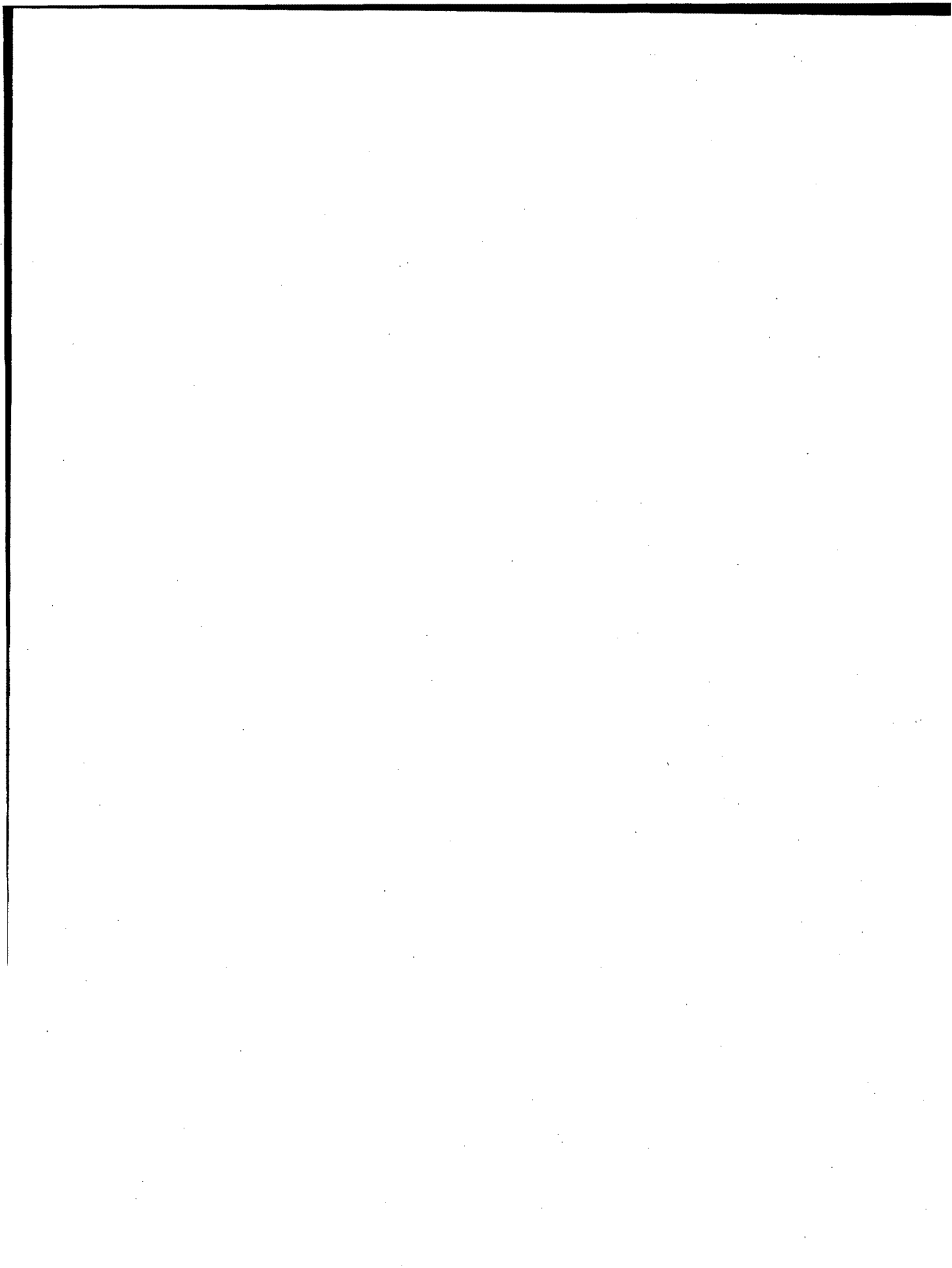


EXHIBIT B

VERIFIED STATEMENT OF THOMAS D. CROWLEY

I. INTRODUCTION

My name is Thomas D. Crowley. I am an economist and the President of L. E. Peabody & Associates, Inc., an economic consulting firm that specializes in solving economic, transportation, marketing, and fuel supply problems. I have spent most of my consulting career of over thirty-five (35) years evaluating fuel supply issues and railroad operations, including railroad costs, prices, financing, capacity and equipment planning issues. My assignments in these matters were commissioned by railroads, producers, and shippers of different commodities. A copy of my credentials are included as Exhibit No. 1 to this verified statement.

My consulting assignments regularly involve working with and determining various facets of railroad financial issues, including cost of capital determinations. In these assignments, I have calculated railroad capital structures, market values, cost of railroad debt, cost of preferred railroad equity and common railroad equity. I am also well acquainted with and have used the commonly accepted models for determining a firm's cost of equity, including the Discounted Cash Flow Model ("DCF"), Capital Asset Pricing Model ("CAPM"), French-Fama Three Factor Model and Arbitrage Pricing Model.

I have developed railroad industry average cost of capital and company specific cost of capital for use in litigation and for use in general business management. For several clients, I have determined the Going Concern Value ("GCV") of privately held railroads. Developing the GCV under the Income Based Methodology requires developing company specific costs of debt and equity for use in discounting future company cash flows. I have also developed cost of capital in

order to capture the costs associated with shipper investment in railroad equipment and road property.

I have been asked by Counsel for the Western Coal Traffic League ("WCTL") to respond to the Association of American Railroad's ("AAR") filing pursuant to the STB's December 19, 2005 decision in Ex Parte No. 558 (Sub-No. 9), *Railroad Cost of Capital – 2005*, in which the AAR estimated the 2005 Railroad Industry Cost of Capital ("2005 Cost of Capital"). As described in detail in the Verified Statement of Mr. Craig F. Rockey, the AAR's Vice President of Policy and Economics ("Rockey VS"), the AAR developed its estimate of the 2005 Cost of Capital based on its calculations of the Railroad Industry's 2005 average capital structure, 2005 average cost of debt ("COD"), average cost of preferred equity and 2005 average cost of common equity ("COE"), and concluded that the 2005 Cost of Capital equaled 12.2 percent.^{1/}

I have reviewed the AAR's calculations of the railroad industry's capital structure, COD, COE, and 2005 Cost of Capital, and, in general, accept its calculations of the railroad industry's capital structure and COD. However, the AAR's use of the DCF method to estimate the COE leads to a significant overstatement of the COE and, subsequently, the 2005 Cost of Capital.

Contrary to the AAR's implicit assertion that its approach to calculating COE is at least as accurate as any other, each approach available to financial analysts contains assumptions and associated limitations. The DCF approach used by the AAR in its calculations of the COE is not

^{1/} See Rockey VS at 2. None of the Class I railroads included in the study group had any preferred stock outstanding in 2005. Therefore, the AAR did not calculate the cost of the preferred equity capital and the market value weight for preferred equity was given a weight of zero percent (0%) in the 2005 Cost of Capital calculation.

immune from these limitations. Specifically, the DCF approach assumes stable, perpetual growth rates in estimating a firm's COE. Over the last year, railroad industry earnings growth has not been stable, but has increased to record levels. The AAR relies on industry analysts' estimates of five year growth in railroad earnings per share ("EPS"). This overstates the perpetual growth rate implicit in the DCF model, since it is highly unlikely that the high near-term growth rates will continue into perpetuity. The AAR therefore significantly overstates COE.

An alternative approach to estimating the railroad industry's COE is the CAPM. The CAPM is used by the majority of experts within the financial industry to estimate the COE. It does not rely upon estimated growth rates, and, therefore, is not impacted by short-term growth expectations that lead to overstated COE using the DCF approach. A railroad industry COE using the CAPM can be easily calculated using publicly available data from reputable sources. The result can be vetted against railroad industry cost of equity prepared by independent sources. Using the CAPM, I have determined the railroad industry's 2005 COE is 10.41 percent, and the 2005 Cost of Capital is 8.87 percent.

My testimony is discussed further below under the following topical headings:

- II. Shortcomings of the DCF Approach
- III. The CAPM as an Alternative to the DCF Approach
- IV. Railroad Industry COE Using the CAPM
- V. 2005 Cost of Capital

II. SHORTCOMINGS OF THE DCF APPROACH

The DCF approach for estimating a company's COE is rooted in the concept of the time value of money. The model assumes that a public company's current stock price embodies future returns that the market would expect to receive by investing in that stock today. In other words, the current stock price is the sum of the present values of the expected future returns to investors in the form of dividends and stock price changes. The relationship between a company's stock price and the present value of future returns can be written in the form of a growing perpetuity and expressed mathematically as:

$$P_0 = \text{Div}_1 \div (r - g_p)$$

Where:

- P_0 = a company's current stock price;
- Div_1 = a company's dividend in the next pay period;
- r = a company's equity discount rate; and
- g_p = a company's anticipated perpetual growth rate.^{2/}

Alternatively, the growing perpetuity formula can be used to obtain an estimate of a company's equity discount rate from the company's expected future dividends, its current stock price and its perpetual growth rate. This would be expressed mathematically as:

^{2/} The theoretical underpinnings of the DCF approach are explained in numerous financial texts. See, for example, *Principles of Corporate Finance*, R.A Brealey, S.C. Myers, and A.J. Marcus, Eighth Edition, 2006, page 65.

$$r = (\text{Div}_1 \div P_0) + g_p$$

Of the three factors required to estimate the equity's required rate of return, only the equity's current stock price (P_0) is known. The other two factors, the company's expected dividend (Div_1) and perpetual growth rate (g_p), are not known. Surrogates for these factors must be used.^{3/}

In its previous cost of capital decisions, the STB has used a composite of the consensus analyst five-year earnings per share ("EPS") forecasts developed by the Institutional Brokers Estimate System ("IBES") to estimate the composite perpetual EPS growth rate, as well as to estimate the dividend yield in the next pay period. Mathematically, the DCF approach used by the STB can be expressed as:

$$k = \{[\text{Div}_0 (1+g/2)] \div P_0\} + g$$

Where:

- k = COE;
- Div_0 = Composite annual average railroad dividends;
- P_0 = Composite annual average railroad stock prices; and
- g = The composite average IBES forecasted five-year EPS growth rate.

The results of the dividend yield portion of the DCF approach ($[\text{Div}_0 (1+g/2)] \div P_0$) have been consistent in past STB railroad cost of capital calculations. Estimates have generally been between

^{3/} Without the use of insider information, a company's expected future dividend can only be estimated. Once a company announces a positive or negative change in its dividend, the price of the underlying equity shifts to reflect the newly acquired information.

1 and 3 percent per year for the past number of years. However, estimates of the railroad industry's perpetual growth rate have exhibited higher variability and have had a greater impact on the STB's COE estimates. For 2005, the AAR determined that the estimated perpetual growth rate based on IBES consensus forecasts is 13.67 percent. When this growth rate is added to the AAR's calculation of the composite average railroad industry dividend yield of 1.52 percent, the COE is estimated to be 15.19 percent.^{4/}

While on the surface the AAR's calculations appear reasonable, the estimate of the COE it produces is actually overstated. The overstatement is due to two primary factors. First, most of the estimates included in the average EPS growth rate were developed by stock analysts whose companies have a vested interest in selling stock and are more likely to forecast optimistic growth rates. Second, a mismatch exists between the estimated growth rate calculated by use of composite IBES five-year forecast and the actual perpetual growth rate the railroad industry can reasonably expect.^{5/} Simply stated, the AAR's use of a 13.67 percent growth rate far exceeds the growth rate any company can expect to achieve into perpetuity.

It is well documented that securities analysts are subject to behavioral biases and that their forecasts tend to be over-optimistic.^{6/} The STB's procedures attempt to adjust for this bias by using a truncated growth rate, which excludes the highest and lowest earnings estimates for each stock

^{4/} See Rockey VS at 13.

^{5/} In addition, the growth rate for small publicly traded companies can also be misstated due to the lack of coverage provided by industry analysts. The size of the railroad industry assures that it receives significant coverage by financial analysts.

^{6/} See *Principles of Corporate Finance*, R.A. Brealey, S.C. Myers, and A.J. Marcus, Eighth Edition, 2006, page 65, and A. Dugar and S. Nathan, *The Effects of Investment Banking Relationships on Financial Analysts' Earnings Investment Recommendations*, *Contemporary Accounting Research* 12 (1995), pp. 131-160.

observation in the study group. Even with the truncation, the remaining estimates can still be considered overly optimistic. As Dr. Shannon P. Pratt, a leading expert in the fields of valuation and cost of capital, observes of using analyst's growth estimates:

Most published analysts' estimates come from "sell-side" stock analysts who work for firms that are in business to sell stocks. Thus, although their earnings forecasts fall within the range of "reasonable" possibilities, they may be on the high end of the range.^{7f}

An even more significant aspect of the overstatement is the mismatch between the IBES five-year consensus forecast of the perpetual growth rate inherent in the DCF approach. It is widely agreed that the Class I railroads included in the AAR's cost of capital calculations are generating record earnings.^{8f} Class I railroads are likely to continue to generate even more earnings in the coming years due to capacity constraints and limited intermodal options.^{9f} This strong pricing power is reflected in the earnings estimates included in the IBES data used to estimate the railroads growth rates.

As indicated above, though, the growth factor included in the DCF approach represents the perpetual growth of railroad earnings. It is unrealistic to assume, as does the AAR in its calculations, that the railroad industry will grow at over 13 percent effectively forever. As indicated by Dr. Shannon P. Pratt:

^{7f} See *Cost of Capital: Estimations and Applications*, S. P. Pratt, Second Edition, 2002, p. 113.

^{8f} See *Uncommon Ground: railroad-shipper relationships are being tested by escalating rates, tight capacity and inadequate service* by John Gallagher, *Traffic World* magazine, March 20, 2006, page 8.

^{9f} One could argue that increasing fuel prices could put a damper on railroad earnings. Railroad fuel surcharge programs have tempered, or eliminated, the impact of fuel price increases, and will even do more so in the future as legacy contracts expire, and the railroads impose common carrier rates subject to fuel surcharge tariffs.

It is theoretically impossible for the sustainable growth rate for a company to significantly exceed the growth rate in the economy. Anything over 6-7% perpetual growth rate should be questioned carefully.^{10/}

Leading practitioners and theorists in the field of financial economics caution against the use of the DCF approach when the industry under study is experiencing high current rates of growth. In the widely used financial text "Principles of Corporate Finance," Drs. Richard A. Brealey, Stewart C. Myers and Alan J. Marcus point to the problem of high growth rates, especially in the railroad industry:

In addition, resist the temptation to apply the [DCF] formula to firms having high current rates of growth. Such growth can rarely be sustained indefinitely, but the constant-growth DCF formula assumes it can. This erroneous assumption leads to an overestimate of [the required rate of return on equity].

One wonders whether the large railroads listed there can really sustain the 11 percent forecasted growth rate.^{11/}

Similarly, Dr. Pratt notes that:

^{10/} See *Cost of Capital: Estimations and Applications*, S. P. Pratt, Second Edition, 2002, p. 113.

^{11/} See *Principles of Corporate Finance*, R.A Brealey, S.C. Myers, and A.J. Marcus, Eighth Edition, 2006, page 69. This citation is especially relevant because one of the authors of the text, Dr. Stewart C. Myers, is a former railroad witness who has previously testified to the proper cost of equity capital in a maximum reasonable rate case. See Myers Reply VS, public version, Volume 4 of 18, Docket No. 42022, FMC Corporation and FMC Wyoming Corporation v. Union Pacific Railroad Company. Also see STB Docket No. 42051, Wisconsin Power and Light Company v. Union Pacific Railroad Company, Decided December 12, 2001, p. 32, n.77.

These earnings growth estimates typically are for only the next two to five years; they are not perpetual. Therefore, any use of these forecasts in a single-stage DCF model must be tempered with a longer-term forecast.^{12/}

It is implausible to assume that the Class I railroads will continue to grow at over 13 percent per year, even with their substantial pricing power. Eventually, railroad profitability will fall due to a slow down in the economy, a change in transportation practices, depletion of opportunities, or the railroads' own greed. The AAR has failed to recognize this fact and incorrectly made the assumption that the railroads will continue to grow at a 13 percent clip (meaning earnings would double every 5.27 years) into perpetuity. As Drs. Brealey, Myers and Marcus astutely point out:

The simple constant-growth rate DCF formula is an extremely useful rule of thumb, but no more than that. Naive trust in the formula has led many financial analysts to silly conclusions.^{13/}

^{12/} See *Cost of Capital: Estimations and Applications*, S. P. Pratt, Second Edition, 2002, p. 113.

^{13/} See *id* at 68.

III. THE CAPM AS AN ALTERNATIVE TO THE DCF APPROACH

What is needed to provide a realistic estimate of the COE is a model that is not significantly impacted by the railroad industry's current record growth. Fortunately such a model exists, the Capital Asset Pricing Model ("CAPM"). The CAPM is part of a larger economic theory known as Capital Market Theory, which seeks to model pricing for risky assets based upon their relative risk. Investors will expect higher returns for higher risk. The Capital Market Theory represents a significant body of work over the past 50 years, and CAPM is a conceptual cornerstone of modern Capital Market Theory.^{14/}

The CAPM calculates a firm's COE by comparing the company's risk profile to that of the market as a whole. Mathematically, the CAPM can be expressed using the following equation:

$$k + r_f + \beta(rp_m) + rp_s$$

Where:

- k = COE;
- r_f = Rate of return available on a risk-free security;
- β = The measure of systematic risk of a stock, relative to the market as a whole;
- rp_m = The general equity risk premium for the market; and
- rp_s = The market risk premium related to company size.

^{14/} The CAPM is also the leading method used to develop the cost of equity amongst financial theorists and practitioners contrary to the AAR's assertions regarding the DCF approach. See Pratt at 70, and Brealy, Myers and Marcus at 306.

The CAPM assumes that investors will be compensated for three factors: 1) For investing their money, which is approximated by the risk free return; 2) For systematic risk of default, which cannot be eliminated through a diversified portfolio and is approximated by the market risk premium; and 3) For unsystematic risk, which depends upon the company's fortunes, as approximated by a company's Beta (β). Each factor is described in more detail below.

The risk-free rate (r_f) refers to a rate of return that is available in the market on an investment that is free of default risk. Normally, since the true risk-free rate is unknown, the yield to maturity on a long-term government security is used as a proxy. This represents a riskless asset because the government can raise taxes to cover the debt it incurs, thereby negating its risk of default.

The systematic risk, the additional return investors expect to receive to compensate for the additional risk associated with investing in equities as opposed to the risk free assets, is represented by the equity risk premium. The equity risk premium can be calculated at any time by comparing the rates of return on the market as whole to the rates of returns offered by long-term government securities. However, over a short-time period, the equity risk premium can greatly fluctuate due to "noise" intrinsic to the market as a whole. To avoid this problem of noisy data, long-term averages of the historic equity risk premium are used. Ibbotson Associates, Inc. ("Ibbotson"), a leading financial consulting firm, publishes a widely used estimate of the market risk premium. Ibbotson calculates its historic average by comparing the arithmetic average total return of the S&P 500 Index to the arithmetic average return of Treasury securities from 1928 to 2005. The Ibbotson calculation

of the equity risk premium is widely considered the best estimate of the equity risk premium available.^{15/}

Unsystematic risk is represented by the Beta (β). Mathematically, Beta is equal to the covariance between a company's stock and the market as a whole divided by the variance of the market as whole ($\beta = \sigma_{(\text{stock,market})} \div \sigma_{(\text{market})}$). The degree of risk represented by the size of the Beta represents three decisions the firm makes. The first decision is the type of business the company is in. For example, the more discretionary its products or services are, the higher the Beta and hence risk. Second is the cost structure of the firm as measured by the company's operating leverage, and third the financial leverage that the firm takes on. The higher the financial leverage, the higher the Beta. With access to historical company stock data, Beta can be calculated through the use of standard ordinary least square regression models. However, Beta information is readily available from reputable third-party sources, including Ibbotson. Ibbotson prepares two primary types of Beta estimates for large, publicly traded companies, levered betas, and the unlevered Beta. The unlevered Beta assumes that a firm's capital structure consists entirely of equity, and that the firm holds no debt. A levered Beta takes into consideration the incremental risk associated with a company's debt.

Finally, in addition to calculating the basic CAPM, financial theorists have determined there to be a "size effect" inherent in the CAPM. Simply stated, smaller companies have greater risks and require higher rates of return, while larger companies are less risky, and require lower rates of return. Ibbotson Associates has for many years separated companies with publicly traded equity into deciles

^{15/} See Pratt at 116.

based on size and calculated the size premium inherent in each decile's cost of equity. Exhibit No. 2 to this verified statement is a copy of Ibbotson's recently released "Risk Premia over Time Report: 2006" which contains updates on company size premiums through the end of 2005. As shown in the Ibbotson report, those companies in the highest decile with market capitalizations of greater than approximately \$16.1 billion have shown a negative size premium of approximately 0.37 percent. In other words, the largest publicly traded companies have, on average, had equity returns 0.37 percent less than that estimated by a straight application of the CAPM. Similarly, those companies with the smallest market capitalizations (less than \$169 million) have shown size premiums of upwards of 9.8 percent. Therefore, any calculation of the COE using the CAPM should take into consideration the relative size of the firms.

IV. RAILROAD INDUSTRY COE USING THE CAPM

Using publicly available U.S. government security information and Ibbotson beta and risk premium information, I have calculated the 2005 composite COE for the railroad industry using the CAPM. The determination of the data to include in the CAPM and its application are discussed below.

The first required component in the CAPM is an estimate of the 2005 risk-free rate of return. As mentioned previously, consensus amongst financial analysts today is to use long term government securities as a proxy for the risk-free rate of return.^{16/} I used the 2005 average 20-year U.S. Treasury yield to maturity as the risk-free rate when developing the COE under the CAPM. To be consistent with the STB's cost of capital calculations, the average was developed on a monthly basis. Based on this approach, as shown in Exhibit No. 3, the 2005 risk-free rate was found to be 4.65%.

To measure unsystematic risk, I obtained from Ibbotson its 2005 estimates for the unlevered Beta for the four U.S. based Class I railroads included in the AAR's cost of capital analysis, UP, BNSF, CSXT and NS.^{17/} A railroad industry weighted average unlevered Beta was calculated using the average market value of common equity of each of the four railroads included in the study group as the weighting factor. As shown in Table 1 below and also in Exhibit No. 4 to this Verified Statement, the railroad industry composite unlevered Beta was determined to be 0.56 in 2005.

^{16/} The estimated risk-free rate using long-term U.S. government securities actually has one element of risk: maturity or interest risk. This is the risk that the value of the bond will fluctuate with changes in general level of interest rates. It is generally agreed though that, even with this risk, long-term government securities remain the best proxy.

^{17/} Ibbotson's company specific Beta estimates were released in March, 2006 and reflect company specific information through December, 2005.

Table 1 <u>2005 Railroad Industry Unlevered Beta</u>			
Company (1)	Unlevered Beta (2)	Railroad Weights (3)	Weighted Average ^{1/} (4)
1. Burlington Northern Santa Fe Corporation	0.53	32.20%	0.171
2. CSX Corporation	0.59	14.95%	0.088
3. Norfolk Southern Corporation	0.70	24.56%	0.172
4. Union Pacific Corporation	<u>0.46</u>	<u>28.29%</u>	<u>0.130</u>
5. Railroad Industry Unlevered Beta ^{2/}	---	---	0.56
^{1/} Column (2) x Column (3). ^{2/} Sum of Column (4). Source: Exhibit No. 4.			

As shown in Table 1 above, the railroad industry composite unlevered Beta equaled 0.56 in 2005. I next adjusted the composite unlevered Beta by the weighted average 2005 railroad debt to equity ratio to yield a levered Beta, which takes into consideration the risk implicit in the railroad industry COE from the railroad industry's debt load. Table 2 below and Exhibit No. 5 summarize the calculation of the railroad industry composite average levered Beta.

Table 2
2005 Railroad Industry Levered Beta

Item (1)	Amount (2)
1. 2005 Railroad Industry Debt to Equity Ratio	
a. Debt portion of Capital Structure	30.4%
b. Equity portion of Capital Structure	<u>69.6%</u>
c. Debt/Equity Ratio ^{1/}	0.44
2. Railroad Industry 2005 Unlevered Beta	<u>0.56</u>
3. Railroad Industry 2005 Levered Beta ^{2/}	0.81
 ^{1/} Line 1a ÷ Line 1b.	
^{2/} (1 + Line 1c) x Line 2.	
Source: Exhibit No. 5.	

As shown in Table 2 above, the railroad industry composite average leveraged Beta equaled 0.81 in 2005.^{18/}

Next, I obtained risk premium information that reflected market data through the end of 2005 from Ibbotson to finalize the calculation of the COE. Ibbotson's most current estimate of the long-term equity risk premium is 7.1 percent, which reflects stock and interest rates through 2005. In addition, the size premium of the railroad industry was also considered. As mentioned previously, financial analysts believe that company size impacts the relative risks of equities. The four carriers in the 2005 study have relatively large market capitalizations and therefore can be expected to have

^{18/} Normally, levered Betas are calculated by multiplying the unlevered Beta by one plus the company's debt to equity ratio times one less the company's effective tax rate ($\beta_{\text{levered}} = \beta_{\text{unlevered}} \times (1 + [(Debt \div Equity) \times (1 - \text{tax rate})])$). Because the STB does not consider the tax-shielding effects of a company's tax rate in its Cost of Capital determination, the impact of tax rates was excluded from the leveraged Beta calculation.

relatively low risk relative to smaller companies, all other factors being equal. Ibbotson has calculated separate size premiums through 2005 for each decile of companies' market capitalization. The two largest carriers of the group, UP and BNSF, are in the top decile of the market based on their equity capitalization. These two were found to have a market size premium of negative 0.37%. The other two railroads, NS and CSXT, are in the second decile and have a size premium of 0.67%. By weighting the size premiums by the four railroads' market capitalizations, a composite railroad industry size premium was determined to be 0.04% as shown in Table 3 below and Exhibit No. 6.

Company (1)	2005 Average Market Capitalization (2)	Capitalization Decile Rank (3)	Size Premium (4)	Railroad Weights (5)	Weighted Average ^{1/} (6)
1. Burlington Northern Santa Fe Corporation	\$20,253,925,358	1	-0.37%	32.20%	-0.0012
2. CSX Corporation	9,402,561,373	2	0.67%	14.95%	0.0010
3. Norfolk Southern Corporation	15,449,669,248	2	0.67%	24.56%	0.0016
4. Union Pacific Corporation	<u>17,792,912,666</u>	<u>1</u>	<u>-0.37%</u>	<u>28.29%</u>	<u>-0.0010</u>
5. 2005 Railroad Industry Size Premium ^{2/}	---	---	---	---	0.04%

1/ Column (4) x Column (5).
2/ Sum of Column (6).
Source: Exhibit No. 6.

Having developed a proxy of the risk-free rate, calculated the railroad industry composite levered Beta and composite size premium and obtained current estimates of the equity risk premium, I combined the data to develop the COE using the CAPM.

Table 4
2005 Railroad Industry Cost of Equity

<u>Item</u> (1)	<u>Amount</u> (2)
1. 2005 Average Risk Free Rate	4.65%
2. Railroad Risk Premium	
a. 2005 Equity Risk Premium	7.10%
b. 2005 Railroad Industry Levered Beta	<u>0.81</u>
c. 2005 Railroad Industry Risk Premium ^{1/}	5.72%
3. 2005 Railroad Industry Size Premium	0.04%
4. 2005 Railroad Industry Cost of Equity ^{2/}	10.41%

^{1/} Line 2a x Line 2b.

^{2/} Line 1 + Line 2c + Line 3.

Source: Exhibit No. 7.

As shown in Table 4 above and Exhibit No. 7, when the data is combined, the 2005 composite railroad industry COE equals 10.41 percent.

V. 2005 COST OF CAPITAL

To develop the 2005 Cost of Capital, I utilized the same approach as used by the AAR for all but the COE calculation. For COE, I substituted the CAPM results of 10.41 percent for the overstated 15.10 percent COE estimated by the AAR using the DCF approach. The other components of the AAR's cost of capital remained the same, including a composite railroad industry capital structure of 69.6 percent common equity, 30.4 percent debt and 0.0 percent preferred equity, and a railroad industry cost of debt of 5.36.^{19/}

Table 5 <u>2005 Railroad Industry Weighted Cost of Capital</u>	
<u>Item</u> (1)	<u>Amount</u> (2)
1. 2005 Weighted cost of Equity	
a. 2005 Railroad Industry Cost of Equity	10.42%
b. Equity portion of Capital Structure	<u>69.60%</u>
c. 2005 Weighted Cost of Railroad Industry Equity ^{1/}	7.24%
2. 2005 Weighted Cost of Debt	
a. 2005 Railroad Industry Cost of Debt	5.36%
b. Debt portion of Capital Structure	<u>30.40%</u>
c. 2005 Weighted cost of Railroad Industry Debt	1.63%
3. 2005 Railroad Industry Weighted Cost of Capital ^{2/}	8.87%
^{1/} Line 1a x Line 1b.	
^{2/} Line 1c + Line 2c.	
See Exhibit No. 8.	

Based on these parameters and the CAPM determined COE of 10.42 percent, the 2005 railroad industry weighted average cost of capital equals 8.87 percent as shown in Table 5 above and Exhibit No. 8.

^{19/} See Rockey VS at 28.

VERIFICATION

COMMONWEALTH OF VIRGINIA)
)
CITY OF ALEXANDRIA)

I, THOMAS D. CROWLEY, verify under penalty of perjury that I have read the foregoing Verified Statement of Thomas D. Crowley, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.


Thomas D. Crowley

Sworn to and subscribed before me
this day of April 27, 2006

Anthony V. Evanshaw
Anthony V. Evanshaw III
Notary Public for the State of Virginia

My Commission expires: September 30, 2007

STATEMENT OF QUALIFICATIONS

My name is Thomas D. Crowley. I am an economist and President of the economic consulting firm of L. E. Peabody & Associates, Inc. The firm's offices are located at 1501 Duke Street, Suite 200, Alexandria, Virginia 22314 and 5901 N. Cicero Avenue, Suite 504, Chicago, Illinois 60646.

I am a graduate of the University of Maine from which I obtained a Bachelor of Science degree in Economics. I have also taken graduate courses in transportation at George Washington University in Washington, D.C. I spent three years in the United States Army and since February 1971 have been employed by L. E. Peabody & Associates, Inc.

I am a member of the American Economic Association, the Transportation Research Forum, and the American Railway Engineering and Maintenance-of-Way Association.

The firm of L. E. Peabody & Associates, Inc. specializes in solving economic, marketing and transportation problems. As an economic consultant, I have organized and directed economic studies and prepared reports for railroads, freight forwarders and other carriers, for shippers, for associations and for state governments and other public bodies dealing with transportation and related economic problems. Examples of studies I have participated in include organizing and directing traffic, operational and cost analyses in connection with multiple car movements, unit train operations for coal and other commodities, freight forwarder facilities, TOFC/COFC rail facilities, divisions of through rail rates, operating commuter passenger service, and other studies dealing with markets and the transportation by different modes of various commodities from both eastern and western origins to various destinations in the United States. The nature of these

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studies enabled me to become familiar with the operating practices and accounting procedures utilized by railroads in the normal course of business.

Additionally, I have inspected and studied both railroad terminal and line-haul facilities used in handling various commodities, and in particular unit train coal movements from the Powder River Basin to various utility destinations in the midwestern and western portions of the United States. These operational reviews and studies were used as a basis for the determination of the traffic and operating characteristics for specific movements of coal, both inbound raw materials and outbound paper products to and from paper mills, crude and pelletized iron ore, crushed stone, soda ash, aluminum, fresh fruits and vegetables, TOFC/COFC traffic and numerous other commodities handled by rail.

I have frequently been called upon to develop and coordinate economic and operational studies relative to the acquisition of coal and the rail transportation of coal on behalf of electric utility companies. My responsibilities in these undertakings included the analyses of rail routes, rail operations and an assessment of the relative efficiency and costs of railroad operations over those routes. I have also analyzed and made recommendations regarding the acquisition of railcars according to the specific needs of various coal shippers. The results of these analyses have been employed in order to assist shippers in the development and negotiation of rail transportation contracts which optimize operational efficiency and cost effectiveness.

STATEMENT OF QUALIFICATIONS

I have presented evidence before the Interstate Commerce Commission ("ICC") in Ex Parte No. 347 (Sub-No. 1), Coal Rate Guidelines - Nationwide which is the proceeding that established the methodology for developing a maximum rail rate based on stand-alone costs. I have submitted evidence applying the ICC's stand-alone cost procedures in every proceeding before the ICC and its successor the Surface Transportation Board ("STB").^{1/}

^{1/} ICC Docket No. 36180, San Antonio, Texas, Acting By and Through Its City Public Service Board v. Burlington Northern Railroad Company, et al.; ICC Docket No. 37029, Iowa Public Service Company v. Burlington Northern, Inc.; ICC Docket No. 37038, Bituminous Coal - Hiawatha, Utah to Moapa, Nevada; ICC Docket No. 37437, Arizona Electric Power Cooperative, Inc. v. The Atchison, Topeka and Santa Fe Railway Company, et al.; ICC Docket No. 37809, McCarthy Farms, Inc. et al. v. Burlington Northern, Inc.; ICC Docket No. 38025S, The Dayton Power and Light Company v. Louisville and Nashville Railroad Company; ICC Docket No. 38301S, Coal Trading Corporation v. Baltimore & Ohio Railroad, et al.; ICC Docket No. 38301S (Sub-No. 1), Westmoreland Coal Sales Company v. Denver and Rio Grande Western Railroad Company, et al.; ICC Docket No. 38783, Omaha Public Power District v. Burlington Northern Railroad Company; ICC Docket No. 39002, Utility Fuels Inc. v. The Burlington Northern Railroad Company, et al.; ICC Docket No. 39386, The Kansas Power and Light Company v. Burlington Northern Railroad Company and Union Pacific Railroad Company; ICC Docket No. 40155, Lower Colorado River Authority and City of Austin, Texas v. Missouri-Kansas-Texas Railroad Company; ICC Docket No. 40224, Iowa Power and Light Company v. Burlington Northern Railroad Company; ICC Docket No. 41528, Kansas City Power & Light Company v. Missouri Pacific Railroad Company; ICC Docket No. 41685, CF Industries, Inc. v. Koch Pipeline, L.P.; STB No. 41185, Arizona Public Service Company and PacifiCorp v. The Atchison, Topeka And Santa Fe Railway Company; STB Docket No. 41191, West Texas Utilities Company v. Burlington Northern Railroad Company; STB Docket No. 41295, Pennsylvania Power & Light Company v. Consolidated Rail Corporation, CSX Transportation Inc. and Norfolk Southern Railway Company; STB Docket No. 41989, Potomac Electric Power Company v. CSX Transportation Inc.; STB Docket No. 42006, Omaha Public Power District v. Union Pacific Railroad Company; STB Docket No. 42012, Sierra Pacific Power Company, Idaho Power Company v. Union Pacific Railroad Company; STB Docket No. 42022, FMC Wyoming Corporation and FMC Corporation v. Union Pacific Railroad Company; STB Docket No. 42051, Wisconsin Power and Light Company v. Union Pacific Railroad Company; STB Docket No. 42054, PPL Montana LLC v. The Burlington Northern and Santa Fe Railway Company; STB Docket No. 42056, Texas Municipal Power Agency v. The Burlington Northern and Santa Fe Railway Company; STB Docket No. 42057, Public Service Company of Colorado D/B/A Xcel Energy v. The Burlington Northern and Santa Fe Railway Company; STB Docket No. 42058, Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company; STB Docket No. 42069, Duke Energy Corporation v. Norfolk Southern Railway Company; STB Docket No. 42070, Duke Energy Corporation v. CSX Transportation, Inc.; STB Docket No. 42071, Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company; STB Docket No. 42072, Carolina Power & Light Company v. Norfolk Southern Railway Company; STB Docket No. 42077, Arizona Public Service Company & PacifiCorp v. The Burlington Northern and Santa Fe Railway Company; STB Docket No. 41191 (Sub-No. 1), AEP Texas North Company v. BNSF Railway Company; STB Docket No. 42088, Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company.

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Moreover, I have developed numerous variable cost calculations utilizing the various formulas employed by the ICC/STB for the development of variable costs for common carriers, with particular emphasis on the basis and use of Rail Form A and its replacement costing formula the Uniform Railroad Costing System ("URCS"). I have utilized Rail Form A/URCS costing principles since the beginning of my career with L. E. Peabody & Associates Inc. in 1971.

I have frequently presented both oral and written testimony before the Interstate Commerce Commission, Surface Transportation Board, Federal Energy Regulatory Commission, Railroad Accounting Principles Board, Postal Rate Commission and numerous state regulatory commissions, federal courts and state courts. This testimony was generally related to the development of variable cost of service calculations, rail traffic and operating patterns, fuel supply economics, contract interpretations, economic principles concerning the maximum level of rates, implementation of maximum rate principles, and calculation of reparations or damages, including interest. I presented testimony before the Congress of the United States, Committee on Transportation and Infrastructure on the status of rail competition in the western United States. I have also presented testimony in a number of court and arbitration proceedings concerning the level of rates, rate adjustment procedures, rail operating procedures and other economic components of specific contracts.

Since the implementation of the Staggers Rail Act of 1980, which clarified that rail carriers could enter into transportation contracts with shippers, I have been actively involved in negotiating transportation contracts on behalf of coal shippers. Specifically, I have advised utilities

STATEMENT OF QUALIFICATIONS

concerning coal transportation rates based on market conditions and carrier competition, movement specific service commitments, specific cost-based rate adjustment provisions, contract reopeners that recognize changes in productivity and cost-based ancillary charges.

I have been actively engaged in negotiating coal supply contracts for various users throughout the United States. In addition, I have analyzed the economic impact of buying out, brokering, and modifying existing coal supply agreements. My coal supply assignments have encompassed analyzing alternative coals to determine the impact on the delivered price of operating and maintenance costs, unloading costs, shrinkage factor and by-product savings.

I have developed different economic analyses for over sixty (60) electric utility companies located in all parts of the United States, and for major associations, including American Paper Institute, American Petroleum Institute, Chemical Manufacturers Association, Coal Exporters Association, Edison Electric Institute, Mail Order Association of America, National Coal Association, National Industrial Transportation League, the Fertilizer Institute and Western Coal Traffic League. In addition, I have assisted numerous government agencies, major industries and major railroad companies in solving various economic problems.

I have participated in various proceedings involved with the division of through rail rates. For example, I participated in ICC Docket No. 35585, Akron, Canton & Youngstown Railroad Company, et al. v. Aberdeen and Rockfish Railroad Company, et al. which was a complaint filed by the northern and midwestern rail lines to change the primary north-south divisions. I was personally involved in all traffic, operating and cost aspects of this proceeding on behalf of the

STATEMENT OF QUALIFICATIONS

northern and midwestern rail lines. I was the lead witness on behalf of the Long Island Rail Road in ICC Docket No. 36874, Notice of Intent to File Division Complaint by the Long Island Rail Road Company.

ibbotson**Risk Premia over
Time Report: 2006**Estimates for 1926-2005

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Introduction

This report contains data that summarizes the results of the capital markets for 2005 and current variables used to estimate the cost of capital. In addition, Tables A-1 through A-6 allow you to estimate any of these variables for any time period, 1926-2005. Each table consists of six pages and cover:

- Long-horizon equity risk premia
- Intermediate-horizon equity risk premia
- Short-horizon equity risk premia
- Mid-cap size premia
- Low-cap size premia
- Micro-cap size premia

Reading the Tables

The top row of each table indicates the starting year and the left column indicates the ending year. To find any statistic for a given time period, find the intersection of start and end dates. Please note that we have constrained the beta and size premia tables to contain data only for five-year periods or longer. Again, each table consists of six pages of data.

Description of Data

Long-horizon equity risk premia: large company stock total returns minus long-term government bond income returns¹

Intermediate-horizon equity risk premia: large company stock total returns minus intermediate-term government bond income returns¹

Short-horizon equity risk premia: large company stock total returns minus U.S. Treasury bill total returns^{1,2}

Mid-cap equity size premia: returns in excess of those predicted by beta for the portfolio of stocks represented by the 3-5 deciles of the New York Stock Exchange, American Stock Exchange, and Nasdaq National Market, current capitalization between \$1,729 and \$7,187 million

Low-cap equity size premia: returns in excess of those predicted by beta for the portfolio of stocks represented by the 6-8 deciles of the New York Stock Exchange, American Stock Exchange, and Nasdaq National Market, current capitalization between \$586 and \$1,729 million

Micro-cap equity size premia: returns in excess of those predicted by beta for the portfolio of stocks represented by the 9-10 deciles of the New York Stock Exchange, American Stock Exchange, and Nasdaq National Market, current capitalization below \$586 million

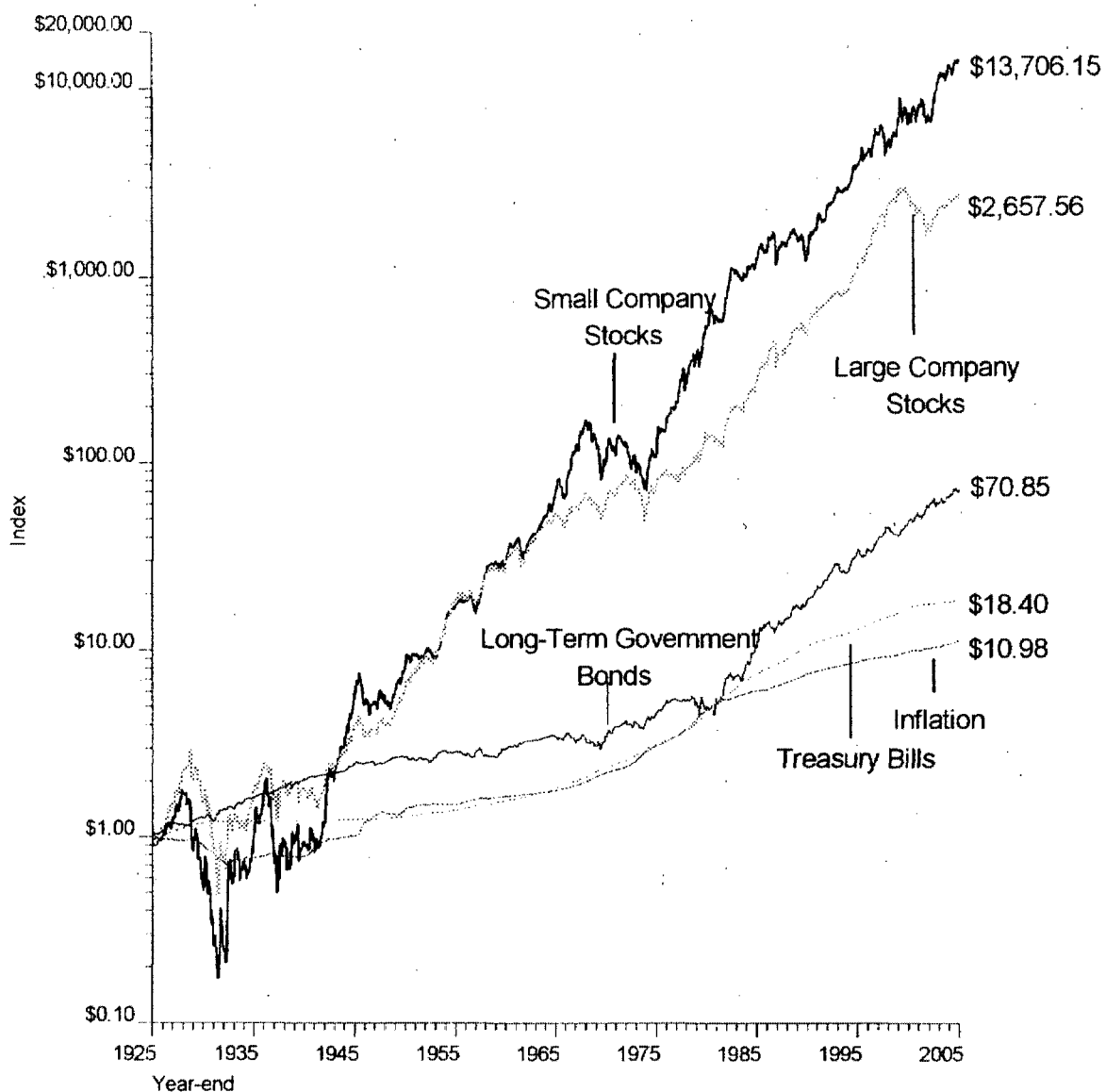
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¹ Expected risk premia are based on the differences of historical annual arithmetic mean return over the period selected.

² For U.S. Treasury bills, the income return and total return are the same.

Graph 1 **Wealth Indices of Investments**
In the U.S. Capital Markets
(Year-end 1925 = \$1.00)

December 31, 1925 to
December 30, 2005



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Table 1 **Total Returns, Income Returns
and Capital Appreciation**

Summary Statistics of
Annual Returns

From 1926 to 2005

Series	Geometric Mean	Arithmetic Mean	Standard Deviation
Large Company Stocks			
Total Returns	10.4	12.3	20.2
Income	4.2	4.2	1.5
Capital Appreciation	5.9	7.8	19.5
Ibbotson Small Company Stocks			
Total Returns	12.6	17.4	32.9
Mid-Cap Stocks*			
Total Returns	11.4	14.2	24.7
Income	4.1	4.1	1.7
Capital Appreciation	7.1	9.8	24.1
Low-Cap Stocks*			
Total Returns	11.7	15.7	29.5
Income	3.7	3.7	2.0
Capital Appreciation	7.9	11.7	28.9
Micro-Cap Stocks*			
Total Returns	12.7	18.8	39.2
Income	2.6	2.6	1.8
Capital Appreciation	10.1	16.1	38.6
Long-Term Corporate Bonds			
Total Returns	5.9	6.2	8.5
Long-Term Government Bonds			
Total Returns	5.5	5.8	9.2
Income	5.2	5.2	2.7
Capital Appreciation	0.1	0.4	8.1
Intermediate-Term Government Bonds			
Total Returns	5.3	5.5	5.7
Income	4.7	4.8	2.9
Capital Appreciation	0.4	0.5	4.4
Treasury Bills			
Total Returns	3.7	3.8	3.1
Inflation	3.0	3.1	4.3

Total return is equal to the sum of income return, capital appreciation return, and reinvestment return.

*Source: Center for Research in Security Prices, University of Chicago.

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**Table 2 Key Variables in Estimating
the Cost of Capital**

(As of Year-end 2005)

				Value
Yields (Riskless Rates)³				
Long-Term (20-year) U.S. Treasury Coupon Bond Yield				4.6%
Equity Risk Premium⁴				
Long-horizon expected equity risk premium (historical): large company stock total returns minus long-term government bond income returns				7.1%
Long-horizon expected equity risk premium (supply side): historical equity risk premium minus price-to-earnings ratio calculated using three-year average earnings				6.3%
Size Premium⁵				
Decile	Market Capitalization of Smallest Company (in millions)		Market Capitalization of Largest Company (in millions)	Size Premium (Return in Excess of CAPM)
Mid-Cap, 3-5	\$1,729,364	-	\$7,187,244	1.02%
Low-Cap, 6-8	\$587,243	-	\$1,728,888	1.81%
Micro-Cap, 9-10	\$1,079	-	\$586,393	3.95%
Breakdown of Deciles 1-10				
1-Largest	\$16,091,015	-	\$367,495,144	-0.37%
2	\$7,189,887	-	\$16,016,450	0.67%
3	\$3,968,998	-	\$7,187,244	0.85%
4	\$2,525,472	-	\$3,961,425	1.10%
5	\$1,729,364	-	\$2,519,280	1.49%
6	\$1,282,276	-	\$1,728,888	1.73%
7	\$872,443	-	\$1,280,966	1.67%
8	\$587,243	-	\$872,103	2.33%
9	\$265,056	-	\$586,393	2.76%
10-Smallest	\$1,079	-	\$264,981	6.36%
Breakdown of the 10th Decile				
10a	\$169,245	-	\$264,981	4.39%
10b-Smallest	\$1,079	-	\$169,195	9.83%

³ As of December 31, 2005. Maturity is approximate.

⁴ See Chapter 5 of Ibbotson's *S&P Valuation Edition Yearbook* for complete methodology.

⁵ Expected return in excess of that predicted by the capital asset pricing model, also known as the beta-adjusted size premium. Underlying data provided by CRSP, the Center for Research in Security Prices. See Chapter 7 of Ibbotson's *S&P Valuation Edition Yearbook* for methodology.

Table A-1 (Page 1 of 6)

Long-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926	7.9																				
1927	21.0	34.1																			
1928	27.5	37.2	40.4																		
1929	17.6	20.9	14.3	-11.9																	
1930	8.5	8.6	0.1	-20.1	-28.2																
1931	-0.7	-2.5	-11.6	-28.9	-37.4	-46.7															
1932	-2.3	-4.0	-11.7	-24.7	-28.9	-29.3	-11.9														
1933	4.3	3.8	-1.2	-9.6	-9.0	-2.6	19.5	50.9													
1934	3.3	2.8	-1.7	-8.7	-8.1	-3.1	11.5	23.1	-4.6												
1935	7.5	7.4	4.1	-1.1	0.7	6.5	19.8	30.4	20.1	44.9											
1936	9.6	9.8	7.1	3.0	5.1	10.6	22.1	30.6	23.8	38.0	31.1										
1937	5.7	5.5	2.6	-1.6	-0.3	3.7	12.1	16.9	8.4	12.8	-3.3	-37.7									
1938	7.4	7.4	5.0	1.4	2.9	6.8	14.5	18.8	12.4	16.7	7.3	-4.6	28.5								
1939	6.7	6.6	4.3	1.1	2.3	5.7	12.3	15.7	9.9	12.8	4.8	-4.0	12.8	-2.8							
1940	5.5	5.3	3.1	0.0	1.0	4.0	9.6	12.3	6.8	8.7	1.4	-6.0	4.6	-7.4	-12.0						
1941	4.3	4.0	1.9	-1.1	-0.2	2.4	7.3	9.4	4.2	5.5	-1.1	-7.5	0.0	-9.5	-12.8	-13.5					
1942	5.1	4.9	3.0	0.3	1.2	3.7	8.2	10.3	5.7	7.0	1.6	-3.3	3.6	-2.6	-2.6	2.2	17.9				
1943	6.1	6.0	4.2	1.8	2.8	5.2	9.5	11.5	7.5	8.9	4.4	0.5	6.9	2.6	3.9	9.3	20.7	23.5			
1944	6.7	6.6	5.0	2.8	3.8	6.1	10.1	11.9	8.4	9.7	5.8	2.6	8.4	5.0	6.6	11.3	19.5	20.4	17.3		
1945	8.1	8.1	6.6	4.6	5.7	7.9	11.8	13.6	10.5	11.9	8.6	6.1	11.6	9.2	11.2	15.8	23.2	24.9	25.7	34.1	
1946	7.2	7.2	5.7	3.8	4.7	6.8	10.4	12.0	9.0	10.1	6.9	4.5	9.2	6.8	8.2	11.5	16.5	16.2	13.8	12.0	
1947	7.0	7.0	5.6	3.8	4.7	6.6	9.9	11.4	8.6	9.6	6.6	4.4	8.6	6.4	7.6	10.4	14.4	13.7	11.2	9.2	
1948	6.9	6.8	5.5	3.8	4.6	6.4	9.5	10.9	8.2	9.1	6.4	4.3	8.1	6.1	7.1	9.5	12.8	11.9	9.6	7.7	
1949	7.3	7.2	6.0	4.4	5.2	6.9	9.8	11.2	8.7	9.6	7.1	5.3	8.8	7.0	8.0	10.3	13.2	12.6	10.7	9.4	
1950	8.2	8.2	7.0	5.5	6.4	8.1	11.0	12.2	10.0	10.9	8.6	7.0	10.4	8.9	10.0	12.2	15.0	14.7	13.4	12.8	
1951	8.7	8.7	7.6	6.2	7.0	8.7	11.5	12.7	10.6	11.5	9.4	8.0	11.2	9.9	11.0	13.0	15.7	15.5	14.5	14.1	
1952	8.9	9.0	8.0	6.6	7.4	9.0	11.7	12.9	10.9	11.7	9.8	8.5	11.5	10.3	11.3	13.3	15.7	15.5	14.6	14.3	
1953	8.5	8.5	7.5	6.2	7.0	8.5	11.0	12.1	10.1	10.9	9.0	7.7	10.6	9.4	10.2	12.0	14.1	13.7	12.8	12.3	
1954	9.9	10.0	9.1	7.9	8.7	10.2	12.7	13.8	12.0	12.9	11.2	10.1	12.9	11.9	12.9	14.7	16.8	16.7	16.1	16.0	
1955	10.5	10.6	9.8	8.7	9.4	10.9	13.4	14.4	12.8	13.6	12.1	11.1	13.8	12.9	13.9	15.6	17.7	17.7	17.2	17.2	
1956	10.3	10.4	9.6	8.5	9.2	10.7	13.0	14.0	12.4	13.2	11.7	10.7	13.2	12.4	13.3	14.9	16.7	16.7	16.1	16.0	
1957	9.5	9.6	8.8	7.7	8.4	9.7	11.9	12.9	11.3	12.0	10.5	9.5	11.9	11.0	11.7	13.1	14.8	14.6	14.0	13.7	
1958	10.5	10.5	9.8	8.8	9.5	10.8	13.0	13.9	12.4	13.1	11.8	10.9	13.2	12.4	13.2	14.6	16.3	16.2	15.7	15.6	
1959	10.4	10.5	9.7	8.7	9.4	10.7	12.8	13.7	12.3	12.9	11.6	10.8	13.0	12.2	13.0	14.3	15.8	15.7	15.2	15.1	
1960	10.0	10.0	9.3	8.4	9.0	10.2	12.2	13.1	11.7	12.3	11.0	10.2	12.2	11.5	12.2	13.4	14.8	14.6	14.1	13.9	
1961	10.4	10.4	9.7	8.8	9.4	10.7	12.6	13.4	12.1	12.7	11.5	10.7	12.7	12.0	12.7	13.8	15.2	15.1	14.6	14.4	
1962	9.7	9.8	9.1	8.2	8.8	9.9	11.8	12.5	11.2	11.8	10.6	9.8	11.7	11.0	11.6	12.6	13.9	13.7	13.2	12.9	
1963	10.0	10.0	9.4	8.5	9.1	10.2	12.0	12.7	11.5	12.0	10.9	10.1	11.9	11.3	11.9	12.9	14.1	13.9	13.5	13.3	
1964	10.0	10.1	9.4	8.6	9.2	10.3	12.0	12.7	11.5	12.0	10.9	10.2	12.0	11.3	11.9	12.9	14.0	13.9	13.4	13.2	
1965	10.0	10.0	9.4	8.6	9.1	10.2	11.9	12.6	11.4	11.9	10.8	10.1	11.8	11.2	11.7	12.7	13.8	13.6	13.2	13.0	
1966	9.4	9.4	8.8	8.0	8.5	9.5	11.1	11.8	10.6	11.1	10.0	9.3	10.9	10.3	10.8	11.7	12.7	12.4	12.0	11.7	
1967	9.6	9.7	9.1	8.3	8.8	9.8	11.4	12.0	10.9	11.3	10.3	9.6	11.2	10.6	11.1	11.9	12.9	12.7	12.3	12.1	
1968	9.5	9.6	9.0	8.2	8.7	9.7	11.2	11.8	10.7	11.2	10.2	9.5	11.0	10.4	10.9	11.7	12.6	12.4	12.0	11.8	
1969	9.0	9.0	8.4	7.6	8.1	9.1	10.5	11.1	10.0	10.4	9.4	8.8	10.2	9.6	10.0	10.8	11.7	11.4	11.0	10.7	
1970	8.7	8.7	8.2	7.4	7.9	8.8	10.2	10.8	9.7	10.1	9.1	8.4	9.8	9.2	9.6	10.4	11.2	10.9	10.5	10.2	

*S&P 500 total returns minus long-term government bond income returns.

