ABANDON ALL *HOPE*? FERC'S EVOLVING STANDARDS FOR IDENTIFYING COMPARABLE FIRMS AND ESTIMATING THE RATE OF RETURN

*Jonathan A. Lesser and Emma Nicholson**

Synopsis: The "comparative risk" standard established by *Hope Natural Gas* is a basic tenet of estimating regulated rates of return.[1] *Hope* remains the *sine qua non* for determining whether regulated rates of return set by the Federal Energy Regulatory Commission (FERC) and by state utility regulators are just and reasonable. In the last few years, however, the FERC's approach to setting regulated rates of return has evolved, and this evolution has raised new methodological and legal issues. This article examines how the FERC's approach to setting the rate of return for regulated electric companies and natural gas pipelines has changed over time, most recently including the changes arising out of its *Atlantic Path 15, Williston Basin*, and *Kern River* decisions. In this article, we evaluate approaches to determining comparable risk and the limitations of those approaches. We discuss controversies that have arisen in setting the rate of return within what regulators typically refer to as the "zone of reasonableness," and we explore how those controversies are embedded in the overarching meaning of "comparable risk." We also introduce a statistically robust approach that can avoid the more arbitrary aspects of establishing proxy groups. We conclude with recommendations as to how the FERC and other state and federal regulators can lessen these ongoing controversies while ensuring that allowed rates of return are truly "just and reasonable."

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* The authors are, respectively, Partner and Senior Consultant, with Bates White, LLC, an economic and litigation consulting firm. The views and opinions expressed in this article are solely those of the authors and do not necessarily reflect the views and opinions of Bates White, LLC, any of its other employees, or its clients.

1. Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944) [hereinafter *Hope*].

I. INTRODUCTION

Under the long-established but unwritten "regulatory compact,"[2] a regulated firm agrees that the prices it charges will be set by regulators, and regulators agree that the prices they set will allow the firm to recoup its operating costs plus a reasonable profit. For a regulated firm, "reasonable profit" is defined as the rate of return that is sufficient to attract the capital the firm needs to continue to meet its obligations. Regulators rely on the regulated firm's overall cost of capital to estimate such a rate of return.[3]

There are two main components to any firm's overall cost of capital: the cost of debt and the cost of equity. The cost of debt generally can be directly measured, but the cost of equity cannot. As a consequence, determining an appropriate return on equity and an overall fair allowed rate of return for a regulated firm is one of the oldest issues in rate regulation.

Beginning in the 1890s, state regulators relied on the "fair value" of a regulated firm's assets to determine the rate of return. This approach culminated in the U.S. Supreme Court decision in *Smyth v. Ames*,[4] and came to be known as the "Fair Value" Doctrine. The Fair Value Doctrine did not last long; it collapsed under its inherent circularity—the value of a regulated firm was whatever regulators said it was.[5] A decade later, in *Consolidated Gas*,[6] the Court began to discuss the relationship between risk and return directly; it reasoned that a fair rate of return encompassed a return on invested capital and a return for risk.[7]

By 1923, in its *Bluefield* decision,[8] the Court had begun to zero in on the idea of comparable risk, stating as follows:

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2. The origin of the "regulatory compact" is arguably the concept of regulating firms in the "public interest." For a discussion of the origins and key legal cases, CHARLES F. PHILLIPS, JR., THE REGULATION OF PUBLIC UTILITIES, 89-118 (Public Utilities Reports, Inc. 1988).

3. A regulated firm's overall rate of return, usually called its "weighted average cost of capital," is based on its embedded cost of debt, its allowed return on equity, and the fractions of debt and equity relative to the firm's total capitalization. For a brief discussion, JONATHAN A. LESSER & LEONARDO R. GIACCHINO, FUNDAMENTALS OF ENERGY REGULATION, 110-11 (Public Utilities Reports, Inc. 2007).

4. 169 U.S. 466 (1898).

5. One definition of the "value" of a firm is the present discounted value of its future net earnings stream (i.e., dividends plus stock price appreciation). This is similar in concept to "enterprise value," which reflects the current value of a firm's equity, less existing obligations, plus any cash on hand. For any regulated firm, one can always estimate future earnings—as long as that valuation does not form the basis for setting the rates from which the regulated firm ultimately derives its earnings. The reason is that, when future earnings depend on a ratemaking formula that references the value of the firm's capital, one has created a circular process: one cannot determine value based on prices that are determined based on value in the first place.

6. Willcox v. Consol. Gas Co., 212 U.S. 19 (1909).

7. *Id*.