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Table A-1 (Page 2 of 6)

Long-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	8.7	8.7	8.2	7.4	7.9	8.7	10.1	10.7	9.6	10.0	9.1	8.4	9.8	9.2	9.6	10.3	11.1	10.8	10.4	10.1
1972	8.8	8.8	8.3	7.5	8.0	8.8	10.2	10.8	9.7	10.1	9.2	8.5	9.9	9.3	9.7	10.4	11.1	10.9	10.5	10.2
1973	8.2	8.2	7.6	6.9	7.3	8.1	9.5	10.0	8.9	9.3	8.4	7.7	9.0	8.5	8.8	9.4	10.1	9.9	9.4	9.2
1974	7.3	7.3	6.7	6.0	6.4	7.2	8.4	8.9	7.9	8.2	7.3	6.7	7.9	7.3	7.6	8.1	8.8	8.5	8.0	7.7
1975	7.8	7.8	7.2	6.5	6.9	7.7	8.9	9.4	8.4	8.7	7.8	7.2	8.4	7.9	8.2	8.7	9.4	9.1	8.7	8.4
1976	7.9	7.9	7.4	6.7	7.1	7.9	9.1	9.6	8.6	8.9	8.0	7.5	8.6	8.1	8.4	8.9	9.6	9.3	8.9	8.7
1977	7.5	7.5	7.0	6.3	6.6	7.4	8.6	9.0	8.1	8.4	7.5	6.9	8.0	7.5	7.8	8.3	8.9	8.7	8.2	8.0
1978	7.3	7.3	6.8	6.1	6.5	7.2	8.4	8.8	7.9	8.1	7.3	6.7	7.8	7.3	7.5	8.1	8.6	8.4	8.0	7.7
1979	7.4	7.4	6.8	6.2	6.5	7.3	8.4	8.8	7.9	8.2	7.3	6.8	7.8	7.3	7.6	8.1	8.7	8.4	8.0	7.7
1980	7.6	7.6	7.1	6.5	6.9	7.6	8.7	9.1	8.2	8.5	7.7	7.1	8.2	7.7	8.0	8.5	9.0	8.8	8.4	8.1
1981	7.2	7.2	6.7	6.1	6.4	7.1	8.2	8.6	7.7	8.0	7.2	6.6	7.6	7.1	7.4	7.9	8.4	8.1	7.7	7.5
1982	7.2	7.2	6.7	6.1	6.4	7.1	8.2	8.6	7.7	8.0	7.2	6.6	7.6	7.2	7.4	7.9	8.4	8.1	7.7	7.5
1983	7.3	7.3	6.8	6.2	6.5	7.2	8.2	8.6	7.8	8.0	7.3	6.8	7.7	7.3	7.5	8.0	8.5	8.2	7.9	7.6
1984	7.1	7.1	6.6	6.0	6.3	7.0	8.0	8.4	7.5	7.8	7.0	6.5	7.5	7.0	7.2	7.6	8.1	7.9	7.5	7.3
1985	7.3	7.3	6.9	6.3	6.6	7.2	8.2	8.6	7.8	8.0	7.3	6.8	7.7	7.3	7.5	7.9	8.4	8.2	7.8	7.6
1986	7.4	7.3	6.9	6.3	6.6	7.3	8.2	8.6	7.8	8.1	7.3	6.9	7.8	7.3	7.6	8.0	8.5	8.2	7.9	7.7
1987	7.2	7.2	6.7	6.2	6.5	7.1	8.0	8.4	7.6	7.9	7.1	6.7	7.6	7.1	7.3	7.7	8.2	8.0	7.6	7.4
1988	7.2	7.2	6.8	6.2	6.5	7.1	8.0	8.4	7.6	7.9	7.2	6.7	7.6	7.1	7.3	7.8	8.2	8.0	7.7	7.4
1989	7.4	7.4	7.0	6.5	6.8	7.4	8.3	8.6	7.9	8.1	7.4	7.0	7.9	7.4	7.7	8.1	8.5	8.3	8.0	7.8
1990	7.2	7.1	6.7	6.2	6.5	7.1	8.0	8.3	7.6	7.8	7.1	6.7	7.5	7.1	7.3	7.7	8.1	7.9	7.6	7.4
1991	7.4	7.4	7.0	6.4	6.7	7.3	8.2	8.5	7.8	8.0	7.4	6.9	7.8	7.4	7.6	8.0	8.4	8.2	7.9	7.7
1992	7.3	7.3	6.9	6.3	6.6	7.2	8.1	8.4	7.7	7.9	7.3	6.8	7.6	7.2	7.4	7.8	8.2	8.0	7.7	7.5
1993	7.2	7.2	6.8	6.3	6.6	7.1	8.0	8.3	7.6	7.8	7.2	6.8	7.5	7.2	7.4	7.7	8.1	7.9	7.6	7.4
1994	7.0	7.0	6.6	6.1	6.4	6.9	7.8	8.1	7.4	7.6	7.0	6.5	7.3	6.9	7.1	7.5	7.9	7.7	7.4	7.2
1995	7.4	7.4	7.0	6.5	6.7	7.3	8.1	8.4	7.8	8.0	7.3	6.9	7.7	7.3	7.5	7.9	8.3	8.1	7.8	7.6
1996	7.5	7.5	7.1	6.6	6.9	7.4	8.3	8.6	7.9	8.1	7.5	7.1	7.9	7.5	7.7	8.0	8.4	8.3	8.0	7.8
1997	7.8	7.8	7.4	6.9	7.2	7.7	8.5	8.9	8.2	8.4	7.8	7.4	8.2	7.8	8.0	8.4	8.8	8.6	8.3	8.2
1998	8.0	8.0	7.6	7.1	7.4	7.9	8.7	9.1	8.4	8.6	8.0	7.7	8.4	8.1	8.3	8.6	9.0	8.8	8.6	8.4
1999	8.1	8.1	7.7	7.3	7.5	8.0	8.8	9.2	8.5	8.7	8.2	7.8	8.5	8.2	8.4	8.7	9.1	9.0	8.7	8.6
2000	7.8	7.8	7.4	6.9	7.2	7.7	8.5	8.8	8.2	8.4	7.8	7.4	8.1	7.8	8.0	8.3	8.7	8.5	8.3	8.1
2001	7.4	7.4	7.1	6.6	6.9	7.4	8.1	8.4	7.8	8.0	7.4	7.1	7.7	7.4	7.6	7.9	8.3	8.1	7.8	7.7
2002	7.0	7.0	6.6	6.1	6.4	6.9	7.6	7.9	7.3	7.5	6.9	6.5	7.2	6.9	7.0	7.3	7.7	7.5	7.2	7.1
2003	7.2	7.2	6.8	6.4	6.6	7.1	7.8	8.1	7.5	7.7	7.1	6.8	7.5	7.1	7.3	7.6	7.9	7.8	7.5	7.3
2004	7.2	7.2	6.8	6.4	6.6	7.1	7.8	8.1	7.5	7.7	7.1	6.8	7.4	7.1	7.3	7.6	7.9	7.7	7.5	7.3
2005	7.1	7.1	6.7	6.3	6.5	7.0	7.7	8.0	7.4	7.6	7.0	6.7	7.3	7.0	7.2	7.5	7.8	7.6	7.4	7.2

*S&P 500 total returns minus long-term government bond income returns.

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Risk Premia Over Time Report 2006

Table A-1 (Page 3 of 6)

Long-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1926	-10.1																				
1947	-3.3	3.6																			
1948	-1.1	3.3	3.1																		
1949	3.3	7.7	9.8	16.5																	
1950	8.5	13.2	16.4	23.1	29.6																
1951	10.7	14.9	17.7	22.6	25.6	21.6															
1952	11.4	15.0	17.3	20.9	22.3	18.7	15.7														
1953	9.5	12.3	13.8	15.9	15.8	11.2	5.9	-3.8													
1954	14.0	17.0	18.9	21.6	22.6	20.8	20.6	23.0	49.8												
1955	15.5	18.3	20.2	22.6	23.6	22.4	22.6	24.9	39.3	28.8											
1956	14.4	16.9	18.3	20.2	20.8	19.3	18.8	19.6	27.4	16.2	3.6										
1957	12.0	14.0	15.1	16.4	16.4	14.5	13.3	12.8	17.0	6.1	-5.3	-14.2									
1958	14.2	16.2	17.3	18.8	19.0	17.7	17.1	17.4	21.6	14.6	9.8	12.9	40.1								
1959	13.7	15.6	16.6	17.8	17.9	16.6	16.0	16.0	19.3	13.2	9.3	11.3	24.0	7.9							
1960	12.6	14.2	15.0	16.0	15.9	14.6	13.8	13.6	16.0	10.4	6.7	7.5	14.7	2.1	-3.8						
1961	13.2	14.8	15.6	16.5	16.5	15.3	14.7	14.6	16.9	12.2	9.4	10.6	16.8	9.1	9.6	23.1					
1962	11.7	13.1	13.7	14.4	14.3	13.0	12.2	11.9	13.6	9.1	6.3	6.7	10.9	3.6	2.2	5.2	-12.7				
1963	12.1	13.4	14.0	14.7	14.6	13.5	12.8	12.5	14.1	10.2	7.9	8.5	12.2	6.7	6.4	9.7	3.1	18.9			
1964	12.1	13.3	13.9	14.6	14.5	13.4	12.7	12.5	14.0	10.4	8.4	9.0	12.3	7.6	7.6	10.4	6.2	15.6	12.3		
1965	11.9	13.1	13.6	14.2	14.1	13.0	12.4	12.2	13.5	10.2	8.3	8.9	11.8	7.7	7.7	10.0	6.7	13.2	10.3	8.3	
1966	10.7	11.7	12.1	12.6	12.4	11.3	10.6	10.3	11.3	8.1	6.3	6.5	8.8	4.9	4.5	5.9	2.4	6.2	2.0	-3.1	
1967	11.1	12.1	12.5	13.0	12.8	11.8	11.2	10.9	11.9	9.0	7.4	7.7	9.9	6.5	6.4	7.8	5.3	8.9	6.4	4.4	
1968	10.8	11.8	12.2	12.6	12.4	11.4	10.8	10.5	11.5	8.8	7.2	7.5	9.5	6.4	6.3	7.5	5.3	8.3	6.2	4.7	
1969	9.8	10.6	10.9	11.3	11.1	10.1	9.4	9.1	9.9	7.2	5.7	5.8	7.5	4.5	4.2	5.1	2.8	5.1	2.8	0.8	
1970	9.3	10.1	10.3	10.7	10.4	9.4	8.8	8.4	9.1	6.6	5.1	5.2	6.7	3.9	3.6	4.3	2.2	4.1	2.0	0.2	
1971	9.2	10.0	10.3	10.6	10.3	9.4	8.8	8.4	9.1	6.7	5.3	5.4	6.8	4.2	3.9	4.6	2.8	4.5	2.7	1.4	
1972	9.4	10.1	10.4	10.7	10.4	9.5	9.0	8.6	9.3	7.0	5.7	5.9	7.2	4.9	4.6	5.3	3.7	5.4	3.9	2.8	
1973	8.3	8.9	9.2	9.4	9.1	8.2	7.6	7.2	7.8	5.5	4.3	4.3	5.5	3.1	2.8	3.3	1.7	3.0	1.4	0.2	
1974	6.8	7.4	7.6	7.7	7.4	6.5	5.8	5.3	5.8	3.6	2.3	2.2	3.1	0.8	0.4	0.7	-1.1	-0.1	-1.8	-3.2	
1975	7.6	8.2	8.3	8.5	8.2	7.4	6.8	6.4	6.8	4.8	3.6	3.6	4.6	2.5	2.2	2.6	1.1	2.2	0.8	-0.3	
1976	7.8	8.4	8.6	8.8	8.5	7.7	7.1	6.8	7.2	5.3	4.2	4.2	5.2	3.3	3.0	3.4	2.1	3.1	1.9	1.1	
1977	7.1	7.7	7.8	8.0	7.7	6.9	6.3	5.9	6.3	4.5	3.3	3.3	4.2	2.3	2.0	2.4	1.1	2.0	0.8	-0.1	
1978	6.9	7.4	7.5	7.7	7.4	6.6	6.0	5.7	6.0	4.2	3.1	3.1	4.0	2.1	1.8	2.2	0.9	1.8	0.6	-0.2	
1979	7.0	7.5	7.6	7.7	7.5	6.7	6.2	5.8	6.2	4.4	3.4	3.4	4.2	2.5	2.2	2.5	1.4	2.2	1.2	0.4	
1980	7.4	7.9	8.1	8.2	7.9	7.2	6.7	6.4	6.8	5.1	4.2	4.2	5.0	3.4	3.2	3.5	2.5	3.4	2.4	1.8	
1981	6.7	7.2	7.3	7.5	7.2	6.5	5.9	5.6	5.9	4.3	3.4	3.4	4.1	2.5	2.3	2.6	1.6	2.3	1.4	0.7	
1982	6.8	7.2	7.3	7.5	7.2	6.5	6.0	5.7	6.0	4.5	3.5	3.5	4.3	2.8	2.5	2.8	1.9	2.6	1.7	1.1	
1983	6.9	7.4	7.5	7.6	7.3	6.7	6.2	5.9	6.2	4.7	3.9	3.9	4.6	3.1	2.9	3.2	2.3	3.0	2.3	1.7	
1984	6.6	7.0	7.1	7.2	7.0	6.3	5.8	5.5	5.8	4.4	3.5	3.5	4.2	2.8	2.6	2.9	2.0	2.7	1.9	1.4	
1985	7.0	7.4	7.5	7.6	7.4	6.7	6.3	6.0	6.3	4.9	4.1	4.1	4.8	3.5	3.3	3.6	2.8	3.5	2.8	2.3	
1986	7.0	7.4	7.5	7.7	7.4	6.8	6.4	6.1	6.4	5.1	4.3	4.3	4.9	3.7	3.5	3.8	3.0	3.7	3.0	2.6	
1987	6.8	7.2	7.3	7.4	7.2	6.6	6.1	5.9	6.1	4.8	4.1	4.1	4.7	3.5	3.3	3.6	2.8	3.5	2.8	2.4	
1988	6.8	7.2	7.3	7.4	7.2	6.6	6.2	5.9	6.2	4.9	4.2	4.2	4.8	3.6	3.5	3.7	3.0	3.6	3.0	2.6	
1989	7.2	7.6	7.7	7.8	7.6	7.0	6.6	6.4	6.6	5.4	4.7	4.8	5.4	4.2	4.1	4.4	3.7	4.3	3.8	3.4	
1990	6.8	7.1	7.2	7.3	7.1	6.5	6.2	5.9	6.2	4.9	4.3	4.3	4.8	3.7	3.6	3.9	3.2	3.8	3.2	2.9	

*S&P 500 total returns minus long-term government bond income returns.

Risk Premia Over Time Report 2006

Table A-1 (Page 4 of 6)

Long-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia for
all historical time periods.

from 1926 to 2005

To the end of	From the beginning of																			
	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1991	7.1	7.5	7.6	7.7	7.5	6.9	6.6	6.3	6.6	5.4	4.8	4.8	5.4	4.3	4.2	4.5	3.8	4.4	3.9	3.6
1992	7.0	7.3	7.4	7.5	7.3	6.8	6.4	6.2	6.4	5.3	4.7	4.7	5.2	4.2	4.1	4.3	3.7	4.3	3.8	3.5
1993	6.9	7.2	7.3	7.4	7.2	6.7	6.3	6.1	6.3	5.2	4.6	4.6	5.2	4.2	4.0	4.3	3.7	4.2	3.7	3.4
1994	6.6	7.0	7.0	7.1	6.9	6.4	6.0	5.8	6.1	5.0	4.3	4.4	4.9	3.9	3.8	4.0	3.4	3.9	3.4	3.1
1995	7.1	7.4	7.5	7.6	7.4	6.9	6.6	6.4	6.6	5.6	5.0	5.0	5.5	4.6	4.5	4.7	4.2	4.7	4.3	4.0
1996	7.3	7.6	7.7	7.8	7.6	7.1	6.8	6.6	6.9	5.8	5.3	5.3	5.8	4.9	4.8	5.1	4.6	5.1	4.7	4.4
1997	7.7	8.0	8.1	8.2	8.0	7.6	7.3	7.1	7.3	6.3	5.8	5.8	6.3	5.5	5.4	5.7	5.2	5.7	5.3	5.1
1998	7.9	8.3	8.4	8.5	8.3	7.9	7.6	7.4	7.7	6.7	6.2	6.2	6.7	5.9	5.9	6.1	5.7	6.2	5.8	5.6
1999	8.1	8.4	8.5	8.6	8.5	8.0	7.7	7.6	7.8	6.9	6.4	6.5	7.0	6.1	6.1	6.4	5.9	6.4	6.1	5.9
2000	7.6	8.0	8.1	8.2	8.0	7.6	7.3	7.1	7.3	6.4	5.9	6.0	6.4	5.6	5.6	5.8	5.4	5.8	5.5	5.3
2001	7.2	7.5	7.6	7.7	7.5	7.1	6.8	6.6	6.8	5.9	5.4	5.4	5.9	5.1	5.0	5.2	4.8	5.2	4.9	4.7
2002	6.6	6.9	6.9	7.0	6.8	6.4	6.1	5.9	6.1	5.2	4.7	4.7	5.1	4.3	4.3	4.5	4.0	4.4	4.0	3.8
2003	6.9	7.2	7.2	7.3	7.2	6.7	6.4	6.3	6.5	5.6	5.1	5.1	5.5	4.8	4.7	4.9	4.5	4.9	4.5	4.3
2004	6.9	7.2	7.2	7.3	7.1	6.7	6.4	6.3	6.5	5.6	5.1	5.1	5.6	4.8	4.7	4.9	4.5	4.9	4.6	4.4
2005	6.8	7.0	7.1	7.2	7.0	6.6	6.3	6.1	6.3	5.5	5.0	5.0	5.4	4.7	4.6	4.8	4.4	4.8	4.5	4.3

*S&P 500 total returns minus long-term government bond income returns.

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Risk Premia Over Time Report 2006

Table A-1 (Page 5 of 6)

Long-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966	-14.6																				
1967	2.4	19.4																			
1968	3.5	12.5	5.6																		
1969	-1.0	3.5	-4.4	-14.5																	
1970	-1.4	1.9	-3.9	-8.6	-2.7																
1971	0.2	3.2	-0.9	-3.1	2.6	8.0															
1972	2.0	4.8	1.9	1.0	6.1	10.6	13.1														
1973	-0.9	1.1	-1.9	-3.5	-0.7	0.0	-4.0	-21.2													
1974	-4.5	-3.3	-6.5	-8.5	-7.3	-8.5	-13.9	-27.5	-33.7												
1975	-1.1	0.4	-2.0	-3.1	-1.2	-0.9	-3.1	-8.6	-2.3	29.2											
1976	0.4	1.5	0.0	-0.7	1.2	1.9	0.7	-2.4	3.8	22.6	16.0										
1977	-0.8	0.4	-1.5	-2.2	-0.7	-0.4	-1.8	-4.8	-0.7	10.3	0.8	-14.3									
1978	-0.9	0.3	-1.4	-2.1	-0.8	-0.5	-1.8	-4.2	-0.8	7.4	0.1	-7.8	-1.3								
1979	-0.1	1.0	-0.5	-1.1	0.3	0.6	-0.3	-2.3	0.9	7.8	2.5	-2.0	4.1	9.6							
1980	1.4	2.5	1.2	0.9	2.3	2.8	2.2	0.8	4.0	10.3	6.5	4.1	10.2	16.0	22.4						
1981	0.3	1.3	0.0	-0.5	0.7	1.0	0.3	-1.1	1.4	6.4	2.6	0.0	3.6	5.2	3.0	-16.5					
1982	0.7	1.7	0.5	0.1	1.3	1.6	1.0	-0.2	2.1	6.6	3.4	1.3	4.4	5.9	4.6	-4.3	7.9				
1983	1.4	2.3	1.2	0.9	2.0	2.4	1.9	0.9	3.1	7.2	4.5	2.9	5.7	7.1	6.5	1.2	10.0	12.1			
1984	1.0	1.9	0.8	0.5	1.5	1.8	1.4	0.4	2.4	6.0	3.4	1.8	4.1	5.0	4.1	-0.5	4.9	3.3	-5.5		
1985	2.0	2.9	2.0	1.7	2.8	3.1	2.8	2.0	3.9	7.3	5.1	3.9	6.2	7.3	6.9	3.8	8.9	9.2	7.7	20.9	
1986	2.4	3.2	2.3	2.2	3.1	3.5	3.2	2.5	4.3	7.5	5.5	4.5	6.6	7.6	7.3	4.8	9.0	9.3	8.3	15.2	
1987	2.1	2.9	2.1	1.9	2.8	3.2	2.8	2.2	3.8	6.7	4.8	3.8	5.7	6.4	6.0	3.7	7.0	6.9	5.6	9.2	
1988	2.4	3.1	2.4	2.2	3.1	3.4	3.1	2.5	4.1	6.8	5.1	4.2	5.9	6.6	6.2	4.2	7.2	7.0	6.0	8.9	
1989	3.2	4.0	3.3	3.2	4.1	4.4	4.2	3.7	5.3	7.9	6.3	5.6	7.3	8.0	7.9	6.3	9.1	9.3	8.8	11.6	
1990	2.6	3.4	2.7	2.5	3.3	3.6	3.4	2.9	4.3	6.7	5.2	4.4	5.8	6.4	6.1	4.5	6.8	6.7	5.9	7.8	
1991	3.4	4.1	3.5	3.4	4.2	4.5	4.4	3.9	5.3	7.6	6.2	5.6	7.0	7.6	7.5	6.1	8.4	8.4	8.0	9.9	
1992	3.3	4.0	3.4	3.3	4.0	4.3	4.2	3.7	5.0	7.2	5.9	5.3	6.6	7.1	6.9	5.6	7.7	7.6	7.1	8.7	
1993	3.3	3.9	3.3	3.2	4.0	4.3	4.1	3.7	4.9	7.0	5.7	5.1	6.3	6.8	6.6	5.4	7.3	7.2	6.7	8.0	
1994	3.0	3.6	3.0	2.9	3.6	3.9	3.7	3.3	4.4	6.3	5.1	4.5	5.6	6.1	5.8	4.7	6.3	6.2	5.6	6.7	
1995	3.9	4.5	4.0	3.9	4.6	4.9	4.8	4.4	5.6	7.5	6.4	5.9	7.0	7.5	7.3	6.3	8.0	8.0	7.6	8.8	
1996	4.3	4.9	4.4	4.4	5.1	5.4	5.3	4.9	6.1	7.9	6.9	6.4	7.5	8.0	7.9	7.0	8.6	8.6	8.3	9.5	
1997	5.0	5.6	5.2	5.1	5.8	6.2	6.1	5.8	6.9	8.7	7.8	7.4	8.5	9.0	9.0	8.2	9.7	9.8	9.7	10.8	
1998	5.5	6.2	5.7	5.7	6.4	6.8	6.7	6.5	7.6	9.3	8.4	8.1	9.1	9.7	9.7	9.0	10.5	10.6	10.5	11.7	
1999	5.8	6.4	6.0	6.0	6.7	7.1	7.0	6.8	7.9	9.5	8.7	8.4	9.4	10.0	10.0	9.3	10.7	10.9	10.8	11.9	
2000	5.2	5.8	5.4	5.4	6.0	6.3	6.2	6.0	7.0	8.6	7.7	7.4	8.3	8.8	8.8	8.8	8.1	9.4	9.3	10.2	
2001	4.6	5.1	4.7	4.7	5.3	5.5	5.5	5.2	6.1	7.6	6.8	6.4	7.3	7.6	7.6	6.9	8.0	8.0	7.8	8.6	
2002	3.7	4.2	3.8	3.7	4.3	4.5	4.4	4.1	5.0	6.3	5.5	5.1	5.9	6.2	6.0	5.3	6.3	6.2	5.9	6.6	
2003	4.2	4.7	4.3	4.3	4.9	5.1	5.0	4.7	5.6	7.0	6.2	5.8	6.6	6.9	6.8	6.1	7.1	7.1	6.8	7.5	
2004	4.3	4.8	4.4	4.3	4.9	5.1	5.0	4.8	5.6	6.9	6.1	5.8	6.5	6.8	6.7	6.1	7.1	7.0	6.8	7.4	
2005	4.2	4.7	4.3	4.2	4.8	5.0	4.9	4.6	5.4	6.7	6.0	5.6	6.3	6.6	6.5	5.8	6.8	6.7	6.5	7.1	

*S&P 500 total returns minus long-term government bond income returns.

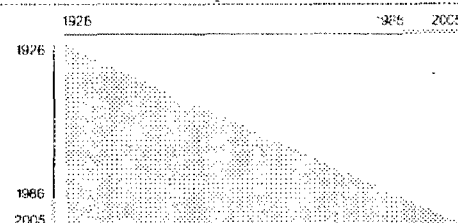
Risk Premia Over Time Report 2006

Table A-1 (Page 6 of 6)

Long-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005



to the end of	From the beginning of	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1986	9.5																				
1987	3.4	-2.7																			
1988	4.9	2.6	7.8																		
1989	9.3	9.3	15.3	22.7																	
1990	5.2	4.1	6.4	5.7	-11.4																
1991	8.0	7.8	10.4	11.2	5.5	22.3															
1992	7.0	6.5	8.4	8.5	3.8	11.4	0.4														
1993	6.4	6.0	7.5	7.4	3.5	8.5	1.6	2.8													
1994	5.1	4.6	5.6	5.3	1.8	5.1	-0.7	-1.2	-5.3												
1995	7.6	7.4	8.7	8.8	6.5	10.0	6.9	9.1	12.3	29.8											
1996	8.5	8.3	9.6	9.8	7.9	11.2	8.9	11.1	13.8	23.4	16.9										
1997	10.0	10.0	11.3	11.7	10.3	13.4	11.9	14.2	17.0	24.5	21.8	26.7									
1998	11.0	11.1	12.3	12.8	11.7	14.6	13.4	15.6	18.2	24.1	22.1	24.7	22.7								
1999	11.3	11.4	12.6	13.0	12.1	14.7	13.7	15.6	17.7	22.3	20.5	21.6	19.1	15.5							
2000	9.5	9.5	10.4	10.6	9.5	11.6	10.4	11.7	13.0	16.0	13.2	12.3	7.5	-0.1	-15.6						
2001	7.8	7.7	8.4	8.5	7.3	9.0	7.7	8.5	9.2	11.2	8.1	6.4	1.3	-5.8	-16.5	-17.4					
2002	5.7	5.5	6.0	5.9	4.6	5.9	4.4	4.8	5.1	6.4	3.0	0.7	-4.5	-11.3	-20.2	-22.6	-27.7				
2003	6.7	6.6	7.1	7.1	6.0	7.3	6.1	6.6	7.0	8.3	5.6	4.0	0.2	-4.3	-9.2	-7.1	-1.9	23.9			
2004	6.7	6.5	7.1	7.0	6.0	7.2	6.1	6.5	6.9	8.1	5.7	4.2	1.0	-2.6	-6.2	-3.8	0.7	14.9	5.8		
2005	6.4	6.2	6.7	6.6	5.6	6.7	5.6	6.0	6.3	7.4	5.1	3.8	0.9	-2.2	-5.1	-3.0	0.6	10.0	3.0	0.2	

*S&P 500 total returns minus long-term government bond income returns.

Risk Premia Over Time Report 2006

Table A-2 (Page 1 of 6)

Intermediate-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926	7.8																				
1927	20.9	34.0																			
1928	27.3	37.0	40.0																		
1929	17.3	20.5	13.7	-12.5																	
1930	8.2	8.5	-0.2	-20.3	-28.2																
1931	-0.9	-2.6	-11.8	-29.1	-37.3	-46.5															
1932	-2.5	-4.2	-11.8	-24.7	-28.8	-29.2	-11.8														
1933	4.2	3.7	-1.3	-9.6	-8.8	-2.4	19.7	51.2													
1934	3.3	2.7	-1.7	-8.7	-7.9	-2.9	11.7	23.4	-4.4												
1935	7.5	7.5	4.2	-0.9	1.0	6.8	20.2	30.8	20.6	45.6											
1936	9.8	10.0	7.3	3.2	5.5	11.1	22.6	31.2	24.6	39.1	32.5										
1937	5.9	5.8	2.9	-1.2	0.2	4.3	12.8	17.7	9.3	13.9	-2.0	-36.5									
1938	7.7	7.7	5.3	1.9	3.5	7.4	15.1	19.6	13.3	17.7	8.4	-3.6	29.3								
1939	7.1	7.0	4.7	1.5	2.9	6.4	13.0	16.6	10.8	13.8	5.9	-3.0	13.8	-1.7							
1940	5.9	5.7	3.6	0.5	1.7	4.7	10.4	13.2	7.7	9.8	2.6	-4.9	5.6	-6.2	-10.7						
1941	4.7	4.5	2.4	-0.5	0.5	3.2	8.1	10.3	5.2	6.6	0.1	-6.4	1.2	-8.2	-11.5	-12.3					
1942	5.6	5.5	3.6	1.0	2.0	4.5	9.2	11.3	6.8	8.2	2.9	-2.0	4.8	-1.3	-1.1	3.7	19.6				
1943	6.7	6.6	4.9	2.5	3.6	6.0	10.4	12.5	8.6	10.0	5.6	1.7	8.1	3.8	5.2	10.6	22.0	24.3			
1944	7.3	7.2	5.7	3.5	4.6	6.9	11.0	12.8	9.5	10.8	7.0	3.8	9.6	6.3	7.9	12.5	20.7	21.3	18.3		
1945	8.7	8.7	7.3	5.4	6.5	8.8	12.8	14.7	11.6	13.1	9.8	7.3	12.8	10.4	12.4	17.0	24.4	26.0	26.8	35.2	
1946	7.8	7.8	6.4	4.6	5.6	7.7	11.3	13.0	10.0	11.2	8.1	5.6	10.3	8.0	9.3	12.7	17.7	17.2	14.8	13.0	
1947	7.7	7.7	6.3	4.6	5.5	7.5	10.9	12.4	9.6	10.7	7.8	5.5	9.7	7.6	8.7	11.5	15.5	14.6	12.2	10.2	
1948	7.5	7.5	6.2	4.5	5.4	7.3	10.5	11.9	9.2	10.2	7.5	5.4	9.2	7.2	8.2	10.6	13.8	12.9	10.6	8.6	
1949	7.9	7.9	6.7	5.2	6.0	7.8	10.9	12.2	9.8	10.7	8.2	6.3	9.9	8.1	9.1	11.3	14.3	13.5	11.7	10.4	
1950	8.8	8.9	7.8	6.3	7.2	9.0	11.9	13.2	11.0	11.9	9.7	8.0	11.5	10.0	11.1	13.2	16.1	15.6	14.4	13.7	
1951	9.3	9.4	8.4	7.0	7.9	9.6	12.4	13.7	11.6	12.5	10.4	9.0	12.2	10.9	12.0	14.0	16.7	16.3	15.3	14.9	
1952	9.6	9.6	8.7	7.4	8.2	9.9	12.6	13.8	11.8	12.7	10.8	9.4	12.5	11.3	12.3	14.2	16.6	16.3	15.4	15.1	
1953	9.1	9.2	8.2	6.9	7.7	9.3	11.8	13.0	11.1	11.9	10.0	8.7	11.5	10.3	11.2	12.8	14.9	14.5	13.5	13.0	
1954	10.6	10.7	9.8	8.6	9.5	11.0	13.5	14.7	13.0	13.8	12.1	11.0	13.8	12.8	13.8	15.6	17.7	17.6	16.9	16.8	
1955	11.2	11.3	10.5	9.4	10.2	11.8	14.2	15.3	13.7	14.6	13.0	12.0	14.7	13.8	14.8	16.5	18.5	18.4	18.0	17.9	
1956	10.9	11.0	10.2	9.2	10.0	11.4	13.8	14.8	13.2	14.0	12.5	11.5	14.1	13.2	14.1	15.7	17.5	17.4	16.8	16.7	
1957	10.1	10.2	9.4	8.4	9.1	10.5	12.7	13.7	12.1	12.8	11.3	10.3	12.7	11.8	12.5	13.9	15.5	15.3	14.6	14.3	
1958	11.1	11.2	10.4	9.4	10.2	11.6	13.7	14.7	13.2	14.0	12.6	11.7	14.0	13.2	14.0	15.4	17.0	16.8	16.3	16.2	
1959	11.0	11.1	10.3	9.4	10.1	11.4	13.5	14.4	13.0	13.7	12.4	11.5	13.7	13.0	13.7	15.0	16.5	16.3	15.8	15.6	
1960	10.5	10.6	9.9	9.0	9.7	10.9	12.9	13.8	12.4	13.0	11.7	10.9	12.9	12.2	12.9	14.0	15.2	14.7	14.7	14.4	
1961	10.9	11.0	10.3	9.4	10.1	11.3	13.3	14.1	12.8	13.4	12.2	11.4	13.4	12.7	13.3	14.5	15.8	15.6	15.1	14.9	
1962	10.3	10.3	9.7	8.8	9.4	10.6	12.4	13.2	11.9	12.5	11.3	10.5	12.3	11.6	12.2	13.3	14.5	14.2	13.7	13.4	
1963	10.5	10.6	9.9	9.1	9.7	10.8	12.6	13.4	12.2	12.7	11.6	10.8	12.6	11.9	12.5	13.5	14.7	14.4	14.0	13.7	
1964	10.5	10.6	10.0	9.2	9.8	10.9	12.6	13.4	12.2	12.7	11.6	10.8	12.6	12.0	12.5	13.5	14.6	14.4	13.9	13.7	
1965	10.5	10.6	9.9	9.1	9.7	10.8	12.5	13.2	12.1	12.6	11.5	10.8	12.4	11.8	12.3	13.3	14.3	14.1	13.6	13.4	
1966	9.9	9.9	9.3	8.5	9.1	10.1	11.7	12.4	11.2	11.7	10.6	9.9	11.5	10.9	11.3	12.2	13.1	12.9	12.4	12.1	
1967	10.1	10.1	9.5	8.8	9.3	10.3	11.9	12.6	11.5	11.9	10.9	10.2	11.7	11.1	11.6	12.4	13.4	13.1	12.7	12.4	
1968	10.0	10.0	9.4	8.7	9.2	10.2	11.7	12.4	11.3	11.8	10.7	10.0	11.6	11.0	11.4	12.2	13.1	12.8	12.4	12.1	
1969	9.4	9.4	8.9	8.1	8.6	9.6	11.0	11.7	10.6	11.0	10.0	9.3	10.7	10.1	10.5	11.2	12.1	11.8	11.3	11.0	
1970	9.1	9.2	8.6	7.8	8.3	9.2	10.7	11.3	10.2	10.6	9.6	8.9	10.3	9.7	10.1	10.8	11.5	11.3	10.8	10.5	

*S&P 500 total returns minus intermediate-term government bond income returns.

Ibbotson Associates

Risk Premia Over Time Report 2006

Table A-2 (Page 2 of 6)

Intermediate-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

to the end of	From the beginning of 1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	9.1	9.1	8.6	7.8	8.3	9.2	10.6	11.2	10.1	10.5	9.6	8.9	10.2	9.7	10.0	10.7	11.4	11.2	10.7	10.4
1972	9.2	9.2	8.7	8.0	8.4	9.3	10.7	11.2	10.2	10.6	9.7	9.0	10.3	9.8	10.1	10.8	11.5	11.2	10.8	10.5
1973	8.6	8.6	8.0	7.3	7.8	8.6	9.9	10.4	9.4	9.8	8.8	8.2	9.4	8.9	9.2	9.8	10.5	10.2	9.7	9.4
1974	7.7	7.7	7.1	6.4	6.8	7.6	8.9	9.4	8.4	8.7	7.7	7.1	8.3	7.7	8.0	8.5	9.1	8.8	8.3	8.0
1975	8.1	8.2	7.6	6.9	7.3	8.1	9.4	9.9	8.9	9.2	8.3	7.7	8.8	8.3	8.6	9.1	9.7	9.5	9.0	8.7
1976	8.3	8.3	7.8	7.1	7.5	8.3	9.5	10.0	9.1	9.4	8.5	7.9	9.0	8.5	8.8	9.3	9.9	9.7	9.2	8.9
1977	7.9	7.9	7.4	6.7	7.1	7.9	9.0	9.5	8.6	8.9	8.0	7.4	8.5	7.9	8.2	8.7	9.3	9.0	8.5	8.3
1978	7.7	7.7	7.2	6.5	6.9	7.7	8.8	9.3	8.3	8.6	7.8	7.2	8.2	7.7	8.0	8.4	9.0	8.7	8.3	8.0
1979	7.8	7.7	7.2	6.6	7.0	7.7	8.8	9.3	8.4	8.6	7.8	7.2	8.3	7.8	8.0	8.5	9.0	8.7	8.3	8.0
1980	8.0	8.0	7.5	6.9	7.3	8.0	9.1	9.5	8.6	8.9	8.1	7.6	8.6	8.1	8.3	8.8	9.3	9.1	8.7	8.4
1981	7.5	7.5	7.0	6.4	6.8	7.5	8.6	9.0	8.1	8.4	7.5	7.0	8.0	7.5	7.7	8.2	8.7	8.4	8.0	7.7
1982	7.6	7.6	7.1	6.5	6.8	7.5	8.6	9.0	8.1	8.4	7.6	7.0	8.0	7.5	7.7	8.2	8.7	8.4	8.0	7.7
1983	7.6	7.6	7.2	6.6	6.9	7.6	8.6	9.0	8.2	8.4	7.7	7.1	8.1	7.6	7.8	8.3	8.7	8.5	8.1	7.8
1984	7.4	7.4	6.9	6.4	6.7	7.3	8.4	8.8	7.9	8.2	7.4	6.9	7.8	7.3	7.5	7.9	8.4	8.2	7.8	7.5
1985	7.7	7.7	7.2	6.6	7.0	7.6	8.6	9.0	8.2	8.4	7.7	7.2	8.1	7.6	7.8	8.3	8.7	8.5	8.1	7.8
1986	7.7	7.7	7.3	6.7	7.0	7.7	8.7	9.0	8.2	8.5	7.7	7.3	8.1	7.7	7.9	8.3	8.8	8.5	8.2	7.9
1987	7.6	7.5	7.1	6.5	6.9	7.5	8.5	8.8	8.0	8.3	7.6	7.1	7.9	7.5	7.7	8.1	8.5	8.3	7.9	7.7
1988	7.6	7.6	7.1	6.6	6.9	7.5	8.5	8.8	8.1	8.3	7.6	7.1	8.0	7.5	7.7	8.1	8.5	8.3	7.9	7.7
1989	7.8	7.8	7.4	6.9	7.2	7.8	8.7	9.1	8.3	8.5	7.9	7.4	8.2	7.8	8.0	8.4	8.8	8.6	8.3	8.0
1990	7.5	7.5	7.1	6.6	6.9	7.5	8.4	8.7	8.0	8.2	7.5	7.1	7.9	7.5	7.6	8.0	8.4	8.2	7.8	7.6
1991	7.8	7.8	7.3	6.8	7.1	7.7	8.6	9.0	8.2	8.5	7.8	7.3	8.2	7.8	7.9	8.3	8.7	8.5	8.2	7.9
1992	7.7	7.7	7.2	6.7	7.0	7.6	8.5	8.8	8.1	8.3	7.7	7.2	8.0	7.6	7.8	8.2	8.6	8.4	8.0	7.8
1993	7.6	7.6	7.2	6.7	7.0	7.6	8.4	8.8	8.1	8.3	7.6	7.2	8.0	7.6	7.8	8.1	8.5	8.3	8.0	7.7
1994	7.4	7.4	7.0	6.5	6.8	7.4	8.2	8.5	7.8	8.1	7.4	7.0	7.7	7.4	7.5	7.9	8.2	8.0	7.7	7.5
1995	7.8	7.8	7.4	6.9	7.2	7.7	8.6	8.9	8.2	8.4	7.8	7.4	8.1	7.8	7.9	8.3	8.7	8.5	8.1	7.9
1996	7.9	7.9	7.5	7.0	7.3	7.9	8.7	9.0	8.4	8.6	8.0	7.5	8.3	7.9	8.1	8.4	8.8	8.6	8.3	8.1
1997	8.2	8.2	7.8	7.3	7.6	8.2	9.0	9.3	8.7	8.9	8.3	7.9	8.6	8.3	8.4	8.8	9.1	9.0	8.7	8.5
1998	8.4	8.4	8.0	7.6	7.9	8.4	9.2	9.5	8.9	9.1	8.5	8.1	8.9	8.5	8.7	9.0	9.4	9.2	8.9	8.8
1999	8.5	8.5	8.1	7.7	8.0	8.5	9.3	9.6	9.0	9.2	8.6	8.2	9.0	8.6	8.8	9.1	9.5	9.3	9.1	8.9
2000	8.2	8.2	7.8	7.4	7.6	8.2	8.9	9.2	8.6	8.8	8.3	7.9	8.6	8.2	8.4	8.7	9.1	8.9	8.6	8.5
2001	7.8	7.8	7.5	7.0	7.3	7.8	8.6	8.9	8.3	8.4	7.9	7.5	8.2	7.9	8.0	8.3	8.7	8.5	8.2	8.0
2002	7.4	7.4	7.0	6.6	6.9	7.3	8.1	8.4	7.8	7.9	7.4	7.0	7.7	7.3	7.5	7.8	8.1	7.9	7.6	7.4
2003	7.6	7.6	7.3	6.8	7.1	7.6	8.3	8.6	8.0	8.2	7.6	7.3	7.9	7.6	7.8	8.1	8.4	8.2	7.9	7.7
2004	7.6	7.6	7.3	6.9	7.1	7.6	8.3	8.6	8.0	8.2	7.6	7.3	7.9	7.6	7.8	8.0	8.4	8.2	7.9	7.7
2005	7.5	7.5	7.2	6.8	7.0	7.5	8.2	8.5	7.9	8.1	7.6	7.2	7.8	7.5	7.7	7.9	8.3	8.1	7.8	7.6

*S&P 500 total returns minus intermediate-term government bond income returns.

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Risk Premia Over Time Report 2006

Table A-2 (Page 3 of 6)

Intermediate-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1946	-9.2																				
1947	-2.3	4.5																			
1948	-0.2	4.2	3.9																		
1949	4.2	8.6	10.7	17.4																	
1950	9.4	14.0	17.2	23.9	30.3																
1951	11.5	15.6	18.4	23.3	26.2	22.0															
1952	12.2	15.7	18.0	21.5	22.8	19.1	16.2														
1953	10.2	13.0	14.4	16.5	16.2	11.6	6.3	-3.5													
1954	14.7	17.7	19.6	22.2	23.2	21.4	21.2	23.7	51.0												
1955	16.2	19.0	20.8	23.2	24.2	23.0	23.2	25.5	40.1	29.1											
1956	15.0	17.4	18.9	20.8	21.2	19.7	19.3	20.0	27.9	16.3	3.5										
1957	12.6	14.6	15.6	16.9	16.8	14.8	13.7	13.1	17.3	6.1	-5.4	-14.4									
1958	14.7	16.7	17.8	19.2	19.4	18.0	17.5	17.7	21.9	14.7	9.9	13.0	40.4								
1959	14.2	16.0	17.0	18.2	18.2	16.9	16.3	16.3	19.6	13.3	9.3	11.3	24.1	7.8							
1960	13.0	14.6	15.4	16.4	16.3	14.8	14.0	13.8	16.3	10.5	6.7	7.5	14.8	2.1	-3.7						
1961	13.7	15.2	16.0	16.9	16.8	15.6	15.0	14.8	17.1	12.3	9.5	10.7	17.0	9.2	9.8	23.3					
1962	12.1	13.5	14.1	14.8	14.6	13.3	12.5	12.1	13.9	9.2	6.4	6.8	11.1	3.7	2.4	5.4	-12.5				
1963	12.5	13.8	14.4	15.1	14.9	13.7	13.0	12.7	14.4	10.3	8.0	8.6	12.4	6.8	6.6	10.0	3.3	19.1			
1964	12.5	13.7	14.3	14.9	14.7	13.6	13.0	12.7	14.2	10.5	8.5	9.1	12.4	7.8	7.8	10.6	6.4	15.8	12.5		
1965	12.3	13.4	13.9	14.5	14.3	13.3	12.7	12.4	13.7	10.3	8.4	9.0	11.9	7.8	7.8	10.2	6.9	13.3	10.4	8.3	
1966	11.0	12.0	12.4	12.9	12.6	11.5	10.8	10.4	11.5	8.2	6.3	6.6	8.9	5.0	4.6	6.0	2.5	6.2	1.9	-3.3	
1967	11.4	12.4	12.8	13.2	13.0	12.0	11.3	11.0	12.0	9.0	7.4	7.7	9.9	6.6	6.4	7.8	5.3	8.8	6.2	4.1	
1968	11.1	12.0	12.4	12.8	12.6	11.6	11.0	10.7	11.6	8.8	7.2	7.5	9.5	6.5	6.3	7.6	5.3	8.3	6.1	4.5	
1969	10.0	10.9	11.2	11.5	11.2	10.2	9.5	9.1	9.9	7.2	5.6	5.8	7.5	4.5	4.2	5.0	2.7	4.9	2.6	0.6	
1970	9.5	10.3	10.5	10.8	10.5	9.5	8.9	8.4	9.2	6.5	5.0	5.1	6.6	3.8	3.5	4.2	2.0	3.9	1.7	-0.1	
1971	9.5	10.2	10.4	10.7	10.4	9.5	8.8	8.5	9.1	6.7	5.3	5.4	6.8	4.2	3.9	4.6	2.7	4.4	2.5	1.1	
1972	9.6	10.3	10.6	10.8	10.5	9.6	9.0	8.7	9.3	7.0	5.7	5.9	7.2	4.8	4.6	5.3	3.7	5.3	3.7	2.6	
1973	8.5	9.1	9.3	9.5	9.2	8.3	7.7	7.3	7.8	5.5	4.2	4.3	5.4	3.1	2.8	3.3	1.6	2.9	1.2	0.0	
1974	7.0	7.6	7.7	7.9	7.5	6.5	5.9	5.4	5.8	3.6	2.2	2.2	3.1	0.8	0.3	0.6	-1.1	-0.2	-1.9	-3.4	
1975	7.8	8.4	8.5	8.7	8.4	7.5	6.9	6.5	6.9	4.8	3.6	3.6	4.6	2.5	2.2	2.6	1.1	2.1	0.7	-0.4	
1976	8.1	8.7	8.8	9.0	8.7	7.8	7.3	6.9	7.3	5.4	4.2	4.3	5.3	3.3	3.0	3.5	2.1	3.2	1.9	1.1	
1977	7.4	7.9	8.1	8.2	7.9	7.0	6.5	6.1	6.5	4.5	3.4	3.4	4.3	2.4	2.1	2.4	1.1	2.0	0.8	-0.1	
1978	7.1	7.7	7.8	7.9	7.6	6.7	6.2	5.8	6.2	4.3	3.2	3.2	4.0	2.2	1.9	2.2	1.0	1.8	0.7	-0.2	
1979	7.2	7.7	7.8	7.9	7.6	6.8	6.3	5.9	6.3	4.5	3.5	3.5	4.3	2.6	2.3	2.6	1.5	2.3	1.2	0.5	
1980	7.6	8.1	8.2	8.4	8.1	7.3	6.8	6.5	6.9	5.2	4.2	4.2	5.0	3.4	3.2	3.6	2.5	3.4	2.4	1.8	
1981	6.9	7.4	7.5	7.6	7.3	6.5	6.0	5.7	6.0	4.3	3.4	3.4	4.1	2.5	2.3	2.6	1.5	2.3	1.3	0.7	
1982	7.0	7.4	7.5	7.6	7.3	6.6	6.1	5.8	6.1	4.5	3.6	3.6	4.3	2.8	2.5	2.8	1.9	2.6	1.7	1.1	
1983	7.1	7.5	7.6	7.7	7.4	6.8	6.3	6.0	6.3	4.7	3.9	3.9	4.6	3.1	2.9	3.2	2.3	3.0	2.2	1.7	
1984	6.8	7.2	7.3	7.4	7.1	6.4	5.9	5.6	5.9	4.4	3.5	3.5	4.2	2.8	2.6	2.9	2.0	2.6	1.9	1.3	
1985	7.2	7.6	7.7	7.8	7.5	6.8	6.4	6.1	6.4	5.0	4.2	4.2	4.8	3.5	3.4	3.6	2.8	3.5	2.8	2.3	
1986	7.2	7.7	7.7	7.8	7.6	6.9	6.5	6.2	6.5	5.1	4.4	4.4	5.0	3.8	3.6	3.9	3.1	3.8	3.1	2.7	
1987	7.0	7.4	7.5	7.6	7.3	6.7	6.3	6.0	6.3	4.9	4.2	4.2	4.8	3.6	3.4	3.7	2.9	3.5	2.9	2.5	
1988	7.1	7.4	7.5	7.6	7.4	6.7	6.3	6.1	6.3	5.0	4.3	4.3	4.9	3.7	3.6	3.9	3.1	3.7	3.1	2.7	
1989	7.4	7.8	7.9	8.0	7.7	7.2	6.8	6.5	6.8	5.5	4.8	4.9	5.5	4.4	4.2	4.5	3.8	4.4	3.9	3.5	
1990	7.0	7.4	7.4	7.5	7.3	6.7	6.3	6.1	6.3	5.1	4.4	4.4	5.0	3.9	3.7	4.0	3.3	3.9	3.3	3.0	

*S&P 500 total returns minus intermediate-term government bond income returns.

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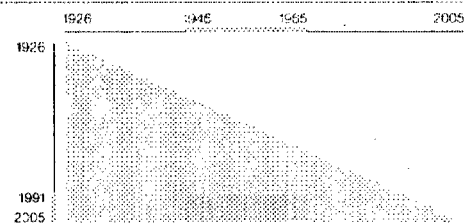
Risk Premia Over Time Report 2006

Table A-2 (Page 4 of 6)

Intermediate-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of 1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1991	7.4	7.7	7.8	7.9	7.7	7.1	6.7	6.5	6.8	5.6	4.9	4.9	5.5	4.5	4.3	4.6	4.0	4.5	4.0	3.7
1992	7.2	7.6	7.7	7.7	7.5	7.0	6.6	6.4	6.6	5.4	4.8	4.8	5.4	4.4	4.3	4.5	3.9	4.4	3.9	3.6
1993	7.2	7.5	7.6	7.7	7.4	6.9	6.5	6.3	6.6	5.4	4.8	4.8	5.4	4.4	4.3	4.5	3.9	4.4	4.0	3.7
1994	6.9	7.3	7.3	7.4	7.2	6.6	6.3	6.1	6.3	5.2	4.6	4.6	5.1	4.1	4.0	4.2	3.7	4.2	3.7	3.4
1995	7.4	7.7	7.8	7.9	7.7	7.2	6.8	6.6	6.9	5.8	5.2	5.3	5.8	4.8	4.7	5.0	4.4	5.0	4.5	4.3
1996	7.6	7.9	8.0	8.1	7.9	7.4	7.1	6.9	7.1	6.1	5.5	5.6	6.1	5.2	5.1	5.3	4.8	5.3	4.9	4.7
1997	8.0	8.3	8.4	8.5	8.3	7.8	7.5	7.3	7.6	6.6	6.0	6.1	6.6	5.7	5.7	5.9	5.4	5.9	5.6	5.4
1998	8.3	8.6	8.7	8.8	8.6	8.1	7.8	7.7	7.9	6.9	6.4	6.5	7.0	6.2	6.1	6.4	5.9	6.4	6.1	5.9
1999	8.4	8.7	8.8	8.9	8.7	8.3	8.0	7.8	8.1	7.1	6.6	6.7	7.2	6.4	6.4	6.6	6.2	6.7	6.3	6.2
2000	8.0	8.3	8.4	8.4	8.3	7.8	7.5	7.4	7.6	6.6	6.1	6.2	6.7	5.9	5.8	6.1	5.6	6.1	5.8	5.6
2001	7.5	7.8	7.9	8.0	7.8	7.4	7.1	6.9	7.1	6.2	5.7	5.7	6.2	5.4	5.3	5.5	5.1	5.5	5.2	5.0
2002	6.9	7.2	7.3	7.3	7.2	6.7	6.4	6.2	6.4	5.5	5.0	5.0	5.4	4.7	4.6	4.8	4.3	4.7	4.4	4.2
2003	7.3	7.6	7.6	7.7	7.5	7.1	6.8	6.6	6.8	5.9	5.4	5.5	5.9	5.1	5.1	5.3	4.8	5.3	4.9	4.7
2004	7.3	7.6	7.6	7.7	7.5	7.1	6.8	6.6	6.8	5.9	5.5	5.5	5.9	5.2	5.1	5.3	4.9	5.3	5.0	4.8
2005	7.2	7.5	7.5	7.6	7.4	7.0	6.7	6.5	6.7	5.8	5.4	5.4	5.8	5.1	5.0	5.2	4.8	5.2	4.9	4.7

*S&P 500 total returns minus intermediate-term government bond income returns.

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Risk Premia Over Time Report 2006

Table A-2 (Page 5 of 6)

Intermediate-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966	-15.0																				
1967	2.1	19.1																			
1968	3.2	12.3	5.6																		
1969	-1.4	3.2	-4.8	-15.2																	
1970	-1.8	1.5	-4.4	-9.3	-3.5																
1971	-0.1	2.9	-1.1	-3.4	2.5	8.6															
1972	1.8	4.6	1.7	0.8	6.1	10.9	13.2														
1973	-1.0	0.9	-2.1	-3.6	-0.7	0.2	-4.0	-21.2													
1974	-4.7	-3.4	-6.6	-8.6	-7.3	-8.3	-13.9	-27.5	-33.7												
1975	-1.2	0.3	-2.0	-3.1	-1.1	-0.7	-3.0	-8.4	-1.9	29.9											
1976	0.4	1.9	0.0	-0.7	1.4	2.2	1.0	-2.1	4.3	23.3	16.7										
1977	-0.8	0.5	-1.3	-2.1	-0.5	0.0	-1.5	-4.4	-0.2	11.0	1.5	-13.7									
1978	-0.8	0.4	-1.3	-2.0	-0.6	-0.2	-1.4	-3.9	-0.4	7.9	0.6	-7.5	-1.3								
1979	-0.1	1.1	-0.4	-1.0	0.4	0.9	-0.1	-2.0	1.2	8.2	2.8	-1.8	4.1	9.4							
1980	1.4	2.6	1.3	0.9	2.4	3.0	2.4	1.0	4.2	10.5	6.6	4.1	10.0	15.6	21.9						
1981	0.2	1.2	-0.1	-0.5	0.7	1.1	0.3	-1.1	1.4	6.4	2.5	-0.3	3.0	4.5	2.0	-17.9					
1982	0.7	1.7	0.5	0.1	1.3	1.7	1.1	-0.1	2.2	6.7	3.4	1.2	4.1	5.5	4.2	-4.6	8.6				
1983	1.3	2.3	1.2	0.9	2.1	2.5	2.0	1.0	3.2	7.3	4.5	2.7	5.5	6.8	6.2	1.0	10.4	12.2			
1984	1.0	1.8	0.8	0.5	1.6	1.9	1.4	0.5	2.4	6.0	3.4	1.7	3.9	4.8	3.9	-0.6	5.1	3.4	-5.4		
1985	2.0	2.9	2.0	1.8	2.9	3.3	2.9	2.1	4.0	7.5	5.2	4.0	6.2	7.2	6.9	3.9	9.3	9.5	8.2	21.9	
1986	2.4	3.3	2.5	2.3	3.3	3.7	3.4	2.7	4.6	7.8	5.7	4.6	6.7	7.7	7.4	5.0	9.6	9.8	9.1	16.3	
1987	2.2	3.0	2.2	2.1	3.0	3.4	3.1	2.4	4.1	7.0	5.1	4.0	5.8	6.6	6.2	4.0	7.6	7.4	6.2	10.1	
1988	2.5	3.3	2.5	2.4	3.3	3.7	3.4	2.8	4.4	7.1	5.3	4.4	6.0	6.8	6.5	4.6	7.8	7.6	6.7	9.7	
1989	3.3	4.1	3.5	3.4	4.3	4.7	4.5	4.0	5.5	8.2	6.6	5.8	7.5	8.2	8.1	6.6	9.7	9.8	9.4	12.4	
1990	2.8	3.5	2.8	2.7	3.5	3.9	3.6	3.1	4.5	6.9	5.4	4.6	6.0	6.6	6.4	4.8	7.3	7.2	6.5	8.4	
1991	3.5	4.3	3.7	3.6	4.4	4.8	4.6	4.2	5.6	7.9	6.5	5.8	7.2	7.9	7.8	6.5	8.9	8.9	8.5	10.5	
1992	3.5	4.2	3.6	3.5	4.3	4.7	4.5	4.0	5.4	7.5	6.2	5.6	6.8	7.4	7.3	6.1	8.2	8.2	7.8	9.4	
1993	3.5	4.2	3.6	3.5	4.3	4.6	4.5	4.1	5.3	7.4	6.1	5.5	6.7	7.2	7.1	5.9	7.9	7.9	7.4	8.8	
1994	3.2	3.9	3.3	3.2	3.9	4.3	4.1	3.7	4.8	6.8	5.5	4.9	6.0	6.5	6.3	5.2	6.9	6.8	6.3	7.5	
1995	4.1	4.8	4.3	4.2	5.0	5.3	5.2	4.8	6.0	7.9	6.8	6.3	7.4	7.9	7.8	6.9	8.6	8.6	8.3	9.6	
1996	4.6	5.2	4.7	4.7	5.4	5.8	5.7	5.3	6.5	8.3	7.3	6.8	7.9	8.4	8.4	7.5	9.2	9.3	9.0	10.2	
1997	5.3	5.9	5.5	5.5	6.2	6.6	6.5	6.2	7.4	9.2	8.2	7.8	8.9	9.4	9.4	8.7	10.3	10.5	10.3	11.5	
1998	5.8	6.5	6.0	6.1	6.8	7.2	7.1	6.9	8.0	9.7	8.9	8.5	9.6	10.1	10.1	9.5	11.1	11.3	11.2	12.4	
1999	6.1	6.7	6.4	6.4	7.1	7.5	7.4	7.2	8.3	10.0	9.2	8.8	9.8	10.4	10.4	9.8	11.4	11.5	11.5	12.6	
2000	5.5	6.1	5.7	5.7	6.4	6.7	6.6	6.4	7.4	9.0	8.2	7.8	8.8	9.2	9.2	8.6	10.0	10.0	9.9	10.9	
2001	4.9	5.5	5.1	5.0	5.7	6.0	5.9	5.6	6.6	8.1	7.2	6.9	7.7	8.1	8.0	7.4	8.7	8.7	8.5	9.3	
2002	4.1	4.6	4.2	4.1	4.7	5.0	4.8	4.6	5.5	6.9	6.0	5.6	6.4	6.7	6.6	5.9	7.0	6.9	6.6	7.3	
2003	4.6	5.2	4.8	4.7	5.3	5.6	5.5	5.3	6.1	7.5	6.7	6.3	7.1	7.4	7.4	6.7	7.9	7.8	7.6	8.3	
2004	4.7	5.2	4.8	4.8	5.4	5.7	5.6	5.3	6.2	7.5	6.7	6.4	7.1	7.5	7.4	6.8	7.8	7.8	7.6	8.3	
2005	4.6	5.1	4.7	4.7	5.3	5.5	5.4	5.2	6.0	7.3	6.6	6.2	6.9	7.2	7.1	6.5	7.6	7.5	7.3	7.9	

*S&P 500 total returns minus intermediate-term government bond income returns.

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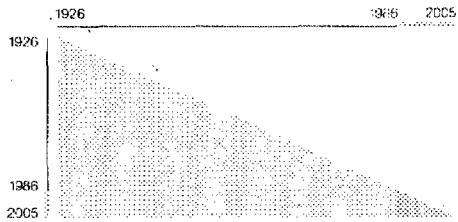
Risk Premia Over Time Report 2006

Table A-2 (Page 6 of 6)

Intermediate-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1986	10.8																				
1987	4.3	-2.2																			
1988	5.7	3.2	8.6																		
1989	10.0	9.8	15.8	23.0																	
1990	5.8	4.5	6.8	5.8	-11.3																
1991	8.7	8.2	10.8	11.6	5.9	23.1															
1992	7.6	7.1	9.0	9.1	4.4	12.3	1.4														
1993	7.2	6.7	8.2	8.1	4.4	9.7	2.9	4.5													
1994	5.9	5.3	6.4	6.0	2.6	6.1	0.4	-0.1	-4.8												
1995	8.4	8.1	9.4	9.5	7.3	11.0	8.0	10.1	13.0	30.7											
1996	9.2	9.0	10.3	10.5	8.7	12.0	9.8	11.9	14.4	24.0	17.3										
1997	10.7	10.7	12.0	12.3	11.0	14.2	12.7	15.0	17.6	25.1	22.2	27.2									
1998	11.7	11.7	13.0	13.4	12.4	15.3	14.2	16.4	18.7	24.6	22.6	25.3	23.3								
1999	11.9	12.0	13.2	13.7	12.7	15.4	14.4	16.3	18.2	22.8	20.9	22.1	19.5	15.7							
2000	10.1	10.1	11.0	11.2	10.2	12.3	11.1	12.3	13.5	16.5	13.6	12.7	7.9	0.2	-15.3						
2001	8.5	8.3	9.1	9.1	8.0	9.7	8.4	9.2	9.8	11.8	8.7	7.0	1.9	-5.2	-15.7	-16.2					
2002	6.5	6.2	6.7	6.6	5.4	6.7	5.3	5.6	5.8	7.1	3.7	1.5	-3.7	-10.4	-19.2	-21.1	-26.1				
2003	7.5	7.3	7.9	7.9	6.8	8.2	7.0	7.5	7.8	9.2	6.5	4.9	1.2	-3.2	-7.9	-5.5	-0.1	25.8			
2004	7.5	7.4	7.9	7.9	6.9	8.2	7.0	7.5	7.8	9.0	6.6	5.3	2.1	-1.4	-4.8	-2.2	2.4	16.7	7.6		
2005	7.2	7.0	7.5	7.5	6.5	7.7	6.6	7.0	7.2	8.3	6.0	4.8	2.0	-1.1	-3.9	-1.6	2.1	11.5	4.3	1.0	

*S&P 500 total returns minus intermediate-term government bond income returns.

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Risk Premia Over Time Report 2006

Table A-3 (Page 1 of 6)

Short-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926	8.4																				
1927	21.4	34.4																			
1928	27.6	37.2	40.1																		
1929	17.4	20.4	13.4	-13.2																	
1930	8.5	8.5	-0.1	-20.2	-27.3																
1931	-0.4	-2.1	-11.2	-28.3	-35.9	-44.4															
1932	-1.6	-3.3	-10.8	-23.5	-27.0	-26.8	-9.2														
1933	5.3	4.9	0.0	-8.1	-6.8	0.0	22.3	53.7													
1934	4.5	4.1	-0.3	-7.0	-5.8	-0.4	14.3	26.0	-1.6												
1935	8.8	8.5	5.7	0.8	3.1	9.2	22.6	33.2	22.9	47.5											
1936	11.1	11.4	8.8	4.9	7.5	13.3	24.8	33.3	26.5	40.6	33.7										
1937	7.2	7.1	4.4	0.4	2.1	6.3	14.8	19.6	11.1	15.3	-0.8	-35.3									
1938	9.1	9.1	6.8	3.5	5.4	9.4	17.1	21.5	15.1	19.3	9.8	-2.1	31.1								
1939	8.4	8.4	6.2	3.2	4.8	8.3	14.9	18.4	12.5	15.3	7.3	-1.5	15.4	-0.4							
1940	7.2	7.1	5.0	2.1	3.5	6.5	12.2	14.9	9.3	11.1	3.9	-3.6	7.0	-5.1	-9.8						
1941	6.0	5.8	3.8	1.0	2.2	4.9	9.8	11.9	6.7	7.9	1.3	-5.2	2.3	-7.3	-10.7	-11.7					
1942	6.8	6.7	4.9	2.4	3.6	6.1	10.7	12.7	8.2	9.4	4.0	-1.0	5.9	-0.4	-0.5	4.2	20.1				
1943	7.9	7.8	6.2	3.9	5.1	7.6	12.0	13.9	9.9	11.2	6.7	2.8	9.1	4.8	6.0	11.3	22.8	25.6			
1944	8.5	8.5	7.0	4.9	6.1	8.5	12.6	14.4	10.8	12.0	8.1	4.9	10.6	7.2	8.7	13.3	21.7	22.5	19.4		
1945	9.9	9.9	8.6	6.7	8.0	10.3	14.2	16.0	12.9	14.2	10.9	8.3	13.8	11.3	13.3	17.9	25.3	27.0	27.8	36.1	
1946	9.0	9.0	7.7	5.9	7.0	9.2	12.7	14.3	11.3	12.3	9.1	6.7	11.3	8.9	10.2	13.5	18.5	18.2	15.7	13.8	
1947	8.8	8.8	7.6	5.9	6.9	8.9	12.3	13.7	10.8	11.8	8.8	6.5	10.7	8.5	9.6	12.3	16.3	15.6	13.1	11.0	
1948	8.6	8.6	7.4	5.8	6.8	8.7	11.8	13.1	10.4	11.3	8.5	6.4	10.2	8.1	9.0	11.4	14.7	13.8	11.4	9.4	
1949	9.0	9.0	7.9	6.4	7.3	9.2	12.1	13.4	10.9	11.7	9.1	7.2	10.8	8.9	9.9	12.1	15.0	14.3	12.4	11.1	
1950	9.9	9.9	8.9	7.5	8.4	10.2	13.1	14.3	12.0	12.9	10.6	8.9	12.3	10.7	11.8	13.9	16.8	16.3	15.0	14.3	
1951	10.4	10.4	9.4	8.1	9.1	10.8	13.6	14.8	12.6	13.4	11.3	9.8	13.0	11.7	12.7	14.7	17.3	17.0	16.0	15.5	
1952	10.6	10.7	9.7	8.5	9.4	11.1	13.7	14.9	12.8	13.6	11.6	10.2	13.3	12.0	13.0	14.9	17.3	17.0	16.0	15.6	
1953	10.1	10.2	9.3	8.0	8.9	10.5	13.0	14.0	12.0	12.8	10.8	9.5	12.3	11.0	11.8	13.5	15.6	15.2	14.2	13.6	
1954	11.6	11.7	10.8	9.7	10.6	12.2	14.7	15.7	13.9	14.7	13.0	11.8	14.6	13.6	14.5	16.2	18.4	18.2	17.6	17.4	
1955	12.2	12.3	11.5	10.5	11.4	12.9	15.3	16.4	14.7	15.4	13.8	12.8	15.5	14.5	15.5	17.2	19.2	19.1	18.6	18.5	
1956	11.9	12.0	11.3	10.2	11.1	12.6	14.8	15.8	14.2	14.9	13.4	12.4	14.9	14.0	14.8	16.3	18.2	18.1	17.5	17.3	
1957	11.1	11.2	10.4	9.4	10.2	11.6	13.7	14.7	13.0	13.7	12.1	11.1	13.4	12.5	13.2	14.6	16.2	15.9	15.3	14.9	
1958	12.0	12.1	11.4	10.5	11.3	12.7	14.8	15.7	14.2	14.8	13.4	12.5	14.8	14.0	14.7	16.1	17.7	17.6	17.0	16.9	
1959	11.9	12.0	11.4	10.4	11.2	12.5	14.6	15.5	14.0	14.6	13.2	12.3	14.5	13.7	14.4	15.7	17.2	17.1	16.5	16.3	
1960	11.5	11.6	10.9	10.0	10.8	12.1	14.0	14.8	13.4	14.0	12.6	11.7	13.8	13.0	13.6	14.8	16.2	16.0	15.4	15.2	
1961	11.9	12.0	11.3	10.5	11.2	12.5	14.4	15.2	13.8	14.4	13.1	12.3	14.2	13.5	14.1	15.3	16.6	16.4	15.9	15.7	
1962	11.3	11.4	10.7	9.8	10.5	11.7	13.5	14.3	12.9	13.4	12.2	11.3	13.2	12.5	13.0	14.1	15.3	15.1	14.5	14.2	
1963	11.5	11.6	10.9	10.1	10.8	12.0	13.7	14.5	13.1	13.7	12.4	11.7	13.5	12.8	13.3	14.3	15.5	15.3	14.8	14.5	
1964	11.5	11.6	11.0	10.2	10.9	12.0	13.7	14.4	13.1	13.6	12.5	11.7	13.4	12.8	13.3	14.3	15.4	15.2	14.7	14.4	
1965	11.5	11.5	10.9	10.1	10.8	11.9	13.5	14.2	13.0	13.5	12.3	11.6	13.3	12.6	13.1	14.0	15.1	14.9	14.4	14.2	
1966	10.8	10.9	10.3	9.5	10.1	11.1	12.7	13.4	12.2	12.6	11.5	10.7	12.3	11.6	12.1	12.9	13.9	13.6	13.1	12.8	
1967	11.0	11.1	10.5	9.8	10.4	11.4	12.9	13.6	12.4	12.8	11.7	11.0	12.5	11.9	12.3	13.2	14.1	13.9	13.4	13.1	
1968	10.9	11.0	10.4	9.7	10.2	11.2	12.7	13.3	12.2	12.6	11.5	10.8	12.3	11.7	12.1	12.9	13.8	13.6	13.1	12.8	
1969	10.3	10.4	9.8	9.1	9.6	10.6	12.0	12.6	11.4	11.8	10.8	10.1	11.5	10.8	11.2	11.9	12.8	12.5	12.0	11.7	
1970	10.0	10.1	9.5	8.8	9.3	10.2	11.6	12.2	11.1	11.4	10.4	9.7	11.1	10.4	10.8	11.5	12.3	12.0	11.5	11.2	

*S&P 500 total returns minus 30-day Treasury bill total returns. For 30-day Treasury bills, the income return and total return are the same.

Risk Premia Over Time Report 2006

Table A-3 (Page 2 of 6)

Short-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of																			
	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	10.0	10.1	9.5	8.8	9.3	10.2	11.6	12.1	11.0	11.4	10.4	9.7	11.0	10.4	10.7	11.4	12.2	11.9	11.4	11.1
1972	10.1	10.2	9.6	8.9	9.5	10.3	11.7	12.2	11.1	11.5	10.5	9.8	11.1	10.5	10.9	11.5	12.3	12.0	11.5	11.3
1973	9.5	9.5	9.0	8.3	8.8	9.6	10.9	11.4	10.3	10.6	9.6	9.0	10.2	9.6	9.9	10.5	11.2	10.9	10.4	10.1
1974	8.6	8.6	8.0	7.3	7.8	8.6	9.8	10.3	9.2	9.5	8.5	7.9	9.0	8.4	8.7	9.2	9.8	9.5	9.0	8.6
1975	9.0	9.1	8.5	7.9	8.3	9.1	10.3	10.8	9.7	10.0	9.1	8.5	9.6	9.0	9.3	9.8	10.5	10.2	9.7	9.4
1976	9.2	9.2	8.7	8.1	8.5	9.3	10.5	11.0	10.0	10.2	9.3	8.7	9.8	9.3	9.5	10.1	10.7	10.4	10.0	9.7
1977	8.8	8.8	8.3	7.7	8.1	8.9	10.0	10.4	9.5	9.7	8.8	8.2	9.3	8.7	9.0	9.5	10.1	9.8	9.3	9.0
1978	8.6	8.6	8.1	7.5	7.9	8.7	9.8	10.2	9.2	9.5	8.6	8.0	9.0	8.5	8.7	9.2	9.8	9.5	9.0	8.7
1979	8.6	8.6	8.1	7.5	7.9	8.6	9.7	10.1	9.2	9.4	8.6	8.0	9.0	8.5	8.7	9.2	9.7	9.5	9.0	8.7
1980	8.9	8.9	8.4	7.8	8.2	8.9	10.0	10.4	9.5	9.7	8.9	8.3	9.3	8.8	9.0	9.5	10.0	9.8	9.3	9.1
1981	8.3	8.3	7.9	7.3	7.6	8.3	9.4	9.8	8.9	9.1	8.2	7.7	8.6	8.1	8.3	8.8	9.3	9.0	8.6	8.3
1982	8.4	8.4	7.9	7.3	7.7	8.4	9.4	9.8	8.9	9.1	8.3	7.7	8.7	8.2	8.4	8.8	9.3	9.1	8.6	8.3
1983	8.5	8.5	8.0	7.4	7.8	8.5	9.5	9.9	9.0	9.2	8.4	7.9	8.8	8.3	8.5	8.9	9.4	9.2	8.8	8.5
1984	8.3	8.3	7.8	7.2	7.6	8.3	9.3	9.6	8.7	8.9	8.2	7.6	8.5	8.1	8.2	8.7	9.1	8.9	8.5	8.2
1985	8.5	8.5	8.1	7.5	7.9	8.6	9.5	9.9	9.0	9.3	8.5	8.0	8.9	8.4	8.6	9.0	9.5	9.2	8.8	8.6
1986	8.6	8.6	8.2	7.6	8.0	8.6	9.6	9.9	9.1	9.3	8.6	8.1	8.9	8.5	8.7	9.1	9.5	9.3	8.9	8.7
1987	8.5	8.5	8.0	7.5	7.8	8.5	9.4	9.7	8.9	9.1	8.4	7.9	8.8	8.3	8.5	8.9	9.3	9.1	8.7	8.5
1988	8.5	8.5	8.1	7.5	7.9	8.5	9.4	9.8	9.0	9.2	8.4	7.9	8.8	8.3	8.5	8.9	9.3	9.1	8.7	8.5
1989	8.7	8.7	8.3	7.8	8.1	8.7	9.7	10.0	9.2	9.4	8.7	8.2	9.1	8.6	8.8	9.2	9.6	9.4	9.1	8.8
1990	8.4	8.4	8.0	7.5	7.8	8.4	9.3	9.6	8.9	9.0	8.3	7.9	8.7	8.3	8.4	8.8	9.2	9.0	8.6	8.4
1991	8.7	8.7	8.3	7.8	8.1	8.7	9.6	9.9	9.1	9.3	8.6	8.2	9.0	8.6	8.7	9.1	9.5	9.3	9.0	8.8
1992	8.6	8.6	8.2	7.7	8.0	8.6	9.5	9.8	9.1	9.2	8.6	8.1	8.9	8.5	8.7	9.0	9.4	9.2	8.9	8.7
1993	8.6	8.6	8.2	7.7	8.0	8.6	9.4	9.8	9.0	9.2	8.5	8.1	8.9	8.5	8.6	9.0	9.4	9.2	8.8	8.6
1994	8.4	8.4	8.0	7.5	7.9	8.4	9.3	9.6	8.8	9.0	8.4	7.9	8.7	8.3	8.4	8.8	9.2	8.9	8.6	8.4
1995	8.8	8.8	8.4	7.9	8.2	8.8	9.6	9.9	9.2	9.4	8.7	8.3	9.1	8.7	8.8	9.2	9.6	9.4	9.1	8.9
1996	8.9	8.9	8.5	8.1	8.4	8.9	9.7	10.0	9.3	9.5	8.9	8.5	9.2	8.8	9.0	9.3	9.7	9.5	9.2	9.0
1997	9.2	9.2	8.8	8.3	8.7	9.2	10.0	10.3	9.6	9.8	9.2	8.8	9.5	9.2	9.3	9.7	10.1	9.9	9.6	9.4
1998	9.4	9.4	9.0	8.6	8.9	9.4	10.2	10.5	9.8	10.0	9.4	9.0	9.8	9.4	9.6	9.9	10.3	10.1	9.8	9.7
1999	9.4	9.5	9.1	8.7	9.0	9.5	10.3	10.6	9.9	10.1	9.5	9.2	9.9	9.5	9.7	10.0	10.4	10.2	10.0	9.8
2000	9.1	9.1	8.8	8.3	8.7	9.2	9.9	10.2	9.6	9.7	9.2	8.8	9.5	9.1	9.3	9.6	10.0	9.8	9.5	9.3
2001	8.8	8.8	8.5	8.0	8.3	8.8	9.6	9.8	9.2	9.4	8.8	8.4	9.1	8.7	8.9	9.2	9.5	9.4	9.1	8.9
2002	8.4	8.4	8.0	7.6	7.9	8.4	9.1	9.4	8.7	8.9	8.3	7.9	8.6	8.2	8.4	8.7	9.0	8.8	8.5	8.3
2003	8.6	8.6	8.3	7.9	8.1	8.6	9.4	9.6	9.0	9.1	8.6	8.2	8.9	8.5	8.7	9.0	9.3	9.1	8.8	8.7
2004	8.6	8.6	8.3	7.9	8.2	8.6	9.4	9.6	9.0	9.2	8.6	8.2	8.9	8.5	8.7	9.0	9.3	9.1	8.9	8.7
2005	8.5	8.5	8.2	7.8	8.1	8.6	9.3	9.5	8.9	9.1	8.5	8.1	8.8	8.4	8.6	8.9	9.2	9.0	8.7	8.6

*S&P 500 total returns minus 30-day Treasury bill total returns. For 30-day Treasury bills, the income return and total return are the same.

Risk Premia Over Time Report 2006

Table A-3 (Page 3 of 6)

Short-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1946	-8.4																				
1947	-1.6	5.2																			
1948	0.5	4.9	4.7																		
1949	4.8	9.2	11.2	17.7																	
1950	9.9	14.5	17.6	24.1	30.5																
1951	12.0	16.1	18.9	23.6	26.5	22.5															
1952	12.7	16.2	18.4	21.9	23.3	19.6	16.7														
1953	10.8	13.5	14.9	16.9	16.7	12.1	6.9	-2.8													
1954	15.3	18.3	20.2	22.7	23.7	22.0	21.9	24.5	51.8												
1955	16.8	19.6	21.4	23.8	24.8	23.6	23.9	26.3	40.9	30.0											
1956	15.6	18.0	19.5	21.3	21.8	20.4	19.9	20.8	28.6	17.0	4.1										
1957	13.2	15.1	16.1	17.4	17.4	15.5	14.3	13.8	18.0	6.7	-4.9	-13.9									
1958	15.4	17.4	18.5	19.8	20.1	18.8	18.2	18.5	22.7	15.5	10.7	14.0	41.8								
1959	14.9	16.7	17.7	18.9	19.0	17.7	17.1	17.1	20.5	14.2	10.3	12.3	25.4	9.0							
1960	13.8	15.4	16.1	17.1	17.0	15.7	14.9	14.7	17.2	11.5	7.8	8.7	16.2	3.4	-2.2						
1961	14.5	16.0	16.8	17.7	17.7	16.5	15.9	15.8	18.2	13.4	10.6	11.9	18.3	10.5	11.3	24.8					
1962	12.9	14.3	14.9	15.6	15.4	14.2	13.4	13.1	14.9	10.3	7.4	8.0	12.4	5.0	3.7	6.6	-11.5				
1963	13.3	14.6	15.2	15.9	15.7	14.6	14.0	13.7	15.4	11.3	9.0	9.7	13.6	8.0	7.7	11.0	4.1	19.7			
1964	13.3	14.5	15.0	15.7	15.6	14.5	13.9	13.6	15.1	11.5	9.4	10.1	13.5	8.8	8.7	11.5	7.1	16.3	12.9		
1965	13.1	14.2	14.7	15.3	15.1	14.1	13.5	13.2	14.6	11.2	9.3	9.9	12.9	8.8	8.7	10.9	7.4	13.7	10.7	8.5	
1966	11.7	12.7	13.1	13.6	13.4	12.3	11.6	11.2	12.3	9.0	7.1	7.4	9.8	5.8	5.3	6.6	3.0	6.6	2.2	-3.1	
1967	12.1	13.1	13.5	13.9	13.7	12.7	12.1	11.8	12.9	9.9	8.2	8.6	10.8	7.4	7.2	8.5	5.8	9.2	6.6	4.5	
1968	11.8	12.7	13.1	13.5	13.3	12.3	11.7	11.4	12.4	9.6	8.0	8.3	10.4	7.2	7.0	8.2	5.8	8.7	6.5	4.8	
1969	10.7	11.5	11.8	12.2	11.9	10.9	10.3	9.9	10.7	7.9	6.4	6.5	8.2	5.2	4.8	5.6	3.2	5.3	2.9	0.8	
1970	10.2	10.9	11.2	11.5	11.2	10.2	9.6	9.2	9.9	7.3	5.8	5.9	7.4	4.5	4.1	4.8	2.5	4.3	2.1	0.3	
1971	10.2	10.9	11.1	11.4	11.1	10.2	9.6	9.2	9.9	7.4	6.0	6.2	7.6	5.0	4.6	5.2	3.3	4.9	3.1	1.7	
1972	10.3	11.1	11.3	11.6	11.3	10.4	9.9	9.5	10.2	7.9	6.6	6.7	8.1	5.7	5.4	6.1	4.4	5.9	4.4	3.3	
1973	9.2	9.9	10.0	10.3	9.9	9.0	8.4	8.0	8.6	6.3	5.0	5.0	6.2	3.9	3.5	3.9	2.2	3.4	1.8	0.6	
1974	7.7	8.3	8.4	8.5	8.2	7.2	6.6	6.1	6.5	4.3	2.9	2.9	3.8	1.5	1.0	1.2	-0.6	0.3	-1.5	-2.9	
1975	8.5	9.1	9.2	9.4	9.1	8.2	7.6	7.2	7.7	5.6	4.3	4.4	5.4	3.2	2.9	3.2	1.7	2.7	1.3	0.2	
1976	8.8	9.4	9.5	9.7	9.4	8.6	8.1	7.7	8.1	6.2	5.0	5.1	6.1	4.1	3.8	4.2	2.8	3.8	2.6	1.7	
1977	8.2	8.7	8.8	9.0	8.6	7.8	7.3	6.9	7.3	5.4	4.2	4.2	5.2	3.2	2.9	3.2	1.9	2.7	1.5	0.7	
1978	7.9	8.4	8.5	8.6	8.3	7.5	7.0	6.6	7.0	5.1	4.0	4.0	4.9	3.0	2.7	3.0	1.7	2.5	1.4	0.6	
1979	7.9	8.4	8.5	8.6	8.3	7.5	7.0	6.7	7.0	5.2	4.2	4.2	5.0	3.9	3.0	3.3	2.1	2.9	1.8	1.1	
1980	8.3	8.8	8.9	9.0	8.7	8.0	7.5	7.2	7.5	5.8	4.9	4.9	5.7	4.1	3.9	4.2	3.1	3.9	2.9	2.3	
1981	7.5	8.0	8.0	8.1	7.8	7.1	6.6	6.3	6.6	4.9	3.9	3.9	4.7	3.1	2.8	3.0	1.9	2.6	1.7	1.0	
1982	7.6	8.0	8.1	8.2	7.9	7.2	6.7	6.4	6.7	5.1	4.2	4.2	4.9	3.4	3.1	3.4	2.4	3.1	2.2	1.6	
1983	7.8	8.2	8.3	8.4	8.1	7.4	7.0	6.6	7.0	5.4	4.5	4.5	5.3	3.8	3.6	3.8	2.9	3.6	2.8	2.2	
1984	7.5	7.9	8.0	8.0	7.8	7.1	6.6	6.3	6.6	5.1	4.3	4.3	4.9	3.5	3.3	3.5	2.6	3.2	2.5	1.9	
1985	7.9	8.3	8.4	8.5	8.2	7.6	7.2	6.9	7.2	5.7	4.9	5.0	5.6	4.3	4.1	4.4	3.5	4.2	3.5	3.0	
1986	8.0	8.4	8.5	8.6	8.3	7.7	7.3	7.0	7.3	5.9	5.2	5.2	5.9	4.6	4.4	4.7	3.9	4.5	3.8	3.4	
1987	7.8	8.2	8.3	8.4	8.1	7.5	7.1	6.8	7.1	5.8	5.0	5.0	5.7	4.4	4.2	4.5	3.7	4.3	3.7	3.3	
1988	7.9	8.3	8.3	8.4	8.2	7.6	7.2	6.9	7.2	5.9	5.2	5.2	5.8	4.6	4.5	4.7	4.0	4.5	3.9	3.6	
1989	8.2	8.6	8.7	8.8	8.6	8.0	7.6	7.4	7.6	6.4	5.7	5.7	6.4	5.2	5.1	5.3	4.6	5.2	4.7	4.3	
1990	7.8	8.2	8.2	8.3	8.1	7.5	7.1	6.9	7.1	5.9	5.2	5.2	5.8	4.7	4.6	4.8	4.1	4.7	4.1	3.8	

*S&P 500 total returns minus 30-day Treasury bill total returns. For 30-day Treasury bills, the income return and total return are the same.

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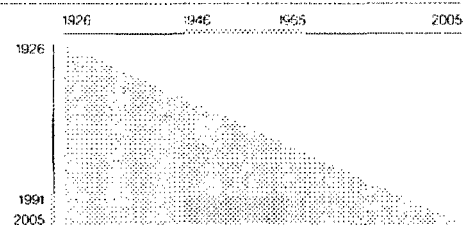
Risk Premia Over Time Report 2006

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Short-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1991		8.2	8.5	8.6	8.7	8.5	7.9	7.6	7.3	7.6	6.4	5.8	5.8	6.4	5.3	5.2	5.4	4.8	5.4	4.8	4.5
1992		8.1	8.4	8.5	8.6	8.4	7.9	7.5	7.3	7.5	6.4	5.7	5.8	6.3	5.3	5.2	5.4	4.8	5.3	4.8	4.5
1993		8.1	8.4	8.5	8.6	8.3	7.8	7.5	7.3	7.5	6.4	5.8	5.8	6.3	5.3	5.2	5.4	4.8	5.4	4.9	4.6
1994		7.8	8.2	8.2	8.3	8.1	7.6	7.2	7.0	7.3	6.2	5.5	5.6	6.1	5.1	5.0	5.2	4.6	5.1	4.7	4.4
1995		8.3	8.7	8.7	8.8	8.6	8.1	7.8	7.6	7.8	6.8	6.2	6.3	6.8	5.8	5.7	6.0	5.4	5.9	5.5	5.3
1996		8.5	8.8	8.9	9.0	8.8	8.3	8.0	7.8	8.1	7.0	6.5	6.5	7.1	6.2	6.1	6.3	5.8	6.3	5.9	5.7
1997		8.9	9.2	9.3	9.4	9.2	8.8	8.5	8.3	8.5	7.5	7.0	7.1	7.6	6.7	6.7	6.9	6.4	6.9	6.5	6.3
1998		9.2	9.5	9.6	9.7	9.5	9.1	8.8	8.6	8.9	7.9	7.4	7.5	8.0	7.1	7.1	7.3	6.9	7.4	7.0	6.8
1999		9.3	9.6	9.7	9.8	9.7	9.2	8.9	8.8	9.0	8.1	7.6	7.7	8.2	7.4	7.3	7.6	7.1	7.6	7.3	7.1
2000		8.9	9.2	9.2	9.3	9.2	8.7	8.5	8.3	8.5	7.6	7.1	7.2	7.6	6.8	6.8	7.0	6.5	7.0	6.7	6.5
2001		8.4	8.7	8.8	8.9	8.7	8.3	8.0	7.8	8.0	7.1	6.6	6.6	7.1	6.3	6.2	6.4	6.0	6.4	6.1	5.9
2002		7.8	8.1	8.2	8.3	8.1	7.6	7.4	7.2	7.4	6.4	5.9	6.0	6.4	5.6	5.5	5.7	5.3	5.7	5.3	5.1
2003		8.2	8.5	8.5	8.6	8.4	8.0	7.7	7.6	7.8	6.9	6.4	6.4	6.9	6.1	6.0	6.2	5.8	6.2	5.9	5.7
2004		8.2	8.5	8.6	8.6	8.5	8.1	7.8	7.6	7.8	6.9	6.5	6.5	6.9	6.2	6.1	6.3	5.9	6.3	6.0	5.8
2005		8.1	8.4	8.4	8.5	8.3	7.9	7.7	7.5	7.7	6.8	6.4	6.4	6.8	6.1	6.0	6.2	5.8	6.2	5.9	5.7

*S&P 500 total returns minus 30-day Treasury bill total returns. For 30-day Treasury bills, the income return and total return are the same.

Risk Premia Over Time Report 2006

Table A-3 (Page 5 of 6)

Short-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966	-14.8																				
1967	2.5	19.8																			
1968	3.6	12.8	5.9																		
1969	-1.1	3.5	-4.6	-15.1																	
1970	-1.4	2.0	-3.9	-8.8	-2.5																
1971	0.5	3.6	-0.5	-2.6	3.7	9.9															
1972	2.6	5.5	2.7	1.9	7.5	12.5	15.1														
1973	-0.4	1.6	-1.4	-2.8	0.2	1.2	-3.2	-21.6													
1974	-4.2	-2.5	-6.1	-8.1	-6.7	-7.7	-13.6	-28.0	-34.5												
1975	-0.6	0.5	-1.4	-2.5	-0.4	0.1	-2.4	-8.2	-1.5	31.4											
1976	1.1	2.7	0.8	0.2	2.4	3.2	1.8	-1.5	5.2	25.1	18.8										
1977	0.0	1.4	-0.5	-1.2	0.5	1.0	-0.5	-3.6	0.8	12.6	3.2	-12.3									
1978	0.0	1.2	-0.5	-1.1	0.4	0.8	-0.5	-3.1	0.6	9.3	1.9	-6.5	-0.6								
1979	0.5	1.7	0.2	-0.3	1.2	1.6	0.5	-1.5	1.8	9.1	3.5	-1.6	3.7	8.1							
1980	1.9	3.1	1.8	1.5	3.0	3.5	2.8	1.3	4.6	11.1	7.0	4.1	9.5	14.6	21.2						
1981	0.6	1.6	0.3	-0.1	1.1	1.4	0.6	-1.0	1.5	6.7	2.6	-0.7	2.3	3.2	0.8	-19.6					
1982	1.2	2.2	1.0	0.7	1.9	2.2	1.5	0.2	2.6	7.2	3.8	1.3	4.0	5.1	4.1	-4.4	10.9				
1983	1.9	2.9	1.8	1.5	2.7	3.1	2.5	1.4	3.7	7.9	5.0	3.0	5.6	6.8	6.5	1.7	12.3	13.7			
1984	1.6	2.5	1.5	1.2	2.3	2.6	2.1	1.0	3.0	6.8	4.1	2.2	4.3	5.1	4.5	0.3	7.0	5.1	-3.6		
1985	2.7	3.6	2.8	2.6	3.7	4.1	3.7	2.8	4.8	8.4	6.1	4.7	6.8	7.9	7.8	5.2	11.4	11.5	10.4	24.4	
1986	3.2	4.1	3.3	3.1	4.2	4.6	4.2	3.5	5.4	8.7	6.7	5.4	7.4	8.4	8.5	6.4	11.5	11.7	11.1	18.4	
1987	3.0	3.9	3.1	2.9	3.9	4.3	4.0	3.2	5.0	8.0	6.1	4.9	6.7	7.5	7.4	5.4	9.6	9.3	8.2	12.2	
1988	3.3	4.2	3.4	3.3	4.3	4.7	4.3	3.7	5.4	8.2	6.4	5.4	7.0	7.8	7.7	6.0	9.7	9.5	8.7	11.7	
1989	4.2	5.0	4.3	4.3	5.2	5.6	5.4	4.8	6.5	9.2	7.6	6.8	8.3	9.2	9.3	7.9	11.4	11.5	11.1	14.0	
1990	3.6	4.3	3.7	3.6	4.4	4.8	4.5	3.9	5.4	7.9	6.4	5.5	6.9	7.5	7.4	6.0	8.9	8.7	7.9	9.9	
1991	4.4	5.2	4.5	4.5	5.4	5.8	5.5	5.0	6.5	8.9	7.5	6.8	8.1	8.8	8.9	7.8	10.5	10.5	10.1	12.0	
1992	4.4	5.1	4.5	4.5	5.3	5.7	5.5	5.0	6.4	8.7	7.3	6.6	7.9	8.5	8.5	7.5	9.9	9.8	9.4	11.0	
1993	4.5	5.2	4.6	4.6	5.4	5.7	5.6	5.1	6.4	8.6	7.3	6.6	7.8	8.4	8.4	7.4	9.7	9.6	9.2	10.6	
1994	4.2	4.9	4.4	4.3	5.1	5.4	5.2	4.8	6.0	8.0	6.8	6.1	7.2	7.7	7.7	6.7	8.7	8.6	8.1	9.3	
1995	5.2	5.8	5.3	5.3	6.1	6.5	6.3	5.9	7.2	9.2	8.1	7.5	8.6	9.1	9.2	8.4	10.4	10.4	10.1	11.3	
1996	5.6	6.2	5.8	5.8	6.5	6.9	6.8	6.4	7.6	9.6	8.5	8.0	9.1	9.6	9.7	9.0	10.9	10.9	10.7	11.9	
1997	6.3	6.9	6.5	6.5	7.3	7.7	7.6	7.3	8.5	10.4	9.4	9.0	10.0	10.6	10.7	10.1	12.0	12.0	11.9	13.1	
1998	6.8	7.5	7.1	7.1	7.9	8.3	8.2	7.9	9.1	10.9	10.0	9.6	10.7	11.2	11.4	10.9	12.7	12.8	12.7	13.9	
1999	7.1	7.7	7.4	7.4	8.2	8.5	8.5	8.2	9.4	11.1	10.3	9.9	10.9	11.5	11.7	11.2	12.9	13.0	12.9	14.0	
2000	6.4	7.1	6.7	6.7	7.4	7.7	7.7	7.4	8.5	10.1	9.3	8.9	9.8	10.3	10.4	9.8	11.4	11.4	11.3	12.2	
2001	5.8	6.4	6.0	6.0	6.7	7.0	6.9	6.6	7.6	9.2	8.3	7.9	8.7	9.2	9.2	8.6	10.0	10.0	9.8	10.6	
2002	5.0	5.6	5.2	5.2	5.8	6.0	5.9	5.6	6.5	8.0	7.1	6.7	7.4	7.8	7.8	7.2	8.4	8.3	8.0	8.7	
2003	5.6	6.2	5.8	5.8	6.4	6.7	6.6	6.3	7.2	8.7	7.9	7.5	8.2	8.6	8.6	8.1	9.3	9.2	9.0	9.7	
2004	5.7	6.3	5.9	5.9	6.5	6.8	6.7	6.4	7.3	8.7	7.9	7.5	8.3	8.6	8.6	8.1	9.3	9.3	9.0	9.7	
2005	5.6	6.2	5.8	5.8	6.4	6.6	6.5	6.3	7.2	8.5	7.7	7.3	8.1	8.4	8.4	7.9	9.0	8.9	8.7	9.3	

*S&P 500 total returns minus 30-day Treasury bill total returns. For 30-day Treasury bills, the income return and total return are the same.

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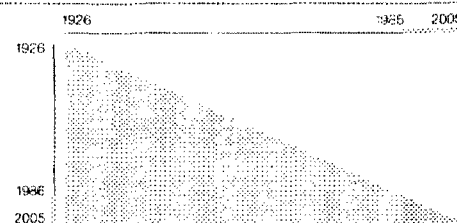
Risk Premia Over Time Report 2006

Table A-3 (Page 6 of 6)

Short-Horizon Equity Risk Premia*

Percent per annum arithmetic mean risk premia
for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1986	12.3																				
1987	6.0	-0.2																			
1988	7.5	5.1	10.5																		
1989	11.4	11.1	16.8	23.1																	
1990	6.9	5.6	7.5	6.1	-11.0																
1991	9.9	9.5	11.9	12.4	7.0	25.0															
1992	9.1	8.6	10.3	10.3	6.0	14.6	4.2														
1993	8.9	8.4	9.8	9.7	6.3	12.1	5.6	7.1													
1994	7.6	7.0	8.0	7.6	4.5	8.4	2.9	2.2	-2.6												
1995	10.0	9.8	11.0	11.1	9.1	13.1	10.1	12.1	14.6	31.8											
1996	10.7	10.6	11.8	11.9	10.3	13.9	11.7	13.5	15.7	24.9	17.9										
1997	12.2	12.2	13.4	13.7	12.6	15.9	14.4	16.5	18.8	25.9	23.0	28.1									
1998	13.1	13.1	14.3	14.7	13.8	16.9	15.7	17.7	19.8	25.4	23.2	25.9	23.7								
1999	13.3	13.4	14.5	14.9	14.1	16.8	15.8	17.5	19.2	23.6	21.5	22.7	20.0	16.4							
2000	11.4	11.3	12.2	12.4	11.4	13.7	12.4	13.4	14.3	17.1	14.2	13.3	8.4	0.7	-15.0						
2001	9.7	9.5	10.2	10.2	9.2	11.0	9.6	10.2	10.6	12.5	9.2	7.5	2.3	-4.8	-15.4	-15.7					
2002	7.7	7.5	8.0	7.8	6.6	8.1	6.6	6.8	6.8	7.9	4.5	2.3	-2.9	-9.5	-18.2	-19.7	-23.8				
2003	8.9	8.7	9.2	9.1	8.1	9.6	8.3	8.7	8.9	10.1	7.4	5.9	2.2	-2.1	-6.7	-3.9	2.0	27.7			
2004	8.9	8.7	9.2	9.2	8.2	9.6	8.4	8.8	8.9	10.1	7.7	6.4	3.3	-0.1	-3.4	-0.5	4.5	18.7	9.7		
2005	8.5	8.4	8.8	8.7	7.8	9.1	8.0	8.2	8.3	9.3	7.1	5.9	3.1	0.2	-2.5	0.0	3.9	13.1	5.8	1.9	

*S&P 500 total returns minus 30-day Treasury bill total returns. For 30-day Treasury bills, the income return and total return are the same.