8. Bluefield Waterworks & Improvement Co. v. Pub. Serv. Comm'n, 262 U.S. 679 (1923) [hereinafter *Bluefield*].

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time . . . *in other business undertakings which are attended by corresponding risks, and* uncertainties;. . . . The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate . . . to maintain and support its credit and enable it to raise money necessary for the proper discharge of its public duties.[9]

Two decades later, the principle of basing a regulated utility's return on the financial risks of other comparable firms was firmly established in the Court's 1944 *Hope* decision, in which the Court stated as follows:

"[T]he return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."[10]

For the last seven decades, the quoted language from *Hope*, along with the comparable risk standard (once called "comparative" risk) has been the *sine qua non* for determining whether regulated rates of return set by federal regulators, such as the FERC, and state utility regulators are just and reasonable. Yet, the ways that regulators determine which firms have comparable risk remain quite arbitrary. Perhaps this is inevitable. Every firm is unique, and, therefore, it is impossible to say that any two firms face identical financial and business risks.

Since 2000, financial risk in regulated electric utilities, transmission owners, and generators has been affected by volatile fuel markets and regulatory uncertainty that has affected the industry as it has evolved. For example, the restructuring efforts of the 1990s continue in some segments of the industry (such as transmission markets), while a move towards re-regulation appears to be underway in the generation market.

The task of establishing separate rates of return for transmission, generation, and distribution functions has also been complicated by restructuring, generation mandates for renewable resources, new FERC incentives for transmission investment,[11] and the risks associated with looming greenhouse gas regulations. These changes, along with the upheaval in global financial markets, have made it more difficult to identify risk-comparable firms that can be used to determine "zones of reasonableness" within which allowed returns can be set. As a result, the criteria traditionally used by the FERC and state utility regulators to establish risk comparability may no longer be relevant or adequate. Consequentially, allowed rates of return may be straying ever further away from satisfying the Court's mandate that returns must be sufficient to maintain financial integrity and attract capital.[12]

This article first examines how the FERC's policy toward defining comparable risk for the firms it regulates has changed over time. As we discuss, the general approach taken by the FERC in defining comparability has not been consistent. It is reasonable to expect that the major factors influencing the financial risks faced by regulated firms might change over time, but, even given this inevitability, the FERC's approach to defining comparability has proven to

9. *Id*. at 692-93 (emphasis added).

10. *Hope*, *supra* note 1, at 603.

11. *Promoting Transmission Investment through Pricing Reform*, 116 F.E.R.C. ¶ 61,057 (2006).

12. *Hope*, *supra* note 1.

be unnecessarily arbitrary. In a 1987 Notice of Proposed Rulemaking (NOPR), the Federal Communications Commission (FCC) recognized that the common "screening" approach used to determine groups of risk-comparable firms (the approach most used today by both the FERC and state utility regulators) fails to allow for any substitution across various risk measures.[13] To avoid the weaknesses of the direct screening approach, the FCC NOPR recommended using a statistical technique called cluster analysis to identify firms of comparable risk. Oddly, the FCC ultimately did not adopt the approach, although it has been used since in several instances in both telecommunication and electric rate cases. In this article, we review this technique and demonstrate several examples of its application. Although cluster analysis is not a panacea for selecting risk-comparable firm—that process will always include some degree of subjectivity—we believe cluster analysis aids in the selection of the *most* comparable firms and, thus, better serves the Court's requirements set out in *Bluefield* and *Hope*.

II. THE FERC'S EVOLVING APPROACH TO COMPARABILITY

The *Bluefield* and *Hope* decisions require all state and federal regulators to ensure that the companies they regulate earn rates of return sufficient to continue their operations and attract capital, while at the same time guaranteeing that the rate is just and reasonable to ratepayers.[14] Typically, rate of return is determined on a case-by-case basis through administrative procedures.[15] In these "rate cases," regulators rely on evidence presented by various parties to determine the allowed return on equity (ROE) as well as an appropriate capital structure.[16]

Economists define the required rate of return on a particular investment as the return that investors forego by making that investment instead of an alternative investment of equal risk. This is known as the opportunity cost of capital. Although the cost of debt is easily observable, the required return on equity is not. Moreover, in many cases, regulated firms are not publicly traded, either because they are privately held or are subsidiaries of parent companies which may or may not be publicly traded. Thus, in setting an allowed rate of return on invested capital that meets the requirements established by the *Bluefield* and *Hope* decisions, regulators like the FERC must: (1) identify risk-comparable firms, (2) determine an appropriate capital structure for the regulated firm, and (3) apply one or more analytical methodologies to estimate an appropriate allowed ROE.[17] This article focuses on step (1)–identifying risk-comparable firms. The group of risk-comparable firms (the "proxy group") forms the basis from which the FERC determines an allowed return for the firm

13. Refinement of Procedures and Methodologies for Represcribing Interstate Rates of Return for AT&T Communications and Local Exchange Carriers, 2 F.C.C.R. 6491 (proposed Oct. 8 1987).