Risk Premia Over Time Report 2006

Table A-4 (Page 1 of 6)

Mid-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926																					
1927																					
1928																					
1929																					
1930	-8.5																				
1931	-7.7	-7.4																			
1932	-6.2	-5.6	-5.5																		
1933	0.0	1.5	3.0	5.3																	
1934	1.4	2.9	4.5	6.8	11.7																
1935	0.0	1.2	2.3	3.9	7.3	9.7															
1936	-0.2	0.9	1.8	3.1	5.8	7.6	7.7														
1937	-0.3	0.7	1.5	2.6	5.0	6.5	6.5	6.5													
1938	-0.1	0.7	1.5	2.5	4.6	5.8	5.7	5.6	-0.5												
1939	-0.2	0.6	1.3	2.2	4.1	5.0	4.8	4.5	-0.8	-3.4											
1940	0.2	1.0	1.7	2.5	4.3	5.2	5.0	4.9	0.3	-1.7	0.7										
1941	0.5	1.3	1.9	2.8	4.4	5.2	5.1	5.1	1.0	-0.6	1.5	2.5									
1942	0.4	1.0	1.6	2.4	3.8	4.6	4.4	4.3	0.6	-0.8	0.9	1.5	1.9								
1943	0.8	1.5	2.1	2.8	4.2	4.8	4.7	4.6	1.4	0.2	1.8	2.5	2.9	3.3							
1944	1.2	1.8	2.4	3.1	4.3	5.0	4.8	4.7	1.9	0.9	2.4	3.1	3.4	3.8	5.2						
1945	1.9	2.5	3.1	3.8	5.0	5.6	5.5	5.4	2.9	2.2	3.6	4.3	4.8	5.3	7.0	7.2					
1946	1.8	2.4	2.9	3.6	4.7	5.3	5.1	5.0	2.7	1.9	3.3	3.9	4.2	4.6	5.8	5.6	5.4				
1947	1.4	2.0	2.5	3.1	4.1	4.6	4.5	4.3	2.1	1.4	2.5	3.0	3.3	3.5	4.4	3.9	3.4	3.8			
1948	1.1	1.7	2.1	2.7	3.6	4.1	3.9	3.8	1.6	0.9	2.0	2.3	2.5	2.7	3.4	3.0	2.6	3.0	2.2		
1949	1.1	1.7	2.1	2.6	3.5	3.9	3.7	3.6	1.6	0.9	1.9	2.2	2.4	2.5	3.2	2.8	2.4	2.7	2.0	1.1	
1950	0.9	1.3	1.7	2.2	3.0	3.4	3.2	3.0	1.1	0.5	1.4	1.6	1.7	1.8	2.4	2.0	1.6	1.6	0.9	0.0	
1951	0.5	1.0	1.3	1.7	2.5	2.8	2.6	2.3	0.6	0.0	0.7	0.9	1.0	1.0	1.6	1.2	0.7	0.6	-0.1	-1.0	
1952	0.2	0.6	0.9	1.3	2.0	2.3	2.0	1.8	0.1	-0.4	0.2	0.4	0.4	0.4	1.0	0.6	0.1	0.0	-0.7	-1.7	
1953	0.2	0.6	0.9	1.3	1.9	2.2	2.0	1.8	0.2	-0.3	0.3	0.4	0.5	0.5	1.0	0.7	0.3	0.2	-0.4	-1.2	
1954	0.1	0.5	0.8	1.1	1.7	2.0	1.7	1.5	0.1	-0.4	0.2	0.3	0.3	0.4	1.1	0.9	0.6	0.5	0.0	-0.8	
1955	-0.4	0.0	0.2	0.5	1.0	1.3	1.0	0.8	-0.5	-0.9	-0.5	-0.5	-0.4	-0.3	0.5	0.4	0.2	0.0	-0.4	-1.2	
1956	-0.3	0.0	0.3	0.5	1.1	1.3	1.1	1.0	-0.3	-0.7	-0.3	-0.3	-0.1	0.0	0.8	0.8	0.6	0.5	0.1	-0.6	
1957	-0.3	0.1	0.3	0.5	1.1	1.3	1.1	1.0	-0.2	-0.6	-0.2	-0.2	0.0	0.1	0.7	0.7	0.6	0.5	0.1	-0.6	
1958	0.0	0.3	0.5	0.8	1.3	1.5	1.3	1.2	0.1	-0.2	0.2	0.2	0.3	0.5	1.3	1.3	1.2	1.2	0.9	0.3	
1959	0.0	0.3	0.6	0.8	1.3	1.5	1.3	1.3	0.2	-0.1	0.3	0.3	0.5	0.6	1.4	1.4	1.4	1.3	1.1	0.6	
1960	0.1	0.4	0.6	0.9	1.4	1.6	1.4	1.3	0.3	0.0	0.4	0.4	0.6	0.8	1.5	1.5	1.5	1.5	1.2	0.7	
1961	0.1	0.4	0.6	0.8	1.3	1.5	1.3	1.2	0.3	0.0	0.4	0.4	0.6	0.7	1.4	1.5	1.4	1.4	1.1	0.7	
1962	0.0	0.3	0.5	0.7	1.2	1.4	1.2	1.1	0.2	-0.1	0.2	0.3	0.4	0.5	1.1	1.1	1.0	1.0	0.7	0.3	
1963	-0.2	0.1	0.2	0.4	0.9	1.0	0.9	0.8	-0.1	-0.4	-0.1	-0.1	0.1	0.2	0.8	0.8	0.7	0.6	0.3	-0.1	
1964	-0.2	0.1	0.2	0.4	0.8	1.0	0.8	0.8	-0.1	-0.3	0.0	0.0	0.1	0.2	0.8	0.8	0.7	0.7	0.4	0.0	
1965	0.1	0.4	0.5	0.7	1.1	1.3	1.2	1.1	0.3	0.1	0.4	0.4	0.5	0.7	1.2	1.3	1.2	1.2	0.9	0.6	
1966	0.3	0.5	0.7	0.9	1.3	1.5	1.3	1.3	0.5	0.3	0.6	0.6	0.7	0.9	1.4	1.4	1.3	1.3	1.1	0.8	
1967	0.6	0.8	1.0	1.2	1.6	1.8	1.7	1.6	0.9	0.7	1.0	1.0	1.2	1.3	1.8	1.9	1.8	1.8	1.6	1.4	
1968	0.8	1.0	1.2	1.4	1.8	2.0	1.9	1.8	1.1	0.9	1.2	1.2	1.4	1.6	2.1	2.1	2.0	2.1	1.9	1.6	
1969	0.6	0.9	1.1	1.3	1.6	1.8	1.7	1.6	0.9	0.7	1.0	1.0	1.2	1.3	1.7	1.7	1.6	1.6	1.4	1.1	
1970	0.5	0.7	0.9	1.1	1.4	1.6	1.5	1.4	0.7	0.4	0.7	0.8	0.9	0.9	1.3	1.2	1.1	1.1	0.9	0.6	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-4 (Page 2 of 6)

Mid-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of																			
	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	0.6	0.6	1.0	1.2	1.5	1.7	1.6	1.5	0.8	0.6	0.9	0.9	1.0	1.1	1.4	1.4	1.3	1.3	1.0	0.8
1972	0.3	0.6	0.7	0.9	1.2	1.4	1.2	1.2	0.5	0.2	0.5	0.5	0.6	0.7	1.0	1.0	0.9	0.8	0.6	0.4
1973	0.1	0.3	0.5	0.6	1.0	1.1	1.0	0.9	0.1	-0.1	0.2	0.2	0.2	0.3	0.5	0.4	0.3	0.2	0.0	-0.3
1974	0.3	0.5	0.6	0.8	1.1	1.3	1.2	1.1	0.4	0.2	0.4	0.5	0.5	0.6	0.8	0.7	0.6	0.6	0.4	0.1
1975	0.6	0.6	0.9	1.1	1.4	1.6	1.5	1.4	0.7	0.5	0.8	0.8	0.9	0.9	1.2	1.1	1.0	1.0	0.8	0.6
1976	0.8	1.0	1.2	1.4	1.7	1.8	1.7	1.7	1.0	0.8	1.1	1.1	1.2	1.3	1.5	1.4	1.3	1.3	1.2	0.9
1977	1.1	1.3	1.4	1.6	1.9	2.1	2.0	2.0	1.3	1.1	1.4	1.4	1.5	1.6	1.8	1.7	1.7	1.7	1.5	1.3
1978	1.1	1.3	1.5	1.7	2.0	2.1	2.0	2.0	1.4	1.2	1.4	1.5	1.6	1.6	1.9	1.8	1.7	1.7	1.6	1.4
1979	1.3	1.6	1.7	1.9	2.2	2.4	2.3	2.2	1.6	1.4	1.7	1.7	1.8	1.9	2.1	2.0	2.0	2.0	1.9	1.7
1980	1.2	1.5	1.6	1.8	2.1	2.2	2.1	2.1	1.5	1.3	1.6	1.6	1.7	1.8	2.0	1.9	1.8	1.9	1.7	1.6
1981	1.4	1.6	1.8	2.0	2.3	2.4	2.3	2.3	1.7	1.5	1.8	1.8	1.9	2.0	2.2	2.1	2.1	2.1	2.0	1.8
1982	1.4	1.6	1.8	2.0	2.3	2.4	2.3	2.3	1.7	1.6	1.8	1.9	2.0	2.0	2.2	2.1	2.1	2.1	2.0	1.8
1983	1.5	1.7	1.8	2.0	2.3	2.4	2.3	2.3	1.7	1.6	1.8	1.9	2.0	2.0	2.2	2.2	2.1	2.2	2.0	1.9
1984	1.3	1.5	1.7	1.8	2.1	2.2	2.2	2.1	1.6	1.4	1.6	1.7	1.8	1.8	2.0	1.9	1.9	1.9	1.8	1.6
1985	1.2	1.4	1.6	1.7	2.0	2.1	2.0	2.0	1.5	1.3	1.5	1.6	1.7	1.7	1.9	1.8	1.8	1.8	1.7	1.5
1986	1.2	1.4	1.5	1.6	1.9	2.0	2.0	2.0	1.4	1.3	1.5	1.5	1.6	1.6	1.8	1.8	1.7	1.8	1.6	1.5
1987	1.1	1.3	1.4	1.6	1.8	2.0	1.9	1.9	1.3	1.2	1.4	1.4	1.5	1.6	1.7	1.7	1.6	1.7	1.5	1.4
1988	1.2	1.4	1.5	1.6	1.9	2.3	1.9	1.9	1.4	1.3	1.5	1.5	1.6	1.6	1.8	1.8	1.7	1.7	1.6	1.4
1989	1.0	1.2	1.3	1.4	1.7	1.8	1.8	1.8	1.2	1.1	1.3	1.3	1.4	1.4	1.6	1.6	1.5	1.5	1.4	1.2
1990	0.9	1.1	1.2	1.3	1.6	1.7	1.6	1.6	1.1	0.9	1.1	1.2	1.2	1.3	1.4	1.4	1.3	1.3	1.2	1.0
1991	1.0	1.2	1.3	1.4	1.7	1.8	1.7	1.7	1.2	1.1	1.3	1.3	1.4	1.4	1.6	1.5	1.5	1.5	1.4	1.2
1992	1.1	1.3	1.4	1.5	1.8	1.9	1.9	1.9	1.4	1.2	1.4	1.4	1.5	1.6	1.7	1.7	1.6	1.7	1.5	1.4
1993	1.2	1.4	1.5	1.6	1.9	2.0	1.9	1.9	1.4	1.3	1.5	1.5	1.6	1.6	1.8	1.8	1.7	1.7	1.6	1.5
1994	1.1	1.3	1.4	1.5	1.8	1.9	1.8	1.8	1.4	1.2	1.4	1.4	1.5	1.6	1.7	1.7	1.6	1.6	1.5	1.4
1995	1.0	1.2	1.3	1.4	1.6	1.8	1.7	1.7	1.2	1.1	1.3	1.3	1.4	1.4	1.6	1.5	1.5	1.5	1.4	1.3
1996	0.9	1.1	1.2	1.3	1.5	1.6	1.5	1.6	1.1	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.3	1.4	1.2	1.1
1997	0.7	0.9	1.0	1.1	1.3	1.4	1.4	1.4	0.9	0.8	1.0	1.0	1.1	1.1	1.3	1.2	1.2	1.2	1.1	0.9
1998	0.4	0.5	0.6	0.7	0.9	1.0	1.0	1.0	0.5	0.4	0.6	0.6	0.6	0.7	0.8	0.8	0.7	0.7	0.6	0.4
1999	0.5	0.6	0.7	0.8	1.0	1.1	1.1	1.1	0.6	0.5	0.7	0.7	0.8	0.8	1.0	0.9	0.8	0.9	0.7	0.6
2000	0.5	0.7	0.8	0.9	1.1	1.2	1.1	1.1	0.7	0.6	0.8	0.8	0.9	0.9	1.0	1.0	0.9	1.0	0.8	0.7
2001	0.7	0.8	0.9	1.0	1.2	1.3	1.3	1.3	0.9	0.7	0.9	0.9	1.0	1.0	1.2	1.1	1.1	1.1	0.9	0.8
2002	0.8	0.9	1.0	1.1	1.3	1.4	1.4	1.4	1.0	0.9	1.0	1.0	1.1	1.1	1.3	1.2	1.2	1.2	1.1	0.9
2003	0.9	1.0	1.1	1.2	1.4	1.5	1.5	1.5	1.1	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.3	1.3	1.2	1.1
2004	1.0	1.1	1.2	1.3	1.5	1.6	1.6	1.6	1.2	1.1	1.2	1.2	1.3	1.3	1.5	1.4	1.4	1.4	1.3	1.2
2005	1.0	1.2	1.3	1.4	1.6	1.7	1.6	1.6	1.2	1.1	1.3	1.3	1.4	1.4	1.5	1.5	1.5	1.5	1.4	1.3

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

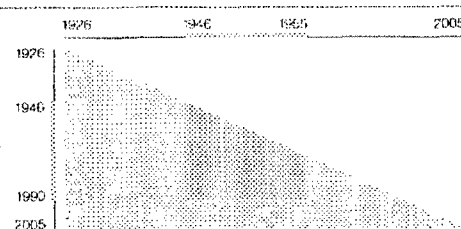
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Risk Premia Over Time Report 2006

Table A-4 (Page 3 of 6)

Mid-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

To the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1946																					
1947																					
1948																					
1949																					
1950	-3.0																				
1951	-3.7	-3.8																			
1952	-4.1	-4.0	-3.4																		
1953	-3.3	-3.2	-2.5	-1.8																	
1954	-2.6	-2.1	-1.2	-0.1	-0.5																
1955	-3.0	-2.2	-1.4	0.1	-0.2	0.1															
1956	-2.2	-1.4	-0.6	0.8	0.5	0.7	1.8														
1957	-2.1	-1.5	-0.9	0.1	-0.2	-0.3	0.2	1.0													
1958	-1.0	-0.2	0.5	1.7	1.6	1.8	2.8	3.9	5.0												
1959	-0.6	0.2	0.9	1.9	1.9	2.1	3.0	4.0	4.9	3.4											
1960	-0.4	0.5	0.9	1.8	1.7	1.9	2.5	3.4	4.0	2.7	4.2										
1961	-0.3	0.3	0.9	1.8	1.7	1.9	2.6	3.3	3.8	2.8	3.9	3.7									
1962	-0.8	-0.3	0.1	0.7	0.5	0.6	1.1	1.7	1.8	1.0	2.3	2.1	2.4								
1963	-1.1	-0.6	-0.2	0.3	0.1	0.2	0.6	1.0	1.1	0.3	1.2	0.8	0.9	-1.0							
1964	-0.9	-0.5	-0.1	0.4	0.2	0.3	0.7	1.2	1.3	0.5	1.3	0.9	0.9	-0.6	-1.5						
1965	-0.2	0.2	0.6	1.1	1.0	1.2	1.6	2.1	2.2	1.7	2.4	2.1	2.3	1.2	0.9	0.3					
1966	0.0	0.3	0.7	1.2	1.1	1.2	1.6	2.0	2.2	1.7	2.5	2.4	2.6	1.7	1.5	1.2	1.4				
1967	0.6	1.0	1.4	1.9	1.9	2.0	2.5	2.9	3.1	2.8	3.6	3.5	3.8	3.1	3.1	3.0	3.6	5.1			
1968	0.9	1.3	1.7	2.1	2.1	2.3	2.7	3.2	3.3	3.1	3.9	3.8	4.1	3.6	3.7	4.3	5.4		8.0		
1969	0.5	0.8	1.1	1.4	1.4	1.5	1.9	2.3	2.4	2.2	3.0	3.0	3.1	2.7	2.7	2.6	3.1	3.7	5.9	7.3	
1970	0.0	0.2	0.5	0.7	0.7	0.8	1.2	1.5	1.6	1.4	2.3	2.2	2.2	1.8	1.8	1.6	2.0	2.4	4.3	5.2	
1971	0.2	0.4	0.7	0.9	0.8	1.0	1.3	1.7	1.8	1.7	2.5	2.4	2.4	2.1	2.1	2.0	2.4	2.7	4.4	5.2	
1972	-0.2	-0.1	0.2	0.4	0.3	0.5	0.8	1.1	1.1	1.0	1.7	1.5	1.5	1.1	1.0	0.8	1.0	1.2	2.4	2.9	
1973	-0.8	-0.7	-0.5	-0.4	-0.5	-0.3	-0.1	0.2	0.2	0.1	0.9	0.7	0.6	0.3	0.2	0.0	0.2	0.3	1.5	1.9	
1974	-0.5	-0.4	-0.2	0.0	-0.1	0.0	0.3	0.6	0.6	0.6	1.3	1.3	1.3	0.9	0.8	0.7	0.9	1.1	2.2	2.4	
1975	0.0	0.1	0.3	0.5	0.5	0.6	0.9	1.2	1.2	1.3	2.0	2.0	2.0	1.7	1.7	1.6	1.9	2.2	3.2	3.6	
1976	0.5	0.6	0.8	1.0	0.9	1.1	1.4	1.7	1.8	1.8	2.5	2.5	2.6	2.4	2.4	2.3	2.6	2.9	3.9	4.3	
1977	0.8	1.0	1.2	1.4	1.4	1.5	1.9	2.2	2.2	2.3	3.0	3.1	3.1	3.0	3.0	3.0	3.3	3.7	4.6	5.1	
1978	0.9	1.0	1.3	1.5	1.4	1.6	1.9	2.2	2.3	2.4	3.1	3.1	3.2	3.0	3.1	3.1	3.4	3.7	4.6	5.0	
1979	1.3	1.4	1.6	1.8	1.8	2.0	2.3	2.6	2.7	2.8	3.5	3.5	3.6	3.5	3.6	3.6	3.9	4.2	5.1	5.5	
1980	1.1	1.2	1.5	1.6	1.6	1.8	2.1	2.4	2.5	2.5	3.2	3.2	3.3	3.1	3.2	3.2	3.4	3.7	4.5	4.9	
1981	1.4	1.5	1.7	1.9	1.9	2.1	2.4	2.7	2.8	2.9	3.5	3.5	3.6	3.5	3.6	3.6	3.9	4.2	5.0	5.3	
1982	1.4	1.5	1.7	1.9	1.9	2.1	2.4	2.7	2.8	2.8	3.5	3.5	3.6	3.5	3.5	3.5	3.8	4.1	4.8	5.1	
1983	1.5	1.6	1.8	2.0	2.0	2.1	2.4	2.7	2.8	2.8	3.4	3.5	3.5	3.4	3.5	3.5	3.7	4.0	4.7	4.9	
1984	1.2	1.3	1.5	1.7	1.7	1.9	2.1	2.4	2.4	2.5	3.1	3.1	3.2	3.0	3.1	3.1	3.3	3.5	4.1	4.4	
1985	1.1	1.2	1.4	1.6	1.6	1.7	2.0	2.2	2.3	2.3	2.9	2.9	2.9	2.8	2.8	2.8	3.0	3.2	3.7	3.9	
1986	1.1	1.2	1.4	1.5	1.5	1.6	1.9	2.1	2.2	2.2	2.7	2.7	2.8	2.6	2.6	2.6	2.7	2.9	3.5	3.6	
1987	1.0	1.1	1.2	1.4	1.4	1.5	1.7	2.0	2.0	2.1	2.5	2.5	2.6	2.4	2.4	2.4	2.5	2.7	3.2	3.4	
1988	1.1	1.2	1.3	1.5	1.5	1.6	1.8	2.1	2.1	2.1	2.6	2.6	2.7	2.5	2.5	2.5	2.6	2.8	3.3	3.4	
1989	0.9	1.0	1.1	1.3	1.3	1.4	1.6	1.8	1.8	1.8	2.3	2.3	2.3	2.1	2.1	2.1	2.2	2.4	2.8	2.9	
1990	0.7	0.8	0.9	1.1	1.0	1.1	1.3	1.5	1.6	1.6	2.0	2.0	2.0	1.9	1.8	1.8	1.9	2.0	2.4	2.5	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

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Mid-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1946	1966	2005																
	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	
1991	0.9	1.0	1.1	1.3	1.2	1.3	1.5	1.8	1.8	1.8	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.3	2.7	2.8	
1992	1.1	1.1	1.3	1.4	1.4	1.5	1.7	1.9	2.0	2.0	2.4	2.4	2.4	2.3	2.3	2.2	2.3	2.5	2.9	3.0	
1993	1.2	1.2	1.4	1.5	1.5	1.6	1.8	2.0	2.1	2.1	2.5	2.5	2.5	2.4	2.4	2.3	2.4	2.6	3.0	3.1	
1994	1.1	1.1	1.3	1.4	1.4	1.5	1.7	1.9	1.9	2.0	2.3	2.3	2.4	2.2	2.2	2.2	2.3	2.4	2.8	2.9	
1995	0.9	1.0	1.2	1.3	1.3	1.4	1.5	1.7	1.8	1.8	2.1	2.1	2.1	2.0	2.0	1.9	2.0	2.1	2.5	2.6	
1996	0.8	0.9	1.0	1.1	1.1	1.2	1.4	1.5	1.6	1.6	1.9	1.9	1.9	1.7	1.7	1.7	1.7	1.9	2.2	2.2	
1997	0.6	0.7	0.8	0.9	0.9	1.0	1.2	1.3	1.3	1.3	1.6	1.6	1.6	1.4	1.4	1.4	1.4	1.5	1.8	1.9	
1998	0.1	0.2	0.3	0.4	0.4	0.4	0.6	0.7	0.7	0.7	1.0	0.9	1.0	0.8	0.7	0.6	0.7	0.8	1.0	1.1	
1999	0.3	0.4	0.5	0.6	0.5	0.6	0.8	0.9	0.9	0.9	1.2	1.1	1.1	1.0	0.9	0.9	0.9	1.0	1.2	1.3	
2000	0.4	0.5	0.6	0.7	0.6	0.7	0.9	1.0	1.0	1.0	1.3	1.2	1.3	1.1	1.0	1.0	1.0	1.1	1.4	1.4	
2001	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.2	1.2	1.2	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.3	1.6	1.6	
2002	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.3	1.3	1.3	1.6	1.5	1.6	1.4	1.4	1.3	1.4	1.5	1.7	1.8	
2003	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.5	1.5	1.5	1.7	1.7	1.8	1.6	1.6	1.5	1.6	1.7	1.9	2.0	
2004	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.6	1.8	1.8	1.9	1.7	1.7	1.6	1.7	1.8	2.0	2.1	
2005	1.0	1.1	1.2	1.3	1.3	1.3	1.5	1.6	1.6	1.6	1.9	1.9	1.9	1.8	1.8	1.7	1.8	1.9	2.1	2.2	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

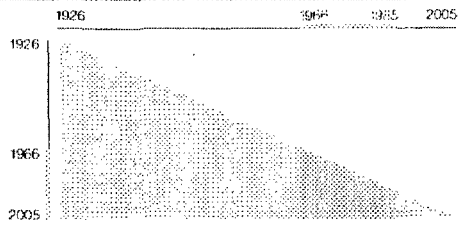
Risk Premia Over Time Report 2006

Table A-4 (Page 5 of 6)

Mid-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966																					
1967																					
1968																					
1969																					
1970	4.0																				
1971	4.1	3.3																			
1972	1.7	0.6	-1.6																		
1973	0.7	-0.4	-2.1	-4.1																	
1974	1.4	0.7	-1.0	-2.8	-2.8																
1975	2.7	2.2	1.0	-0.1	0.4	1.6															
1976	3.6	3.3	2.3	1.5	2.2	3.5	3.1														
1977	4.5	4.3	3.5	2.9	3.6	4.9	4.8	8.2													
1978	4.5	4.3	3.6	3.0	3.7	4.9	4.7	7.6	10.6												
1979	5.1	4.9	4.3	3.9	4.6	5.8	5.8	8.4	11.1	11.3											
1980	4.4	4.2	3.6	3.1	3.7	4.7	4.6	6.7	9.0	8.7	7.9										
1981	4.9	4.7	4.2	3.8	4.4	5.4	5.3	7.3	9.2	9.3	8.6	7.6									
1982	4.7	4.6	4.0	3.7	4.2	5.1	5.0	6.7	8.5	8.5	7.6	6.6	5.4								
1983	4.5	4.4	3.9	3.5	4.1	4.9	4.8	6.3	7.9	7.8	7.0	6.1	4.9	5.1							
1984	4.0	3.8	3.3	2.9	3.4	4.0	3.9	5.2	6.5	6.3	5.5	4.5	3.2	3.1	1.2						
1985	3.5	3.4	2.8	2.5	2.9	3.5	3.4	4.5	5.8	5.4	4.6	3.6	2.4	2.2	0.5	1.2					
1986	3.2	3.1	2.5	2.2	2.6	3.1	3.0	4.0	5.1	4.9	4.0	3.0	2.0	1.7	0.2	0.7	-1.2				
1987	3.0	2.8	2.3	1.9	2.3	2.8	2.6	3.5	4.5	4.3	3.4	2.5	1.5	1.2	-0.3	0.0	-1.6	-2.4			
1988	3.0	2.9	2.3	2.0	2.4	2.9	2.7	3.6	4.5	4.3	3.5	2.6	1.7	1.5	0.3	0.6	-0.7	-1.2	-2.2		
1989	2.5	2.3	1.8	1.5	1.8	2.3	2.1	2.9	3.8	3.5	2.7	1.9	1.0	0.7	-0.5	-0.2	-1.5	-2.0	-2.9	-1.9	
1990	2.1	2.0	1.5	1.1	1.4	1.8	1.6	2.3	3.1	2.9	2.0	1.2	0.3	0.0	-1.1	-1.0	-2.2	-2.8	-3.7	-3.0	
1991	2.4	2.3	1.8	1.5	1.8	2.2	2.0	2.7	3.5	3.2	2.5	1.8	1.0	0.8	-0.2	0.0	-1.0	-1.4	-2.0	-1.1	
1992	2.6	2.5	2.0	1.8	2.1	2.5	2.3	3.0	3.8	3.6	2.9	2.2	1.5	1.3	0.5	0.7	-0.1	-0.4	-0.8	0.1	
1993	2.7	2.6	2.2	1.9	2.2	2.6	2.5	3.1	3.9	3.7	3.1	2.4	1.8	1.7	0.9	1.1	0.4	0.2	-0.1	0.8	
1994	2.5	2.4	2.0	1.7	2.0	2.4	2.2	2.8	3.5	3.3	2.7	2.1	1.5	1.3	0.6	0.8	0.1	-0.1	-0.4	0.3	
1995	2.2	2.1	1.7	1.4	1.7	2.0	1.9	2.4	3.1	2.9	2.3	1.7	1.1	1.0	0.2	0.4	-0.3	-0.4	-0.8	-0.1	
1996	1.9	1.8	1.4	1.1	1.3	1.7	1.5	2.0	2.7	2.5	1.9	1.3	0.7	0.6	-0.1	0.0	-0.7	-0.8	-1.2	-0.6	
1997	1.5	1.4	1.0	0.7	0.9	1.3	1.1	1.6	2.2	2.0	1.4	0.8	0.3	0.1	-0.6	-0.4	-1.1	-1.2	-1.6	-1.0	
1998	0.7	0.5	0.1	-0.2	0.0	0.3	0.1	0.5	1.1	0.8	0.3	-0.4	-1.0	-1.2	-1.9	-1.8	-2.5	-2.8	-3.2	-2.9	
1999	0.9	0.8	0.4	0.1	0.3	0.6	0.4	0.9	1.4	1.2	0.6	0.1	-0.5	-0.7	-1.3	-1.3	-1.9	-2.1	-2.5	-2.1	
2000	1.1	0.9	0.5	0.3	0.5	0.8	0.6	1.0	1.6	1.3	0.8	0.3	-0.3	-0.4	-1.0	-0.9	-1.5	-1.7	-2.0	-1.6	
2001	1.3	1.2	0.8	0.6	0.8	1.0	0.9	1.3	1.8	1.6	1.1	0.6	0.1	-0.1	-0.6	-0.6	-1.1	-1.2	-1.5	-1.1	
2002	1.5	1.4	1.0	0.8	0.9	1.2	1.1	1.4	1.9	1.8	1.3	0.8	0.3	0.2	-0.4	-0.3	-0.7	-0.9	-1.1	-0.8	
2003	1.7	1.6	1.3	1.0	1.2	1.5	1.4	1.8	2.2	2.1	1.6	1.2	0.7	0.6	0.1	0.2	-0.2	-0.3	-0.5	-0.1	
2004	1.8	1.7	1.4	1.2	1.4	1.6	1.5	1.9	2.4	2.2	1.8	1.3	0.9	0.8	0.4	0.5	0.1	0.0	-0.2	0.2	
2005	1.9	1.8	1.5	1.3	1.7	1.8	1.6	2.0	2.5	2.4	1.9	1.5	1.1	1.0	0.6	0.7	0.3	0.3	0.1	0.5	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

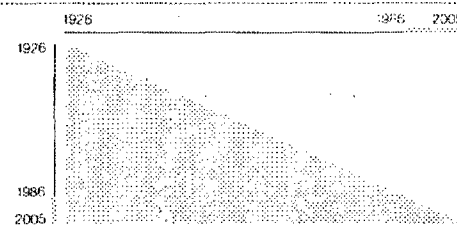
Ibbotson Associates

Risk Premia Over Time Report 2006

Table A-4 (Page 6 of 6)

Mid-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

To the end of	From the beginning of	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1986																	
1987																	
1988																	
1989																	
1990	-3.2																
1991	-1.0	-0.3															
1992	0.4	0.3	1.7														
1993	1.1	1.5	2.4	1.9													
1994	0.6	0.9	1.6	1.0	2.8												
1995	0.1	0.3	0.8	0.2	1.3	3.6											
1996	-0.4	-0.4	0.1	-0.5	0.2	2.3	0.8										
1997	-1.0	-1.0	-0.3	-0.9	-0.4	1.7	0.5	-1.2									
1998	-2.9	-3.1	-2.9	-3.7	-3.5	-2.5	-4.2	-6.6	-9.3								
1999	-2.1	-2.2	-1.9	-2.6	-2.3	-1.2	-2.6	-4.4	-6.2	-6.8							
2000	-1.6	-1.6	-1.2	-1.8	-1.5	-0.4	-1.7	-3.0	-4.3	-4.3	-4.7						
2001	-1.1	-1.0	-0.8	-1.2	-0.8	0.0	-1.1	-2.2	-3.2	-3.1	-3.0	-2.5					
2002	-0.7	-0.7	-0.4	-0.8	-0.3	0.4	-0.6	-1.5	-2.4	-2.2	-2.0	-1.4	0.6				
2003	0.0	0.1	0.4	0.1	0.5	1.3	0.5	-0.3	-0.9	-0.6	-0.2	0.6	2.4	7.7			
2004	0.3	0.4	0.7	0.5	0.9	1.6	0.9	0.3	-0.2	0.1	0.5	1.4	3.1	7.6	7.2		
2005	0.6	0.7	1.0	0.8	1.2	1.9	1.3	0.7	0.3	0.6	1.1	1.9	3.5	7.4	7.1	8.3	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-5 (Page 1 of 6)

Low-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926																					
1927																					
1928																					
1929																					
1930	-17.0																				
1931	-14.8	-15.1																			
1932	-11.7	-11.3	-9.8																		
1933	-3.4	-1.8	1.2	6.1																	
1934	-0.5	1.3	4.5	9.3	16.9																
1935	-0.5	1.2	3.9	7.8	13.7	17.7															
1936	0.4	1.9	4.3	7.8	12.7	15.9	16.9														
1937	0.0	1.3	3.5	6.6	10.9	13.3	13.7	13.8													
1938	0.0	1.3	3.3	6.0	9.7	11.6	11.7	11.4	4.1												
1939	0.2	1.4	3.3	5.9	9.2	10.8	10.6	10.0	3.8	0.3											
1940	0.8	1.9	3.7	6.1	9.1	10.5	10.5	10.2	4.9	2.1	3.5										
1941	1.1	2.2	3.9	6.1	8.9	10.2	10.1	9.9	5.3	2.9	4.1	3.9									
1942	1.1	2.2	3.7	5.7	8.2	9.4	9.3	9.0	4.8	2.7	3.5	3.1	4.0								
1943	2.5	3.5	5.0	7.0	9.4	10.5	10.5	10.2	6.5	4.9	6.0	6.1	7.2	8.7							
1944	3.3	4.3	5.8	7.7	10.0	11.1	11.0	10.8	7.4	6.2	7.3	7.5	8.6	10.1	12.3						
1945	4.0	5.0	6.4	8.2	10.3	11.4	11.3	11.1	8.0	7.0	8.1	8.3	9.4	10.8	13.6	14.2					
1946	3.8	4.7	6.1	7.7	9.7	10.7	10.6	10.3	7.5	6.5	7.4	7.5	8.4	9.5	11.3	11.4	12.5				
1947	3.2	4.1	5.3	6.8	8.7	9.5	9.3	9.0	6.2	5.2	6.0	6.0	6.6	7.4	8.7	8.4	8.6	8.6			
1948	2.6	3.4	4.6	6.0	7.7	8.4	8.2	7.9	5.2	4.3	4.8	4.6	5.2	5.8	6.8	6.5	6.7	6.6	3.7		
1949	2.4	3.2	4.2	5.6	7.1	7.8	7.6	7.2	4.7	3.8	4.2	4.0	4.5	5.0	5.9	5.5	5.5	5.2	2.7	-0.4	
1950	2.2	2.9	3.9	5.1	6.6	7.2	6.9	6.5	4.1	3.3	3.7	3.4	3.8	4.3	5.3	4.9	4.8	4.2	2.1	-0.6	
1951	1.5	2.2	3.1	4.3	5.6	6.2	5.8	5.4	3.0	2.2	2.5	2.2	2.5	2.9	3.9	3.4	3.1	2.4	0.4	-2.1	
1952	1.0	1.6	2.5	3.6	4.8	5.3	4.9	4.5	2.2	1.5	1.7	1.3	1.6	1.9	2.9	2.4	2.2	1.4	-0.5	-2.9	
1953	1.0	1.6	2.4	3.4	4.6	5.0	4.7	4.3	2.2	1.4	1.6	1.2	1.5	1.8	2.7	2.3	2.1	1.4	-0.3	-2.4	
1954	0.7	1.2	2.0	2.9	4.0	4.5	4.1	3.7	1.6	1.0	1.1	0.7	1.1	1.4	2.6	2.2	2.1	1.4	0.0	-1.9	
1955	0.1	0.6	1.3	2.2	3.2	3.6	3.2	2.8	0.9	0.4	0.4	0.0	0.3	0.7	2.0	1.8	1.9	1.2	-0.1	-1.9	
1956	0.2	0.7	1.3	2.1	3.1	3.5	3.2	2.9	1.1	0.5	0.6	0.1	0.5	1.0	2.3	2.2	2.3	1.8	0.5	-1.1	
1957	0.1	0.6	1.2	2.0	2.9	3.3	3.0	2.7	1.0	0.5	0.5	0.1	0.4	0.8	1.9	1.8	1.9	1.4	0.1	-1.4	
1958	0.3	0.8	1.4	2.2	3.1	3.5	3.2	2.9	1.3	0.8	0.9	0.5	0.9	1.3	2.6	2.6	2.7	2.2	1.2	-0.2	
1959	0.4	0.9	1.5	2.2	3.1	3.5	3.2	2.9	1.4	1.0	1.0	0.6	1.1	1.5	2.8	2.8	2.9	2.5	1.6	0.3	
1960	0.4	0.8	1.4	2.1	2.9	3.3	3.0	2.8	1.3	0.9	0.9	0.6	1.0	1.4	2.5	2.6	2.7	2.3	1.3	0.1	
1961	0.3	0.7	1.3	1.9	2.7	3.1	2.8	2.5	1.1	0.7	0.8	0.4	0.8	1.3	2.4	2.4	2.5	2.1	1.2	0.1	
1962	0.1	0.6	1.1	1.7	2.5	2.8	2.6	2.3	1.0	0.6	0.6	0.2	0.6	1.0	1.8	1.8	1.8	1.4	0.5	-0.6	
1963	-0.1	0.3	0.8	1.4	2.2	2.5	2.2	2.0	0.7	0.3	0.3	-0.1	0.3	0.7	1.6	1.5	1.5	1.1	0.2	-0.8	
1964	-0.2	0.2	0.7	1.3	2.0	2.3	2.0	1.8	0.6	0.2	0.2	-0.2	0.2	0.6	1.5	1.4	1.4	1.0	0.2	-0.8	
1965	0.4	0.7	1.2	1.8	2.5	2.8	2.6	2.4	1.2	0.8	0.9	0.6	0.9	1.3	2.2	2.1	2.2	1.9	1.1	0.2	
1966	0.5	0.9	1.4	2.0	2.7	3.0	2.7	2.5	1.4	1.0	1.0	0.8	1.1	1.5	2.3	2.2	2.2	1.9	1.2	0.3	
1967	1.3	1.7	2.2	2.8	3.5	3.8	3.6	3.4	2.3	2.0	2.1	1.8	2.2	2.6	3.4	3.4	3.5	3.2	2.6	1.8	
1968	1.7	2.1	2.6	3.2	3.9	4.2	4.0	3.9	2.8	2.5	2.6	2.4	2.7	3.1	3.9	3.9	4.0	3.8	3.2	2.5	
1969	1.4	1.8	2.3	2.9	3.5	3.8	3.6	3.4	2.4	2.1	2.1	1.9	2.2	2.5	3.2	3.1	3.2	3.0	2.3	1.6	
1970	1.1	1.5	1.9	2.5	3.1	3.4	3.2	3.0	1.9	1.6	1.7	1.4	1.7	2.0	2.5	2.4	2.4	2.2	1.5	0.8	

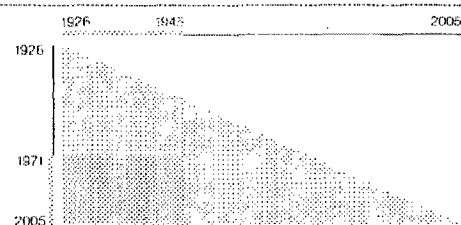
*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-5 (Page 2 of 6)

Low-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

to the end of	From the beginning of																			
	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	1.1	1.5	2.0	2.5	3.1	3.4	3.2	3.0	1.9	1.6	1.7	1.5	1.7	2.0	2.5	2.4	2.4	2.1	1.5	0.8
1972	0.8	1.1	1.5	2.0	2.6	2.9	2.7	2.5	1.5	1.2	1.2	1.0	1.2	1.4	2.0	1.8	1.8	1.6	0.9	0.3
1973	0.4	0.7	1.1	1.6	2.2	2.4	2.2	2.0	0.9	0.6	0.6	0.4	0.6	0.8	1.2	0.9	0.8	0.6	0.0	-0.7
1974	0.7	1.0	1.4	1.9	2.5	2.7	2.6	2.4	1.4	1.1	1.1	0.9	1.1	1.3	1.6	1.5	1.4	1.2	0.5	-0.1
1975	1.0	1.3	1.7	2.2	2.8	3.0	2.8	2.7	1.7	1.4	1.4	1.2	1.5	1.6	2.0	1.9	1.8	1.6	1.0	0.4
1976	1.4	1.7	2.1	2.6	3.2	3.4	3.2	3.1	2.2	1.9	1.9	1.8	2.0	2.2	2.5	2.4	2.4	2.2	1.6	1.1
1977	1.9	2.3	2.7	3.2	3.7	4.0	3.8	3.7	2.8	2.6	2.6	2.4	2.7	2.9	3.2	3.1	3.1	3.0	2.4	1.9
1978	2.1	2.4	2.8	3.3	3.8	4.1	4.0	3.9	3.0	2.7	2.8	2.6	2.8	3.0	3.3	3.2	3.2	3.1	2.6	2.1
1979	2.5	2.8	3.2	3.7	4.3	4.5	4.4	4.3	3.4	3.2	3.2	3.1	3.3	3.5	3.9	3.8	3.8	3.7	3.2	2.7
1980	2.4	2.7	3.1	3.5	4.1	4.3	4.2	4.1	3.2	3.0	3.1	2.9	3.1	3.3	3.7	3.6	3.6	3.5	3.0	2.5
1981	2.5	2.9	3.3	3.7	4.2	4.5	4.4	4.3	3.5	3.2	3.3	3.1	3.4	3.5	3.9	3.8	3.8	3.7	3.2	2.7
1982	2.6	2.9	3.3	3.8	4.3	4.5	4.4	4.3	3.5	3.3	3.4	3.2	3.5	3.6	3.9	3.9	3.9	3.8	3.3	2.9
1983	2.6	2.9	3.3	3.8	4.3	4.5	4.4	4.3	3.5	3.3	3.4	3.2	3.5	3.6	3.9	3.9	3.9	3.8	3.3	2.9
1984	2.5	2.8	3.1	3.6	4.1	4.3	4.2	4.1	3.3	3.1	3.2	3.0	3.2	3.4	3.7	3.6	3.6	3.5	3.0	2.6
1985	2.4	2.6	3.0	3.4	3.9	4.1	4.0	3.9	3.2	3.0	3.0	2.9	3.1	3.3	3.5	3.5	3.5	3.4	2.9	2.5
1986	2.2	2.4	2.8	3.2	3.7	3.9	3.8	3.7	3.0	2.8	2.8	2.6	2.9	3.0	3.3	3.2	3.2	3.1	2.7	2.3
1987	2.0	2.2	2.6	3.0	3.4	3.6	3.5	3.5	2.8	2.5	2.6	2.4	2.6	2.8	3.0	2.9	2.9	2.8	2.4	2.0
1988	2.0	2.3	2.6	3.0	3.5	3.7	3.6	3.5	2.8	2.6	2.6	2.5	2.7	2.9	3.1	3.0	3.0	2.9	2.5	2.1
1989	1.8	2.0	2.3	2.7	3.1	3.3	3.3	3.2	2.5	2.3	2.3	2.2	2.4	2.5	2.8	2.7	2.7	2.6	2.2	1.8
1990	1.5	1.8	2.1	2.5	2.9	3.1	3.0	3.0	2.3	2.0	2.0	1.9	2.1	2.2	2.4	2.4	2.3	2.2	1.8	1.4
1991	1.7	2.0	2.3	2.6	3.1	3.3	3.2	3.1	2.5	2.2	2.3	2.1	2.3	2.5	2.7	2.6	2.6	2.5	2.1	1.7
1992	1.8	2.1	2.4	2.8	3.2	3.4	3.3	3.3	2.6	2.4	2.4	2.3	2.5	2.6	2.8	2.8	2.8	2.7	2.2	1.9
1993	1.9	2.2	2.5	2.8	3.2	3.4	3.4	3.3	2.7	2.5	2.5	2.4	2.6	2.7	2.9	2.9	2.9	2.8	2.4	2.0
1994	1.9	2.1	2.4	2.8	3.2	3.4	3.3	3.3	2.6	2.4	2.4	2.3	2.5	2.6	2.9	2.8	2.8	2.7	2.3	1.9
1995	1.7	1.9	2.2	2.5	2.9	3.1	3.0	3.0	2.3	2.2	2.2	2.0	2.2	2.4	2.6	2.5	2.5	2.4	2.0	1.7
1996	1.5	1.8	2.0	2.3	2.7	2.9	2.8	2.8	2.2	2.0	2.0	1.9	2.1	2.2	2.4	2.4	2.4	2.3	1.9	1.5
1997	1.4	1.6	1.9	2.2	2.6	2.7	2.7	2.6	2.1	1.9	1.9	1.7	1.9	2.1	2.3	2.3	2.2	2.2	1.8	1.4
1998	0.9	1.1	1.4	1.7	2.0	2.2	2.1	2.1	1.5	1.3	1.3	1.2	1.4	1.5	1.7	1.7	1.6	1.5	1.1	0.8
1999	1.0	1.2	1.5	1.8	2.1	2.3	2.2	2.2	1.6	1.5	1.5	1.3	1.5	1.7	1.9	1.8	1.8	1.7	1.3	1.0
2000	1.1	1.3	1.5	1.8	2.2	2.4	2.3	2.3	1.7	1.6	1.5	1.4	1.6	1.7	1.9	1.9	1.9	1.8	1.4	1.1
2001	1.4	1.7	1.9	2.2	2.6	2.7	2.7	2.7	2.1	1.9	1.9	1.8	2.0	2.1	2.3	2.3	2.3	2.2	1.8	1.5
2002	1.5	1.7	2.0	2.3	2.6	2.8	2.8	2.8	2.2	2.0	2.0	1.9	2.1	2.2	2.4	2.3	2.3	2.3	1.9	1.6
2003	1.7	1.9	2.2	2.5	2.8	3.0	3.0	3.0	2.4	2.3	2.3	2.1	2.3	2.4	2.6	2.6	2.6	2.5	2.2	1.9
2004	1.8	2.0	2.3	2.6	2.9	3.1	3.0	3.0	2.5	2.4	2.4	2.2	2.4	2.5	2.7	2.7	2.7	2.6	2.3	2.0
2005	1.8	2.0	2.3	2.5	2.9	3.1	3.0	3.0	2.5	2.3	2.3	2.2	2.4	2.5	2.7	2.7	2.7	2.6	2.2	1.9

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

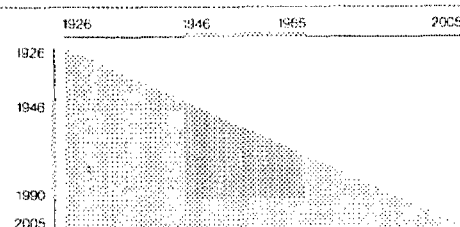
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Risk Premia Over Time Report 2006

Table A-5 (Page 3 of 6)

Low-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

To the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1946																					
1947																					
1948																					
1949																					
1950	-4.5																				
1951	-5.7	-5.9																			
1952	-6.1	-6.1	-5.1																		
1953	-5.3	-5.1	-4.1	-3.3																	
1954	-4.4	-3.8	-2.6	-1.3	-0.8																
1955	-4.3	-3.2	-2.1	-0.2	0.5	-0.2															
1956	-3.3	-2.1	-1.0	0.9	1.4	0.7	2.6														
1957	-3.5	-2.7	-1.8	-0.4	-0.3	-1.3	-0.3	0.6													
1958	-1.9	-0.9	0.2	1.7	2.1	1.7	3.2	4.6	6.4												
1959	-1.3	-0.2	0.8	2.2	2.6	2.4	3.7	5.0	6.6	4.9											
1960	-1.4	-0.5	0.4	1.6	1.9	1.5	2.5	3.5	4.5	2.9	3.6										
1961	-1.3	-0.5	0.4	1.4	1.7	1.5	2.4	3.3	4.1	2.9	3.4	2.9									
1962	-2.0	-1.4	-0.8	-0.1	0.0	-0.4	0.4	1.0	1.3	0.3	1.1	0.7	1.6								
1963	-2.1	-1.6	-1.0	-0.3	-0.2	-0.6	0.1	0.6	0.9	0.0	0.4	-0.1	0.4	-2.2							
1964	-2.0	-1.5	-0.9	-0.2	-0.2	-0.5	0.2	0.7	0.9	0.1	0.4	-0.2	0.2	-2.0	-3.5						
1965	-0.9	-0.3	0.3	1.0	1.1	0.9	1.6	2.2	2.5	1.9	2.4	2.1	2.7	1.2	0.5	0.6					
1966	-0.7	-0.2	0.3	0.9	1.1	0.9	1.5	2.0	2.3	1.8	2.4	2.2	2.9	1.6	1.1	1.5	2.2				
1967	0.9	1.4	2.1	2.7	2.9	2.9	3.6	4.3	4.7	4.5	5.2	5.2	6.0	5.3	5.3	6.1	7.7	10.1			
1968	1.6	2.1	2.8	3.4	3.6	3.6	4.4	5.1	5.5	5.4	6.2	6.3	7.0	6.6	6.8	7.7	9.2	11.4	15.1		
1969	0.8	1.1	1.7	2.2	2.3	2.3	3.0	3.6	3.8	3.8	4.6	4.7	5.2	4.8	4.8	5.4	6.7	8.0	10.9	14.1	
1970	0.0	0.2	0.7	1.1	1.2	1.1	1.7	2.3	2.4	2.4	3.2	3.2	3.6	3.2	3.1	3.5	4.4	5.3	7.6	9.7	
1971	0.0	0.3	0.7	1.1	1.2	1.2	1.8	2.3	2.4	2.5	3.2	3.2	3.5	3.2	3.1	3.5	4.3	5.1	7.0	8.7	
1972	-0.5	-0.3	0.1	0.4	0.5	0.5	1.0	1.4	1.5	1.5	2.1	2.0	2.2	1.8	1.6	1.8	2.4	2.8	4.2	5.3	
1973	-1.4	-1.3	-1.0	-0.8	-0.7	-0.8	-0.3	0.1	0.1	0.2	0.9	0.8	0.8	0.5	0.3	0.4	1.0	1.2	2.5	3.4	
1974	-0.9	-0.7	-0.4	-0.1	0.0	-0.1	0.3	0.7	0.8	0.8	1.5	1.6	1.9	1.3	1.2	1.5	1.8	2.4	3.4	4.1	
1975	-0.3	-0.1	0.2	0.5	0.6	0.5	1.0	1.4	1.5	1.6	2.3	2.3	2.6	2.2	2.1	2.4	2.8	3.4	4.5	5.2	
1976	0.4	0.6	0.9	1.3	1.4	1.4	1.9	2.3	2.4	2.6	3.3	3.3	3.6	3.3	3.3	3.6	4.1	4.7	5.8	6.6	
1977	1.3	1.5	1.9	2.2	2.3	2.4	2.9	3.3	3.5	3.7	4.4	4.5	4.9	4.7	4.7	5.1	5.7	6.3	7.4	8.3	
1978	1.5	1.7	2.0	2.4	2.5	2.5	3.0	3.5	3.7	3.9	4.6	4.8	5.1	4.9	5.0	5.4	5.9	6.6	7.6	8.4	
1979	2.1	2.3	2.7	3.1	3.2	3.3	3.8	4.3	4.5	4.7	5.4	5.6	6.0	5.9	6.0	6.4	7.0	7.6	8.7	9.5	
1980	2.0	2.1	2.5	2.8	3.0	3.0	3.5	4.0	4.1	4.4	5.1	5.2	5.5	5.4	5.4	5.8	6.3	6.9	7.8	8.5	
1981	2.2	2.4	2.8	3.1	3.2	3.3	3.8	4.2	4.4	4.6	5.3	5.5	5.8	5.7	5.8	6.1	6.6	7.2	8.1	8.8	
1982	2.4	2.5	2.9	3.2	3.3	3.4	3.9	4.3	4.5	4.7	5.4	5.5	5.9	5.7	5.8	6.2	6.6	7.2	8.0	8.7	
1983	2.4	2.6	2.9	3.3	3.4	3.5	3.9	4.4	4.5	4.7	5.3	5.5	5.8	5.6	5.7	6.0	6.5	7.0	7.8	8.4	
1984	2.2	2.3	2.6	2.9	3.1	3.1	3.6	4.0	4.1	4.3	4.9	5.0	5.3	5.2	5.2	5.5	5.9	6.4	7.1	7.6	
1985	2.0	2.2	2.5	2.8	2.9	3.0	3.4	3.8	3.9	4.1	4.6	4.7	5.0	4.8	4.8	5.1	5.5	5.9	6.6	7.0	
1986	1.8	2.0	2.2	2.5	2.6	2.7	3.0	3.4	3.5	3.7	4.2	4.2	4.5	4.3	4.3	4.5	4.8	5.2	5.8	6.2	
1987	1.5	1.6	1.9	2.2	2.2	2.3	2.6	3.0	3.1	3.2	3.7	3.8	4.0	3.8	3.8	4.0	4.2	4.6	5.2	5.5	
1988	1.6	1.8	2.0	2.3	2.4	2.4	2.8	3.1	3.2	3.3	3.8	3.9	4.1	3.9	3.9	4.1	4.3	4.7	5.2	5.5	
1989	1.3	1.4	1.7	1.9	2.0	2.0	2.4	2.7	2.8	2.9	3.3	3.3	3.5	3.3	3.2	3.4	3.6	4.0	4.4	4.7	
1990	0.9	1.1	1.3	1.5	1.6	1.6	1.9	2.2	2.3	2.4	2.8	2.8	3.0	2.8	2.7	2.9	3.1	3.4	3.8	4.0	

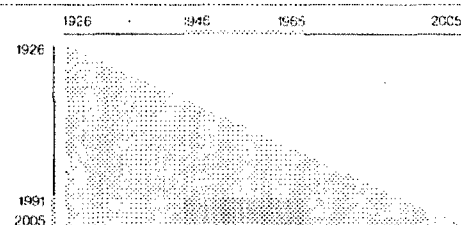
*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-5 (Page 4 of 6)

Low-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



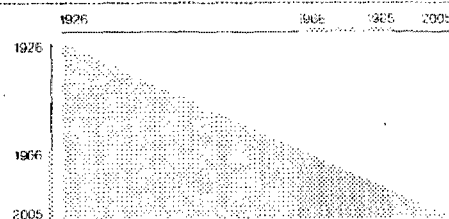
from 1926 to 2005

To the end of	From the beginning of																			
	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1991	1.3	1.4	1.6	1.9	1.9	2.0	2.3	2.6	2.7	2.7	3.1	3.2	3.4	3.1	3.1	3.3	3.4	3.7	4.1	4.4
1992	1.5	1.6	1.8	2.1	2.1	2.2	2.5	2.8	2.8	2.9	3.3	3.4	3.6	3.3	3.3	3.5	3.6	4.0	4.3	4.6
1993	1.6	1.7	2.0	2.2	2.3	2.3	2.6	2.9	3.0	3.1	3.4	3.5	3.7	3.5	3.4	3.6	3.8	4.1	4.5	4.7
1994	1.5	1.7	1.9	2.1	2.2	2.2	2.5	2.8	2.9	2.9	3.3	3.4	3.5	3.3	3.3	3.5	3.6	3.9	4.3	4.5
1995	1.3	1.4	1.6	1.8	1.9	1.9	2.2	2.5	2.5	2.6	2.9	2.9	3.1	2.9	2.8	3.0	3.1	3.4	3.7	3.9
1996	1.1	1.2	1.5	1.7	1.7	1.7	2.0	2.3	2.3	2.4	2.7	2.7	2.9	2.6	2.6	2.7	2.8	3.1	3.4	3.6
1997	1.0	1.1	1.4	1.6	1.6	1.6	1.9	2.1	2.2	2.2	2.5	2.5	2.6	2.4	2.3	2.4	2.6	2.8	3.1	3.2
1998	0.4	0.5	0.7	0.9	0.9	0.9	1.1	1.4	1.4	1.4	1.7	1.7	1.8	1.5	1.4	1.5	1.6	1.8	2.1	2.2
1999	0.6	0.7	0.9	1.1	1.1	1.1	1.4	1.6	1.6	1.6	1.9	1.9	2.0	1.7	1.7	1.8	1.8	2.1	2.3	2.4
2000	0.7	0.8	1.0	1.2	1.2	1.2	1.4	1.6	1.7	1.7	1.9	1.9	2.1	1.8	1.7	1.8	1.9	2.1	2.4	2.5
2001	1.1	1.2	1.4	1.6	1.7	1.7	1.9	2.1	2.2	2.2	2.5	2.5	2.6	2.4	2.3	2.4	2.5	2.8	3.0	3.1
2002	1.2	1.3	1.5	1.7	1.7	1.7	1.9	2.2	2.2	2.3	2.5	2.5	2.7	2.5	2.4	2.5	2.6	2.8	3.1	3.2
2003	1.5	1.6	1.8	2.0	2.0	2.0	2.3	2.5	2.6	2.6	2.9	2.9	3.0	2.8	2.8	2.9	3.0	3.2	3.5	3.6
2004	1.6	1.7	1.9	2.1	2.2	2.2	2.4	2.6	2.7	2.7	3.0	3.0	3.2	3.0	2.9	3.0	3.1	3.4	3.6	3.7
2005	1.6	1.7	1.9	2.1	2.1	2.1	2.4	2.6	2.7	2.6	3.0	3.0	3.1	2.9	2.9	3.0	3.1	3.3	3.6	3.7

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Percent per annum risk premia for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of																			
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966																				
1967																				
1968																				
1969																				
1970	7.7																			
1971	6.9	6.4																		
1972	3.3	2.3	-3.6																	
1973	1.5	0.3	-4.7	-9.2																
1974	2.2	1.7	-3.3	-7.3	-6.9															
1975	3.7	3.3	-0.6	-3.5	-2.5	-0.3														
1976	5.3	5.1	1.9	-0.2	1.2	3.6	3.5													
1977	7.3	7.3	4.6	2.9	4.5	7.0	7.4	12.2												
1978	7.5	7.5	5.1	3.7	5.2	7.5	7.9	12.0	17.3											
1979	8.8	8.8	6.8	5.7	7.2	9.4	10.1	14.0	18.8	19.6										
1980	7.8	7.8	5.8	4.7	6.0	8.0	8.5	11.6	15.6	15.4	15.9									
1981	8.1	8.2	6.3	5.3	6.6	8.4	8.8	11.7	15.0	15.3	15.5	14.2								
1982	8.0	8.0	6.3	5.4	6.5	8.2	8.6	11.1	14.1	14.3	14.2	12.8	9.8							
1983	7.7	7.7	6.1	5.2	6.3	7.9	8.2	10.4	13.1	13.2	12.9	11.5	8.7	8.7						
1984	6.9	6.9	5.3	4.4	5.4	6.8	7.0	8.9	11.2	11.1	10.7	9.2	6.5	6.0	2.2					
1985	6.3	6.3	4.8	3.9	4.8	6.1	6.2	7.9	10.1	9.8	9.2	7.8	5.2	4.7	1.4	2.4				
1986	5.5	5.5	3.9	3.1	3.9	5.1	5.1	6.6	8.6	8.3	7.6	6.1	3.7	3.1	0.1	0.5	-1.2			
1987	4.8	4.7	3.2	2.4	3.1	4.1	4.1	5.4	7.1	6.9	6.1	4.5	2.2	1.5	-1.5	-1.4	-3.2	-5.3		
1988	4.9	4.8	3.4	2.6	3.3	4.3	4.3	5.5	7.1	6.9	6.1	4.7	2.7	2.1	-0.5	-0.3	-1.7	-3.1	-4.8	
1989	4.0	3.9	2.5	1.7	2.4	3.3	3.2	4.3	5.9	5.5	4.7	3.3	1.3	0.7	-1.7	-1.6	-3.0	-4.4	-6.0	-5.4
1990	3.3	3.2	1.8	1.0	1.6	2.4	2.4	3.3	4.7	4.3	3.5	2.0	0.1	-0.6	-2.9	-3.0	-4.4	-5.8	-7.4	-7.2
1991	3.8	3.7	2.3	1.6	2.2	3.0	3.0	4.0	5.3	5.0	4.2	2.9	1.2	0.7	-1.3	-1.2	-2.3	-3.4	-4.4	-3.8
1992	4.0	3.9	2.6	2.0	2.6	3.4	3.3	4.3	5.5	5.3	4.6	3.4	1.8	1.3	-0.5	-0.3	-1.2	-2.0	-2.8	-2.0
1993	4.1	4.1	2.8	2.2	2.8	3.5	3.5	4.4	5.7	5.4	4.8	3.7	2.2	1.8	0.1	0.4	-0.4	-1.1	-1.7	-0.9
1994	3.9	3.9	2.7	2.0	2.6	3.3	3.3	4.1	5.3	5.0	4.4	3.4	2.0	1.6	0.0	0.2	-0.5	-1.2	-1.8	-1.0
1995	3.4	3.3	2.1	1.5	2.0	2.7	2.7	3.4	4.6	4.2	3.6	2.6	1.2	0.8	-0.6	-0.5	-1.2	-1.8	-2.4	-1.8
1996	3.0	2.9	1.8	1.2	1.7	2.4	2.3	3.0	4.1	3.8	3.2	2.2	0.9	0.5	-0.9	-0.8	-1.4	-2.0	-2.6	-2.0
1997	2.7	2.6	1.5	0.9	1.4	2.1	2.0	2.7	3.7	3.4	2.8	1.9	0.6	0.3	-1.0	-0.9	-1.5	-2.1	-2.6	-2.0
1998	1.6	1.5	0.4	-0.2	0.3	0.8	0.7	1.4	2.3	1.9	1.3	0.3	-1.0	-1.4	-2.7	-2.7	-3.4	-4.0	-4.6	-4.3
1999	1.9	1.8	0.7	0.1	0.6	1.2	1.1	1.7	2.7	2.3	1.7	0.8	-0.4	-0.8	-2.0	-1.9	-2.5	-3.1	-3.6	-3.2
2000	2.0	1.9	0.8	0.3	0.7	1.3	1.2	1.8	2.7	2.4	1.8	0.9	-0.2	-0.5	-1.7	-1.6	-2.2	-2.7	-3.2	-2.7
2001	2.6	2.6	1.6	1.1	1.5	2.1	2.0	2.6	3.5	3.2	2.7	1.9	0.8	0.5	-0.6	-0.5	-0.9	-1.3	-1.7	-1.3
2002	2.7	2.7	1.7	1.2	1.6	2.1	2.1	2.6	3.5	3.3	2.7	1.9	1.0	0.7	-0.4	-0.3	-0.8	-1.2	-1.5	-1.1
2003	3.1	3.1	2.2	1.7	2.1	2.7	2.6	3.2	4.0	3.9	3.4	2.6	1.7	1.4	0.5	0.6	0.2	-0.1	-0.4	0.1
2004	3.3	3.3	2.4	1.9	2.4	2.9	2.8	3.4	4.2	4.0	3.5	2.8	1.9	1.7	0.8	0.9	0.6	0.3	0.0	0.5
2005	3.2	3.2	2.3	1.9	2.8	2.8	2.8	3.3	4.1	3.9	3.5	2.8	1.9	1.7	0.9	0.9	0.6	0.3	0.1	0.0

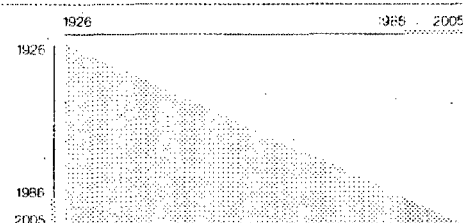
*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-5 (Page 6 of 6)

Low-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

To the end of	From the beginning of	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1986																	
1987																	
1988																	
1989																	
1990	-8.4																
1991	-4.2	-3.3															
1992	-2.2	-1.1	1.5														
1993	-0.9	0.2	2.6	1.4													
1994	-1.1	-0.1	1.9	0.8	3.5												
1995	-1.9	-1.2	0.6	-0.5	1.1	5.2											
1996	-2.1	-1.6	0.1	-1.0	0.2	3.9	1.5										
1997	-2.1	-1.7	0.2	-0.8	0.1	3.8	1.8	0.0									
1998	-4.5	-4.3	-3.1	-4.3	-3.7	-1.6	-4.2	-6.9	-10.1								
1999	-3.3	-3.0	-1.8	-2.8	-2.2	0.0	-2.1	-4.1	-6.2	-7.3							
2000	-2.9	-2.5	-1.3	-2.1	-1.5	0.5	-1.4	-2.9	-4.5	-4.8	-4.6						
2001	-1.3	-0.8	0.2	-0.4	0.4	2.1	0.6	-0.5	-1.6	-1.4	-0.4	0.3					
2002	-1.1	-0.7	0.3	-0.3	0.5	2.0	0.5	-0.4	-1.4	-1.2	-0.3	0.4	1.7				
2003	0.1	0.6	1.6	1.1	2.0	3.4	2.3	1.6	0.9	1.3	2.5	3.5	5.1	12.0			
2004	0.6	1.1	2.0	1.6	2.5	3.8	2.8	2.2	1.7	2.1	3.2	4.3	5.7	11.7	12.0		
2005	0.6	1.1	1.9	1.5	2.4	3.6	2.7	2.1	1.6	1.9	3.0	3.9	5.2	10.3	10.4	12.9	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

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Risk Premia Over Time Report 2006

Table A-6 (Page 1 of 6)

Micro-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926																					
1927																					
1928																					
1929																					
1930	-18.8																				
1931	-15.6	-14.3																			
1932	-10.2	-7.9	-5.8																		
1933	5.1	9.2	14.4	20.9																	
1934	7.6	11.6	16.5	22.6	34.8																
1935	7.0	10.4	14.5	19.3	28.5	35.2															
1936	9.5	12.9	16.8	21.2	29.1	34.9	37.2														
1937	8.7	11.7	15.2	19.1	26.0	30.3	31.5	30.8													
1938	6.5	9.0	11.9	15.0	20.5	23.7	23.8	22.1	6.6												
1939	5.8	8.2	10.9	13.7	18.6	21.0	20.4	18.0	4.6	0.3											
1940	5.8	7.9	10.4	13.0	17.4	19.5	18.9	17.1	5.6	2.0	3.9										
1941	5.7	7.8	10.0	12.4	16.4	18.3	17.7	16.1	5.9	2.8	4.5	-0.5									
1942	6.7	8.6	10.8	13.0	16.7	18.5	17.9	16.5	7.3	5.0	6.5	2.5	1.7								
1943	9.6	11.6	13.8	16.1	19.7	21.5	21.2	19.9	12.0	10.5	12.8	10.4	10.8	17.8							
1944	10.7	12.7	14.8	17.0	20.4	22.1	21.8	20.5	13.4	12.3	14.4	12.7	13.2	19.1	24.4						
1945	11.6	13.4	15.5	17.6	20.7	22.4	22.0	20.7	14.1	13.3	15.3	13.8	14.5	19.2	25.2	27.0					
1946	11.1	12.8	14.7	16.7	19.6	21.1	20.7	19.5	13.3	12.5	14.2	12.7	13.2	17.5	21.6	23.2	27.0				
1947	10.1	11.7	13.5	15.2	17.9	19.2	18.7	17.4	11.5	10.6	12.1	10.5	10.8	14.3	17.5	18.2	20.3	18.3			
1948	9.1	10.6	12.2	13.8	16.3	17.4	16.9	15.7	10.1	9.2	10.3	8.7	8.9	11.9	14.5	15.3	17.0	15.1	8.3		
1949	8.5	9.9	11.4	12.9	15.1	16.1	15.5	14.3	9.0	8.1	9.0	7.4	7.5	10.1	12.6	12.9	14.2	12.0	6.1	1.2	
1950	8.1	9.4	10.8	12.2	14.2	15.2	14.5	13.2	8.1	7.4	8.1	6.6	6.7	8.8	11.6	11.7	12.8	10.5	5.6	1.6	
1951	6.8	8.0	9.3	10.5	12.4	13.2	12.5	11.1	6.2	5.4	6.0	4.4	4.4	6.2	8.8	8.8	9.5	7.1	2.6	-1.4	
1952	5.8	7.0	8.2	9.2	11.0	11.7	10.9	9.6	4.9	4.1	4.6	3.0	2.9	4.5	7.1	7.0	7.7	5.2	1.1	-2.6	
1953	5.5	6.6	7.8	8.8	10.4	11.1	10.4	9.1	4.6	3.9	4.3	2.7	2.7	4.2	6.5	6.5	7.1	4.8	1.0	-2.4	
1954	5.0	6.0	7.0	8.0	9.4	10.1	9.3	8.0	3.8	3.2	3.5	1.9	2.0	3.4	6.1	6.2	6.9	4.7	1.4	-1.5	
1955	4.1	5.1	6.0	6.8	8.2	8.8	8.0	6.8	2.8	2.2	2.4	0.8	0.9	2.4	5.2	5.4	6.2	4.1	1.2	-1.6	
1956	3.9	4.8	5.8	6.5	7.8	8.4	7.7	6.5	2.8	2.3	2.4	0.9	1.1	2.5	5.3	5.6	6.4	4.6	1.8	-0.8	
1957	3.9	4.8	5.7	6.4	7.7	8.3	7.6	6.6	3.0	2.5	2.6	1.1	1.4	2.8	5.2	5.5	6.3	4.6	1.8	-0.6	
1958	4.1	4.9	5.8	6.5	7.7	8.2	7.5	6.5	3.1	2.7	2.8	1.5	1.7	3.1	5.8	6.2	7.0	5.4	3.0	0.9	
1959	4.0	4.9	5.7	6.3	7.5	8.0	7.4	6.4	3.1	2.8	2.8	1.6	1.9	3.2	5.8	6.2	7.0	5.5	3.3	1.4	
1960	3.9	4.7	5.5	6.1	7.2	7.7	7.1	6.2	3.1	2.7	2.8	1.5	1.9	3.2	5.6	6.0	6.8	5.4	3.2	1.4	
1961	3.6	4.4	5.1	5.7	6.7	7.2	6.6	5.7	2.7	2.4	2.4	1.2	1.6	2.9	5.3	5.7	6.4	5.0	3.0	1.3	
1962	3.5	4.3	5.0	5.6	6.6	7.1	6.5	5.7	2.8	2.5	2.5	1.3	1.6	2.9	4.9	5.3	5.9	4.6	2.5	0.8	
1963	2.9	3.7	4.3	4.9	5.8	6.3	5.7	4.9	2.1	1.8	1.8	0.6	1.0	2.2	4.2	4.6	5.2	3.9	1.9	0.3	
1964	2.8	3.5	4.1	4.6	5.5	6.0	5.4	4.6	1.9	1.6	1.6	0.5	0.8	2.0	4.0	4.4	5.0	3.7	1.9	0.3	
1965	3.3	3.9	4.6	5.1	6.0	6.4	5.9	5.2	2.6	2.3	2.3	1.3	1.6	2.8	4.8	5.2	5.7	4.6	2.9	1.4	
1966	3.4	4.1	4.7	5.2	6.1	6.5	6.0	5.3	2.8	2.6	2.6	1.5	1.9	3.0	4.8	5.1	5.7	4.6	2.8	1.4	
1967	5.0	5.7	6.3	6.8	7.7	8.2	7.8	7.1	4.8	4.6	4.7	3.7	4.2	5.3	7.2	7.6	8.2	7.2	5.7	4.5	
1968	5.7	6.4	7.1	7.6	8.5	9.0	8.6	8.0	5.7	5.6	5.7	4.8	5.3	6.4	8.3	8.7	9.3	8.5	7.0	5.9	
1969	5.2	5.8	6.5	7.0	7.8	8.3	7.9	7.3	5.0	4.8	4.9	4.0	4.4	5.4	7.0	7.3	7.8	6.9	5.4	4.3	
1970	4.7	5.3	5.9	6.4	7.2	7.6	7.2	6.6	4.4	4.2	4.2	3.4	3.7	4.7	6.1	6.3	6.7	5.9	4.3	3.2	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

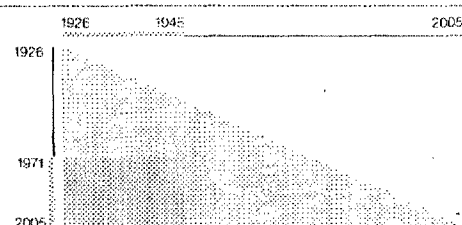
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Risk Premia Over Time Report 2006

Table A-6 (Page 2 of 6)

Micro-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

To the end of	From the beginning of																			
	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	4.5	5.2	5.7	6.2	7.0	7.4	7.0	6.4	4.3	4.0	4.1	3.2	3.5	4.5	5.8	6.0	6.4	5.6	4.0	3.0
1972	3.9	4.5	5.0	5.5	6.2	6.6	6.2	5.6	3.5	3.2	3.3	2.4	2.7	3.6	4.9	5.1	5.4	4.6	3.1	2.0
1973	3.4	4.0	4.5	4.9	5.7	6.0	5.6	5.0	2.9	2.6	2.6	1.8	2.0	2.8	3.9	4.0	4.2	3.4	1.8	0.8
1974	3.8	4.4	4.9	5.3	6.1	6.4	6.1	5.6	3.5	3.2	3.2	2.4	2.7	3.5	4.4	4.6	4.8	4.0	2.4	1.4
1975	4.1	4.7	5.2	5.6	6.4	6.7	6.4	5.9	3.9	3.6	3.6	2.9	3.1	3.9	4.9	5.0	5.3	4.5	3.0	2.0
1976	4.5	5.0	5.5	5.9	6.7	7.0	6.7	6.2	4.3	4.0	4.1	3.3	3.6	4.4	5.3	5.5	5.7	5.0	3.6	2.7
1977	5.1	5.6	6.2	6.6	7.3	7.7	7.4	7.0	5.1	4.8	4.9	4.1	4.4	5.2	6.1	6.3	6.6	5.9	4.5	3.6
1978	5.3	5.8	6.3	6.8	7.5	7.8	7.6	7.2	5.3	5.1	5.1	4.4	4.7	5.5	6.3	6.5	6.7	6.1	4.7	3.9
1979	5.6	6.1	6.6	7.0	7.8	8.1	7.8	7.4	5.6	5.4	5.5	4.8	5.1	5.8	6.7	6.8	7.1	6.5	5.2	4.4
1980	5.3	5.9	6.4	6.7	7.4	7.8	7.5	7.1	5.4	5.2	5.2	4.5	4.8	5.5	6.4	6.6	6.8	6.2	4.9	4.1
1981	5.6	6.2	6.6	7.0	7.7	8.1	7.8	7.5	5.7	5.5	5.6	4.9	5.2	5.9	6.7	6.9	7.1	6.5	5.3	4.5
1982	5.6	6.1	6.6	7.0	7.7	8.0	7.8	7.5	5.8	5.6	5.6	5.0	5.3	6.0	6.7	6.9	7.1	6.6	5.3	4.6
1983	5.7	6.2	6.6	7.0	7.7	8.0	7.7	7.4	5.8	5.6	5.6	5.0	5.3	6.0	6.8	6.9	7.2	6.6	5.4	4.7
1984	5.3	5.8	6.2	6.5	7.2	7.5	7.3	7.0	5.3	5.2	5.2	4.5	4.8	5.5	6.2	6.4	6.6	6.0	4.8	4.1
1985	5.0	5.4	5.9	6.2	6.8	7.2	6.9	6.6	5.0	4.8	4.9	4.2	4.5	5.2	5.9	6.0	6.2	5.7	4.5	3.8
1986	4.6	5.1	5.5	5.8	6.4	6.7	6.5	6.2	4.7	4.5	4.5	3.9	4.2	4.8	5.5	5.7	5.9	5.3	4.2	3.5
1987	4.3	4.8	5.2	5.5	6.1	6.4	6.2	6.0	4.4	4.2	4.2	3.6	3.8	4.4	5.1	5.2	5.4	4.9	3.7	3.0
1988	4.3	4.8	5.2	5.4	6.0	6.3	6.1	5.9	4.4	4.2	4.2	3.6	3.8	4.4	5.1	5.2	5.4	4.9	3.7	3.0
1989	3.8	4.2	4.6	4.9	5.4	5.7	5.5	5.3	3.8	3.6	3.6	3.0	3.3	3.8	4.5	4.6	4.8	4.3	3.2	2.5
1990	3.5	3.9	4.2	4.5	5.1	5.3	5.1	4.9	3.4	3.2	3.2	2.6	2.8	3.4	4.0	4.1	4.3	3.8	2.6	1.9
1991	3.6	4.0	4.4	4.6	5.2	5.4	5.3	5.1	3.6	3.5	3.4	2.8	3.1	3.7	4.3	4.4	4.6	4.1	3.0	2.3
1992	3.9	4.3	4.6	4.9	5.4	5.7	5.5	5.3	3.9	3.8	3.7	3.1	3.4	4.0	4.6	4.7	4.9	4.4	3.4	2.7
1993	3.9	4.3	4.7	4.9	5.5	5.8	5.6	5.4	4.0	3.9	3.8	3.3	3.5	4.1	4.7	4.8	5.0	4.5	3.5	2.8
1994	3.9	4.3	4.6	4.8	5.4	5.6	5.5	5.3	4.0	3.8	3.8	3.2	3.5	4.0	4.6	4.7	4.9	4.4	3.4	2.7
1995	3.6	4.0	4.3	4.5	5.0	5.3	5.1	5.0	3.7	3.5	3.5	2.9	3.2	3.7	4.4	4.5	4.6	4.2	3.2	2.5
1996	3.4	3.8	4.1	4.3	4.8	5.1	4.9	4.8	3.5	3.4	3.3	2.7	3.0	3.6	4.2	4.3	4.5	4.0	3.0	2.4
1997	3.2	3.5	3.8	4.0	4.5	4.8	4.6	4.5	3.3	3.1	3.1	2.5	2.8	3.3	4.0	4.1	4.3	3.8	2.8	2.2
1998	2.5	2.9	3.2	3.4	3.8	4.1	3.9	3.8	2.6	2.4	2.4	1.8	2.1	2.6	3.2	3.4	3.5	3.0	2.1	1.5
1999	2.6	2.9	3.2	3.4	3.9	4.1	4.0	3.9	2.7	2.5	2.5	1.9	2.2	2.7	3.4	3.5	3.6	3.2	2.2	1.7
2000	2.7	3.0	3.3	3.5	3.9	4.2	4.0	4.0	2.8	2.6	2.6	2.0	2.3	2.8	3.4	3.6	3.7	3.2	2.3	1.7
2001	3.3	3.7	3.9	4.1	4.6	4.9	4.8	4.7	3.5	3.4	3.3	2.8	3.1	3.6	4.1	4.3	4.4	4.0	3.1	2.5
2002	3.6	3.9	4.2	4.4	4.9	5.1	5.0	4.9	3.8	3.6	3.5	3.0	3.3	3.8	4.3	4.4	4.6	4.2	3.2	2.7
2003	4.0	4.4	4.7	4.9	5.3	5.6	5.5	5.4	4.3	4.2	4.1	3.6	3.9	4.4	4.9	5.1	5.2	4.8	3.9	3.4
2004	4.0	4.4	4.6	4.8	5.3	5.6	5.5	5.4	4.3	4.2	4.1	3.6	3.9	4.4	4.9	5.0	5.2	4.8	3.9	3.4
2005	3.9	4.3	4.6	4.7	5.2	5.5	5.4	5.3	4.2	4.1	4.0	3.5	3.8	4.3	4.8	4.9	5.1	4.7	3.8	3.3

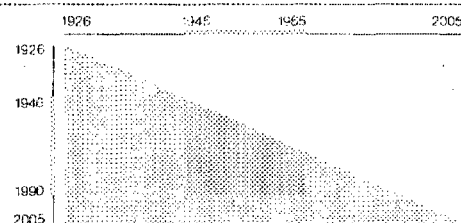
*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-6 (Page 3 of 6)

Micro-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

to the end of	From the beginning of	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1946																					
1947																					
1948																					
1949																					
1950	-4.6																				
1951	-7.1	-7.3																			
1952	-7.8	-7.7	-6.4																		
1953	-7.0	-6.7	-5.6	-4.2																	
1954	-5.5	-4.7	-3.2	-1.2	-0.3																
1955	-5.3	-4.0	-2.5	0.0	1.0	-0.8															
1956	-4.2	-2.8	-1.4	1.2	1.9	0.1	3.0														
1957	-3.9	-2.7	-1.6	0.4	0.7	-1.2	0.6	2.1													
1958	-1.9	-0.5	0.9	3.0	3.7	2.7	5.1	7.1	10.0												
1959	-1.2	0.2	1.5	3.5	4.3	3.4	5.5	7.3	9.8	7.4											
1960	-1.1	0.2	1.4	3.1	3.6	2.7	4.4	5.8	7.7	5.2	5.7										
1961	-1.0	0.3	1.4	3.0	3.5	2.7	4.4	5.7	7.2	5.3	5.7	6.1									
1962	-1.4	-0.5	0.4	1.6	1.9	0.9	2.2	3.2	4.2	2.4	3.0	3.4	4.5								
1963	-1.9	-1.0	-0.2	1.0	1.2	0.3	1.5	2.3	3.1	1.3	1.6	1.6	2.2	-2.3							
1964	-1.7	-0.8	0.0	1.1	1.3	0.5	1.6	2.4	3.1	1.6	1.7	1.6	2.1	-1.5	-3.3						
1965	-0.4	0.5	1.3	2.4	2.7	2.1	3.2	4.0	4.8	3.6	4.0	4.1	4.8	2.1	1.3	1.6					
1966	-0.3	0.5	1.2	2.2	2.4	1.8	2.8	3.6	4.2	3.1	3.6	3.8	4.4	2.0	1.3	1.9	2.1				
1967	3.0	3.9	4.8	5.9	6.3	5.9	7.2	8.2	9.1	8.6	9.5	10.1	11.1	9.9	10.4	11.9	14.0	17.2			
1968	4.5	5.4	6.4	7.4	7.9	7.7	9.0	10.0	11.0	10.7	11.7	12.4	13.6	12.8	13.5	15.2	17.5	20.8	27.3		
1969	2.9	3.6	4.4	5.2	5.5	5.3	6.4	7.3	8.0	7.7	8.6	9.2	9.8	9.1	9.4	10.6	12.3	14.0	19.2	23.9	
1970	1.8	2.4	3.0	3.7	4.0	3.6	4.6	5.4	6.0	5.7	6.6	7.0	7.4	6.6	6.7	7.6	8.8	10.0	13.8	16.8	
1971	1.6	2.1	2.7	3.4	3.6	3.3	4.2	5.0	5.5	5.2	6.1	6.4	6.7	6.0	6.1	6.8	7.9	8.8	12.0	14.3	
1972	0.8	1.2	1.7	2.3	2.5	2.2	3.0	3.7	4.0	3.7	4.4	4.6	4.7	3.9	3.8	4.2	4.9	5.4	7.8	9.2	
1973	-0.5	-0.2	0.2	0.7	0.8	0.5	1.3	1.9	2.1	1.9	2.6	2.7	2.7	2.0	1.9	2.1	2.8	3.0	5.2	6.4	
1974	0.1	0.4	0.8	1.3	1.4	1.0	1.8	2.4	2.7	2.4	3.1	3.4	3.6	2.7	2.5	3.0	3.4	4.1	6.0	6.8	
1975	0.9	1.1	1.6	2.1	2.2	1.9	2.7	3.3	3.6	3.5	4.3	4.5	4.7	4.1	4.0	4.5	5.1	5.6	7.5	8.4	
1976	1.6	1.8	2.3	2.8	2.9	2.7	3.5	4.2	4.5	4.4	5.2	5.5	5.7	5.2	5.2	5.7	6.3	6.9	8.7	9.7	
1977	2.6	2.9	3.4	3.9	4.1	3.9	4.7	5.3	5.7	5.7	6.5	6.8	7.1	6.7	6.8	7.4	8.0	8.7	10.6	11.6	
1978	2.9	3.2	3.6	4.1	4.3	4.2	5.0	5.6	6.0	6.0	6.8	7.2	7.5	7.1	7.2	7.8	8.5	9.2	11.0	11.9	
1979	3.4	3.7	4.2	4.7	4.9	4.8	5.5	6.2	6.6	6.7	7.5	7.8	8.1	7.8	8.0	8.5	9.2	9.9	11.6	12.6	
1980	3.2	3.5	3.9	4.4	4.6	4.5	5.2	5.9	6.2	6.3	7.0	7.3	7.6	7.2	7.4	7.9	8.5	9.0	10.5	11.4	
1981	3.6	3.9	4.3	4.8	5.0	4.9	5.6	6.3	6.6	6.7	7.4	7.8	8.0	7.7	7.9	8.4	9.0	9.6	11.1	11.9	
1982	3.7	4.0	4.4	4.9	5.1	5.0	5.7	6.3	6.6	6.7	7.4	7.7	8.0	7.6	7.8	8.2	8.8	9.4	10.7	11.4	
1983	3.9	4.1	4.6	5.0	5.2	5.1	5.8	6.4	6.7	6.8	7.4	7.7	8.0	7.7	7.8	8.2	8.8	9.3	10.6	11.2	
1984	3.3	3.5	3.9	4.3	4.5	4.4	5.0	5.6	5.9	5.9	6.5	6.8	7.0	6.7	6.7	7.1	7.6	8.0	9.2	9.7	
1985	3.0	3.2	3.6	4.0	4.2	4.0	4.7	5.2	5.4	5.5	6.0	6.3	6.4	6.1	6.1	6.5	6.9	7.3	8.3	8.8	
1986	2.6	2.9	3.2	3.6	3.7	3.6	4.2	4.7	4.9	4.9	5.4	5.6	5.8	5.3	5.4	5.7	6.0	6.3	7.3	7.7	
1987	2.2	2.4	2.7	3.1	3.2	3.0	3.6	4.0	4.3	4.2	4.7	4.9	5.0	4.6	4.6	4.8	5.1	5.4	6.3	6.6	
1988	2.2	2.4	2.8	3.1	3.2	3.1	3.6	4.1	4.3	4.2	4.7	4.8	5.0	4.6	4.5	4.8	5.1	5.4	6.2	6.5	
1989	1.6	1.9	2.2	2.5	2.6	2.4	2.9	3.3	3.5	3.4	3.8	3.9	4.1	3.6	3.5	3.8	3.9	4.2	4.9	5.1	
1990	1.1	1.3	1.6	1.9	2.0	1.8	2.3	2.6	2.8	2.7	3.1	3.2	3.3	2.8	2.7	2.9	3.1	3.3	4.0	4.1	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

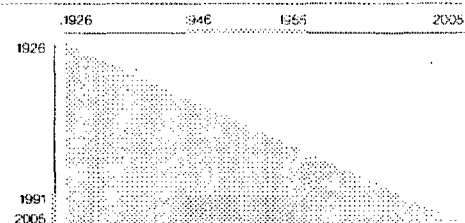
Risk Premia Over Time Report 2006

Table A-6 (Page 4 of 6)

Micro-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005



To the end of	From the beginning of																			
	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1991	1.5	1.7	2.0	2.3	2.4	2.2	2.7	3.0	3.2	3.1	3.5	3.6	3.7	3.2	3.2	3.4	3.5	3.8	4.4	4.6
1992	1.9	2.1	2.4	2.8	2.8	2.7	3.1	3.5	3.7	3.6	4.0	4.1	4.2	3.8	3.7	3.9	4.1	4.3	5.0	5.2
1993	2.1	2.3	2.6	2.9	3.0	2.8	3.3	3.7	3.8	3.7	4.1	4.2	4.4	3.9	3.9	4.1	4.2	4.5	5.1	5.3
1994	2.0	2.2	2.5	2.8	2.9	2.7	3.1	3.5	3.7	3.6	3.9	4.0	4.2	3.7	3.7	3.9	4.0	4.3	4.9	5.0
1995	1.8	2.0	2.3	2.6	2.7	2.5	2.9	3.3	3.4	3.3	3.6	3.7	3.8	3.4	3.4	3.5	3.6	3.9	4.4	4.6
1996	1.7	1.9	2.2	2.5	2.5	2.4	2.8	3.1	3.3	3.1	3.4	3.5	3.6	3.2	3.1	3.3	3.4	3.6	4.1	4.3
1997	1.5	1.7	2.0	2.3	2.3	2.2	2.6	2.9	3.0	2.9	3.1	3.2	3.3	2.9	2.8	2.9	3.0	3.2	3.7	3.8
1998	0.8	0.9	1.2	1.4	1.5	1.3	1.7	2.0	2.1	1.9	2.2	2.2	2.3	1.8	1.7	1.8	1.9	2.1	2.5	2.5
1999	1.0	1.1	1.4	1.6	1.7	1.5	1.9	2.2	2.3	2.1	2.4	2.4	2.5	2.0	1.9	2.0	2.1	2.3	2.7	2.8
2000	1.0	1.2	1.5	1.7	1.8	1.6	1.9	2.2	2.3	2.2	2.4	2.4	2.5	2.1	2.0	2.1	2.1	2.3	2.7	2.8
2001	1.8	2.0	2.3	2.5	2.6	2.4	2.8	3.1	3.2	3.1	3.3	3.4	3.5	3.1	3.0	3.2	3.2	3.5	3.9	4.0
2002	2.0	2.2	2.4	2.7	2.8	2.6	3.0	3.2	3.4	3.3	3.5	3.6	3.7	3.3	3.2	3.4	3.5	3.7	4.1	4.2
2003	2.8	3.0	3.2	3.5	3.6	3.4	3.8	4.1	4.2	4.1	4.4	4.5	4.6	4.2	4.2	4.4	4.5	4.7	5.1	5.2
2004	2.8	3.0	3.2	3.5	3.6	3.4	3.8	4.1	4.2	4.1	4.4	4.5	4.6	4.2	4.2	4.4	4.5	4.7	5.1	5.2
2005	2.7	2.9	3.1	3.4	3.4	3.3	3.7	4.0	4.1	3.9	4.3	4.4	4.5	4.1	4.1	4.2	4.3	4.5	4.9	5.0

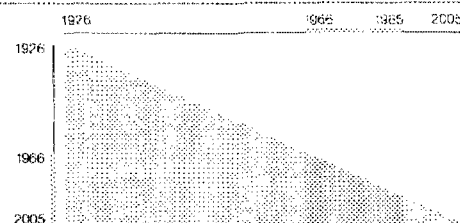
*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-6 (Page 5 of 6)

Micro-Cap Size Premia*

Percent per annum risk premia for all historical time periods.



from 1926 to 2005

To the end of	From the beginning of 1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1966																				
1967																				
1968																				
1969																				
1970	15.7																			
1971	13.1	13.8																		
1972	7.4	7.1	-5.3																	
1973	4.5	3.7	-7.0	-15.6																
1974	4.9	4.8	-5.4	-12.8	-11.7															
1975	7.0	7.0	-1.2	-6.7	-4.7	-1.6														
1976	8.5	8.6	1.6	-2.8	-0.5	2.7	3.1													
1977	10.7	11.0	4.9	1.3	3.7	7.1	8.1	14.6												
1978	11.1	11.4	5.9	2.8	5.1	8.3	9.3	15.1	21.8											
1979	11.9	12.2	7.3	4.5	6.8	9.8	11.0	16.1	22.0	22.7										
1980	10.7	10.9	6.2	3.6	5.7	8.2	9.1	13.4	18.3	17.9	17.6									
1981	11.2	11.5	7.2	4.8	6.8	9.2	10.1	14.0	18.2	18.6	18.1	17.1								
1982	10.7	11.0	6.9	4.7	6.6	8.8	9.5	12.9	16.7	17.1	16.3	14.9	11.3							
1983	10.6	10.8	7.0	4.9	6.7	8.8	9.4	12.5	16.0	16.2	15.3	14.1	10.9	10.3						
1984	9.1	9.2	5.5	3.4	5.0	6.8	7.3	9.9	12.8	12.7	11.6	9.9	6.6	5.3	2.0					
1985	8.1	8.2	4.6	2.7	4.1	5.7	6.1	8.4	11.1	10.7	9.5	8.0	4.8	3.5	0.5	1.1				
1986	6.9	7.0	3.5	1.6	3.0	4.4	4.7	6.6	9.1	8.8	7.5	5.8	2.8	1.5	-1.4	-1.4	-4.3			
1987	5.8	5.9	2.5	0.6	1.8	3.2	3.3	5.0	7.2	6.9	5.4	3.6	0.8	-0.7	-3.6	-4.1	-7.1	-9.7		
1988	5.7	5.8	2.5	0.7	1.9	3.2	3.3	5.0	7.0	6.8	5.3	3.7	1.1	-0.2	-2.7	-2.9	-5.3	-7.2	-10.9	
1989	4.4	4.3	1.2	-0.6	0.5	1.7	1.7	3.1	5.0	4.7	3.2	1.6	-0.9	-2.2	-4.6	-5.0	-7.3	-9.3	-12.7	-11.0
1990	3.4	3.3	0.2	-1.5	-0.5	0.5	0.5	1.7	3.4	3.1	1.5	-0.2	-2.6	-4.0	-6.4	-7.0	-9.3	-11.2	-14.4	-13.3
1991	3.8	3.8	0.9	-0.8	0.3	1.3	1.3	2.5	4.2	3.9	2.6	1.1	-1.1	-2.2	-4.2	-4.5	-6.3	-7.7	-10.1	-8.5
1992	4.5	4.5	1.7	0.1	1.2	2.2	2.3	3.5	5.1	4.9	3.7	2.3	0.4	-0.5	-2.3	-2.4	-3.8	-4.8	-6.6	-4.7
1993	4.7	4.6	2.0	0.5	1.5	2.5	2.6	3.8	5.3	5.2	4.0	2.8	1.0	0.2	-1.4	-1.4	-2.6	-3.4	-4.9	-3.0
1994	4.4	4.4	1.8	0.4	1.3	2.3	2.3	3.4	4.9	4.8	3.6	2.4	0.7	0.0	-1.5	-1.6	-2.7	-3.5	-4.8	-3.1
1995	3.9	3.9	1.4	0.0	1.0	1.9	1.9	3.0	4.4	4.2	3.2	2.0	0.4	-0.3	-1.7	-1.7	-2.8	-3.4	-4.7	-3.1
1996	3.6	3.6	1.2	-0.2	0.7	1.6	1.7	2.6	4.1	3.8	2.8	1.7	0.2	-0.5	-1.8	-1.8	-2.7	-3.4	-4.5	-3.0
1997	3.2	3.2	0.8	-0.5	0.4	1.2	1.3	2.2	3.6	3.4	2.4	1.4	-0.1	-0.7	-1.9	-1.9	-2.8	-3.4	-4.5	-3.0
1998	1.9	1.8	-0.5	-1.8	-1.0	-0.2	-0.2	0.6	1.9	1.6	0.6	-0.5	-2.0	-2.6	-3.9	-4.0	-5.0	-5.7	-6.8	-5.7
1999	2.1	2.1	-0.2	-1.4	-0.6	0.2	0.2	1.0	2.3	2.0	1.1	0.1	-1.3	-1.9	-3.1	-3.1	-4.5	-5.6	-6.6	-4.4
2000	2.2	2.1	-0.1	-1.3	-0.5	0.3	0.3	1.0	2.3	2.1	1.2	0.2	-1.1	-1.7	-2.8	-2.9	-3.6	-4.2	-5.1	-4.0
2001	3.4	3.4	1.3	0.2	1.0	1.7	1.8	2.6	3.8	3.7	2.8	1.9	0.7	0.2	-0.8	-0.8	-1.4	-1.8	-2.6	-1.4
2002	3.6	3.7	1.6	0.5	1.3	2.0	2.1	2.8	3.9	3.9	3.0	2.1	1.0	0.5	-0.4	-0.5	-1.1	-1.4	-2.1	-1.0
2003	4.8	4.8	2.8	1.8	2.6	3.4	3.4	4.2	5.4	5.4	4.6	3.8	2.8	2.4	1.6	1.7	1.2	1.0	0.4	1.6
2004	4.7	4.8	2.9	1.9	2.7	3.4	3.5	4.3	5.4	5.3	4.6	3.8	2.9	2.5	1.7	1.8	1.3	1.1	0.6	1.8
2005	4.6	4.6	2.7	1.8	3.0	3.2	3.3	4.1	5.1	5.1	4.4	3.6	2.7	2.3	1.7	1.6	1.2	1.0	0.5	1.5

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

Risk Premia Over Time Report 2006

Table A-6 (Page 6 of 6)

Micro-Cap Size Premia*

Percent per annum risk premia for all historical time periods.

from 1926 to 2005

To the end of	From the beginning of	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1986																	
1987																	
1988																	
1989																	
1990	-15.1																
1991	-9.2	-8.4															
1992	-4.8	-3.4	0.8														
1993	-2.9	-1.5	2.4	1.6													
1994	-3.1	-1.8	1.3	0.5	4.4												
1995	-3.0	-1.9	1.2	0.4	3.4	10.5											
1996	-2.9	-2.0	1.0	0.3	2.8	8.8	6.1										
1997	-2.9	-2.1	1.0	0.3	2.3	8.0	5.6	2.0									
1998	-5.8	-5.3	-3.1	-4.1	-2.6	1.0	-2.2	-6.6	-10.2								
1999	-4.4	-3.8	-1.6	-2.3	-0.9	2.6	0.1	-3.4	-5.8	-6.3							
2000	-4.0	-3.4	-1.3	-2.0	-0.7	2.5	0.2	-2.6	-4.5	-4.3	-5.6						
2001	-1.3	-0.5	1.3	0.9	2.5	5.4	3.6	1.7	0.6	1.4	1.6	2.1					
2002	-0.9	-0.1	1.4	1.1	2.6	5.1	3.5	1.8	0.8	1.6	1.9	2.5	4.6				
2003	1.9	2.8	4.4	4.3	6.0	8.5	7.4	6.1	5.7	6.9	7.9	9.4	12.2	22.0			
2004	2.0	2.9	4.4	4.3	5.9	8.2	7.2	6.0	5.6	6.7	7.6	8.9	11.3	19.4	21.5		
2005	1.8	2.6	4.0	3.9	5.4	7.5	6.5	5.4	5.0	5.8	6.6	7.7	9.7	16.4	17.8	22.3	

*Beta and equity risk premium estimated from the S&P 500. Estimates based on a minimum of five years of data.

**Market Yield on U.S. Treasury Securities
at 20-Year Constant Maturity, Quoted on Investment Basis**

	<u>Month</u>	<u>Yield</u>
	(1)	(2)
1.	January 2005	4.77
2.	February 2005	4.61
3.	March 2005	4.89
4.	April 2005	4.75
5.	May 2005	4.56
6.	June 2005	4.35
7.	July 2005	4.48
8.	August 2005	4.53
9.	September 2005	4.51
10.	October 2005	4.74
11.	November 2005	4.83
12.	December 2005	<u>4.73</u>
13.	Average	4.65

2005 Railroad Industry Unlevered Beta

<u>Company</u> (1)	<u>Unlevered Beta 1/</u> (2)	<u>Railroad Weights 2/</u> (3)	<u>Weighted Average 3/</u> (4)
1. Burlington Northern Santa Fe Corporation	0.53	32.20%	0.171
2. CSX Corporation	0.59	14.95%	0.088
3. Norfolk Southern Corporation	0.70	24.56%	0.172
4. Union Pacific Corporation	0.46	28.29%	<u>0.130</u>
5. Railroad Industry Unlevered Beta <u>4/</u>	---	---	0.56

1/ Ibbotson Associates.

2/ Rockey VS at 7.

3/ Column (2) x Column (3)

4/ Sum of Column (4)

2005 Railroad Industry Levered Beta

<u>Item</u> (1)	<u>Source</u> (2)	<u>Statistics</u> (3)
1. 2005 Railroad Industry Debt to Equity Ratio		
a. Debt Portion of Capital Structure	Rockey VS at 28	30.4%
b. Equity Portion of Capital Structure	Rockey VS at 28	<u>69.6%</u>
c. Debt/Equity Ratio	Line 1a ÷ Line 1b	0.44
2. Railroad Industry 2005 Unlevered Beta	Exhibit No. 4	<u>0.56</u>
3. Railroad Industry 2005 Levered Beta	(1+ Line 1c) x Line 2	0.81

2005 Railroad Industry Size Premium

Company (1)	2005 Average Market		Capitalization Decile Rank 2/ (3)	Size Premium 2/ (4)	Railroad Weights 1/ (5)	Weighted Average 3/ (6)
	Capitalization 1/ (2)					
1. Burlington Northern Santa Fe Corporation	\$20,253,925,358		1	-0.37%	32.20%	-0.0012
2. CSX Corporation	9,402,561,373		2	0.67%	14.95%	0.0010
3. Norfolk Southern Corporation	15,449,669,248		2	0.67%	24.56%	0.0016
4. Union Pacific Corporation	17,792,912,666		1	-0.37%	28.29%	-0.0010
5. 2005 Railroad Industry Size Premium 4/ Rockey VS at 7.	---		---	---	---	0.04%

1/ Rocky VS at 7.

2/ Ibbotson Associates Risk Premia over Time Report: 2006. For the year end 2005, companies with market capitalizations greater than \$16.091 billion were in the top decile of publicly traded stocks, and companies with market capitalizations between \$7.189 billion and \$16.091 billion were in the second decile.

3/ Column (4) x Column (5)

2005 Railroad Industry Cost of Equity

<u>Item</u> (1)	<u>Source</u> (2)	<u>Statistic</u> (3)
1. 2005 Average Risk Free Rate	<u>1/</u>	4.65%
2. Railroad Risk Premium		
a. 2005 Equity Risk Premium	<u>2/</u>	7.10%
b. 2005 Railroad Industry Levered Beta	Exhibit No. 5	<u>0.81</u>
c. 2005 Railroad Industry Risk Premium	Line 2a x Line 2b	5.72%
3. 2005 Railroad Industry Size Premium	Exhibit No. 6	0.04%
4. 2005 Railroad Industry Cost of Equity	Line 1 + Line 2c + Line 3	10.41%

1/ Average 2005 monthly yield on 20 year U.S. Treasury securities with constant maturity rate as reported by the Federal Reserve Bank of Saint Louis.

2/ Ibbotson Associates Risk Premia over Time Report: 2006.

2005 Railroad Industry Weighted Average Cost of Capital

<u>Item</u> (1)	<u>Source</u> (2)	<u>Statistic</u> (3)
1. 2005 Weighted Cost of Equity		
a. 2005 Railroad Industry Cost of Equity	Exhibit No. 7	10.41%
b. Equity Portion of Capital Structure	Rockey VS at 28	<u>69.60%</u>
c. 2005 Weighted Cost of Railroad Industry Equity	Line 1a x Line 1b	7.24%
2. 2005 Weighted Cost of Debt		
a. 2005 Railroad Industry Cost of Debt	Rockey VS at 28	5.36%
b. Debt Portion of Capital Structure 1/	Rockey VS at 28	<u>30.40%</u>
c. 2005 Weighed Cost of Railroad Industry Debt		1.63%
3. 2005 Railroad Industry Weighted Average Cost of Capital	Line 1c + Line 2c	8.87%

CERTIFICATE OF SERVICE

I hereby certify that on this 28th day of April 2006, I have caused true and accurate copies of the foregoing Reply Comments of the Western Coal Traffic League to be served upon all parties on the service list in this proceeding.

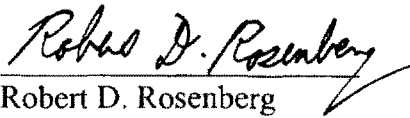

Robert D. Rosenberg

EXHIBIT C

**October 10, 2006 Petition
of the Western Coal Traffic League
for Reconsideration of the 2005 Cost of Capital Decision**

SLOVER & LOFTUS

ATTORNEYS AT LAW

1224 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C. 20036-3003

WILLIAM L. SLOVER
C. MICHAEL LOFTUS
JOHN H. LE SEUR
KELVIN J. DOWD
ROBERT D. ROSENBERG
CHRISTOPHER A. MILLS
FRANK J. PERGOLIZZI
ANDREW B. KOLESAR III
PETER A. PFOHL
DANIEL M. JAFFE

OF COUNSEL
DONALD G. AVERY

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Public Record

TELEPHONE:
(202) 347-7170

FAX:
(202) 347-3619

WRITER'S E-MAIL:

October 10, 2006

rdr@sloverandloftus.com

BY HAND

The Honorable Vernon A. Williams
Secretary
Surface Transportation Board
Case Control Unit
1925 K Street, N.W.
Washington, D.C. 20423-0001

217780



Re: STB Ex Parte No. 558 (Sub-No. 9),
Railroad Cost of Capital-2005

Dear Secretary Williams:

Enclosed please find an original and ten (10) copies of the Petition for Reconsideration of the Western Coal Traffic League in the above-referenced proceeding. Also enclosed is a CD containing the filing.

If there are any questions concerning this matter, please contact the undersigned.

Respectfully submitted,

Robert D. Rosenberg

Robert D. Rosenberg
An Attorney for Western
Coal Traffic League

RDR:tda

Enclosures

cc: Service List-w/encl.

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BEFORE THE
SURFACE TRANSPORTATION BOARD

217780

In the Matter of:

RAILROAD COST OF CAPITAL –
2005

Ex Parte No. 558 (Sub-No. 9)

**PETITION FOR RECONSIDERATION
OF THE WESTERN COAL TRAFFIC LEAGUE**

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: October 10, 2006

William L. Slover
C. Michael Loftus
Robert D. Rosenberg
Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Its Attorneys

BEFORE THE
SURFACE TRANSPORTATION BOARD



In the Matter of:)

RAILROAD COST OF CAPITAL –)
2005)

Ex Parte No. 558 (Sub-No. 9)

**PETITION FOR RECONSIDERATION
OF THE WESTERN COAL TRAFFIC LEAGUE**

Pursuant to 49 C.F.R. § 1115.2, the Western Coal Traffic League (“WCTL” or “League”)¹ hereby petitions for reconsideration of the decision of the Surface Transportation Board (“STB” or “Board”) in STB Ex Parte No. 558 (Sub-No. 9), *Railroad Cost of Capital – 2005* (STB served Sept. 20, 2005) (the “Decision”), on the grounds that the Decision contains material error.

WCTL appreciates that the Board chose to initiate a separate proceeding by issuing an Advanced Notice of Proposed Rulemaking in STB Ex Parte No. 664, *Methodology to be Employed in Determining the Railroad Industry's Cost of Capital* (STB served Sept. 20, 2006) (“Notice”), on the same day as the Decision. WCTL hopes that actions taken in that proceeding will eliminate distortions and error in the cost of capital calculations in the future. However, such future actions will, under the present

¹WCTL is a voluntary association, whose regular membership consists entirely of shippers of coal mined west of the Mississippi River that is transported by rail. WCTL members presently ship and receive in excess of 140 million tons of coal by rail each year. A list of WCTL’s members is attached as Exhibit A.

circumstances, do nothing to correct the error in the cost of capital calculation for 2005 that WCTL demonstrated in its filing. The issuance of a advance notice of proposed rulemaking (which may, or may not, result in a notice of proposed rulemaking, which, in turn, may, or may not, result in any future changes) is thus an inadequate action on the Board's part.

Indeed, the Board's regular practice elsewhere when issuing decisions in the face of uncertainty or challenge as to the accuracy of the underlying calculations or methodology has been to make its decisions subject to revision based on the outcome of other proceedings or to hold its proceedings in abeyance altogether. For example, the Board established a "moratorium" while it considered changes to its merger rules, STB Ex Parte No. 582 (Sub-No. 1), *Major Rail Consolidation Procedures* (STB served Mar. 31, 2000), *aff'd sub nom. Western Coal Traffic League v. STB*, 216 F.3d 1168 (D.C. Cir. 2000), and held already pending coal rate cases in abeyance while it considers changes to its standards for deciding stand-alone rate cases, STB Ex Parte No. 657 (Sub-No. 1), *Major Issues in Rail Rate Cases* (STB served Feb. 27, 2006), *recon. denied* (STB served Apr. 14, 2006). Likewise, in an individual rate case, the Board relaxed the preclusive effect of a rate prescription under *Arizona Grocery Co. v. Atchison, T. & S.F. Ry.*, 284 U.S. 370 (1932), to permit an otherwise impermissible retroactive rate adjustment to reflect subsequent calculations, STB Docket No. 41185, *Arizona Pub. Serv. Co. v. Atchison, T. & S.F. Ry.* (STB served May 12, 2003). Furthermore, the Board regularly

conditions any initial rate prescription relief in a rate case on the shipper's undertaking to refund to the carrier any amounts that might be due back as a result of the reconsideration and appeal process, despite the Board's lack of authority to revise its rate prescription retroactively. *See, e.g.,* STB Docket No. 41185, *Arizona Pub. Serv. Co. v. Atchison, T. & S.F. Ry.* (STB served Aug. 21, 1997).

In light of the Board's established practice in these other contexts, it is incumbent upon the Board to explain why it is deviating from that practice here and not conditioning its determination of the 2005 industry cost of capital on the outcome in its new rulemaking proceeding. Indeed, if the Board feels that there is enough doubt or question to warrant a rulemaking as to its methodology, then there must be enough doubt or question as to the application of that methodology to the 2005 data. The Board's action in the Decision is thus inconsistent with the issuance of the Notice as well as its established practice.

The Decision also suffers from substantive error. In particular, the Decision claims (at 7) that "WCTL's main concerns relate ... to one input that it now suggests is too subjective." This statement is simply not a fair or complete characterization of the League's submission. The League showed that the data submitted by the Association of American Railroads ("AAR") yielded spurious results, even according to standards articulated by a former testifying expert for one of the AAR's own member railroads. More fundamentally, the League demonstrated that the pivotal error in the AAR's

submission (namely, using a five-year consensus earnings forecast to project growth in perpetuity), adopted by the Board in the Decision, is that it raises the cost of capital by a substantial amount just because the covered railroads are enjoying increased earnings and stock prices in the short-term. A methodology for economic regulation that allows regulated entities to charge more because they are enjoying increased earnings is inherently defective on its face, yet nowhere in its Decision does the Board even acknowledge the fundamental problem identified and demonstrated by the League.

To the extent the Board advances any response in its Decision, it is that “[t]here is a norm of regularity in government conduct that presumes an agency’s duties are best carried out by adhering to the settled rule.” Decision at 7. The League has no quarrel with the proposition that precedent should generally be followed, but the general presumption should yield when there is a clear demonstration that the practice, procedure, and/or methodology yields absurd, or at least suspect, results in a particular instance, such as allowing regulated carriers to charge more when, and just because, their earnings and stock prices increase. The Board’s Decision evinces a complete unwillingness and even refusal to consider the League’s central thesis that cannot be reconciled with the Board’s duties under the ICC Termination Act and the Administrative Procedure Act.