14. *Hope*, *supra* note 1; *Bluefield*, *supra* note 8.

15. *Hope*, *supra* note 1.

16. *Hope*, *supra* note 1; *Bluefield*, *supra* note 8.

17. A discussion of the methods used by regulators and analysts to estimate ROE and determine optimal capital structure is beyond the scope of this article, as is a discussion of optimal capital structure. For a brief introduction to the most common methods used, LESSER & GIACCHINO, *supra* note 3, at 114-18. For a more detailed discussion, ROGER A. MORIN, NEW REGULATORY FINANCE ch. 4-6 (Public Utilities Reports, Inc. 2006). For an introduction to capital structure issues, RICHARD A. BREALEY & STEWART C. MYERS, PRINCIPLES OF CORPORATE FINANCE 453-465 (Academic Internet Publishers, Inc. 2006).

under investigation. This section describes how the FERC has historically defined comparable risk and, when used, how the FERC's various definitions of comparable risk were translated into screening parameters for establishing proxy groups.

A. Early Regulation and the Absence of Proxy Groups

The FERC's approach for determining allowed rates of return has changed repeatedly over time. Prior to passage of the Energy Policy Act of 1992,[18] the primary regulatory focus of the FERC was setting allowed rates of return for interstate natural gas and oil pipelines. The Energy Policy Act of 1992 created a broad class of exempt wholesale generators, established open access to high-voltage transmission systems, and set in motion the restructuring of the electric industry.[19] After 1992, the FERC's approach to rate regulation necessarily began to change.

At first, the FERC did not even require the use of proxy groups to determine comparable risk. It instead focused on a single company or, where the regulated entity was a subsidiary, the return of the parent company. Until the early 1990s, many of the FERC's determinations of allowed returns focused on the relative risk of a wholly owned subsidiary relative to its parent.[20] For example, in *Williston Basin* the FERC relied on a stand-alone DCF analysis of the company's parent, MDU Resources, Inc., and then adjusted the resulting value downwards based on Staff's analysis using the Capital Asset Pricing Model.[21]

When proxy groups were used, they were broadly defined and were employed more as guidelines, rather than as a means to determine zones of reasonableness for a given regulated entity's allowed return. For example, in *Tennessee Pipeline* the FERC relied on a hodgepodge of recommendations, none of which was based on a well-defined proxy group.[22] In that case, the company's witnesses presented a risk-premium analysis tied to (1) the pipeline's parent company, Tenneco; (2) "the earned returns of the top 25% of unregulated industrial companies"; and (3) a stand-alone discounted cash flow (DCF) study applied to Tenneco itself.[23] Oddly enough, in its decision the FERC stressed the importance of determining the company's risk relative to its parent Tenneco, stating as follows:

> Having concluded that Tennessee is lower risk than Tenneco and so has a lower cost of equity, we must determine how much lower Tennessee's cost of equity is than Tenneco's. Unfortunately the record evidence concerning the degree (as distinguished from direction) of the difference in their risks and costs of equity is

18. Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (1992).

19. 106 Stat. 2776, 2905.

20. *See, e.g., Arkansas Louisiana Gas Company,* 10 F.E.R.C. ¶ 61,027 (1980)*; Tennessee Gas Pipeline Company,* 25 F.E.R.C. ¶ 61,020 (1983); *Consolidated Gas Supply Corporation,* 24 F.E.R.C. ¶ 61,046 (1983); *Williston Basin Interstate Pipeline Company*, 50 F.E.R.C. ¶ 61,284 (1990).

21. *Id.*

22. *Tennessee Gas Pipeline Company*, 25 F.E.R.C. ¶ 61,020 (1983).

23. *Id*. at 61,091-92. For a discussion of the use of the DCF methodology, Win Whittaker, *The Discounted Cash Flow Methodology: Its Use in Estimating a Utility's Cost of Equity*, 12 ENERGY L.J. 265-290 (1991).

> somewhat limited. The [FERC] has consistently required that rate of return be set based on the risks of the regulated entity [rather than that of the parent.][24]

Thus, in establishing an allowed return for the pipeline, the FERC did not rely on any specific risk criteria or develop a zone of reasonableness by contemporaneously estimating returns for other pipeline companies. Instead, based on the return derived from an analysis of Tenneco,[25] the FERC next evaluated Tennessee Pipeline's risk relative to other pipelines and the past allowed returns the FERC had granted to those pipelines. The FERC also took into account, although in no discernable analytical way, changes in interest rates since those prior decisions.

The FERC ultimately set a zone of reasonableness between 15.0% and 16.9%.[26] The low value was Staff's recommendation. The high value equaled the discounted-cash flow analysis performed for Tennessee's parent. The FERC then determined that the pipeline "is of about average risk" and set an allowed return at 15.95%, the midpoint of the zone.[27]

The FERC used this same approach in other proceedings, either to determine the subject company's return directly or to determine upper and lower bounds of the zone of reasonableness. In the 1980 case, *Arkansas Louisiana Gas Company*, the FERC relied on the highest return on equity that it had previously granted and then adjusted that value downwards by fifty basis points to determine the upper end of the zone of reasonableness.[28] Arkansas Louisiana Gas Company appealed the FERC's Final Order, asserting that the FERC ignored issues of comparable risk when it used a historical benchmark to establish the upper limit of the zone of reasonableness.[29] The Court of Appeals affirmed the FERC's right to rely on historical returns, provided they were "recent," and stated as follows:

> While we are concerned that continuation by the [FERC] for too prolonged a time in a practice of relying primarily on allowed returns might deprive a rate of return decision of a rational relationship with market realities, we do not believe that problem exists here where the cases relied upon are recent and where those cases themselves established their allowed [return] directly on the basis of evidence of market realities.[30]

Throughout the 1980s, the FERC continued to rely on benchmarks as its method for setting allowed returns in both natural gas and electric cases. In 1984, the FERC issued regulations that established generic benchmarks for electric utility ROEs that would to be amended every year.[31] The FERC established a generic rate of return benchmark to (1) introduce consistency, (2)

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24. *Tennessee Gas Pipeline Co., supra* note 22, at p. 61,096, citing *Hampshire Gas Co*., 6 F.E.R.C. ¶ 61,249, 61,613 (1979) and *Ozark Gas Transmission* Sys., 16 F.E.R.C. ¶ 61,099, 61,200 (1981).

25. *Id.* "The [FERC] has consistently required that rate of return be set based on the risks of the regulated entity, and here both the parties and the presiding judge based their respective conclusions on rate of return largely on analyses of Tenneco."

26. *Id.* at p. 61,097.

27. *Id.*

28. *Arkansas Louisiana Gas Company*, 10 F.E.R.C. ¶ 61,027 (1980).

29. Arkansas Louisiana Gas Co. v. F.E.R.C., 654 F.2d 435 (5th Cir. 1981).

30. *Id*. at 442.

31. Generic Determination of Rate of Return on Common Equity for Electric Utilities, 49 Fed. Reg. 29946 (July 25, 1984) (to be codified at 18 C.F.R. pt. 37).

increase FERC input into the return-setting process, and (3) reduce uncertainty and costly litigation for electric utilities.[32] The FERC stressed its belief that the benchmarking would reduce uncertainty: "[t]he generic procedure adopted here should reduce uncertainty, since the advisory and later the presumptive rate of return will be known to all parties by the time each [rate case] proceeding begins."[33]

In an abrupt reversal, just seven years after it formally established the procedure, the FERC abolished the generic benchmark approach.[34] The benchmarks had been adopted to *reduce* regulatory uncertainty, but over a period of a few years, it became clear that the approach was ineffectual.[35] The FERC reversed its position on generic benchmarks for electric utilities and publicly stated its reasons for doing so (i.e., that since returns were still being determined on a case-by-case basis, the generic benchmarks had not achieved the FERC's goals) as follows: "[t]he benchmark has not reduced parties' uncertainty in rate cases as to what will be the [FERC]'s ultimate determination. Thus, hopes of conserving resources and of enhanced certainty have not been fulfilled."[36]

B. The 1990s through Today: Changing Requirements for Proxy Groups

Benchmarking, while convenient, departed from the degree of comparability required under *Hope* and *Bluefield*. Thus, by the mid-1990s, the FERC preferred rate of return recommendations that were supported by the use of well-defined proxy groups of comparable firms. As discussed below, however, the requirements underlying establishment of those proxy groups changed significantly over time. Moreover, the FERC imposed far different requirements for establishing proxy groups of interstate natural gas (and oil) pipelines than it did for establishing proxy groups of regulated electric companies and interstate transmission companies.[37]