Remarkably, the Decision then goes on to criticize the League for not having presented evidence that the analysts forecasts have understated actual earnings growth in past years:

And although the agency has been using this IBES data since 1988, WCTL has offered no empirical evidence (as opposed to theoretical concerns) that the approach followed by the agency for the past 16 years has produced growth rate predictions that have proven to be systematically below the actual earnings growth.

Decision at 7 (footnote omitted). The Board's comment is baffling in several respects.

First, the Board faults the League for failing to provide "empirical evidence" that the growth estimates have been systematically below actual earnings growth. This comment sidesteps the League's point. Whether relatively short-term earnings estimates (e.g., for five years) have matched actual performance (for the long-term, presumably) has no bearing on whether the Decision's finding that the railroad industry can, will, and should maintain growth at an expected 13% in perpetuity is sound or even remotely plausible. The League's focus was on the credibility of the 2005 data, not the data in prior periods. Even if prior cost of calculations were sound, they would not justify adoption of a figure for 2005 that appears suspect, at least not without further scrutiny (which the Decision eschews).

Second, even assuming *arguendo* that the Decision's undocumented assertion that those past projections have systematically understated actual earnings growth is correct, it begs the question of how and why the STB has continued to find railroads habitually revenue inadequate. If the analysts' forecasts accurately depicted (or understated) actual growth as posited by the Board, then railroads would logically have earned their cost of capital on at least a semi-regular basis, especially as the

incontrovertible evidence is that the railroads' financial health has improved enormously over the past twenty-plus years or even the past five. Likewise, railroad stock prices have enjoyed substantial gains in the past few years. The problem is that increased railroad earnings and profitability are used to project still greater earnings and profitability so that the railroads always need to earn more, but can never earn enough. This problem is exemplified by the 2005 data and squarely identified by the League, yet the Board's Decision does nothing to address it.

Finally, in footnote 16, the Decision noted that the growth rates used by the Board and its predecessor peaked at 14.3% in 1982. The apparent implication is that the 2005 growth rate projections are not excessive when viewed in historical context. However, inflation and interest rates were much higher in 1982, *e.g.*, the yield to maturity on 30-year Treasury notes was 12.76%,² whereas the League's filing (Crowley V.S. at 14 and Exhibit 3) demonstrated that the risk-free rate in 2005 was 4.65% based on the average 20-year Treasury note yield to maturity. Attempting to defend the 2005 analysts forecasts on the basis of the 1982 figure without noting the difference in inflation and interest rates is a nonsensical exercise.

Accordingly, the League calls upon the Board to fulfill its regulatory responsibilities and remedy the material error in its Decision by not merely initiating a

²See www.federalreserve.gov/releases/h15/data/Annual/H15_TCMNOM_Y30.txt

rulemaking as to possible changes for the future, but by addressing the error in the calculation in the railroad cost of capital for 2005.

Respectfully submitted,

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: October 10, 2006

William L. Slover

C. Michael Loftus

Robert D. Rosenberg

Slover & Loftus

1224 Seventeenth Street, N.W.

Washington, D.C. 20036

(202) 347-7170

Its Attorneys

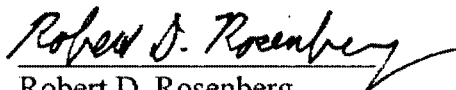
EXHIBIT A

WESTERN COAL TRAFFIC LEAGUE MEMBERS

Alliant Energy
Ameren Energy Fuels and Services
Arizona Electric Power Cooperative, Inc.
Arizona Public Service
CLECO Corporation
City of Austin, Texas
CPS Energy
Kansas City Power & Light Company
Lower Colorado River Authority
MidAmerican Energy Company
Minnesota Power
Nebraska Public Power District
Omaha Public Power District
Texas Genco, LP
Texas Municipal Power Agency
Western Farmers Electric Cooperative
Western Fuels Association, Inc.
Wisconsin Public Service Corporation
Xcel Energy

CERTIFICATE OF SERVICE

I hereby certify that on this 10th day of October 2006, I have caused true and accurate copies of the foregoing Reply Comments of the Western Coal Traffic League to be served upon all parties on the service list in this proceeding.


Robert D. Rosenberg

SLOVER & LOFTUS

ATTORNEYS AT LAW

1224 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C. 20036-3003

WILLIAM L. SLOVER
C. MICHAEL LOFTUS
JOHN H. LE SEUR
KELVIN J. DOWD
ROBERT D. ROSENBERG
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OF COUNSEL
DONALD G. AVERY

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TELEPHONE:
(202) 347-7170

FAX:
(202) 347-3619

WRITER'S E-MAIL:

October 10, 2006

rdr@sloverandloftus.com

BY HAND

The Honorable Vernon A. Williams
Secretary
Surface Transportation Board
Case Control Unit
1925 K Street, N.W.
Washington, D.C. 20423-0001

217780



Re: STB Ex Parte No. 558 (Sub-No. 9),
Railroad Cost of Capital-2005

Dear Secretary Williams:

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If there are any questions concerning this matter, please contact the undersigned.

Respectfully submitted,

Robert D. Rosenberg

Robert D. Rosenberg
An Attorney for Western
Coal Traffic League

RDR:tda

Enclosures

cc: Service List-w/encl.

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BEFORE THE
SURFACE TRANSPORTATION BOARD

217780

In the Matter of:

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2005

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) Ex Parte No. 558 (Sub-No. 9)
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**PETITION FOR RECONSIDERATION
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The Decision also suffers from substantive error. In particular, the Decision claims (at 7) that "WCTL's main concerns relate ... to one input that it now suggests is too subjective." This statement is simply not a fair or complete characterization of the League's submission. The League showed that the data submitted by the Association of American Railroads ("AAR") yielded spurious results, even according to standards articulated by a former testifying expert for one of the AAR's own member railroads. More fundamentally, the League demonstrated that the pivotal error in the AAR's

submission (namely, using a five-year consensus earnings forecast to project growth in perpetuity), adopted by the Board in the Decision, is that it raises the cost of capital by a substantial amount just because the covered railroads are enjoying increased earnings and stock prices in the short-term. A methodology for economic regulation that allows regulated entities to charge more because they are enjoying increased earnings is inherently defective on its face, yet nowhere in its Decision does the Board even acknowledge the fundamental problem identified and demonstrated by the League.

To the extent the Board advances any response in its Decision, it is that “[t]here is a norm of regularity in government conduct that presumes an agency’s duties are best carried out by adhering to the settled rule.” Decision at 7. The League has no quarrel with the proposition that precedent should generally be followed, but the general presumption should yield when there is a clear demonstration that the practice, procedure, and/or methodology yields absurd, or at least suspect, results in a particular instance, such as allowing regulated carriers to charge more when, and just because, their earnings and stock prices increase. The Board’s Decision evinces a complete unwillingness and even refusal to consider the League’s central thesis that cannot be reconciled with the Board’s duties under the ICC Termination Act and the Administrative Procedure Act.

Remarkably, the Decision then goes on to criticize the League for not having presented evidence that the analysts forecasts have understated actual earnings growth in past years:

And although the agency has been using this IBES data since 1988, WCTL has offered no empirical evidence (as opposed to theoretical concerns) that the approach followed by the agency for the past 16 years has produced growth rate predictions that have proven to be systematically below the actual earnings growth.

Decision at 7 (footnote omitted). The Board's comment is baffling in several respects.

First, the Board faults the League for failing to provide "empirical evidence" that the growth estimates have been systematically below actual earnings growth. This comment sidesteps the League's point. Whether relatively short-term earnings estimates (*e.g.*, for five years) have matched actual performance (for the long-term, presumably) has no bearing on whether the Decision's finding that the railroad industry can, will, and should maintain growth at an expected 13% in perpetuity is sound or even remotely plausible. The League's focus was on the credibility of the 2005 data, not the data in prior periods. Even if prior cost of calculations were sound, they would not justify adoption of a figure for 2005 that appears suspect, at least not without further scrutiny (which the Decision eschews).

Second, even assuming *arguendo* that the Decision's undocumented assertion that those past projections have systematically understated actual earnings growth is correct, it begs the question of how and why the STB has continued to find railroads habitually revenue inadequate. If the analysts' forecasts accurately depicted (or understated) actual growth as posited by the Board, then railroads would logically have earned their cost of capital on at least a semi-regular basis, especially as the

incontrovertible evidence is that the railroads' financial health has improved enormously over the past twenty-plus years or even the past five. Likewise, railroad stock prices have enjoyed substantial gains in the past few years. The problem is that increased railroad earnings and profitability are used to project still greater earnings and profitability so that the railroads always need to earn more, but can never earn enough. This problem is exemplified by the 2005 data and squarely identified by the League, yet the Board's Decision does nothing to address it.

Finally, in footnote 16, the Decision noted that the growth rates used by the Board and its predecessor peaked at 14.3% in 1982. The apparent implication is that the 2005 growth rate projections are not excessive when viewed in historical context. However, inflation and interest rates were much higher in 1982, *e.g.*, the yield to maturity on 30-year Treasury notes was 12.76%,² whereas the League's filing (Crowley V.S. at 14 and Exhibit 3) demonstrated that the risk-free rate in 2005 was 4.65% based on the average 20-year Treasury note yield to maturity. Attempting to defend the 2005 analysts forecasts on the basis of the 1982 figure without noting the difference in inflation and interest rates is a nonsensical exercise.

Accordingly, the League calls upon the Board to fulfill its regulatory responsibilities and remedy the material error in its Decision by not merely initiating a

²See www.federalreserve.gov/releases/h15/data/Annual/H15_TCMNOM_Y30.txt

rulemaking as to possible changes for the future, but by addressing the error in the calculation in the railroad cost of capital for 2005.

Respectfully submitted,

WESTERN COAL TRAFFIC LEAGUE

Of Counsel:

Slover & Loftus
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Dated: October 10, 2006

William L. Slover

C. Michael Loftus

Robert D. Rosenberg

Slover & Loftus

1224 Seventeenth Street, N.W.

Washington, D.C. 20036

(202) 347-7170

Its Attorneys

EXHIBIT A

WESTERN COAL TRAFFIC LEAGUE MEMBERS

Alliant Energy
Ameren Energy Fuels and Services
Arizona Electric Power Cooperative, Inc.
Arizona Public Service
CLECO Corporation
City of Austin, Texas
CPS Energy
Kansas City Power & Light Company
Lower Colorado River Authority
MidAmerican Energy Company
Minnesota Power
Nebraska Public Power District
Omaha Public Power District
Texas Genco, LP
Texas Municipal Power Agency
Western Farmers Electric Cooperative
Western Fuels Association, Inc.
Wisconsin Public Service Corporation
Xcel Energy

CERTIFICATE OF SERVICE

I hereby certify that on this 10th day of October 2006, I have caused true and accurate copies of the foregoing Reply Comments of the Western Coal Traffic League to be served upon all parties on the service list in this proceeding.

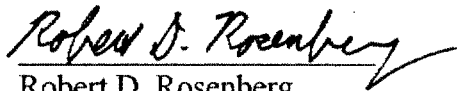

Robert D. Rosenberg

EXHIBIT D

Verified Statement of Dr. James E. Hodder

VERIFIED STATEMENT

OF

JAMES E. HODDER

I. Introduction

My name is James E. Hodder. I am the Charles and Laura Albright Professor of Finance at the University of Wisconsin-Madison and a Wisconsin Distinguished Professor of Business. I am also Chairman of the Finance Department. My address is 3441 Crestwood Drive, Madison, Wisconsin 53705.

I have served on the faculty of the University of Wisconsin Business School since 1992. From 1978 to 1992, I served on the faculty of Stanford University, where I received my Ph.D. in Economics in 1979. Last spring semester, I taught the masters-level Corporate Finance course at Wisconsin. I have taught that course previously as well as corporate-oriented courses on Financial Policy and on Multinational Business Finance. In addition, I have taught several courses on options and other derivative securities, at both introductory and advanced levels. At Stanford, most of my teaching was in corporate finance with a particular focus on valuing manufacturing and technology investments. Hence, I have been teaching corporate finance courses since 1978 – almost 30 years.

A substantial portion of my research and publications has addressed the subjects of investment evaluation and discounting. A key aspect of those subjects is the firm or project cost of capital, including appropriate risk and inflation adjustments. Another substantial portion of my research has addressed corporate capital structure. I have previously submitted

testimony to the Surface Transportation Board (Board) in two rate cases: on behalf of Wisconsin Power & Light in its case against Union Pacific Railroad Company and on behalf of PPL Montana in its case against the Burlington Northern and Santa Fe Railway Company. A copy of my curriculum vitae is attached as Appendix A.

I have been asked on behalf of the Western Coal Traffic League (WCTL) to comment on appropriate methodologies to be employed by the Board in determining the railroad industry's estimated cost of capital. My comments will focus on estimating the cost of equity, where I believe there are significant issues that warrant attention and correction. Those comments can be summarized as follows:

1. I firmly believe that there is more than one appropriate methodology and, when used with consistent assumptions, different methodologies should yield similar estimates for the cost of equity. Hence, there is an important benefit in using more than one methodology so as to obtain a cross-check on the reasonableness of the underlying assumptions. It would be good practice for the Board to consider at least two differing estimation approaches and to explore any substantial differences between the resulting estimates.
2. The Discounted Cash Flow (DCF) formula that has been used to estimate the cost of equity contains a critical assumption that is apparently being overlooked. In particular, the derivation of that formula assumes a growth rate (g) which is constant forever. The current approach for estimating g is to use a truncated average of analyst forecasts of earnings growth over the next five years. If the five-year growth forecast differs

substantially from anticipated growth after year five, the formula will yield estimates that are very misleading.

3. A better, but conceptually similar approach, would use a multi-phase DCF procedure which allows differing growth rates in different periods of time.¹ Such an approach would not be difficult to implement and would be considerably more robust than the current procedure.
4. The Capital Asset Pricing Model (CAPM) provides a conceptually different approach to estimating the cost of equity. Nevertheless, the cost of equity estimated using the CAPM should be similar to that estimated by an appropriately specified DCF procedure. If the results are not similar, that is a signal that the input parameters (for both procedures) need to be re-examined. The CAPM approach is also not difficult to implement. Indeed, it has been the standard approach taught in business schools for roughly 25 years; and it is widely utilized by both operating firms and the investment community.² A major conceptual advantage for the CAPM approach is that it focuses on the economic determinants (firm-specific as well as economy-wide) for the cost of equity. In contrast, the DCF approach backs out an implied cost of equity that is consistent with an observed share price. Nevertheless, both CAPM and DCF

¹ This basic idea is discussed in somewhat different contexts on pages 70–71 of Richard A. Brealey, Stewart C. Myers, and Franklin Allen, Principles of Corporate Finance, 8th Edition, 2006 and on pages 111–112 of Stephen A. Ross, Randolph W. Westerfield, and Jeffrey Jaffe, Corporate Finance, 6th Edition, 2002.

² Use of the CAPM for estimating the cost of equity was and is a major aspect of Richard Brealey and Stewart Myers best-selling textbook Principles of Corporate Finance, whose first edition was copyrighted 1981. Probably the main competitive text at that time was James C. Van Horne, Financial Management and Policy, 5th Edition, 1980. Van Horne's Chapter 8 is entitled "Required Rates of Return for Companies, Divisions, and Acquisitions." That chapter begins by using the CAPM to estimate the cost of equity before moving on to discussing the DCF approach as an alternative.

approaches are typically taught and used to provide the sort of cross-check that I advocate above.

II. Issues with the DCF Formula

The DCF formula that is currently used by the Board dates from a decision by the Interstate Commerce Commission (ICC) in Railroad Cost of Capital - 1982. In that proceeding, Professor Robert H. Litzenberger (on behalf of the railroads) argued that the appropriate DCF formula was:³

$$(1) \quad K = D(0) (1+g) / P(0) + g$$

That is indeed the standard formula found in finance textbooks. The logic of its derivation is that the current price of a firm's stock should be the Present Value of its future dividend stream forever. The use of "forever" is a mechanism for modeling the price at which the stock could be sold in the future. Suppose that someone buys a share today and holds it for T years. They collect the dividends paid out by the firm during that time; and at the end, they sell their share for the then price of P(T). To calculate the return on this investment, we need to know the value of P(T). A way to deal with that is to assume that P(T) equals the Present Value at time T of the subsequent dividend stream (forever).

So the logic underlying formula (1) starts with the valuing the stream of all future dividends to be paid by the firm. There is also an assumption that the discount rate used is the same in every year. This approach leads to the following formula:

$$(2) \quad P(0) = \frac{D(1)}{1+K} + \frac{D(2)}{(1+K)^2} + \frac{D(3)}{(1+K)^3} + \frac{D(4)}{(1+K)^4} + \dots$$

D(1) is the dividend we expect to receive at the end of the first year, D(2) at the end of the second year, and so on. To emphasize that we are talking about all future dividends, it is useful to re-write this formula using a summation indicating that we are going to sum up the present values of dividends from now to a future date that is infinitely far in the future. That formula is:

$$(3) \quad P(0) = \sum_{t=1}^{\infty} \frac{D(t)}{(1+K)^t}$$

We still need some way to specify what those future dividend values will be. The simple approach used here is to assume that they grow at a constant rate g (forever) starting from a current value of $D(0)$, which we can observe now. That is, $D(1) = D(0)(1+g)$, $D(2) = D(0)(1+g)^2$, and so on. This results in a formula:

$$(4) \quad P(0) = \sum_{t=1}^{\infty} \frac{D(0)(1+g)^t}{(1+K)^t}$$

That formula involves an infinite series which has a simple solution that results in:

$$(5) \quad P(0) = \frac{D(0)(1+g)}{K-g}$$

This formula says that assuming a constant growth rate (g) of dividends forever and a constant discount rate (K), there is a rather simple relationship between the current stock price $P(0)$ and the current dividend $D(0)$. Equation (1) simply rearranges that formula to find the value of K .

³ He also advocated use of the CAPM for measuring the cost of equity.

which is consistent with the observed current stock price and dividend plus an assumed g value.

Although perhaps a bit tedious, it is important to have worked through the logic of that formula for several reasons. I have already suggested that the assumption of g being constant forever has major implications, which seem to have been overlooked. Furthermore, equation (3) will provide the starting point for relaxing the assumption that growth is at a constant rate forever. It is also useful to understand that the formula is set up to find the price of a share. The fundamental logic is that $P(0)$ is determined by $D(0)$, g , and K . Using that model to estimate K is effectively an exercise in reverse engineering to find the implied K value that is consistent with the model structure, g forecast, and observed values for $P(0)$ and $D(0)$.

Prior to their decision in Railroad Cost of Capital - 1982, the ICC had used a slightly different formula:

$$(6) \quad K = D(0)/P(0) + g$$

The derivation of that formula is contained in a 1956 article by Professors Myron J. Gordon and Eli Shapiro.⁴ Their derivation follows the same basic approach as above; however, they assume that dividends are paid out continuously through time and discounted at a continuously compounded discount rate. This results in a share price of:

$$(7) \quad P(0) = \frac{D(0)}{K - g}$$

⁴ Myron J. Gordon and Eli Shapiro, "Capital Equipment Analysis: The Required Rate of Profit," Management Science, vol. 3, October, 1956, pp. 102-110. Their derivation entails the use of integral calculus and is perhaps not as readily understood by most individuals as the simpler calculations underlying equation (1).

This formula is then rearranged to obtain equation (6). In other words, the difference between equations (1) and (6) comes from a modeling assumption about how dividends are paid and whether or not one uses discrete time periods or continuous-time discounting. Either formula can be viewed as correct, depending upon the choice of modeling assumptions.

The ICC decided to use the following formula, which is still in use by the Board:

$$(8) \quad K = D(0) (1+0.5g)/ P(0) + g$$

This formula is actually the average of equations (1) and (6). The numerical difference in the outputs of these three formulas is minor. On the other hand, the underlying assumption that g is constant forever is critical and causes all three formulas to generate results which are very sensitive to the assumed value of g .

I will illustrate this issue using formula (8) and estimates from Railroad Cost of Capital - 2005. There it was calculated that the 2005 weighted average dividend yield, $D(0)/P(0)$, was 1.42% using the specified sample of four large railroads.⁵ The estimated value of g was 13.66% based on a truncated average of 5-year earnings per-share growth rate forecasts from IBES. Plugging these estimates into equation (8), we obtain $K = (.0142)(1.0683) + .1366 = 15.18\%$. This was the cost of equity accepted by the Board for 2005.

Recall that the derivation of the DCF formula is actually based on the growth of dividends. In practice, a substantial number of firms adjust their dividends rather infrequently. As a consequence, basing g on actual dividend growth can lead to nonsensical estimates of K .

⁵ The four firms are Burlington Northern Santa Fe Corporation (BNSF), CSX Corporation (CSX), Norfolk Southern Corporation (NSC), and Union Pacific Corporation (UPC). This composite dividend yield is actually lower than the 2004 figure of 1.67% despite the fact that 3 of these firms increased their per-share dividends in

For example, UPC didn't alter its dividends per share in 2005 (or in 2004). Hence using actual dividend growth, its g was zero during that period. Using UPC's 2005 average dividend yield of 1.79% with $g = 0$ in equation (8), we obtain $K = (.0179)(1.0) + 0 = 1.79\%$.⁶ This is below UPC's cost of borrowing, which was estimated as 5.27% for "Bonds, Notes & Debentures".⁷ Clearly, $g = 0$ is not a reasonable assumption. Even though dividends may have not grown in 2005, that doesn't mean they won't grow in the future.

The Board has advocated the use of earnings (rather than dividend) forecasts to establish a value for g . The use of earnings forecasts is reasonable because share price will respond promptly to anticipated changes in earnings. Since the conceptual underpinnings of the model involve an explanation of share price, it is better to use an earnings growth forecast to which that price is apt to be responding rather than dividends which may well be unchanging. However, using a 5-year earnings forecast as an estimate of forever is not a good idea. Suppose that a firm (or industry) currently had declining earnings and the next couple of years looked bleak. Would it make sense to assume a negative g value? We just saw what happens using $g = 0$. Using a negative g value would yield an even more nonsensical estimate for K . That doesn't mean a firm can't have low or even negative growth for a few years, but it can't go on forever. In fact, if a firm grows more slowly than the economy as a whole, it disappears (at least mathematically) in the very long run of forever.

2005 and UPC held its dividends constant. The lower dividend yield was the result of share price increases at all four firms during 2005.

⁶ This dividend yield is from Table 10 of Railroad Cost of Capital – 2005, STB Ex Parte 558 (Sub-No. 9).

⁷ See Table 2 of Railroad Cost of Capital – 2005, op. cit.

On the other hand, a firm or industry continuously growing faster than the overall economy eventually becomes the whole economy (at least mathematically). To illustrate this point, I conducted a small exercise in the effect of perpetual growth. The specified set of four railroads had reported earnings of almost \$5 billion in 2005.⁸ In contrast, the U.S. economy as measured by Gross Domestic Product (GDP) was almost \$12.5 trillion.⁹ However, the economy is growing much more slowly than 13.66% annually. During the last 20 years, GDP annual growth has averaged 5.56% in nominal terms and 3.05% in real terms (excluding effects of inflation).¹⁰ In fact, real GDP growth averaged 3.08% during the 60 year period 1945 - 2005.

The above analysis suggests that a reasonable way to project GDP growth for the future would be to use something close to 3% real growth and add an adjustment for expected inflation. One can get an estimate of long-run inflation by looking at the difference in yields on Treasury Bonds compared with Treasury Inflation Protected Securities (TIPS). Using 20-year bonds, the average difference in yields during 2005 was 2.68%.¹¹ In effect, this is a market-based inflation forecast of roughly 2.7% annually for the subsequent 20 years. Coupling this inflation forecast with an estimate of real GDP growth around 3% suggests a 20-year GDP growth forecast of a bit below 6%.

⁸ Data from the firms' respective 10-K reports indicate 2005 Net Income for BNSF (\$1.531 billion), CSX (\$1.145 billion), NSC (\$1.281 billion) and UPC (\$1.026 billion). The total is \$4.983 billion.

⁹ This and other GDP data are from the U. S. Commerce Department, Bureau of Economic Analysis <http://bea.gov/bea/dn/home/gdp.htm>

¹⁰ GDP growth calculations are geometric annual averages. See "GDP Growth" tab in Hodder Workpapers for spreadsheet calculations.

¹¹ Weekly average of the difference between the 20-Year Treasury Constant Maturity Rate and the 20-Year Constant Maturity Treasury Inflation-Indexed Security Rate. Data are from the Federal Reserve Bank of St. Louis. Spreadsheet calculations are in Hodder Workpapers on a worksheet labeled "Inflation Estimate".

If the economy grows at 6% indefinitely and our set of four railroads grows at 13.66% annually, they will become the whole economy (mathematically) in less than 113 years – that is, \$ 5 billion $\times 1.1366^{113}$ exceeds \$12.5 trillion $\times 1.06^{113}$. It doesn't make sense to think that the whole economy would consist of just railroads; but 113 years is quite a long time. How much difference would it make in our cost of equity calculations if these railroads grew faster than the economy for say 10 or 20 years and then reverted to growing at the economy-wide rate thereafter? It is straightforward to address this question using a multi-phase DCF model based on equation (3), and the answer is that it makes a lot of difference.

In Table 1, I report results from a model which uses different growth rates during different time periods. During the first 5 years, the growth rate is 13.66% and $D(1) = D(0)(1+0.5g) = .0142(1.0683) = 1.517\%$ as in the Board's current procedure. The second phase is years 6-10; and there the growth rate takes on possibly lower values as indicated in the table. Phase 3 is years 11-20; and again the growth rate can be lower as indicated in Table 1. After year 20, the growth rate matches the assumed economy-wide rate of 6% forever. Hence, at the end of year 20 we have a Terminal Value for the subsequent dividends using a formula analogous to equation (5). That is:

$$(9) \quad P(T) = \frac{D(20)[1 + g(T)]}{K - g(T)}$$

where $g(T)$ denotes the terminal growth rate.

Table 1

Cost of Equity Estimates using a Multi-phase DCF Model
with differing growth rates in different phases¹²

Model Version	Growth Rate Years 1-5	Growth Rate Years 6 - 10	Growth Rate Years 11-20	Growth Rate After Year 20	Cost of Equity
0	13.66%	13.66%	13.66%	13.66%	15.18%
1	13.66%	13.66%	13.66%	6.00%	10.20%
2	13.66%	13.66%	9.83%	6.00%	9.40%
3	13.66%	13.66%	6.00%	6.00%	8.68%
4	13.66%	9.83%	9.83%	6.00%	8.97%
5	13.66%	9.83%	6.00%	6.00%	8.31%
6	13.66%	6.00%	6.00%	6.00%	7.98%

Model Version 0 assumes growth at 13.66% forever and yields the same 15.18% cost of equity estimate generated by the simple perpetual growth formula used by the Board. If rapid growth goes on for 20 years (but not forever) as in Model Version 1, the cost of equity from the multi-phase DCF approach is 10.20%, which is a great deal less than the 15.18% resulting from the perpetual growth formula. Actually, arguing that railroads are going to grow more than twice as fast as the overall economy for the next 20 years seriously strains credibility. On the other hand, if railroad growth drops to the economy-wide rate of 6% after only 5 years (Model Version 6), the cost of equity estimate is only 7.98%. There are a variety of possibilities for a transition from 13.66% down to 6%, for example using 9.83% (the average of 6% and 13.66%) in between. The punch-line here is that the time horizon for the rapid growth phase makes an enormous difference on the estimated cost of equity. A variety of

¹² Calculations use the "Multi-phase DCF" spreadsheet in Hodder Workpapers. Growth rate assumptions are specified for the different time periods: years 1-5, years 6-10, years 11-20, and after year 20. The Excel tool

plausible growth assumptions yield costs of equity in the 8 to 10 percent range, all of which are dramatically less than the 15.18% that results from assuming perpetual growth at 13.66%.

III. The CAPM Perspective

As articulated by the Board in its Advanced Notice of Proposed Rulemaking, the CAPM methodology focuses directly on the factors for which investors desire compensation when acquiring a firm's equity shares. That is, the CAPM estimate is composed of parts that include the "risk free" rate of return and a risk premium. The CAPM formula can be written as:

$$(10) \quad K = R_F + \beta(ER_M - R_F)$$

The risk free rate is denoted by R_F and is usually proxied by the yield on a long-term Treasury Bond. That risk free rate can be viewed as including both the real time value of money and a premium for expected inflation. The second term in (10) is a risk premium which is composed of two pieces. Beta (β) measures the riskiness of a firm (or industry) compared to the stock market as a whole. $(ER_M - R_F)$ represents the risk premium for the market and can also be referred to as the price for a unit of market risk.

There are related approaches which use more elaborate mechanisms for estimating the risk premium.¹³ Arbitrage Pricing Theory (APT) argues that there can be potentially many risk factors (rather than just market risk) and that each such factor would have its own risk

SOLVER is then used to find the implied cost of equity (discount rate) that causes the forecasted stream of cash flows from future dividends to match a Present Value of 100.

¹³ Standard corporate finance texts contain useful discussions on using the CAPM and related models to estimate costs of equity. See for example, chapters 8 and 9 in Brealey, Myers, and Allen, *op. cit.*

premium. The cost of equity then becomes R_F plus the sum of the risk premia from multiple factors. The “three-factor model” of Fama and French can be viewed as a special case of APT, where the specified factors are a “market factor” (as in the CAPM) plus a “size factor” and a “book-to-market factor.” In his estimation of a railroad cost of equity, Thomas D. Crowley uses a variation on the basic CAPM with an additional size factor added to equation (10) above.¹⁴ This could be viewed as a compromise between the basic CAPM and the three-factor Fama-French model.

I have examined and found quite reasonable Mr. Crowley’s 2005 railroad cost of equity estimate. As described below, there are some adjustments that can be made which result in what I believe is a more refined and accurate calculation. However, those adjustments are relatively minor and lower the CAPM-based cost of equity estimate by less than 1% compared with Mr. Crowley’s analysis. This serves to emphasize that reasonable but somewhat differing implementations of the same model would generate a range of results, but that range should be relatively modest. That’s why comparing results from the CAPM (or similar) approach with a DCF-based procedure (preferably, multi-phase) can provide valuable insight in determining a reasonable overall cost of equity estimate. In the current situation, the CAPM estimates further confirm that the single-phase DCF model is generating seriously misleading results.

In his CAPM estimation, Mr. Crowley used inputs from Ibbotson Associates, which is a standard and readily available source. I will summarize his procedure and in the process point out a couple of places where one might do something slightly different. He estimated R_F using

¹⁴ Verified Statement of Thomas D. Crowley, Exhibit B in Reply Comments of the Western Coal Traffic League, dated April 28, 2006.

the monthly average during 2005 of yields on 20-year Treasury Bonds and obtained a value of 4.65%. He used unlevered beta estimates from Ibbotson Associates that ranged from .46 (UPC) to .70 (NSC) and calculated a weighted average of .56 for the set of four railroads. Sometimes, beta estimates for individual firms can be distorted by transitory firm-specific issues. Using unlevered betas and averaging across multiple firms in an industry greatly reduces that potential problem. Moreover, the range of .46 to .70 is quite modest. Hence, the unlevered estimate of .56 looks quite reasonable.

When adjusting beta for leverage, the appropriate formula is:¹⁵

$$(11) \quad \beta_E = \beta_A + (\beta_A - \beta_D) \frac{D}{E}$$

Where β_E represents the levered beta for equity, β_A is the unlevered beta of the underlying assets (such as plant and equipment), and β_D is the beta of debt. Mr. Crowley's leverage adjustment implicitly assumed $\beta_D = 0$. This is a frequent simplifying assumption; and indeed, β_D is small. However, it is generally not zero. It can be estimated directly using regression techniques or backed out of the CAPM applied to bond returns. If we believe that the estimated cost of debt at 5.36% represents the expected return for railroad bonds, we can use 4.65% as the risk free rate to see that the risk premium for these bonds is 0.71%. Mr. Crowley uses a market risk premium of 7.1%, which implies $\beta_D = 0.10$. If we used a somewhat lower market risk premium (to be discussed shortly), the implied debt beta would be slightly higher. On the other hand, one could argue that the 5.36% estimated bond yield exceeds the expected

¹⁵ See Brealey, Myers, and Allen, page 518.

return on those bonds due to default risk. If we assume these two effects offset each other and use $\beta_D = 0.10$ in equation (11) with $D/E = .44$ and $\beta_A = 0.56$, we obtain a levered beta of .76 (a bit lower than Mr. Crowley's estimate of .81).

Mr. Crowley used an estimate of 7.1% for the market risk premium. This was based on historical returns for the S&P 500 less long-term government bond returns averaged from 1926-2005. Again, this is a very standard approach and is certainly a reasonable way to estimate that risk premium. However, there is definitely a debate within the finance profession as to whether market returns in the foreseeable future can be expected to match long-term historic averages. As an illustration, the comparable average market premium during 1986-2005 was 6.4%; and there are people who think it will be even less going forward.

If we use these lower beta and market risk premium estimates in equation (10), we obtain $K = .0465 + .76(.064) = 9.51\%$. Mr. Crowley's size adjustment turned out to be a very minor 0.04%. Adding that adjustment gives us an estimated 9.55% for the 2005 railroad cost of equity. The difference between Mr. Crowley's estimate of 10.41% and the 9.55% above is definitely within the realm of reasonable divergence across estimates. Given the results of the multi-phase DCF procedure, I would be more inclined toward the 9.55% estimate.

IV. Concluding Comments

I strongly recommend that the Board replace its current DCF approach with a multi-phase DCF procedure that allows the initial 5-year growth estimate to converge over one or two subsequent phases to the long-term growth rate of the economy. There is more than one way to come up with a GDP growth estimate, but the results will be similar to the approach I

used above. There are also a variety of ways to deal with the transitional phase (or phases) between the first five years and terminal phase where growth occurs at the estimated economy-wide rate. However, reasonable alternatives will yield similar results; and the overall methodology will be more robust. That is, results will be less sensitive to shifts in the 5-year growth forecasts and will provide more sensible cost of equity estimates.¹⁶

I also strongly recommend that the Board mandate the use of a second method for cost of equity estimation to provide a cross-check on the multi-phase DCF result. That second method should be based on the CAPM or a similar approach that attempts to directly estimate a cost of equity based on a risk free return plus one or more risk premia. At this point in time, the CAPM technology is the most widely used and has the best developed infrastructure for data and estimated inputs. I would expect the railroads to understand that technology very well. Hence, the CAPM is probably the current best choice for the second method.

As I have tried to indicate above, cost of equity estimation is not totally precise. All the models require assumptions in their implementation, and some differences across reasonable estimates can be expected. The dramatically different focus of the CAPM (or similar) from a DCF-based procedure can serve to reduce the range of ambiguity as to what is a reasonable cost of equity estimate. We can't see the risk free rate and a risk premium directly in a DCF-based model, but they are there and determining the share price $P(0)$. That is, $P(0)$ and hence K have to be consistent with the expected return that people want for buying those shares. In effect, we have two different paths which should lead to (approximately) the same point. If the

¹⁶ Using the currently approved perpetual DCF model in equation (8), the estimated cost of equity increased from 13.16% in 2004 to 15.18% in 2005. However, it is hard to imagine that railroad risk increased enough to support

two approaches don't yield similar results, it's appropriate to re-examine the implementing assumptions to find out why.

such a substantial rise in the cost of equity. In fact, some might argue that railroad risk declined due to reduced leverage.

Appendix A: Curriculum Vitae

JAMES E. HODDER

**Charles and Laura Albright Professor of Finance
and
Wisconsin Distinguished Professor of Business**

School of Business
University of Wisconsin - Madison
975 University Ave.
Madison, WI 53706-1323

Phone: (608) 262-8774
Fax: (608) 263-0477
Email: jhodder@bus.wisc.edu

Areas of Specialization: Corporate Finance, Derivative Securities, International Finance,
and Risk Management

Education:

1967	B.S.	Industrial Engineering, Stanford University
1968	M.B.A.	Business Administration, University of Michigan
1976	M.A.	Economics, University of California (Berkeley)
1979	Ph.D.	Economics, Stanford University

Dissertation: The Hedging of Exposure to Exchange-Rate Movements

Employment:

1968-69	Sylvania Electronic Systems: Project Administrative Engineer
1969-73	U.S. Navy: Engineering Duty Officer
1974-76	Department of Economics, University of California (Berkeley): Research and Teaching Assistant
1976-78	Department of Economics, Stanford University: Teaching Assistant and Instructor

- 1978-92 Department of Industrial Engineering and Engineering Management,
Stanford University: Assistant Professor and Associate Professor, Associate
Chairman 1987-1988, Ph.D. Program Director 1987-1992
- 1992- School of Business, University of Wisconsin - Madison: Professor of
Finance, Director of Quantitative Masters in Finance (QMF) Program 1995-
2004, Department Chairman since 2004.

Visiting Appointments:

- 1986 Visiting Scholar, Department of Economics, Osaka University -- funded by
a fellowship from the Japan Society for the Promotion of Science
- 1990-91 Visiting Associate Professor, School of Business, University of Wisconsin -
Madison

Teaching:

- Courses: Advanced Derivatives
Corporate Finance
Fixed Income and Derivative Securities
Options and Financial Futures
Ph.D. Seminar: Interest Rate and Credit Risk Models
Ph.D. Seminar: Risk Management in Financial Institutions
Multinational Business Finance
Financial Policy
Doctoral Seminar in Financial Decisions
Engineering Economy
International Economics
- Awards: Outstanding Teacher, Department of Industrial Engineering and Engineering
Management, Stanford University (1981-82 and 1986-87)
- Lawrence J. Larson Award for Excellence in Teaching, School of Business,
University of Wisconsin-Madison (1999)

Publications:

- "Foreign Investment from the Firm's Perspective," in D. Bonham-Yeamman, ed., Developing
Global Corporate Strategies, Academy of International Business and European International
Business Association Joint Conference, Barcelona, Spain, December, 1981.
- "Exposure to Exchange Rate Movements," Journal of International Economics, November,
1982.

"Plant Location Modeling for the Multinational Firm," with J. V. Jucker, Proceedings of the Academy of International Business Conference on the Asia-Pacific Dimension of International Business, Honolulu, Hawaii, December, 1982.

"Financial Market Approaches to Facility Location Under Uncertainty," Operations Research, November-December, 1984.

"Pitfalls in Evaluating Risky Projects," with H. E. Riggs, Harvard Business Review, January-February, 1985. This article has also been reprinted in Managing Projects and Programs, Harvard Business School Press, 1989 and as Chapter 3 in Kim B. Clark and Steven C. Wheelwright, eds., The Product Development Challenge, Harvard Business School Press, 1995.

"Pricing to Reduce Investment When Costs Follow an Experience Curve: Constrained Dynamic Programming as well as Heuristic Rules," with Y. A. Ilan, Proceedings of the American Institute for Decision Sciences Fourteenth Annual Meeting, Western Regional Conference, Monterey, California, March, 1985.

"International Plant Location Under Price and Exchange Rate Uncertainty," with J. V. Jucker, Engineering Costs and Production Economics, April, 1985.

"Some Aspects of Japanese Corporate Finance," with A. E. Tschoegl, Journal of Financial and Quantitative Analysis, June, 1985. This article is also reprinted as Chapter 3 in Edwin J. Elton and Martin J. Gruber, eds., Japanese Capital Markets, Harper-Row, 1990.

"A Simple Plant Location Model for Quantity-Setting Firms Subject to Price Uncertainty," with J. V. Jucker, European Journal of Operational Research, July, 1985.

"Evaluation of Manufacturing Investments: A Comparison of U.S. and Japanese Practices," Financial Management, Spring, 1986. This article has also been reprinted in Stephen H. Archer and Halbert S. Kerr, eds., Readings and Cases in Corporate Finance, McGraw-Hill, 1988.

"Capital Cost: Difference Between U.S. and Japan Shrinks" (in Japanese), Nihon Keizai Shimbun, August 30, 1986.

"A Multifactor Model for International Facility Location and Financing Under Uncertainty," with M. C. Dincer, Computers and Operations Research, 1986.

"Declining Prices and Optimality When Costs Follow an Experience Curve," with Y. A. Ilan, Managerial and Decision Economics, December, 1986.

"Technology Transfer and Second Sourcing when Production Costs Follow an Experience Curve," with Y. A. Ilan, IEEE Transactions on Engineering Management, February, 1987.

"Simple Solution Procedures for Nonlinear Programming Problems that are Derivative Decomposable," with R. C. Carlson and J. V. Jucker, European Journal of Operational Research, July, 1987.

"Corporate capital structure in the United States and Japan: financial intermediation and implications of financial deregulation," in John B. Shoven, ed., Government Policy Towards Industry in the USA and Japan, Cambridge University Press, 1988.

"On Dumping at Less than Marginal Cost," in Developments in Pacific-Asian Business: Education and Research, Volume 2, Pacific Asian Management Institute, 1989.

"A Commentary on 'Japanese Capital Exports through Portfolio Investment in Foreign Securities,'" in Charles A. E. Goodhart and George Sutija, eds., Japanese Financial Growth, Macmillan (London), 1990.

"Agency Problems and International Capital Structure," with L. W. Senbet, in S. Ghon Rhee and Rosita P. Chang, eds., Pacific Basin Capital Markets Research, Elsevier, 1990.

"Valuing Flexibility as a Complex Option," with A. J. Triantis, Journal of Finance, June, 1990.

"International Capital Structure Equilibrium," with L. W. Senbet, Journal of Finance, December, 1990.

"Is the Cost of Capital Lower in Japan?", Journal of the Japanese and International Economies, March, 1991.

"The Cost of Capital for Industrial Firms in the U.S. and Japan," in William T. Ziemba, Warren Bailey, and Yasushi Hamao, eds., Japanese Financial Market Research, Elsevier, 1991.

"Corporate Finance in Japan," with A. E. Tschoegl, in Shinji Takagi, ed., Handbook of Japanese Capital Markets, Basil Blackwell, 1993.

"Valuing Flexibility: An Impulse Control Framework," with A. J. Triantis, Annals of Operations Research, vol. 45, 1993.

"Cross-holdings: Estimation Issues, Biases and Distortions," with M. Fedenia and A. J. Triantis, Review of Financial Studies, Spring, 1994.

"Risk Management and Assessment," in Richard C. Dorf, ed., Handbook of Technology Management, CRC Press, 1998.

"Pricing Models with Transaction Fees," with T. Zariphopoulou, in W. M. McEneaney, G. Yin, and Q. Zhang, eds., Stochastic Analysis, Control, Optimization and Applications: A Volume in Honor of W. H. Fleming, Birkhauser Boston, 1999.

"Multinational Capital Structure and Financial Flexibility," with K. Singh, Journal of International Money and Finance, vol. 19, 2000.

"Numerical Schemes for Variational Inequalities Arising in International Asset Pricing," with A. Tourin and T. Zariphopoulou, Computational Economics, February, 2001.

"Valuing Real Options: Can Risk Adjusted Discounting Be Made To Work?", with A. S. Mello and G. S. Sick, Journal of Applied Corporate Finance, Summer, 2001.

"Corporate Finance," in Allan Bird, ed., Encyclopedia of Japanese Business and Management, Routledge, 2002.

"Debt/Equity Ratios," in Allan Bird, ed., Encyclopedia of Japanese Business and Management, Routledge, 2002.

"Incentive Contracts and Hedge Fund Management," with J. C. Jackwerth, Journal of Financial and Quantitative Analysis, forthcoming.

Published Book Reviews:

"Review of The Economic Analysis of Industrial Projects by Lynn E. Bussey," James E. Hodder and James V. Jucker in The Engineering Economist, Winter, 1980.

"Review of Investment Analysis and Management by Anthony J. Curley and Robert M. Bear," in The Engineering Economist, Spring, 1980.

Research in Progress:

"Default Risk with Managerial Control," with T. Zariphopoulou.

"Valuing Derivatives on a Controlled Stochastic Process," with J. C. Jackwerth

"Managerial Control, Compensation, and Derivative Pricing," with J. C. Jackwerth.

Presentations at Conferences and Public Lectures:

"A Plant-Location Model for the Multi-National Firm," with J. V. Jucker, TIMS/ORSA Joint National Meeting, Washington, D.C., May, 1980.

"Exposure to Exchange Rate Movements," Annual Meeting of Western Finance Association, San Diego, California, June, 1980.

"International Plant Location Under Price and Exchange Rate Uncertainty," with J. V. Jucker, CORS/TIMS/ORSA Joint National Meeting, Toronto, Canada, May, 1981.

"Hedging International Exposure: A Model with Flexible Exchange Rates and Expropriation Risk," Academy of International Business Annual Meeting, Montreal, Canada, October, 1981.

"Foreign Investment from the Firm's Perspective," Academy of International Business and European International Business Association Joint Meeting, Barcelona, Spain, December, 1981.

"A Simple Approach to Solving a Family of Nonlinear Programming Problems," with R. C. Carlson and J. V. Jucker, TIMS/ORSA Joint National Meeting, Detroit, Michigan, April, 1982.

"Evaluating Risky R&D Projects," with H. E. Riggs, TIMS/ORSA Joint National Meeting, San Diego, California, October, 1982.

"A Multifactor Model for International Facility Location Under Uncertainty," with M. C. Dincer, Academy of International Business Annual Meeting, Washington, D.C., October, 1982.

"Hedging International Exposure: Capital Structure Under Flexible Exchange Rates and Expropriation Risk," American Finance Association Annual Meeting, New York, December, 1982.

"Technology Transfer When Production Costs Follow an Experience Curve," with Y. A. Ilan, TIMS/ORSA Joint National Meeting, San Francisco, California, May, 1984.

"Investment and Financial Decision Making in Japanese Firms: A Comparison with U.S. Practices," Academy of International Business Annual Meeting, Cleveland, Ohio, October, 1984.

"Pricing to Reduce Investment When Costs Follow an Experience Curve: Constrained Dynamic Programming as well as Heuristic Rules," with Y. A. Ilan, Fourteenth Annual Meeting of the American Institute for Decision Sciences, Western Regional Conference, Monterey, California, March, 1985.

"Corporate Capital Structure in the U.S. and Japan: Financial Intermediation and Implications of Financial Deregulation," Conference on Government Policy Towards Industry in the United States and Japan, Koret Conference Series, Center for Economic Policy Research, Stanford, California, May, 1985. This paper was also presented at the Academy of International Business Annual Meeting, New York, October, 1985.

"International Capital Structure Equilibrium," with L. W. Senbet, Allied Social Sciences Association Annual Meeting, New York, December, 1985.

"Security Market and Capital Structure Issues in U.S.-Japanese Economic Relations," Public Lecture at Osaka University, June, 1986.

"International Capital Structure Equilibrium," with L. W. Senbet, presented at the 1987 Annual Meetings of the Western Finance Association (San Diego, June), the European Finance Association (Madrid, September), the Academy of International Business (Chicago, November), and the American Finance Association (Chicago, December).

"A Commentary on 'Japanese Capital Exports through Portfolio Investment in Foreign Securities,'" International Conference on Japanese Financial Growth, London, England, October, 1988.

"Capital Structure and Cost of Capital in the U.S. and Japan," presented at the 1988 Annual Meeting of the Academy of International Business (San Diego, November) and the 1989 Annual Meeting of the Association of Japanese Business Studies (San Francisco, January). This paper was also presented at a symposium on Japanese Finance at the University of Michigan, January, 1989.

"On Dumping at Less than Marginal Cost," Second Annual International Symposium on Pacific-Asian Business, Honolulu, January, 1989.

"Agency Problems and International Capital Structure," with L. W. Senbet, First Annual Pacific-Basin Finance Conference, Taipei, Taiwan, March, 1989.

"Japanese Corporate Financing Patterns," Applied Securities Analysis Conference, University of Wisconsin-Madison, September, 1989.

"Is the Cost of Capital Lower in Japan?" Presented at the 1990 Annual Meeting of the Academy of International Business (Toronto, October) and the 1990 TIMS/ORSA Joint National Meeting (Philadelphia, October).

"Global Manufacturing Planning Models and Practices," TIMS/ORSA Joint National Meeting, Philadelphia, October, 1990.

"International Financial Structure and Competitiveness," 1991 International Conference on Economics and Management, Tokyo, Japan, March, 1991.

"Cross-holding and Market Return Measures," with M. Fedenia and A. J. Triantis, presented at the 1991 Western Finance Association Annual Meeting (Jackson Lake Lodge, Wyoming; June), the 1991 TIMS/ORSA Joint National Meeting (Anaheim, November), and the Osaka University - Wharton Conference on Corporate Financial Policy and International Competition (Osaka, Japan, January, 1992).

"Multinationality and Capital Structure," with K. Singh, presented at TIMS/ORSA Joint National Meeting, Boston, April, 1994.

"Multinational Capital Structure and Financial Flexibility," with K. Singh, presented at the 1997 Financial Management Association International Conference (Zurich, Switzerland, May), the 1997 Western Finance Association Annual Meeting (San Diego, June), and the 1997 European Finance Association Annual Meeting (Vienna, Austria, August).

"The Bubble Burst, Then Things Got Worse: Perspectives on the Japanese Financial Crisis," with N. Buchan and K. Ito, presentation at the World Affairs and Global Economy (WAGE) workshop, University of Wisconsin-Madison, April, 1998.

"The Japanese Banking Crisis," presented at the U.S.-Asian Pacific Relations in the 21st Century Conference, St. Norbert College, De Pere, Wisconsin, October, 1998.

"Default Risk with Managerial Control," with T. Zariphopoulou, presented at the Bachelier Finance Society Congress, Crete, June, 2002.

"Incentive Contracts and Hedge Fund Management," with J. Jackwerth, presented at the Conference on Delegated Portfolio Management jointly sponsored by the University of Oregon and the Journal of Financial Economics (Eugene, Oregon, September 2004) and at the 2005 Frontiers of Finance conference (Bonaire, Netherlands Antilles, January 2005).

"Employee Stock Options: Much More Valuable Than You Thought," with J. C. Jackwerth, presented at the 15th Annual Derivative Securities and Risk Management Conference (Arlington, Virginia, April 2005), at the 2005 FMA European Conference (Siena, Italy, June), and at the 2006 Frontiers of Finance conference (Bonaire, Netherlands Antilles, January 2006).

Professional Societies:

Academy of International Business
American Finance Association
Financial Management Association
Global Association of Risk Professionals
Professional Risk Mangers' International Association
Society for Financial Studies
Western Finance Association

Year	Real GDP 1/	20 yr Growth	40 yr Growth	60 yr Growth
1945	1,786.3			
1965	3,191.1	2.944%		
1985	6,053.7	3.253%	3.098%	
2005	11,048.6	3.054%	3.154%	3.084%

Year	Nominal GDP 1/	20 yr Growth	40 yr Growth	60 yr Growth
1945	223.1			
1965	719.1	6.027%		
1985	4220.3	9.252%	7.627%	
2005	12455.8	5.560%	7.390%	6.934%

Initial Value	Growth Rate	Years	Final Value
12.5	6.00%	112.135	8601.678665
5	13.66%	112.135	8600704.542

Notes:

- 1/ GDP data is from the annual table of Current-dollar and "real" GDP
Bureau of Economic Analysis, U.S. Department of Commerce the web site is:
<http://bea.gov/bea/dn/home/gdp.htm>

Title:	20-Year Treasury Constant Maturity Rate			
Series ID:	WGS20YR			
Source:	Board of Governors of the Federal Reserve System			
Release:	H.15 Selected Interest Rates			
Seasonal Adjustment:	Not Applicable			
Frequency:	Weekly, Ending Friday			
Units:	Percent			
Date Range:	1993-10-01 to 2006-10-06			
Last Updated:	2006-10-11 9:20 AM CT			
Notes:	Averages of business days. For further information regarding treasury constant maturity data, please refer to http://www.federalreserve.gov/releases/h15/current/h15.pdf and http://www.treas.gov/offices/domestic-finance/debt-management/interest-rate/index.html			
DATE	VALUE	TIPS Data		INFL Est
2004-07-30	5.30	2004-07-30	2.44	2.86
2004-08-06	5.17	2004-08-06	2.32	2.85
2004-08-13	5.06	2004-08-13	2.21	2.85
2004-08-20	5.04	2004-08-20	2.19	2.85
2004-08-27	5.05	2004-08-27	2.23	2.82
2004-09-03	4.98	2004-09-03	2.18	2.80
2004-09-10	4.99	2004-09-10	2.20	2.79
2004-09-17	4.92	2004-09-17	2.18	2.74
2004-09-24	4.80	2004-09-24	2.13	2.67
2004-10-01	4.84	2004-10-01	2.12	2.72
2004-10-08	4.95	2004-10-08	2.21	2.74
2004-10-15	4.85	2004-10-15	2.12	2.73
2004-10-22	4.79	2004-10-22	2.07	2.72
2004-10-29	4.79	2004-10-29	2.10	2.69
2004-11-05	4.85	2004-11-05	2.09	2.76
2004-11-12	4.95	2004-11-12	2.16	2.79
2004-11-19	4.88	2004-11-19	2.07	2.81
2004-11-26	4.86	2004-11-26	2.04	2.82
2004-12-03	5.02	2004-12-03	2.15	2.87
2004-12-10	4.86	2004-12-10	2.05	2.81
2004-12-17	4.80	2004-12-17	1.99	2.81
2004-12-24	4.84	2004-12-24	1.94	2.90
2004-12-31	4.92	2004-12-31	1.99	2.93
2005-01-07	4.88	2005-01-07	2.02	2.86
2005-01-14	4.80	2005-01-14	2.00	2.80
2005-01-21	4.71	2005-01-21	1.94	2.77
2005-01-28	4.70	2005-01-28	1.96	2.74
2005-02-04	4.62	2005-02-04	1.93	2.69
2005-02-11	4.49	2005-02-11	1.79	2.70
2005-02-18	4.61	2005-02-18	1.80	2.81
2005-02-25	4.74	2005-02-25	1.90	2.84
2005-03-04	4.79	2005-03-04	1.93	2.86
2005-03-11	4.84	2005-03-11	1.90	2.94
2005-03-18	4.91	2005-03-18	1.95	2.96
2005-03-25	4.98	2005-03-25	2.01	2.97
2005-04-01	4.93	2005-04-01	1.97	2.96

2005-04-08	4.87	2005-04-08	1.94	2.93
2005-04-15	4.79	2005-04-15	1.90	2.89
2005-04-22	4.68	2005-04-22	1.81	2.87
2005-04-29	4.64	2005-04-29	1.84	2.80
2005-05-06	4.64	2005-05-06	1.85	2.79
2005-05-13	4.62	2005-05-13	1.84	2.78
2005-05-20	4.53	2005-05-20	1.81	2.72
2005-05-27	4.47	2005-05-27	1.80	2.67
2005-06-03	4.33	2005-06-03	1.72	2.61
2005-06-10	4.31	2005-06-10	1.75	2.56
2005-06-17	4.46	2005-06-17	1.88	2.58
2005-06-24	4.35	2005-06-24	1.84	2.51
2005-07-01	4.31	2005-07-01	1.81	2.50
2005-07-08	4.41	2005-07-08	1.91	2.50
2005-07-15	4.46	2005-07-15	1.99	2.47
2005-07-22	4.52	2005-07-22	2.05	2.47
2005-07-29	4.53	2005-07-29	2.05	2.48
2005-08-05	4.61	2005-08-05	2.08	2.53
2005-08-12	4.62	2005-08-12	2.08	2.54
2005-08-19	4.50	2005-08-19	2.01	2.49
2005-08-26	4.46	2005-08-26	1.97	2.49
2005-09-02	4.36	2005-09-02	1.88	2.48
2005-09-09	4.44	2005-09-09	1.93	2.51
2005-09-16	4.53	2005-09-16	1.94	2.59
2005-09-23	4.56	2005-09-23	1.93	2.63
2005-09-30	4.59	2005-09-30	1.94	2.65
2005-10-07	4.64	2005-10-07	2.02	2.62
2005-10-14	4.72	2005-10-14	2.09	2.63
2005-10-21	4.75	2005-10-21	2.09	2.66
2005-10-28	4.82	2005-10-28	2.16	2.66
2005-11-04	4.89	2005-11-04	2.16	2.73
2005-11-11	4.89	2005-11-11	2.16	2.73
2005-11-18	4.81	2005-11-18	2.15	2.66
2005-11-25	4.77	2005-11-25	2.15	2.62
2005-12-02	4.79	2005-12-02	2.18	2.61
2005-12-09	4.80	2005-12-09	2.21	2.59
2005-12-16	4.77	2005-12-16	2.18	2.59
2005-12-23	4.71	2005-12-23	2.10	2.61
2005-12-30	4.60	2005-12-30	2.04	2.56
2006-01-06	4.62	2006-01-06	2.05	2.57
2006-01-13	4.65	2006-01-13	2.08	2.57
2006-01-20	4.59	2006-01-20	2.02	2.57
2006-01-27	4.69	2006-01-27	2.04	2.65
2006-02-03	4.75	2006-02-03	2.02	2.73
2006-02-10	4.73	2006-02-10	1.99	2.74
2006-02-17	4.76	2006-02-17	2.04	2.72
2006-02-24	4.70	2006-02-24	1.99	2.71
2006-03-03	4.76	2006-03-03	2.01	2.75
2006-03-10	4.91	2006-03-10	2.14	2.77
2006-03-17	4.90	2006-03-17	2.16	2.74
2006-03-24	4.90	2006-03-24	2.19	2.71
2006-03-31	5.01	2006-03-31	2.29	2.72
2006-04-07	5.11	2006-04-07	2.37	2.74

2006-04-14	5.22		2006-04-14	2.44		2.78
2006-04-21	5.26		2006-04-21	2.44		2.82
2006-04-28	5.30		2006-04-28	2.48		2.82
2006-05-05	5.37		2006-05-05	2.51		2.86
2006-05-12	5.37		2006-05-12	2.48		2.89
2006-05-19	5.36		2006-05-19	2.48		2.88
2006-05-26	5.29		2006-05-26	2.46		2.83
2006-06-02	5.32		2006-06-02	2.47		2.85
2006-06-09	5.21		2006-06-09	2.47		2.74
2006-06-16	5.23		2006-06-16	2.49		2.74
2006-06-23	5.35		2006-06-23	2.59		2.76
2006-06-30	5.38		2006-06-30	2.63		2.75
2006-07-07	5.34		2006-07-07	2.60		2.74
2006-07-14	5.25		2006-07-14	2.54		2.71
2006-07-21	5.23		2006-07-21	2.51		2.72
2006-07-28	5.21		2006-07-28	2.46		2.75
2006-08-04	5.14		2006-08-04	2.39		2.75
2006-08-11	5.13		2006-08-11	2.32		2.81
2006-08-18	5.11		2006-08-18	2.34		2.77
2006-08-25	5.03		2006-08-25	2.26		2.77
2006-09-01	4.98		2006-09-01	2.26		2.72
2006-09-08	5.01		2006-09-08	2.33		2.68
2006-09-15	4.99		2006-09-15	2.34		2.65
2006-09-22	4.91		2006-09-22	2.32		2.59
2006-09-29	4.81		2006-09-29	2.25		2.56
2006-10-06	4.84		2006-10-06	2.27		2.57
Averages	20-yr T-Bond		TIPS			Difference (Infl Est)
7/30/04-6/10/06	4.84		2.12			2.72
1/7/05-12/30/05	4.65		1.97			2.68

Model uses Dividend Growth for First Year at one-half the Annual Rate

Input Assumptions 1/					
Current Price	Current Dividend	Growth Rate Years 1-5	Growth Rate Years 6 - 10	Growth Rate Years 11-20	Growth Rate After Year 20
100	1.42	13.66%	6.00%	6.00%	6.00%

Net Present Value of Dividends 2/ 100.00

Implicit Cost of Equity 3/ 7.98%

Year	Dividend	Terminal Value
1	1.51699	
2	1.72421	
3	1.95973	
4	2.22743	
5	2.53170	
6	2.68360	
7	2.84462	
8	3.01529	
9	3.19621	
10	3.38799	
11	3.59126	
12	3.80674	
13	4.03514	
14	4.27725	
15	4.53389	
16	4.80592	
17	5.09428	
18	5.39993	
19	5.72393	
20	6.06737	324.3954049

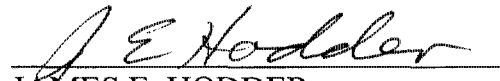
- 1/ Assumptions to calculate the Net Present Value of future dividends. Changing of any of these inputs will require the running of the Excel Solver function to calculate a new implicit cost of equity.
- 2/ Net Present Value of future dividends including a Terminal Value at the end of year 20 for all subsequent dividends.
- 3/ Implicit Cost of Equity calculated using the Excel Solver function. To avoid the possibility of dividing by zero, a constraint is used in Solver that requires the Implicit Cost of Equity to exceed the Terminal Growth Rate. Solver works best if the "initial guess" for the Implicit Cost of Equity in cell E11 exceeds the Terminal Growth Rate input.

Model Version	Growth Rate Years 1-5	Growth Rate Years 6 - 10	Growth Rate Years 11-20	Growth Rate After Year 20	Cost of Equity
0	13.66%	13.66%	13.66%	13.66%	15.18%
1	13.66%	13.66%	13.66%	6.00%	10.20%
2	13.66%	13.66%	9.83%	6.00%	9.40%
3	13.66%	13.66%	6.00%	6.00%	8.68%
4	13.66%	9.83%	9.83%	6.00%	8.97%
5	13.66%	9.83%	6.00%	6.00%	8.31%
6	13.66%	6.00%	6.00%	6.00%	7.98%

VERIFICATION

I, JAMES E. HODDER, declare under penalty of perjury that the foregoing Statement is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed on December 4, 2006



JAMES E. HODDER

EXHIBIT E

Article from *Public Utilities Fortnightly* (November 2006) on Survey of Cost of Equity

Return On Equity

REGULATORS TRUST, BUT VERIFY

Some recent utility rate proceedings cast doubt on new ROE models and “risk adders.”



BY PHILLIP S. CROSS

The results of *Public Utilities Fortnightly's* annual survey of rates of return on equity (ROE) authorized for major electric and natural-gas utilities broadly show a continuing decline in the level of debate over issues specific to restructuring of the electric market. The survey also reveals a subtle shift back to investor requirements and overall business risks faced by regulated energy companies.

For example, in a gas rate case decided in Nevada, regulators rejected an ROE “risk adder” proposed by a natural-gas local distribution company and reminded the utility that hard evidence such as credit ratings and regulatory rulings are what makes the difference in a rate-case setting.

The Illinois Commerce Commission reviewed the underpinnings of the traditional ROE process when it rejected a proposal by a party to a major electric rate case to switch to a completely new approach, purportedly based on direct evidence from the investment-banking community. As it turned out, the so-called “investment-bank analysis” produced an ROE estimate much lower than any produced by the standard financial models normally relied upon in rate cases. The commission concluded it had no way to know what assumptions investment bankers use when putting a value on utility stocks, or whether such an estimate might satisfy the legal requirement for just-and-reasonable rates in a regulated market.

The Risk Adder

In its most recent natural-gas rate case, Sierra Pacific Power Co. asked the Nevada Public Utilities Commission (PUC) to approve a risk-premium adder when estimating the ROE investors would demand before investing in the company. Sierra Pacific argued that it faced an unusually risky position in the near term due to factors such as rapid customer growth and projected increases in capital expenditures. The PUC said

the utility had failed to put forth any evidence that the premium adder is necessary for capital attraction. More to the point, the PUC noted that the company could not explain why it has been able to improve its credit rating from a "B" to a "BB" bond rating since the last rate case, when the current ROE of 10.25 percent did not include a risk-premium adder. Finally, the commission pointed to its own recent actions that would reduce risk perceived by investors in the near term, including:

- 1) Commission statements and orders that indicate the PUC is satisfied with the company's procurement strategy policies;
- 2) Regulatory changes that cause an annual review by the PUC of Sierra Pacific's annual energy supply plan, which informs the commission of short-term purchase plans and number trends, thus decreasing the likelihood of future disallowances;
- 3) Regulatory changes to allow utilities to file annually for two energy cost adjustments if necessary, which is helpful in avoiding large deferred energy balances; and
- 4) Regulatory changes and commission orders that allow for an equity premium adjustment to Sierra Pacific's ROE for construction projects that are deemed critical facilities. *Re Sierra Pacific Power Co., Docket Nos. 05-1005 et al., 248 PUR4th 364, April 27, 2006 (Nev. P.U.C.)*

An Investment-Bank Analysis

In a major rate case involving electric delivery services provided by Commonwealth Edison Co. (ComEd), a coalition of groups representing small consumers looked to recent valuations of utility assets conducted by investment banks to support a new approach to estimating a rate of return that would attract investors to utility stocks. (The recently terminated plan for a merger of ComEd parent, Exelon, and Public Service Enterprise Group [PSEG], a New Jersey company, provided current market data and an opening to pitch the novel approach.) Using this new method, the consumer groups suggested that investors would favor investment in ComEd so long as a 7.75 percent equity allowance was included in rates. The alliance of consumer groups had estimated ComEd's cost of equity by inference from the weighted average cost of capital (WACC) calculated by Morgan Stanley for the merger of Exelon and PSEG. All other parties to the Illinois Commerce Commission (ICC) case used complex financial models to gauge ROE requirements and came up with much higher estimates, including the utility's offered 11 percent, the 10.19 percent presented by the commission staff, and 9.9 percent favored by a large industrial users group.

Predictably, ComEd responded that the new method pre-

How We Conducted the Survey

For those readers unfamiliar with this long-standing feature, our return-on-equity survey is a sample of the major retail electric and natural-gas rate cases conducted by state regulators across the nation. The survey focuses on the statistical results of traditional rate proceedings, where regulators set a revenue requirement based on cost-of-service projections, including an allowance for rate of return on equity (ROE).

This year's survey covers cost-of-equity capital determinations by state public utility commissions between Sept. 1, 2005, through Sept. 1, 2006. Survey methodology remains similar to past years—requests for information on the results of recent rate proceedings were sent to both regulators and utility financial officials. Direct examination of the commission rate orders, when available, provides additional information.

The traditional cost-of-service rate case remains the most obvious source of information on how utility regulators view the issue of shareholder earnings requirements. Nevertheless, performance-based rate plans and cases involving periodic earnings reviews also contain findings about the appropriate return on equity for utilities and are reported herein. Explanatory notes accompany most entries, and citations are provided for orders published in *Public Utilities Reports, Fourth Series (PUR4th)*.—PSC

sented by consumer groups could not possibly be reasonable because the 7.75 percent ROE it produced is more than 100 basis points below any ROE recently approved in the United States.

The consumer groups explained that because the cost of common equity is not a directly observable number, regulatory commissions have had to rely on subjective models, such as the capital-asset pricing model and the discounted cash flow model, to estimate a utility's cost of common equity. The consumer parties argued that recent merger activity in the electric industry could provide more direct evidence on cost of equity, and a unique opportunity to move away from the complex financial models. With this in mind, the groups hired an expert to recommend a cost of common equity based on a review of electric utility stock valuations conducted by three leading investment banks—Morgan Stanley, JP Morgan, and Lehman Brothers—for the merger between Exelon and PSEG. According to the groups, the valuations done by the three investment banks are a far more reliable indicator of investor needs than the subjective models used to bridge evidentiary gaps "that arise because the level of return required to induce real investors to provide capital for the firm is not directly observable."

The ICC rejected the new approach, finding that while the

consumers had portrayed their method as more objective than standard models, it was impossible to know what assumptions were made by the investment bankers, and whether the result was appropriate in a regulated setting. The commission noted that the expert had relied on WACC figures published by the investment firms as the basis for the estimates. To back out the cost of equity from the investment bankers' WACC estimates, the expert first had to make numerous assumptions, the PUC found.

The commission said it could not determine if the investment bankers used the same approach when determining cost of debt, what mix of debt maturities they used, or if they

included short-term debt. Further, it is unclear whether the Morgan Stanley analysis was for Commonwealth Edison and PECO, a Pennsylvania-based affiliate, separately, or for the proposed combined entity. It also is not known if the investment bankers used the same capital structure or made the same assumptions regarding the treatment of transitional funding instruments, the ICC added. *Re Commonwealth Edison Co., No. 05-0597, 250 PUR 4th 161, July 26, 2006 (Ill.C.C.).* ■

Phillip S. Cross is a legal editor for Public Utilities Fortnightly. Please address any questions about the survey to him at pcross@pur.com.

Company Name	Type of Service (Electric or Gas)	Case, Docket, Decs. on Order No.	Application Date	Order Date	Test Year End Date	Increase/Decrease Requested (\$/MWh)	Increase/Decrease Granted (\$/MWh)	Rate of Return on Common Equity	
								Previously Authorized Rate %	Newly Authorized Rate %
ARIZONA									
Southwest Gas Corp.	Gas	G-01551A 04-0716 247 PUR4th 243	12/9/04	2/23/06	8/31/04	66.9	49.35	11	9.5
ARKANSAS									
Arkansas Oklahoma Gas Corp.	Gas	05-006-U 246 PUR4th 228	2/01/05	12/01/05	8/31/04	6.886	NA	NA	9.7
Arkansas Western Gas Co.	Gas	04-176-U	12/29/04	10/31/05	1/31/06	9.7	4.6	9.9	9.7
CenterPoint Energy Arkla	Gas	04-121-U 245 PUR4th 384	11/24/04	9/19/05	4/30/04	27.9	[11.5]	NA	9.45
CALIFORNIA									
Pacific Gas & Electric Co.	Electric	A.05-05-006 D.05-12-043 245 PURth 492	6/16/05	12/15/05	12/31/06	NA	3.3	11.22	11.35
Pacific Gas & Electric Co.	Gas		6/16/05	12/15/05	12/31/06	NA	1.0	11.22	11.35
San Diego Gas & Electric Co.	Electric		6/16/05	12/15/05	12/31/06	NA	NA	10.38	10.79
San Diego Gas & Electric Co.	Gas		6/16/05	12/15/05	12/31/06	NA	NA	10.38	10.79
Southern California Edison Co.	Electric		6/16/05	12/15/05	12/31/06	NA	(26.4)	11.4	11.6
COLORADO									
Colorado Natural Gas, Inc.	Gas	055-412-G	8/31/05	3/01/06	3/31/05	0.9	0.8	15.0	12.0
Eastern Colorado Utility Co.	Gas	055-439G	9/23/05	5/15/06	12/31/04	0.16	0.07	12.9	10.5
Public Service Co. of Colorado	Gas	055-264G	5/27/06	2/03/06	12/31/04	33.4	22.5	11.0	10.5
FLORIDA									
Florida Power & Light Co.	Electric	05-0045-EI	3/22/05	9/15/05	12/31/06	930	NA	11.0	11.75
Progress Energy Florida	Electric	050078-EI	4/29/05	9/28/05	12/31/06	206	NA	12.0	11.75
GEORGIA									
Atmos Energy	Gas	20298-U	5/20/05	11/21/05	6/19/06	4.023	3.45	11.5	10.12
IDAHO									
Idaho Power Co.	Electric	IPC-E-05-28	10/28/05	5/12/06	12/31/05	44	18.1	10.25	NA
ILLINOIS									
Commonwealth Edison Co.	Electric	05-0597 250 PUR4th 161	8/31/05	6/26/06	12/31/04	34.5	8.331	11.72	10.04
NICOR Gas Co.	Gas	04-0779 245 PUR4th 194	11/04/04	09/20/05	12/31/05	83.3	49.7	11.13	10.51
INDIANA									
Snow & Ogdon Gas Co., Inc.	Gas	42844	4/25/05	8/31/05	9/30/04	211	166	NA	9.76
Switzerland County Natural Gas Co., Inc.	Gas	42821-U	4/8/05	11/22/05	11/30/04	0046	0036	NA	10.5
IOWA									
Aquila	Gas	RPU-05-02	5/02/05	3/01/06	12/31/04	4.1	2.6	NA	11

Company Name	Type of Service (Electric or Gas)	Case/Docket, Decision or Order No.	Application Date	Order Date	Test Year End Date	Increase (Decrease) Requested (\$Million)	Increase (Decrease) Granted (\$Million)	Rate of Return on Common Equity	
								Previously Authorized Rate %	Newly Authorized Rate %
Interstate Power & Light Co.	Gas	RPU-05-1 245 PUR4th 171	4/15/05	10/14/05	12/31/04	19.07 ¹²	14.01	11.05	10.4
KANSAS									
Empire District Electric Co.	Electric	05-EPDE-980-RTS	4/29/05	12/09/05	12/31/04	4.18	2.15 ¹³		
Kansas Gas & Electric Co.	Electric	05-WSEE-981-RTS	5/02/05	12/28/05	12/31/04	84.1	3.0 ¹³	11.02	10.0
KENTUCKY									
Kentucky Power Co.	Electric	2005-00341 248 PUR4th 38	8/26/05	3/14/06	6/30/05	64.796	46.0 ¹⁴	11.0	10.5
The Union Light Heat & Power Co.	Gas	2005-00042	2/25/05	12/22/05	9/30/06	14.048	8.091	11.0	10.2
LOUISIANA									
CLECO Power LLC	Electric	U-21496	12/05/05	7/28/06	NA ¹⁵	NA ¹⁵	NA ¹⁵	12.25	11.25
Entergy Gulf States	Electric	U-28916	NA	8/14/05	12/31/04	23.8	0	10.25	10.65
MAINE									
Maine Public Service Co.	Electric	2006-24	3/13/06	7/11/06	12/31/05	3.24	1.75	10.40	10.2
MARYLAND									
Baltimore Gas & Electric Co.	Gas	9036	4/29/05	12/21/05	7/31/05	52.6	35.6	11.05	11.0
MASSACHUSETTS									
Bay State Gas Co.	Gas	DTE-05-27	12/01/05	11/30/05	12/31/04	22.2	11.1	11.40	10.0
MICHIGAN									
Consumers Energy Co.	Electric	U-14347 246 PUR4th 177	12/14/04	12/22/05	12/31/06	319.7	86.1 ¹⁸	12.25	11.15
Detroit Edison Co.	Electric	U-14838	6/01/06	8/31/06	NA	45	[78.25]	11.0	11.0
Upper Peninsula Power Co.	Electric	U-14745	1/03/06	6/27/06	12/31/06	6.6	3.8	11.4	10.75
MINNESOTA									
Interstate Power & Light Co.	Electric	E-001/GE-05-748	5/16/05	3/03/06	12/31/04	4.8	1.2	11.25	10.39
Northern States Power Co.	Electric	E-002/GR-05-1428	11/02/05	9/01/06	12/31/06	168.0	131.5 ¹⁷	11.47	10.54
NEVADA									
Sierra Pacific Power Co.	Electric	05-10003	10/03/05	4/27/06	5/31/05	3	(14)	10.25	10.6
Sierra Pacific Power Co.	Gas	05-10005 248 PUR4th 364	10/03/05	4/27/06	5/31/05	8	4.5	8.7	10.6 ¹⁶
NEW JERSEY									
Jersey Central Power & Light Co.	Electric	ER02080506	NA	5/31/05	12/31/05	[42]	[164]	12.2	9.55
NEW YORK									
Con Edison Natural Gas Corp.	Gas ¹⁹	05-G-1359 249 PUR4th 209	10/31/05	5/22/06	12/31/05	3.46 ²⁰	2.7 ²⁰	10.7	10.0 ²¹
NORTH DAKOTA									
Xcel Energy	Gas	PU-04-578	11/04/04	6/01/05	12/31/04	1.3	.750	11.5	*
OHIO									
Cincinnati Gas & Electric Co.	Electric	05-0059-EL-AIR	2/17/05	12/21/05	6/30/05	77.945 ²²	51.493	12.025	10.29
OKLAHOMA									
Oklahoma Gas & Electric Co.	Electric	PUD20050015	5/20/05	12/12/05	12/31/04	89.065	42.306		10.75
OREGON									
Pacific Power & Light Co.	Electric	UE 170 Order No. 05-150 244 PUR4th 1	11/12/04	9/28/05	12/31/06	102	26	10.5	10.0 ²³
SOUTH CAROLINA									
South Carolina Electric & Gas Co.	Gas	2005-113-G	4/26/05	11/01/05	12/31/04	28.5	22.9	12.25	10.25
VIRGINIA									
Virginia Natural Gas Co.	Gas	PUE-2005-00057 250 PUR4th 421	NA ²³	7/24/06	NA	NA	9.8 ²⁴	NA	10.0
WASHINGTON									
Avista Corp.	Electric	UE-050482	3/30/05	12/21/05	12/31/04	35.8	22.135	11.16	10.4
Avista Corp.	Gas	UG-050483	3/30/05	12/21/05	12/31/04	2.9	.968	11.16	10.4
WISCONSIN									
Madison Gas & Electric Co.	Electric	3270-UR-114	4/19/05	12/12/05	12/31/06	37.9	35.9	11.5	11.0
Madison Gas & Electric Co.	Gas	3270-UR-114	4/19/05	12/12/05	12/31/06	4.0	3.8	11.5	11.0
Northern States Power Co.	Electric	4220-UR-114	6/01/05	1/05/05	12/31/06	61.4 ²⁵	43.4	11.9	11.0
Wisconsin									

Company Name	Type of Service Electric or Gas	Case Docket Decision or Order No.	Application Date	Order Date	Test-year End Date	Increase (Decrease) Requested (\$Million)	Increase (Decrease) Granted (\$Million)	Rate of Return on Common Equity	
								Previously Authorized Rate %	Newly Authorized Rate %
Northern States Power Co. — Wisconsin	Gas	4220-UR-114	6/01/05	1/05/05	12/31/06	8.1	3.9	11.9	11.0
Wisconsin Electric Power Co.	Electric	05-UR-102	7/01/05	1/26/06	12/31/06	256.4*	229.7	12.2	11.2
Wisconsin Electric Power Co.	Gas	05-UR-102	6/01/05	1/26/06	12/31/06	27.4	21.4	12.2	11.2
Wisconsin Gas LLC	Gas	05-UR-102	6/01/05	1/26/06	12/31/06	53.2	38.7	11.8	11.2
Wisconsin Public Service Corp.	Electric	6690-UR-107	4/01/05	12/22/05	12/31/06	134.0	79.9	11.5	11.0
Wisconsin Public Service Corp.	Gas	6690-UR-117	4/01/05	12/22/05	12/31/06	10.0	7.2	11.5	11.0

ENDNOTES

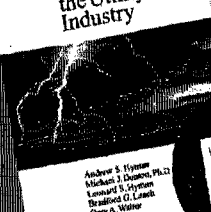
* Settlement agreement. No ROE figure stated.

- ROE figure shown includes a 30 basis-point upward adjustment to account for LDC's higher risk when compared to financial study proxy group.
- Adopted ROE set below the normally accepted mid-point range to reflect finding that LCD had been deficient in accounting and record keeping practices, and had exhibited a pattern of inadequate customer service.
- Order adopting rate-making cost of capital for major investor-owned energy utilities.
- Approved overall rate of return 5 basis points higher than last authorized rate. Produces only nominal change in revenue requirement.
- Although allowed ROE is 20 basis points higher than prior year's award, rate reduction results from lower approved figures for cost of debt and preferred stock.
- Revenue sharing agreement settlement. Existing rates remain in place. Retail base-rate revenues between specified threshold amounts will be shared 2/3 to ratepayers and 1/3 to shareholders. No ROE specified in revenue-sharing settlement.
- Figure shown is current ROE for recovery clause calculations and other non-base-rate purposes.
- Stipulated overall rate of return of 8.1%. No ROE given.
- Delivery service only.
- Final figure per order on rehearing issued 05/28/06. Initial order included an increase of \$45.6 million.
- Settlement agreement. No ROE figure provided. Overall rate of return listed as 8.879%.
- Settlement agreement includes ROE as shown.
- Figure shown includes adjustment for initiation of fuel adjustment charge rate.
- Approved settlement provides that \$28.106 million in environmental surcharge costs will be removed from adjustment clause filing and incorporated into base rates.
- Order on periodic earnings review under existing rate stabilization plan. Threshold for earnings sharing lowered from current ROE of 12.25% to 11.25%.
- Commission finds stranded cost recovery complete. Figure shown allows full recovery of production fixed costs on a going-forward basis.
- Figure shown is Phase 1 grant. Phase 2 grant totaling an additional \$114.9 million revenue requirement effective 1/1/07.
- Commission rejects proposed risk-premium adder as unwarranted given LDC's improved credit rating and recent regulatory actions limiting risk such as preapproval of energy supply plans and ROE premiums for large construction projects.
- Delivery service rates.
- Revenue award includes credit of \$1.4 million in allegedly unreasonable gas commodity costs recovered from ratepayers in 2005-2006 heating season.
- Per settlement proposal. Commission finds revenue figure reflects amount the LDC requires to operate and maintain its gas distribution system.
- Figure as listed in approved settlement agreement.
- In July 14, 2005, order for notice and hearing the commission consolidated utility's rate-case filing and application for performance-based rate plan. Utility may decline commission-approved performance plans, in which case rates may be reset based on cost-of-service data.
- Order approving performance-base rate plan. Commission rejects proposal to dismiss general rate filings and approves revenue requirement findings as shown to be used in event utility rejects plan.
- Financial data indicated the need for a \$393.9 million increase, but WEPCO only requested an increase of \$256.4 million based on the recovery of: \$67.5 million in costs related to transmission charges; \$70.1/million related to reliability investments; \$6 million in costs related to renewable sources of energy; \$93.4 million in additional fuel costs; and \$19.4 million related to Midwest Independent Transmission System Operator additional costs.

Energy Risk Management — A Primer for the Utility Industry

By Andrew S. Hyman et al.

Energy Risk Management: A Primer for the Utility Industry



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EXHIBIT F

UBS Report, When Pigs Fly III, dated April 18, 2006

When Pigs Fly III: Silk Purses from Sow's Ears

18 April 2006

www.ubs.com/investmentresearch

Rick Paterson

Analyst

rick.paterson@ubs.com

+1-212-713 7944

Fadi Chamoun, CFA

Analyst

fadi.chamoun@ubs.com

+1-416-350 4855

Kevin Crissey

Analyst

kevin.crissey@ubs.com

+1-212-713 3562

Elizabeth Mielke

Associate Analyst

elizabeth.mielke@ubs.com

+1-212-713 3683

Stephanie Phillips, CA

Associate Analyst

stephanie.phillips@ubs.com

+1-416-814 1440

■ Sector ROIC one quarter away from WACC

Our last installment of "Pigs" was on January 5th, at which time we were forecasting the sector earning its cost of capital in Q4/06 (on a four-quarter trailing basis). Following a strong Q4 earnings season and some recent earnings upgrades, we now expect the sector to earn its WACC in the second quarter of this year. It's also conceivable that it happens in Q1 if some big upside surprises materialize.

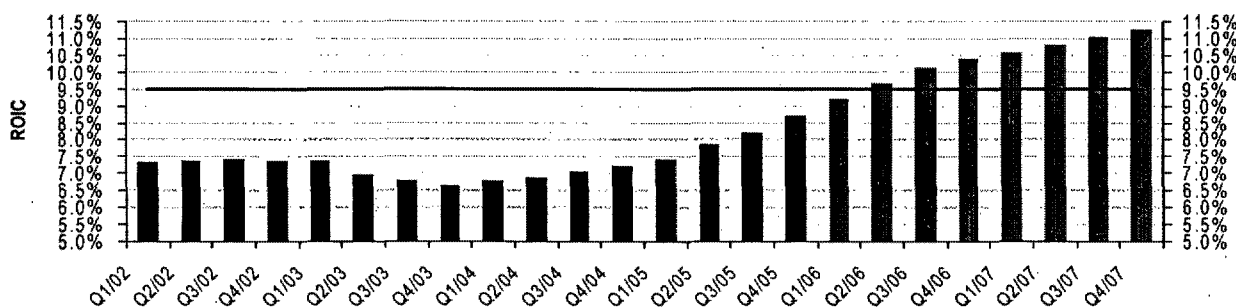
■ CN and BN across the line; NS and CP closing in

The exact WACC of these companies is debatable, and the closest thing we can find to a consensus among CFOs and investors is about 9.5%; hence that's the benchmark we're using. Under our definition of ROIC (see page 2), CN and BN both clearly earn their cost of capital (11.9% for both) and CP (Q1/06E 9.3%) and NS (Q1/06E 9.1%) are just about over the line and should earn their WACC in Q2.

■ CSX, UP, and KCS the laggards

CSX (Q1/06E 8%) and UP (Q1/06E 6.4%) are clearly lagging the other large caps; however, we believe CSX's operational recovery is underway and UP appears to be at an inflection point where things start getting better, not worse. We believe this may allow these companies to play catch-up at an accelerated rate. KCS has the TFM integration to digest, after which we expect ROIC to improve materially.

Chart 1: Railroad ROIC (columns) versus WACC (line at 9.5%)



Source: UBS estimates

This report has been prepared by UBS Securities LLC

ANALYST CERTIFICATION AND REQUIRED DISCLOSURES BEGIN ON PAGE 3

UBS does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Invested Capital

Defined as net debt (interest bearing debt less cash) plus shareholders' equity.

Table 1: Invested Capital, Q1/06E-Q4/07E

Railroad	Q1/06E	Q2/06E	Q3/06E	Q4/06E	Q1/07E	Q2/07E	Q3/07E	Q4/07E
Union Pacific	20,486	20,160	20,193	20,341	20,890	20,755	20,937	21,245
Burlington Northern	16,746	17,103	16,952	16,969	17,479	17,467	17,235	17,174
CSX	13,230	13,372	13,687	13,830	13,794	13,820	14,179	14,268
Norfolk Southern	15,684	15,706	15,907	16,074	16,225	15,980	15,968	15,971
Kansas City Southern	3,352	3,362	3,384	3,394	3,410	3,447	3,478	3,482
Canadian National	12,387	12,578	12,663	12,729	12,624	12,759	12,840	12,936
Canadian Pacific	6,395	6,347	6,295	6,541	6,598	6,545	6,496	6,772
Total	88,280	88,627	89,080	89,878	91,020	90,773	91,134	91,848

Source: UBS estimates

Return on Invested Capital

Post-tax EBIT (using flat 35% rate) divided by invested capital.

Table 2: Return on Invested Capital, Q1/06E-Q4/07E

Railroad	Q1/06E	Q2/06E	Q3/06E	Q4/06E	Q1/07E	Q2/07E	Q3/07E	Q4/07E
Union Pacific	6.4%	7.0%	7.6%	8.1%	8.3%	8.6%	8.8%	9.1%
Burlington Northern	12.5%	12.9%	13.2%	13.6%	13.7%	14.1%	14.4%	14.7%
CSX	8.0%	8.3%	8.8%	9.0%	9.1%	9.2%	9.4%	9.6%
Norfolk Southern	9.1%	9.5%	10.1%	10.3%	10.4%	10.6%	10.9%	11.2%
Kansas City Southern	2.7%	4.1%	4.6%	5.1%	5.4%	5.7%	5.9%	6.2%
Canadian National	12.4%	12.6%	13.1%	13.2%	13.4%	13.6%	13.8%	14.0%
Canadian Pacific	9.3%	9.6%	9.9%	10.2%	10.4%	10.6%	10.7%	10.8%

Source: UBS estimates

Sector Weighted Average ROIC

Each railroad's ROIC multiplied by its percentage of sector invested capital. Q2/06 ROIC hits the sector's WACC.

Table 3: Railroad Contribution to Sector ROIC, Q1/06E-Q4/07E

Invested Capital	Q1/06E	Q2/06E	Q3/06E	Q4/06E	Q1/07E	Q2/07E	Q3/07E	Q4/07E
Union Pacific	1.5%	1.6%	1.7%	1.8%	1.9%	2.0%	2.0%	2.1%
Burlington Northern	2.4%	2.5%	2.5%	2.6%	2.6%	2.7%	2.7%	2.7%
CSX	1.2%	1.3%	1.3%	1.4%	1.4%	1.4%	1.5%	1.5%
Norfolk Southern	1.6%	1.7%	1.8%	1.8%	1.9%	1.9%	1.9%	1.9%
Kansas City Southern	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Canadian National	1.7%	1.8%	1.9%	1.9%	1.9%	1.9%	1.9%	2.0%
Canadian Pacific	0.7%	0.7%	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%
Sector ROIC	9.2%	9.7%	10.1%	10.4%	10.6%	10.8%	11.0%	11.3%

Source: UBS estimates

■ **Statement of Risk**

Risks to railroad stocks include economic (volumes and pricing), financial (debt), event (M&A), and volatile fuel prices. There is also the risk of valuation multiple compression as investors move away from the sector at different stages of the business cycle.

■ **Analyst Certification**

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UBS Investment Research: Global Equity Ratings Definitions and Allocations

UBS rating	Definition	UBS rating	Definition	Rating category	Coverage ¹	IB services ²
Buy 1	FSR is > 10% above the MRA, higher degree of predictability	Buy 2	FSR is > 10% above the MRA, lower degree of predictability	Buy	39%	35%
Neutral 1	FSR is between -10% and 10% of the MRA, higher degree of predictability	Neutral 2	FSR is between -10% and 10% of the MRA, lower degree of predictability	Hold/Neutral	50%	33%
Reduce 1	FSR is > 10% below the MRA, higher degree of predictability	Reduce 2	FSR is > 10% below the MRA, lower degree of predictability	Sell	11%	27%

1: Percentage of companies under coverage globally within this rating category.

2: Percentage of companies within this rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS; as of 31 March 2006.

KEY DEFINITIONS

Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.

Market Return Assumption (MRA) is defined as the one-year local market interest rate plus 5% (a proxy for the equity risk premium and not a forecast).

Predictability Level The predictability level indicates an analyst's conviction in the FSR. A predictability level of '1' means that the analyst's estimate of FSR is in the middle of a narrower, or smaller, range of possibilities. A predictability level of '2' means that the analyst's estimate of FSR is in the middle of a broader, or larger, range of possibilities.

Under Review (UR) Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation.

Rating/Return Divergence (RRD) This qualifier is automatically appended to the rating when stock price movement has caused the prevailing rating to differ from that which would be assigned according to the rating system and will be removed when there is no longer a divergence, either through market movement or analyst intervention.

EXCEPTIONS AND SPECIAL CASES

US Closed-End Fund ratings and definitions are: Buy: Higher stability of principal and higher stability of dividends; Neutral: Potential loss of principal, stability of dividend; Reduce: High potential for loss of principal and dividend risk.

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Companies mentioned

Company Name	Reuters	Rating	Price	Price date/time
Burlington Northern ¹⁸	BNI.N	Neutral 2	US\$83.39	14 Apr 2006 19:36 EDT
Canadian National ^{4a,18}	CNR.TO	Buy 2	C\$53.19	14 Apr 2006 19:36 EDT
Canadian Pacific ¹⁸	CP.TO	Buy 2 (RRD)	C\$61.73	14 Apr 2006 19:36 EDT
CSX Corp. ^{2a,4b,6,7,18,25}	CSX.N	Buy 2 (RRD)	US\$65.05	14 Apr 2006 19:36 EDT
Kansas City Southern ^{13,18}	KSU.N	Buy 2	US\$23.85	14 Apr 2006 19:36 EDT
Norfolk Southern ¹⁸	NSC.N	Buy 2	US\$53.84	14 Apr 2006 19:36 EDT
Union Pacific Corp. ^{2b,18}	UNP.N	Neutral 2 (RRD)	US\$93.52	14 Apr 2006 19:36 EDT

Source: UBS. EDT: Eastern daylight time.

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EXHIBIT G

UBS Report, When Pigs Fly IV, dated August 9, 2006

9 August 2006

www.ubs.com/investmentresearch

Rick Paterson

Analyst

rick.paterson@ubs.com

+1-212-713 7944

Fadi Chamoun, CFA

Analyst

fadi.chamoun@ubs.com

+1-416-350 4855

Elizabeth Mielke

Associate Analyst

elizabeth.mielke@ubs.com

+1-212-713 3683

Stephanie Phillips, CA

Associate Analyst

stephanie.phillips@ubs.com

+1-416-814 1440

When Pigs Fly IV: Ad Astra Per Alia Porci

■ Translation: "To the Stars on the Wings of a Pig"

In our "pigs" series of notes we've been counting down to the day the North American railroad sector finally earns its cost of capital. In our view that day has arrived as the sector weighted average ROIC hit 9.9% on a trailing 12-month basis in Q2. We have been unable to determine the last time this occurred (if ever). Certainly not since 1922, the earliest year that data is available.

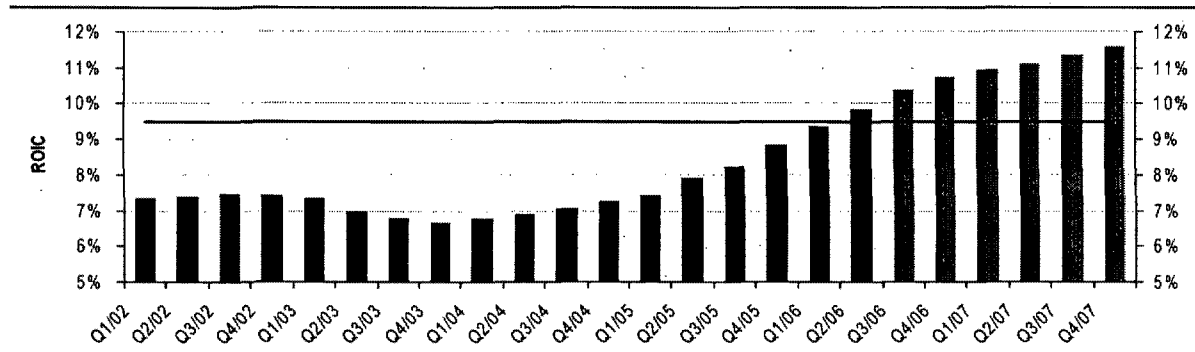
■ More to come

ROIC-WACC parity is a by-product of stronger pricing, driven by the recent tightening of capacity in the industry. This shows no signs of weakening due to demand pressure from intermodal (China) and coal (inventory build), and we forecast prices continuing to move materially higher for at least two more years. Our ROIC forecast hits 10.7% for full year 2006 and 11.6% in 2007.

■ Market doesn't care...yet

The recent sector rotation away from the group appears to have ruined the party as the rails are trading as they always have "at this point in the cycle". Yet the fact that the sector now earns its WACC is also the best example of why these stocks should NOT be trading as they always have, in our opinion. Things have changed and, at some point, we think the market is going to figure that out.

Chart 1: Railroad ROIC (columns) versus WACC (line at 9.5%)



Source: Company reports and UBS estimates

This report has been prepared by UBS
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ANALYST CERTIFICATION AND REQUIRED DISCLOSURES BEGIN ON PAGE 3

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Invested Capital

Defined as net debt (interest bearing debt less cash) plus shareholders' equity.

Table 1: Invested Capital, Q1/06-Q4/07

Railroad	Q1/06	Q2/06	Q3/06E	Q4/06E	Q1/07E	Q2/07E	Q3/07E	Q4/07E
Union Pacific	20,912	21,222	21,309	21,697	22,017	22,005	22,234	22,688
Burlington Northern	16,943	17,189	17,143	17,759	18,247	17,994	17,900	18,142
CSX	13,523	13,866	14,024	14,164	14,150	14,132	14,436	14,546
Norfolk Southern	15,065	15,281	15,314	15,752	15,982	16,022	16,083	16,327
Kansas City Southern	3,175	3,150	3,179	3,181	3,234	3,282	3,306	3,294
Canadian National	12,906	13,075	12,907	13,009	12,842	13,021	13,098	13,223
Canadian Pacific	6,614	6,752	6,671	6,797	6,915	7,008	6,987	7,127
Total	89,138	90,534	90,546	92,358	93,386	93,465	94,044	95,346

Source: Company reports and UBS estimates

Return on Invested Capital

Post-tax EBIT (using flat 35% rate) divided by invested capital.

Table 2: Return on Invested Capital, Q1/06-Q4/07

Railroad	Q1/06	Q2/06	Q3/06E	Q4/06E	Q1/07E	Q2/07E	Q3/07E	Q4/07E
Union Pacific	6.6%	7.3%	8.1%	8.6%	8.9%	9.2%	9.5%	9.7%
Burlington Northern	12.3%	12.8%	13.1%	13.3%	13.4%	13.7%	14.0%	14.3%
CSX	8.2%	8.6%	9.0%	9.3%	9.4%	9.5%	9.8%	10.1%
Norfolk Southern	9.6%	10.2%	10.9%	11.2%	11.4%	11.5%	11.7%	11.9%
Kansas City Southern	3.9%	4.6%	5.4%	6.3%	6.7%	7.1%	7.5%	8.0%
Canadian National	12.3%	12.7%	13.1%	13.4%	13.7%	13.7%	13.7%	13.9%
Canadian Pacific	9.3%	9.4%	9.7%	9.7%	10.2%	10.3%	10.3%	10.5%

Source: Company reports and UBS estimates

Sector Weighted Average ROIC

Each railroad's ROIC multiplied by its percentage of sector invested capital. Q2/06 ROIC hits the sector's WACC.

Table 3: Railroad Contribution to Sector ROIC, Q1/06-Q4/07

Railroad	Q1/06	Q2/06	Q3/06E	Q4/06E	Q1/07E	Q2/07E	Q3/07E	Q4/07E
Union Pacific	1.5%	1.7%	1.9%	2.0%	2.1%	2.2%	2.2%	2.3%
Burlington Northern	2.3%	2.4%	2.5%	2.6%	2.6%	2.6%	2.7%	2.7%
CSX	1.2%	1.3%	1.4%	1.4%	1.4%	1.4%	1.5%	1.5%
Norfolk Southern	1.6%	1.7%	1.8%	1.9%	1.9%	2.0%	2.0%	2.0%
Kansas City Southern	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%
Canadian National	1.8%	1.8%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
Canadian Pacific	0.7%	0.7%	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%
Sector ROIC	9.4%	9.9%	10.4%	10.7%	10.9%	11.1%	11.3%	11.6%

Source: Company reports and UBS estimates

■ **Statement of Risk**

Risks to railroad stocks include economic (volumes and pricing), financial (debt), event (M&A), and volatile fuel prices. There is also the risk of valuation multiple compression as investors move away from the sector at different stages of the business cycle.

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UBS rating	Definition	UBS rating	Definition	Rating category	Coverage ¹	IB services ²
Buy 1	FSR is > 10% above the MRA, higher degree of predictability	Buy 2	FSR is > 10% above the MRA, lower degree of predictability	Buy	48%	34%
Neutral 1	FSR is between -10% and 10% of the MRA, higher degree of predictability	Neutral 2	FSR is between -10% and 10% of the MRA, lower degree of predictability	Hold/Neutral	45%	35%
Reduce 1	FSR is > 10% below the MRA, higher degree of predictability	Reduce 2	FSR is > 10% below the MRA, lower degree of predictability	Sell	7%	32%

1: Percentage of companies under coverage globally within this rating category.

2: Percentage of companies within this rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS; as of 30 June 2006.

KEY DEFINITIONS

Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.

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Companies mentioned

Company Name	Reuters	Rating	Price	Price date/time
Burlington Northern ^{18,25}	BNI.N	Buy 2	US\$67.62	07 Aug 2006 19:36 EDT
Canadian National ^{4a,18}	CNR.TO	Buy 2	C\$45.81	04 Aug 2006 19:34 EDT
Canadian Pacific ¹⁸	CP.TO	Buy 2	C\$53.75	04 Aug 2006 19:34 EDT
CSX Corp. ^{2a,4b,6a,6b,7,18,25}	CSX.N	Buy 2	US\$61.66	07 Aug 2006 19:36 EDT
Kansas City Southern ¹⁸	KSU.N	Buy 2	US\$25.29	07 Aug 2006 19:36 EDT
Norfolk Southern ¹⁸	NSC.N	Buy 2	US\$41.53	07 Aug 2006 19:36 EDT
Union Pacific Corp. ^{2b,18}	UNP.N	Buy 2	US\$80.99	07 Aug 2006 19:36 EDT

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EXHIBIT H

Excepts, Stifel Nicolaus, Report on Railroads, dated October 4, 2006

Transportation Research

John Larkin, CFA
David Ross, CFA
Matthew Grady
Michael Baudendistel

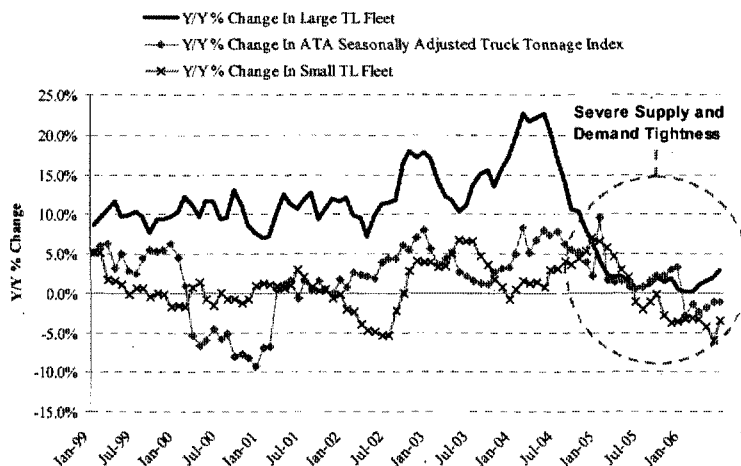
jglarkin@stifel.com
dross@stifel.com
msgrady@stifel.com
mbauden@stifel.com

(410) 454-5158
(410) 454-5164
(410) 454-5316
(410) 454-4725

The following presentation was made to FTR Associates, Inc. on September 14, 2006. The presentation first discusses our general thoughts regarding supply and demand in the freight transportation industry. Next, we provide a discussion of individual sectors within freight transportation under our coverage (truckload, LTL, railroads, ground parcel, and air express) by providing a snapshot of the current state of each sector, the supply and demand dynamics within each sector, and our five-year outlook for each sector. Finally, we provide summarizing comments about the state of the freight transportation industry.

Supply and Demand in the Freight Transportation Industry

Exhibit 1: Market Loosening Slightly in 2006, but Capacity Constraints Remain Severe



Source: American Trucking Associations

Exhibit 1 plots the addition of power units by large truckload fleets and the addition of power units by small truckload fleets against the ATA Truck Tonnage Index. This data is based on a survey that is conducted by Bob Costello, the head economist at the ATA. We believe that the data is statistically significant, very reliable and we believe the survey is well conducted. **Exhibit 1** indicates that since mid-2004, the large truckload carriers have not been adding equipment very rapidly; there have only been some slight additions since that time. Over the same time horizon, small truckload carriers have been reducing the size of their fleets, and despite the recent decline in tonnage, a fairly tight supply and demand dynamic persists in the trucking industry. We believe the tightness in supply and demand in the trucking sector sets that tone for the rest of the transportation index as trucking accounts for the majority of the domestic freight transportation industry.

All relevant disclosures and certifications appear on pages 21-22 of this report

Supply and Demand in the Freight Transportation Industry, Cont.

Exhibit 2: Pricing Verifies Secular Supply and Demand Tightness¹

	CAGR (1999-2002)	CAGR (2003-2006)
Truckload (Rev./loaded mile excl. fsc)	3.4%	6.2%
LTL (Rev./cwt)	4.4%	5.7%
Rail - All Freight (Freight rev./carload)	0.5%	7.9%
Rail - Intermodal (Intermodal rev./unit)	1.5%	7.6%
Ground Parcel (Rev./Piece)	3.7%	3.8%
Air Express (Rev./Piece)	-0.2%	5.3%

¹Truckload data excludes fuel surcharge; all other segments include fuel surcharges
Source: Company data, American Trucking Associations, and Stifel Nicolaus estimates

Exhibit 2 presents pricing growth, the acid test of supply/demand tightness, across the different transportation sectors. Presumably, if supply and demand were not tight, the customer would not pay more for transportation capacity.

In the truckload industry (the only sector presented in **Exhibit 2** exclusive of fuel surcharge), price has increased almost twice as quickly in the past three years as it had in the previous three years.

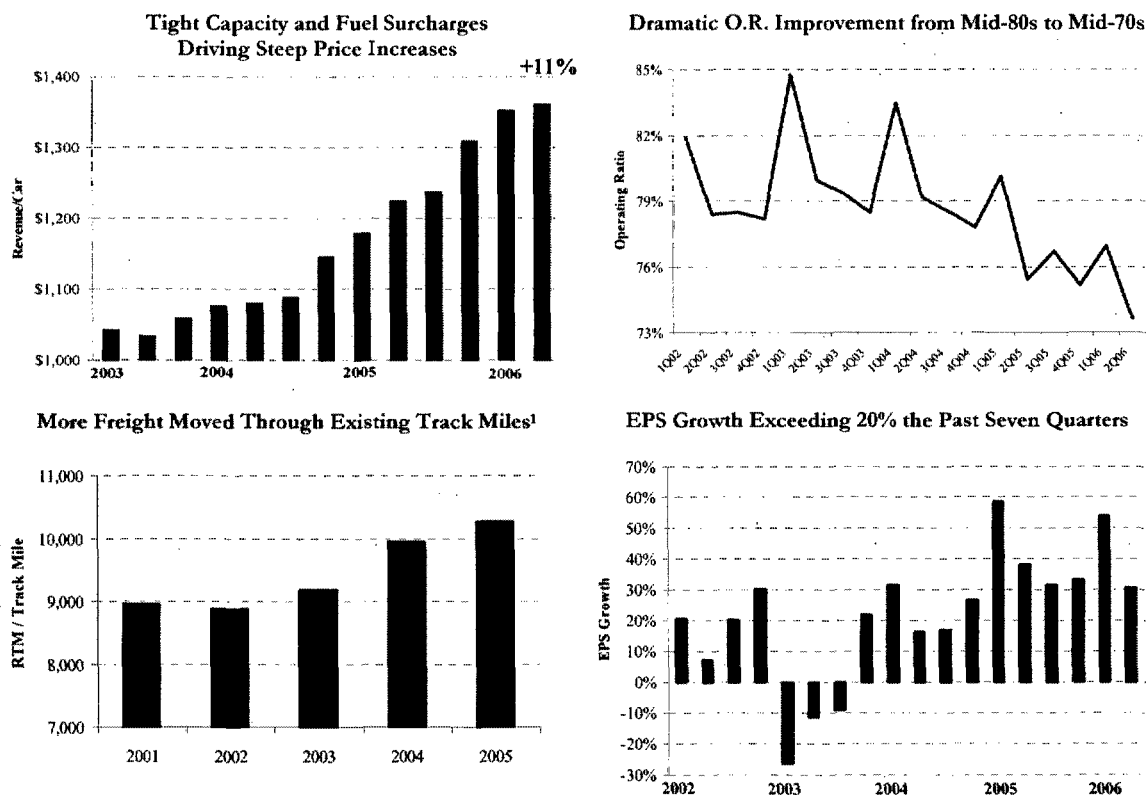
The LTL sector is slightly more mature and the sector also has had favorable pricing, much of the increase due to fuel surcharge. While supply and demand are not quite as tight in LTL (relative to truckload), many of the rapidly growing carriers are able to expand their margins by processing more volume through their fixed cost networks.

In the railroad sector, prices have increased impressively, especially with respect to the carload traffic. Tremendous pricing growth of almost eight percent during the past three years followed a period of very little pricing growth during the previous three years. The railroads have experienced similarly improved pricing growth for the shipment of intermodal units.

The pricing dynamics differ in the ground parcel and air express businesses. There are fewer capacity constraints in those businesses, and therefore, not as much pricing improvement. However, price growth in ground parcel and air express has still been very steady which at least indicates that there is not a large capacity surplus. In the air express sector, the data suggests that much of the pricing growth, given aircraft fuel intensity, is fuel surcharge.

Railroad—Snapshot

Exhibit 6: Strong Earnings Growth On Dramatic Price and Operational Improvement



¹2005 Revenue ton-miles and track miles are Stifel Nicolaus Estimates
Source: AAR and Company data

Exhibit 6 presents the railroad industry snapshot. Revenue per car, a measure of pricing, including fuel surcharge, was up a dramatic 11% year-over-year in 2Q06. In the lower-left quadrant, density is clearly improving as the rails move more revenue-ton miles per track mile. Those two factors have helped to drive the very dramatic improvement in operating ratio down from low 80s to low 70s, which has helped some of these companies earn their cost of capital that had not previously. We expect the railroads that are not currently earning their cost of capital to be earning it shortly. EPS growth for the rails is still very strong, up over 30% in 2Q06. The Street, for some reason, wanted to discount a recession into the numbers even though there is no indication that business is substantially slowing except in a few sectors such as housing materials and autos.

Railroad—Supply and Demand

We would suggest that over the short term, the market is pretty tight and it is only going to get tighter going forward because we expect demand for transportation, especially full carload and container load traffic, to grow faster than capacity is added. As a result, if rail prices appear high now, wait a few years because prices are only going to get higher.

Railroad - Supply:

Scheduled operations create capacity ("better than free"): On the supply side, the ideal situation is to create capacity through scheduled operations or "precision railroading" as Hunter Harrison calls it. He has literally written a book on the topic. The idea is to run the trains on schedule to minimize the delays as trains meet on single track mainlines with passing sidings. The scheduled railroad provides customers with more reliability and it gives the salesforce something to sell to. The scheduled trains that are not full would be where the salesforce would focus. As further benefit, the maintenance crews have a defined window to do their work efficiently instead of guessing when they might get an hour or two.

Discretionary capex targeted at eliminating bottlenecks: Railroads are spending as much as \$500 million per year, above and beyond their maintenance capex requirements, for the occasional double or triple track mainline, extended or additional passing sidings, an upgraded signal system, or some incremental locomotives. A lot of infrastructure improvements are taking place, but not enough to support more than two or three percent tonnage growth across the industry. Therefore, we would suggest that rapid growth in capacity is unlikely because the rails are not spending discretionary capital fast enough to substantially increase capacity.

Rapid capacity growth unlikely as pricing power "feels good": We believe the rail carriers like the notion of being able to manage yield and pick and choose their customers in such a way that they can earn their cost of capital. In the current market, the rails are disincentivized from adding dramatic track capacity and we expect the rails will only pursue expansion projects where the capital spent is easily justified.

Railroad - Demand:

Coal, grain, and intermodal are secular growers: Coal shipments are a function of how hot or cold the weather is and the extent to which the utilities continue to prefer coal as their primary electric generation source. Grain shipments are a function of food consumption and a function of the extent to which China becomes a net grain importer over the next couple of years. Intermodal is related to two secular themes: the driver shortage and container volumes. The driver shortage has caused the truckload carriers to partner with the railroads for the movement of their long-haul freight. Also, the export of manufacturing capacity to the Pacific Rim has created a huge amount of intermodal traffic related to the inbound containerized freight coming in over the West Coast and, increasingly, other ports along the Southeast and the North Atlantic.

Steel volumes have become quite strong: Apparently, the Chinese are absorbing most of the steel they are currently producing and that development has been favorable for the rails. Lately, Norfolk Southern's steel traffic has been tremendous.

Lumber and auto volumes are weak: Weakness in lumber and auto is a function of the slowing housing demand and the issues that the Big 3 auto manufacturers are having with respect to being competitive on a global basis.

In 5 Years, We Believe Railroads...

Will be faced with an attempt to reregulate; attempt thwarted using the "relief valve" argument:

Over the next five years, the railroads could face a governmental attempt to reregulate the industry, especially if there is a change in regime in the White House and Congress towards the Democratic Party. We expect that the railroads would attempt to thwart that reregulation attempt with the argument that under reregulation, the rails are definitely not going to spend any discretionary capex to expand capacity and will no longer be the transportation "relief value." Therefore, if the government expects the rails to be the relief value, the argument will go, leave the rails the way they are, but under regulation the rails will immediately terminate all expansion projects. We believe the rails will be able to thwart a regulation attempt with that argument.

May receive tax incentives to stimulate capacity expansion projects: We would suggest that the probability of the rails receiving such tax incentives to be about 50/50.

X

All Class I's will earn their cost of capital: Currently, CN leads the pack earning about 450 to 500 basis points in excess of its cost of capital. BN and NSC also earn their cost of capital. We believe CSX and UP will also get to that point quickly.

Unions will remain relatively cooperative: There may be a gradual move to one-man crews, but we expect it will be a gentle, gradual move and won't move the cost needle all that much. A very incremental approach tends to be used in these negotiations.

Technology advances will be slow but steady: We believe there is room for technology to make railroads more efficient and less labor-intensive. You will see technology application continue to be implemented in the coming years.

Conclusions

Times are good; the world is not coming to an end: In general, times are good in freight transportation. That wouldn't necessarily have been your first conclusion based on the way the stocks have performed following the 2Q06 earnings releases. We believe investors are starting to realize that Christmas won't be cancelled this year and that the economy is stronger than some are giving it credit for. There will still be a peak season in 4Q06, we don't think there is any question about that.

Supply and demand are tight or in balance (except for temporary dislocations): Supply and demand generally are tight or in balance except for temporary dislocations. For example, some looseness might be evident in the middle two weeks of August or in the first quarter of a calendar year. We believe that inventory corrections may become more frequent. The housing slowdown may slightly reduce demand, but capacity is not expanding very fast. Over the long run, supply and demand are going to be very tight, in our view.

Pricing remains rational: Pricing remains rational, and therefore, there is no indication from customers that the supply and demand dynamic will loosen substantially.

We believe carriers that can deliver high-quality service while operating a fluid, time-definite, cost-effective network will win: That is a nice and neat little sentence, but believe us, execution is not as easy as it sounds. Only a short list of public companies do all those things well, in our view. That list includes, on the truckload side, Knight (KNX; \$17.40; Buy), Heartland (HTLD; \$15.55; Buy), and J.B. Hunt (JBHT; \$21.14; Buy). On the LTL side, we would list FedEx Freight and Old Dominion (ODFL; \$29.81; Buy). On the railroad side, Canadian National (CNI; \$41.45; Buy) leads the way and on the parcel side, FedEx (FDX; \$109.54; Hold). Those are the companies, in our view, that are well positioned to be the long-term winners irrespective of current valuation.

Prices are as of October 3, 2006 close.

Important Disclosures and Certifications

We, John Larkin, CFA, David Ross, CFA, Matthew Grady, and Michael Baudendistel, certify that the views expressed in this research report accurately reflect our personal views about the subject securities or issuers; and we, John Larkin, CFA, David Ross, CFA, Matthew Grady, and Michael Baudendistel, certify that no part of our compensation was, is, or will be directly or indirectly related to the specific recommendation or views contained in this research report.

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Stifel Nicolaus Research Department
Stifel, Nicolaus & Company, Inc.
100 Light Street
33rd Floor
Baltimore, Md. 21202

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| BUY - | We expect this stock to outperform the S&P 500 by more than 10% over the next 12 months. For higher-yielding equities such as REITs and Utilities, we expect a total return in excess of 12% over the next 12 months. |
| HOLD - | We expect this stock to perform within 10% (plus or minus) of the S&P 500 over the next 12 months. A Hold rating is also used for those higher-yielding securities where we are comfortable with the safety of the dividend, but believe that upside in the share price is limited. |
| SELL - | We expect this stock to underperform the S&P 500 by more than 10% over the next 12 months and believe the stock could decline in value. |

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EXHIBIT I

Excerpt, UBS Report, Railroad Operating Leases, dated March 27, 2006

North American Railroads Weekly



Operating Leases

■ Capitalizing Operating Leases

Railroads maintain significant amounts of off-balance sheet debt in the form of operating leases. In order to derive meaningful debt-to-capital ratios across the sector, these leases must be capitalized and put back on the balance sheet. This week, we discuss two easy ways to accomplish this.

■ U.S. Volumes

U.S. carloads fell 1.1% in week 12. The decline was led by coal (-6.4%), building materials (-2.7%), and chemicals (-1.1%). The coal shortfall was driven by weather disruptions at the Powder River Basin in Wyoming. Gains were seen in metals (+17%), paper (+5.8%), and ag (+1.0%). Autos were flat for the week. Intermodal had a strong week, up 8.1%.

■ Canadian Volumes

Carloads were flat for the Canadian railroads. Gains in metals (+17%), chemicals (+11%), ag (+7.3%), and building materials (+4.8%) were offset by decreases in coal (-30%) and paper (-2.6%). Autos were flat. As in the U.S., intermodal was up significantly (+10%).

27 March 2003

www.ubs warburg.com/research

Rick Paterson

rick.paterson@ubsw.com

+1 212 713 7944

Peter A. Rozenberg

peter.rozenberg@ubsw.com

+1-416-350 2801

Ali M. Qureshi, CA

ali-m.qureshi@ubsw.com

+1-416-814 1445

Fadi Chamoun, CFA

fadi.chamoun@ubsw.com

+1-416-350 4855

Operating Leases

Putting them Back on the Balance Sheet

All of the major North American railroads have lease obligations covering assets like office space, locomotives, freight cars, and trailers. Some of these lease obligations are accounted for as capital leases and others as operating leases. This week, we take a brief look at the operating leases and discuss two methods for capitalizing them and putting them "back on the balance sheet".

We examine two methods to put operating leases "back on the balance sheet"

Capital Leases vs. Operating Leases

Under U.S. GAAP, a lease must be capitalized if any of the following are true:

- (1) The lease transfers ownership of the property at the end of the lease term.
- (2) The lease contains a bargain purchase option.
- (3) The term of the lease is 75% or more of the estimated economic life of the asset (not applicable if the lease term begins within the final 25% of the economic life of the asset).
- (4) The present value of the minimum lease payments (MLPs) equals or is greater than 90% of the fair value of the leased asset.

Canadian rules are similar, but slightly less restrictive (ie, a few more leases can be treated as operating compared to U.S. accounting standards).

Financial Reporting Differences

- **Capital.** Capital leases are treated as an asset sale. At the beginning of a capital lease, an asset and a liability are recognized on the balance sheet in the amount of the present value of the future lease payments. As lease payments are made, the expense is allocated between principal and interest.
- **Operating.** No accounting entry is made at lease inception. Lease payments are charged to income and cash flow from operations as they are made.

Capital leases – On-Balance Sheet
Operating leases – Off-Balance Sheet

Implications for Analysis

Future financial obligations are understated in the balance sheet of railroads (and all other firms) that use operating leases. The amount that debt is understated is equal to the net present value of future lease payments. Therefore, to properly analyze railroads, it is important to make adjustments to the balance sheet before calculating ratios such as debt-to-capital.

The balance sheet must be adjusted to reflect operating lease commitments

Ways to Adjust the Balance Sheet

In order to have the balance sheet reflect operating leases as if they were capital leases, you simply need to add the present value of future operating lease payments to the balance sheet as both an asset and long-term debt. However, in practice, determining the appropriate amount for the adjustment requires some assumptions. We examine two of the more popular methods for determining the adjustment amount:

Two methods are:

1. Minimum Lease Payment Method
2. 8x Operating Lease Expense Method

■ **Minimum Lease Payment Method.** Railroads provide their minimum lease payments (MLPs) for the next five years and "thereafter" in their 10-K filings. MLPs are the non-cancellable portion of their leases and include any guaranteed residual values. The Minimum Lease Payment method discounts these MLPs to their present value to determine the balance sheet adjustment. Note that an assumption for how "thereafter" is spread over time is required. We assume 20 years with the amount declining at a constant rate.

■ **Eight Times Operating Lease Expense Method.** A rule of thumb that is often used to approximate the correct balance sheet adjustment is to multiply the most recent annual operating lease expense by eight. This represents a 15-year lease with a 10% residual value.

Impact of Method Choice

Table 1 provides the balance sheet adjustment calculated using the Minimum Lease Payment Method for each of the major North American railroads that have filed their 2002 10-K's (KCS has not filed yet).

Eight Times Operating Lease Expense is more conservative than MLP Method

Table 1: Balance Sheet Adjustment under the MLP Method (\$US)

Railroad	Estimated NPV	2003	2004	2005	2006	2007	Thereafter
Burlington Northern	\$2,960	\$425	\$428	\$398	\$367	\$334	\$3,585
Union Pacific	\$1,946	\$444	\$398	\$363	\$320	\$257	\$1,519
CSX	\$800	\$189	\$179	\$140	\$113	\$113	\$624
Canadian National	\$493	\$144	\$128	\$114	\$95	\$82	\$223
Norfolk Southern	\$468	\$113	\$89	\$77	\$61	\$54	\$486
Canadian Pacific	\$204	\$90	\$71	\$63	\$49	\$33	\$25
Sector	\$6,869	\$1,405	\$1,293	\$1,155	\$1,005	\$873	\$6,462

Source: Company reports, 'Thereafter' spread over 20 years at a constant rate of decline, 7% discount rate, 2003 expensed & not included in NPV, CSX adjusted for sale of CSX Lines, CAD/USD 0.6809

Table 2 provides the balance sheet adjustment using the Eight Times Operating Lease Expense Method. As can be seen by comparing the two tables, using the Eight Times Method generates a significantly larger adjustment figure. This is logical as the Eight Times Method uses a multiple of lease expense, a figure that includes payments for the cancellable component of leases payments, whereas the MLP method obviously includes only non-cancellable payments.

Table 2: Balance Sheet Adjustment under the 8x Method (\$US)

Railroad	2002 Rent Expense	Estimated Adjustment
Union Pacific	\$605	\$4,840
CSX	\$461	\$3,688
Burlington Northern	\$448	\$3,584
Norfolk Southern	\$200	\$1,600
Canadian National	\$183	\$1,464
Canadian Pacific	Undisclosed	

Source: Company reports, CSX adjusted for sale of CSX Lines

Impact on Debt-to-Capital Ratios

Table 3 shows our estimated debt-to-capital ratios across the sector and the adjusted ratios based on the two different methods of capitalizing operating leases. We're defining debt-to-capital as (interest bearing debt)/(interest bearing debt + shareholders equity). Note that we're not using net debt.

Table 3: Adjusted Debt-to-Capital Ratios, 2003E

Railroad	Unadjusted	MLP Method	8x Method
Burlington Northern	46.0%	54.8%	61.2%
CSX	51.9%	54.5%	67.1%
Norfolk Southern	51.9%	53.5%	59.5%
Canadian Pacific	49.1%	51.3%	Undisclosed
Union Pacific	44.8%	49.6%	57.8%
Canadian National	40.0%	43.0%	48.0%

Source: UBS Warburg LLC

Excludes Conrail portion of CSX and Norfolk Southern debt

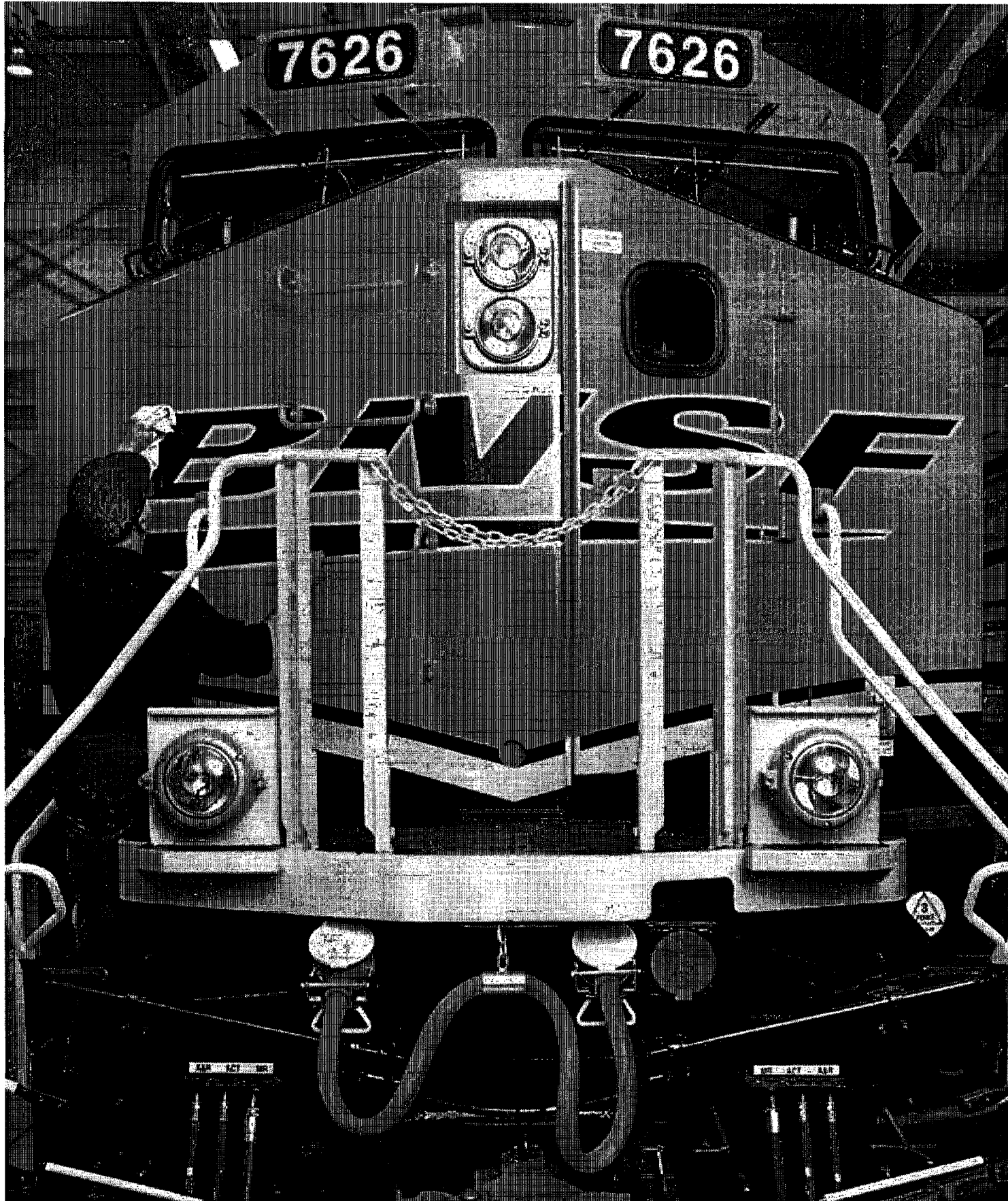
The 8x Method produces substantially higher adjusted debt-to-capital ratios

Which Method is Better?

We use the Minimum Lease Payment Method. We feel that it provides a more accurate estimate of the balance sheet adjustment necessary to reflect operating leases as if they had been capitalized. However, we see the merits of the Eight Times Operating Lease Expense Method as it is more conservative, quicker and easier.

EXHIBIT J

Excerpts from BNSF Annual Report for 2005



THE RIGHT PLACE. THE RIGHT TIME. THE RIGHT RAILROAD.
2005 ANNUAL REPORT AND FORM 10-K



TO OUR SHAREHOLDERS, CUSTOMERS, AND COLLEAGUES We knew 2004 was a historic year. As it turned out, 2005 was even better. During a time of unprecedented demand for rail transportation, we delivered the capacity our customers required. And we did it safely and efficiently. Our volume growth of 5.1 percent again led the largest Class I railroads. We moved a record 10 million units – an increase of nearly 500,000 units over 2004.

For 2005, we also posted a record of nearly \$13 billion in revenue. This 19 percent revenue increase was coupled with solid expense control. The result was operating income of nearly \$3 billion in 2005, almost a 73 percent improvement over 2004. Our productivity, measured as 26.8 million gross ton-miles handled per employee, continues to be the highest among the largest Class I railroads.

2005 was our tenth year since the merger that created BNSF. As we review 2005 and the past decade, BNSF people are to be congratulated for exceeding many of the goals set at the time of the merger. Our 40,000 people demonstrated once again the tremendous value that our rail franchise brings to the entire U.S. supply chain.

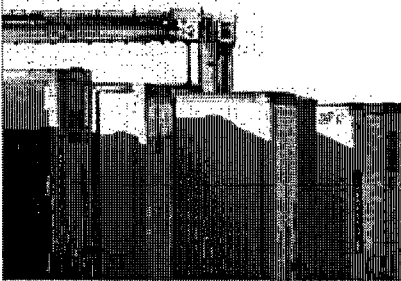
LEADING THE RAIL INDUSTRY

In addition to leading the industry in growth and productivity, BNSF again achieved significant safety improvements in 2005.

Our 2005 frequency ratio of 1.32 injuries per 200,000 hours worked was an all-time low for BNSF. Reflecting a joint effort by BNSF and union leaders and the commitment of every BNSF employee, this safety performance was a 12 percent improvement over 2004 and an even more impressive 52 percent reduction since 1995. Nevertheless, tragically, the four fatalities we experienced in 2005 demonstrate that we have more work to do toward our goal of an injury-free workplace.

To further improve safety and efficiency, we are working with Wabtec Railway Electronics on the Electronic Train Management System (ETMS). This innovative technology uses global positioning satellite (GPS) data and BNSF track and dispatching data to enforce track authority limits and speed limits and to confirm track integrity and switch position. In a pilot project on a 135-mile corridor in central Illinois, we have equipped 50 locomotives with ETMS. More than 1,600 revenue service trips have been logged since 2004 with no failures.

We were ready with increased capacity—locomotives, freight cars, crews, and track—when demand for rail transportation reached historic levels during the economic recovery.



When the merger of the Burlington Northern and Santa Fe railroads was approved in August 1995, we set out to build a balanced portfolio of business and identify strategic capacity increases to handle volume growth.

We also focused on receiving adequate returns to cover the cost of providing service and to invest in the right asset at the right time to keep our network strong. Thanks to these strategies, we were ready with increased capacity – locomotives, freight cars, crews, and track – when demand for rail transportation reached historic levels during the economic recovery.

For 2005, each of our four business units achieved new revenue and volume records:

- Coal revenues increased 8 percent, as BNSF transported more than 259 million tons of coal.
- Agricultural Products revenues were up 20 percent for a total of more than 900,000 shipments, led by corn and soybean exports and growing domestic demand for ethanol.
- Industrial Products revenues grew 17 percent, driven by building products and petroleum.
- Consumer Products, which includes our domestic and international intermodal business, posted a 22 percent revenue increase and exceeded 5 million shipments for the first time.

To help handle these record volumes in 2005, we made capital commitments of almost \$2.2 billion for expanded track, yards, and terminals; track renewal; new locomotives; and technology. We expect our capital commitments in 2006 to be about \$2.4 billion.

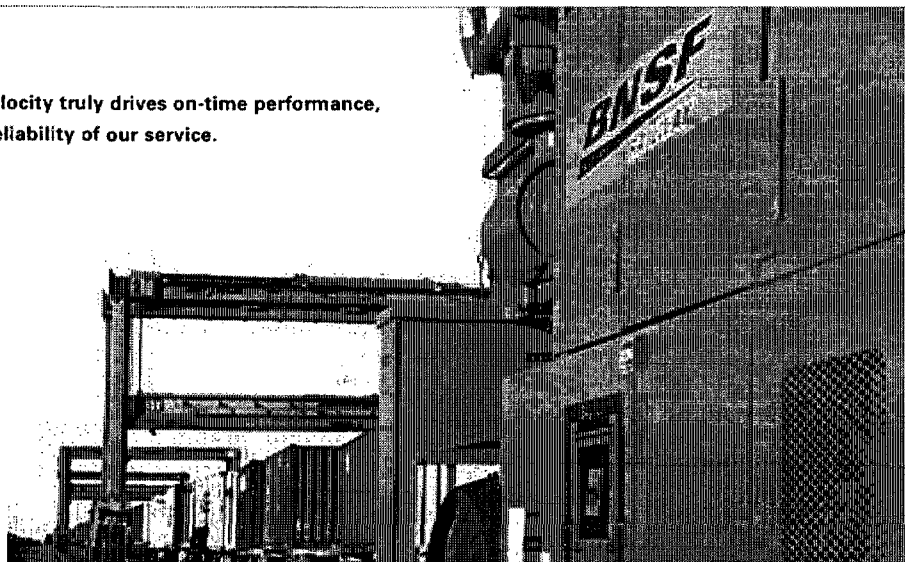
Since the BNSF merger, we have hauled nearly 83 million units. In 2005, we handled more than 10 million units, which was 3 million units more than in 1995. Our intermodal business has led that volume growth and, more recently, our revenue growth. In that ten-year period, international intermodal accounted for 64 percent of our volume growth and domestic intermodal for 16 percent. The balance of our growth was distributed among our three other business units.

Increasingly, trucking firms have joined steamship lines in turning to BNSF as an intermodal partner. Domestically, this helps trucking firms cope with highway congestion, driver shortages, environmental concerns, and higher fuel costs. This trend is expected to continue, as this cooperation enables BNSF to efficiently and safely move the freight across the country, while trucks handle the shorter haul on either end.

SERVING CUSTOMERS

Our record growth definitely challenges our franchise capacity. In 2006 we will focus on improving velocity with the additional business that the marketplace wants us to handle. Our incentive compensation and profit-sharing goals in 2006 will have a significant emphasis on velocity. We believe locomotive and equipment velocity truly drives on-time performance, as well as the efficiency and reliability of our service.

Locomotive and equipment velocity truly drives on-time performance, as well as the efficiency and reliability of our service.



All BNSF people are tailoring their goals for 2006 to focus on velocity improvements. These initiatives will include more efficient trains, reduced intermediate terminal handling, and increased use of shuttle trains. We are also working to improve maintenance planning and scheduling and to streamline loading and unloading processes with shippers.

As volumes increase, however, improved velocity can take us only so far. We must also expand capacity to ensure we have the right network to meet the nation's freight transportation needs.

Our investments in 2005 continued our double- and triple-track projects on our busiest routes to expand our network. This included more than 76 miles of added track on our transcontinental main line between Chicago and Los Angeles. By the end of 2005, all but 143 miles of this busy 2,200-mile route was double-track; and we plan to double- and triple-track another 56 miles in 2006. To serve our coal territory in Wyoming and Nebraska, we've added 275 miles of double- and triple-track since 1995, and we plan to add another 60 miles of double- and triple-track on this route in 2006.

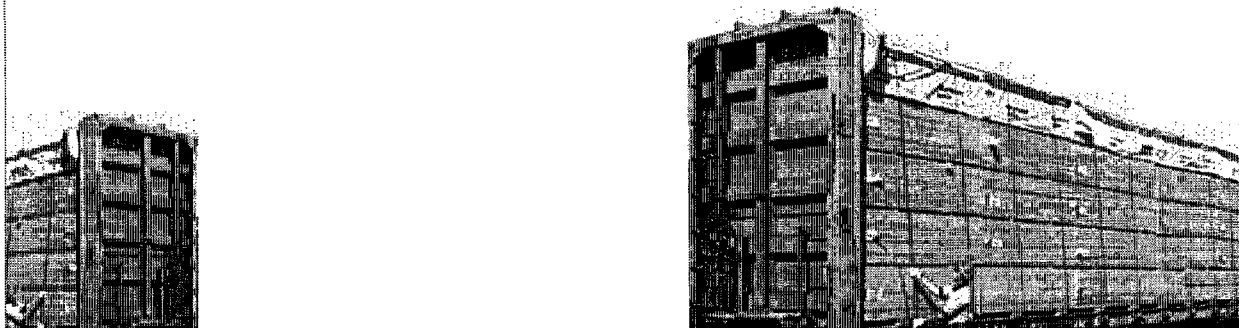
We also expanded several freight and intermodal facilities in 2005. This included expansion at freight yards in Lincoln and Alliance, Nebraska; Edgemont, South Dakota; and Kansas City, serving our coal territory. We increased capacity at intermodal facilities in the Los Angeles and Chicago areas to serve our growing international business. And, on our northern transcontinental main line, where we saw a significant increase in international intermodal and agricultural traffic, we added and expanded sidings to increase track capacity.

In 2005, we took delivery of 288 new locomotives. Since 1995, we have acquired about 2,700 new high-horsepower units, representing nearly 60 percent of our locomotive road fleet. We expect to add another 310 units in 2006. To handle continuing volume increases in 2005, we also took delivery of about 400 centerbeam cars, 3,700 high-capacity covered hoppers, 1,300 rapid-discharge coal cars, and 650 intermodal flatcars with capacity to carry about 6,500 intermodal double-stack containers.

These investments make a tremendous difference in our ability to meet our customers' transportation needs, while also improving our fuel efficiency, network fluidity, and operating reliability. These investments also provide a positive value to the U.S. economy, as we commit more capital to efficiently handle increasing freight volumes.

In addition to meeting customers' expectations, we work to have a positive impact on the communities we serve. We have the lowest grade-crossing collision rate of any U.S. Class I railroad. This is due in part to our extensive driver education through Operation Lifesaver, our crossing closure program that has eliminated more than 2,900 unnecessary crossings since 2000, and other grade-crossing safety initiatives. Our community safety programs also include a comprehensive rail security plan and frequent emergency response drills with local law enforcement agencies.

This past year our people once again stepped up to the challenge and handled record volumes safely and efficiently.



DELIVERING RESULTS

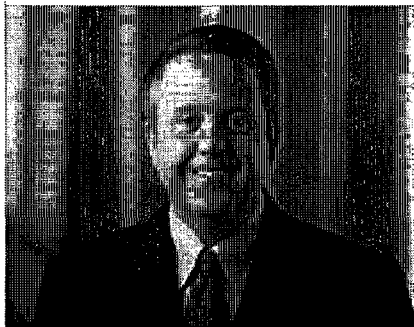
As we provided capacity to handle more volume, the value of our company increased for our shareholders. Earnings per share rose to \$4.01, an increase of \$1.91 over 2004. Our dividend increased to 80 cents per share on an annualized basis, after we approved our third consecutive double-digit dividend increase since 2002.

In a highly capital-intensive business such as a railroad, return on invested capital (ROIC) is one of the most important measures of the value of our company to our shareholders. In 2005, our ROIC was 10.1 percent, the highest level since merger. (For more information on ROIC, see the calculation following Item 6 in our attached Form 10-K.) This was achieved because of continuing significant revenue growth coupled with ongoing aggressive expense control. We have seen steady improvement in our ROIC since 2003, when it was at 6.6 percent. Our ability to continue to increase capacity depends on sustained and improved returns.

Our focus on increasing capacity while also improving profitability requires that we set the stage with a strong long-term strategy. Our 2006 initiatives will address each of the key strategic focus areas impacting our business: franchise, service, return, people, and community. As we develop these initiatives, we are optimistic about the demand for rail freight transportation this year and over the next five years.

In the following pages, we review a few highlights of the past decade since our merger. We also note key achievements of 2005 and some technology and capacity initiatives that position us for continued success.

Our hard work is paying off, and we continue to prove that we have the best team in the industry. This past year our people once again stepped up to the challenge and handled record volumes safely and efficiently. Thank you for your support of this company, its leaders, its board, and the entire BNSF team of employees.



Matthew K. Rose

MATTHEW K. ROSE
CHAIRMAN, PRESIDENT, AND CHIEF EXECUTIVE OFFICER
FEBRUARY 16, 2006

CALCULATION OF RETURN ON INVESTED CAPITAL

BNSF's return on invested capital (ROIC), as discussed in the "Letter from the Chairman, President, and Chief Executive Officer" in the Company's 2005 Annual Report, is a non-GAAP measure and should be considered in addition to, but not as a substitute or preferable to, other information prepared in accordance with GAAP. However, the information is included herein as management believes that ROIC provides meaningful information that can be useful in assessing the long-term performance of the Company's business and in evaluating potential strategic transactions. Below is the calculation of ROIC for the years ended December 31, 2005, 2004 and 2003.

Year ended December 31,	2005	2004	2003
Average capitalization ^a	\$ 19,831	\$ 19,069	\$ 18,409
Operating income	\$ 2,922	\$ 1,686	\$ 1,665
Other expense	(37)	(4)	(14)
X Financing charges ^b	305	274	262
X Exclude 2004 charge for change in estimate of unasserted asbestos and environmental liabilities	-	465	-
Taxes ^c	(1,196)	(917)	(707)
After-tax income excluding financing charges and 2004 charge	\$ 1,994	\$ 1,504	\$ 1,206
Return on invested capital ^d	10.1%	7.9%	6.6%

a Average capitalization is calculated as the average of the sum of stockholders' equity, net debt (total debt less cash and cash equivalents), the net present value of future operating lease commitments, and the receivables sold under the accounts receivable sales program for the most recent preceding 13 month ends.

X b Financing charges represent the estimated interest expense included in operating lease payments and A/R sales fees.

X c Taxes are calculated as the sum of monthly operating income, other expense, A/R sales, and an operating lease interest factor (estimated interest expense included in operating lease payments) multiplied by a federal tax rate respective to each month.

d Return on invested capital is calculated as the total after-tax income excluding financing charges and 2004 charge divided by average capitalization.

FINANCING ACTIVITIES**2005**

Net cash used for financing activities during 2005 was \$833 million primarily related to the following: (i) common stock repurchases of \$799 million, (ii) prepaid forward share repurchases of \$600 million (see Note 15 of the Consolidated Financial Statements), and (iii) dividend payments of \$267 million, which were partially offset by net debt borrowings of \$599 million and proceeds from stock options exercised of \$244 million.

In December 2005, BNSF issued \$500 million of 6.613 percent junior subordinated notes due December 31, 2055. The junior subordinated notes are callable on or after January 15, 2026, at par plus accrued and unpaid interest. On January 15, 2026, if the junior subordinated notes are not called, the interest rate will change to an annual rate equal to the 3-month LIBOR rate plus 2.35%, reset quarterly. Interest payments may be deferred, at the option of the Company, on a cumulative basis for a period of up to five consecutive years; however, during this time the Company will not be permitted to declare or pay dividends on its common stock. In the event that certain financial covenants are not maintained, the Company will be required to sell common stock, the proceeds of which will be used to pay any accrued and unpaid interest. At December 31, 2005, the Company was in compliance with these covenants. Because of this structure, certain rating agencies provide a considerable degree of equity treatment for purposes of calculating various ratios and metrics. The majority of the net proceeds of the debt issuance are being used to repurchase common stock, with the remainder used for general corporate purposes.

Aggregate debt to mature in 2006 is \$456 million. BNSF's ratio of net debt to total capitalization was 42.7 percent at December 31, 2005, compared with 39.9 percent at December 31, 2004. The Company's adjusted net debt to total capitalization was 51.5 percent at December 31, 2005, compared to 51.0 percent at December 31, 2004. BNSF's adjusted net debt to total capitalization is a non-GAAP measure and should be considered in addition to, but not as a substitute or preferable to, the information prepared in accordance with GAAP. However, the information is included herein as management believes that adjusted net debt to total capitalization provides meaningful additional information about the ability of BNSF to service long-term debt and other fixed obligations and to fund future growth.

The following table presents a reconciliation of the calculation of adjusted net debt to total capitalization percentage:

Year Ended December 31,	2005	2004
Net debt to total capitalization ^a	42.7%	39.9%
Adjustment for long-term operating leases	9.4%	9.3%
Adjustment for other debt equivalents ^b	0.6%	1.8%
Adjustment for junior subordinated notes ^c	(1.2)%	—%
Adjusted net debt to total capitalization	51.5%	51.0%

a Net debt to total capitalization is calculated as total debt less cash and cash equivalents divided by the sum of net debt and total stockholders' equity.

b Adjustment for other debt equivalents principally includes accounts receivable financing. See Note 6 of the Consolidated Financial Statements.

c Junior subordinated notes are included in total debt on the respective Consolidated Balance Sheet; however, as they include certain equity characteristics as described above, they have been assigned 50% equity credit for purposes of this calculation.

Pursuant to existing Board authority, BNSF can issue up to an additional \$1 billion of debt securities. The Company expects that it will file shelf registration statements for this additional \$1 billion when it is ready to issue the debt.

2004

Net cash used for financing activities during 2004 was \$478 million primarily related to the following: (i) dividend payments of \$231 million; (ii) net debt repayments of \$292 million; and (iii) common stock repurchases of \$376 million, which were offset by proceeds from stock options exercised of \$420 million.

The following table summarizes information regarding stock options outstanding at December 31, 2005 (options in thousands):

Range of Exercise Prices	Options Outstanding			Options Exercisable	
	Number Outstanding	Weighted Average Remaining Life	Weighted Average Exercise Prices	Number Exercisable	Weighted Average Exercise Prices
\$24.08 to \$27.97	5,649	5.67 Years	\$ 26.91	4,774	\$ 26.76
\$28.34 to \$29.44	5,182	3.73 Years	\$ 29.12	5,182	\$ 29.12
\$29.78 to \$34.59	4,663	5.26 Years	\$ 32.86	3,303	\$ 32.92
\$34.87 to \$71.03	2,787	7.97 Years	\$ 49.15	459	\$ 45.09
\$24.08 to \$71.03	18,281	5.37 Years	\$ 32.45	13,718	\$ 29.75

OTHER INCENTIVE PROGRAMS

BNSF has other long-term incentive programs in addition to stock options as shown in the following table (shares in thousands):

Other Incentive Programs	Generally Vested (in years)	Shares Outstanding as of December 31, 2005	Shares Granted For Year Ended December 31,		
			2005	2004	2003
Restricted shares/units:					
Time-based	3-5	1,464	346	639	558
Performance-based	3	550	316	251	-
BNSF Incentive Bonus Stock Program	3	1,127	601	227	329
BNSF Discounted Stock Purchase Program	N/A	70	33	18	19

Time-based awards are granted to senior managers within BNSF primarily as a retention tool and to encourage ownership in the Company and generally vest over three years and are contingent on continued salaried employment. The weighted-average grant date fair market values of time-based awards granted in 2005, 2004 and 2003 was \$49.23, \$32.72 and \$27.88, respectively.

Performance-based awards are granted to senior managers within BNSF to encourage ownership in the Company and to align management's interest with those of shareholders. Performance-based awards generally vest over three years and are contingent on the achievement of certain predetermined corporate performance goals (e.g., return on invested capital (ROIC)) and continued salaried employment. The weighted-average grant date fair market values of performance-based awards granted in 2005 and 2004 was \$49.21 and \$32.72, respectively, with no performance-based awards granted in 2003. ✓

Additionally, related to the 2005 performance-based grant, eligible employees may also earn performance stock that will be granted in 2008 contingent upon achievement of higher ROIC goals and continued salaried employment. The Company has committed to a maximum grant of approximately 316,000 shares. ✓

Certain eligible employees may exchange through the BNSF Incentive Bonus Stock Program (IBSP) the cash payment of their bonus for restricted stock. The grant date fair market values of IBSP awards granted in 2005, 2004 and 2003 was \$47.58, \$31.97 and \$25.52, respectively. In September 2005, the program was amended so that no awards will be granted after 2006.

Salaried employees not eligible to participate in the IBSP may participate in the BNSF Discounted Stock Purchase Program (DSPP) and use their bonus to purchase BNSF common stock at a discount from the market price. These shares immediately vest but are restricted for a three-year period. The grant date fair market values of DSPP awards granted in 2005, 2004 and 2003 was \$46.91, \$31.84 and \$25.38, respectively.

EXHIBIT K

BNSF Projected 2006 Pro Forma Analysis

**COMPUTATION OF OPERATING RATIO; ADJUSTED DEBT TO CAPITALIZATION, RETURN ON INVESTED CAPITAL and FREE CASH FLOW
RECONCILIATION**

(Dollars in millions except for earnings per share)

Summary 2006 and 2005 Operating Ratio related to Operating Ratio - Third Quarter

	2006 Actual	2005 Actual
Total operating expenses	\$ 3,019	\$ 2,539
Other revenues	124	99
Freight revenue	3,815	3,218
Operating ratio ((Op. Exp.-Other Rev.) / Freight Revenue))	75.9%	75.8%

Summary 2006 and 2005 Operating Ratio Excluding the Fuel Surcharge related to Operating Ratio - Third Quarter

	2006 Actual	2005 Actual
Total operating expenses less fuel surcharge	\$ 2,512	\$ 2,257
Other revenues	124	99
Freight revenue less fuel surcharge	3,308	2,936
Operating ratio ((Op. Exp. Less Fuel Surcharge-Other Rev.) / Freight Revenue Less Fuel Surcharge))	72.2%	73.5%

Operating Expense - Guidance Q4 2005 Materials and Other

	2005 Actual
Q4 2005 materials and other	\$ 284
Adjustment for two commuter related transactions	(57)
Q4 2005 adjusted materials and other	\$ 227

Summary 2006 and 2005 Debt/Capitalization ratio used in Other Financial Statistics - Third Quarter

	2006 Actual	2005 Actual
Net debt to total capitalization (a)	41.8%	37.8%
Adjustment for long-term operating leases	11.4%	10.4%
Adjustment for other debt equivalents (b)	0.6%	1.8%
Adjustment for junior subordinated notes (c)	(1.4%)	
Adjusted debt/capitalization ratio	52.4%	50.0%

Summary Return on Invested Capital used in Capital Commitments

	2005 Actual	2004 Actual	2003 Actual	2002 Actual
Average capitalization (d)	\$ 19,831	\$ 19,069	\$ 18,409	\$ 18,110
Operating income	\$ 2,922	\$ 1,686	\$ 1,665	\$ 1,656
Other expense	(37)	(4)	(14)	(12)
Financing charges (e)	305	274	263	259
Adjustment (f)		465		
Taxes (g)	(1,196)	(917)	(707)	(715)
After-tax income excluding financing charges and 2004 charge	\$ 1,994	\$ 1,504	\$ 1,207	\$ 1,188
Return on Invested Capital (h)	10.1%	7.9%	6.6%	6.6%

Summary 2006 Projected Return on Invested Capital used in 2006 Outlook

	2006 Projected*
Most Comparable GAAP Financial Measure	
Projected GAAP return on invested capital (i)	"Approaching 10.9%"
Adjustments (j)	0.1%
Projected Return on Invested Capital (k)	"Approaching 11.0%"
Most Comparable GAAP Financial Measure	
(Decrease) increase in cash and cash equivalents	\$ (5)
Adjustment	
Exclude use of cash for financing activities other than dividends paid	705+
Projected free cash flow	\$ 700+

**COMPUTATION OF OPERATING RATIO; ADJUSTED DEBT TO CAPITALIZATION, RETURN ON INVESTED CAPITAL and FREE CASH FLOW
RECONCILIATION**

(Dollars in millions except for earnings per share)

- (a) Net debt to total capitalization is calculated as total debt less cash and cash equivalents divided by the sum of net debt and total stockholders' equity.
- (b) Adjustment for other debt equivalents principally includes accounts receivable financing.
- (c) Junior subordinated notes are included in total debt on the respective Consolidated Balance Sheet; however, as they include certain equity characteristics, they have been assigned a 50% equity credit for purposes of this calculation.
- (d) Average capitalization is calculated as the 13-month moving average of the sum of net debt (total debt less cash and cash equivalents), total stockholders' equity, net present value of future operating lease commitments, and the receivables sold under the accounts receivable sales program (A/R sales).
- (e) Financing charges represent the estimated interest expense included in operating lease payments and accounts receivable sales fees.
- (f) Adjustment includes the \$465 million charge taken in the third quarter of 2004 for a change in the estimate of unasserted asbestos and environmental liabilities.
- (g) Taxes are calculated as the sum of monthly net operating income, other expense, accounts receivable sales, and an operating lease interest factor (estimated interest expense included in the operating lease payments), multiplied by a federal tax rate perspective to each month.
- (h) Return on Invested Capital is calculated as the total after-tax income excluding financing charges and the 2004 charge for the change in the estimate of unasserted asbestos and environmental liabilities, divided by average capitalization.
- (i) GAAP Return on Invested Capital is calculated as net income, divided by the average capitalization. Average capitalization is calculated as the 13-month moving average of the sum of total debt and stockholders' equity.
- (j) Adjustments include those referred to in notes (d), (e) and (g).
- (k) Return on Invested Capital is calculated as the total after-tax income excluding financing charges, divided by average capitalization.

*** Forward-Looking Information**

The projected Return on Invested Capital and projected free cash flow reconciliations contain 2006 projected or forward-looking information, and reflect presently forecasted data concerning revenue and expense as well as capital spending expectations and other factors. Forward-looking statements involve a number of risks and uncertainties that could cause actual results to differ materially from those projected in the forward-looking statements. Factors that could cause actual results to differ materially include, but are not limited to: material changes in economic or industry conditions, both within the United States and globally, and customer demand; changes in fuel prices; operational difficulties and changes in operating conditions and costs; the Company's ability to achieve its operating and financial initiatives and its ability to control expenses; changes in investing activities undertaken by the Company; and costs resulting from natural events such as severe weather, floods and earthquakes or other disruptions of its operating systems, structures and equipment.

The Company cautions against placing undue reliance on forward-looking statements, which reflect its current beliefs and are based on information currently available to it as of the date a forward-looking statement is made. The Company undertakes no obligation to revise forward-looking statements to reflect future events, changes in circumstances, or change in beliefs. In the event the Company does update this reconciliation or any forward-looking statement, no inference should be made that the Company will make additional updates with respect to that reconciliation, related matters, or any other forward-looking statement.

EXHIBIT L

Excerpts, UP 2005 Analyst Fact Book

Union Pacific Corporation

2005 ANALYST FACT BOOK



BUILDING AMERICA®



FINANCIAL & OPERATING STATISTICS

Union Pacific Corporation (unaudited)

For the years ended December 31

2005

2004

Financial and Revenue Statistics	1	2	3	4	Full Year	1	2	3	4	Full Year
Operating Revenues (millions)	\$3,152	\$3,344	\$3,461	\$3,621	\$13,578	\$2,893	\$3,029	\$3,076	\$3,217	\$12,215
Operating Expenses (millions)	\$2,839	\$2,876	\$2,980	\$3,088	\$11,783	\$2,579	\$2,670	\$2,658	\$3,013(a)	\$10,920
Operating Margin (%)	9.9	14.0	13.9	14.7	13.2	10.9	11.9	13.6	6.3(a)	10.6
Salaries and Benefits (millions)	\$1,099	\$1,075	\$1,093	\$1,108	\$4,375	\$1,011	\$1,048	\$1,057	\$1,051	\$4,167
Salaries and Benefits/Op. Rev. (%)	34.9	32.1	31.6	30.6	32.2	34.9	34.6	34.4	32.7	34.1
Commodity Revenue/Employee (thousands)	\$60.9	\$63.8	\$65.9	\$69.8	\$260.5	\$59.3	\$60.0	\$60.1	\$62.6	\$241.9
Fuel Expense (millions)	\$498	\$558	\$629	\$708	\$2,393	\$354	\$403	\$426	\$501	\$1,684
Avg. Fuel Price Per Gallon (b)	\$1.45	\$1.67	\$1.88	\$2.08	\$1.77	\$1.02	\$1.16	\$1.25	\$1.46	\$1.22
Commodity Revenue (millions)	\$3,004	\$3,196	\$3,301	\$3,456	\$12,957	\$2,777	\$2,901	\$2,944	\$3,070	\$11,692
Average Revenue Per Car	\$1,306	\$1,337	\$1,357	\$1,428	\$1,358	\$1,214	\$1,225	\$1,223	\$1,282	\$1,236
Commodity Revenue/ Revenue Ton-Mile (cents)	2.19	2.34	2.39	2.54	2.36	2.06	2.13	2.12	2.24	2.14
Effective Tax Rate (%)	36.3	36.9	7.5(c)	36.6	28.6	20.3	33.3	36.1	17.7	29.4
Debt to Capital (%) (d)					35.1					39.1
Lease Adjusted Debt to Capital % (e)					43.6					45.1

Operating Statistics

Revenue Carloads (thousands)	2,300	2,391	2,433	2,419	9,543	2,288	2,368	2,408	2,394	9,458
Revenue Ton-Miles (billions)	138	137	138	136	549	134	136	139	137	546
Gross Ton-Miles (billions)	258	260	263	263	1,044	252	261	263	262	1,038
Average Train Speed (miles per hour) (f)	21.1	21.2	21.6	20.5	21.1	21.9	21.3	21.8	20.5	21.4
Average System Dwell (hours)(f)	29.5	27.4	28.1	29.8	28.7	29.8	30.9	30.1	31.2	30.5
Average Rail Car Inventory (f)				326,486						
Fuel Consumed (millions of gallons)	344	335	334	340	1,353	348	346	340	343	1,377
Average Employees	49,294	50,093	50,106	49,494	49,747	46,838	48,383	49,021	49,067	48,329
GTMs per Employee (millions)	5.24	5.19	5.26	5.30	20.98	5.38	5.39	5.36	5.34	21.47

Refer to the Union Pacific Corporation 2005 Annual Report for additional information.

(a) Includes a \$247 million pre-tax (\$154 million after-tax) charge for unasserted asbestos-related claims.

(b) Including taxes and transportation costs.

(c) Includes a \$118 million tax expense reduction in the estimated deferred income tax liability.

(d) Debt to capital is computed as follows: total debt divided by total debt plus equity.

(e) Lease adjusted debt to capital is computed as follows: total debt plus net present value of operating leases divided by total debt plus equity plus net present value of operating leases.

(f) As reported to the Association of American Railroads. On October 1, 2005, the rail car inventory measurement was standardized for all reporting railroads. Rail car inventory for prior periods was not recalculated.

CAUTIONARY INFORMATION

The 2005 Analyst Fact Book provides additional explanatory information regarding Union Pacific that may not be available in the Company's Annual Report. The information provided is supplemental in nature and is not, and should not be construed as, better than that available in the Company's publicly available reports filed with the SEC. Additionally, some of the information in the Fact Book is derived from the Company's audited financial statements, but the Fact Book and its contents have not been, and should not be considered, audited.

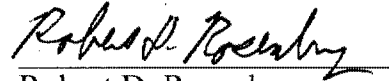
This report may contain statements about future expectations or results of the Company that are not statements of historical fact. These statements are, or will be, forward-looking statements as defined by the federal securities laws and include, without limitation, expectations as to operational or service improvements; statements concerning expectations of the effectiveness of steps taken or to be taken to improve operations, service, or to stabilize the rail system, including infrastructure improvements, transportation plan modifications, and management of customer traffic on the system to meet demand; expectations as to cost savings, revenue growth, and earnings; the time by which certain objectives will be achieved; statements or information concerning projections, predictions, expectations, estimates, or forecasts as to our business, financial and

operational results, future economic performance, and general economic conditions; statements describing management's goals and objectives; expectations and descriptions of proposed new products and services; and any other similar expressions concerning matters that are not historical facts. Forward-looking statements should not be read as a guarantee of future performance or results and will not necessarily be accurate indications of the times that, or by which, such performance or results will be achieved. Forward-looking information is subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in the statements. More detailed information regarding forward-looking information and such risks and uncertainties is contained in the filings made by the Corporation with the Securities and Exchange Commission, which are available on the Company's web site. The Company assumes no duty to update any statements or information provided in this report.



CERTIFICATE OF SERVICE

I hereby certify that on this 8th day of December 2006, I have caused true and accurate copies of the foregoing Reply Comments of the Western Coal Traffic League to be served upon all parties on the service list in this proceeding.


Robert D. Rosenberg