1. Natural Gas and Oil Pipelines.[38]

The FERC's treatment of proxy groups in natural gas pipeline rate cases has changed over time because of the consolidation and restructuring of the pipeline industry that has occurred over the years. The most recent change occurred in April 2008, when the FERC issued its Policy Statement, "Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity."[39] This Policy Statement signified a methodological break from well-established precedent that had been used in connection with setting natural gas and oil pipeline proxy groups: (1) a requirement that natural gas or oil transportation constitute a

32. *Id.* at 29946.

33. *Id.* at 29949.

34. Generic Determination of Rate of Return on Common Equity for Electric Utilities, 57 Fed. Reg. 802 (Jan. 9, 1992) (to be codified at 18 C.F.R. pt. 37).

35. *Id.*

36. *Id*. at 805.

37. The FERC regulates interstate sales of electricity and natural gas at the wholesale level and tests for market power. Owners of interstate transmission facilities are also regulated.

38. Although the oil pipeline industry and oil pipeline companies are occasionally mentioned herein, this article focuses on comparable risk in the natural gas and electric industries rather than the oil pipeline industry.

39. Policy Statement, *Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity*, 123 F.E.R.C. ¶ 61,048 (2008) [hereinafter 2008 Policy Statement].

significant portion of the proxy group's business (usually fifty percent) and (2) the exclusion of Master Limited Partnerships (MLPs) from proxy groups.[40] The FERC explained that:

> Historically, in determining the proxy group, the [FERC] required that pipeline operations constitute a high proportion of the business of any firm included in the proxy group. However, in recent years, there have been fewer gas pipeline corporations that meet that standard, in part because of the greater trend toward Master Limited Partnerships (MLPs) in the gas pipeline industry. Additionally, there are no oil corporations available for use in the oil pipeline proxy group. These trends have made the MLP issue one of particular concern to the [FERC] and are the reason that the [FERC] issued the Proposed Policy. [41]

2. Pipeline Operations Requirement

Historically, the FERC required that all gas pipeline proxy group members: (1) have publicly traded stock, (2) be recognized as a natural gas or oil pipeline company and be tracked by one or more investment information services, and (3) have pipeline operations that constitute at least fifty percent of its business (Pipeline Operations Requirement).[42] The latter would be satisfied if pipeline operations accounted for at least fifty percent of a company's assets or operating income.[43] Both the natural gas and oil pipeline industries consolidated over time through mergers and the establishment of MLPs and, as a result, fewer and fewer firms satisfied the FERC's three-prong proxy group parameters. The FERC's 2008 Policy Statement eliminated the restrictive Pipeline Operations Requirement.[44]

The Pipeline Operations Requirement historically excluded natural gas distribution companies (e.g., LDCs) from pipeline proxy groups because LDCs were considered to have lower risk than gas pipeline companies.[45] Given multiple mergers, very few publicly traded corporations, four in 2008 to be exact, were primarily engaged in the transportation of natural gas, as many firms had significant natural gas distribution operations. The number of gas pipeline firms satisfying the three-prong proxy group parameters shrunk further as many became MLPs and, therefore, were ineligible to become proxy group members

40. *Id.*

41. *Id.* at P 1. The FERC's inclusion of MLPs in its DCF methodology may create comparability problems specifically because MLPs not only provide a return on capital, but also a return of capital. In the 2008 Policy Statement, the FERC also rejected its own previous finding that MLPs were to be excluded from proxy groups. *Kern River Gas Transmission Company*, 117 F.E.R.C. ¶ 61,077 at P 149-150 (2006) [hereinafter *Kern I*]. Most recently, in *Kern River Gas Transmission Company*, Opinion No. 486-B, 126 FERC ¶ 61,034 (2009) [hereinafter *Kern River III*], the FERC applied its findings in the 2008 Policy Statement to determining the allowed return for Kern River Gas Transmission Company, presenting a detailed discussion of which MLPs could and could not be included in the Kern River IIIproxy group. A discussion of the differences between MLPs and corporations, and their implications for DCF analysis, is beyond the scope of this article.

42. *Transcontinental Gas Pipe Line*, 90 F.E.R.C. ¶ 61,279 (2000). *See also*, 2008 Policy Statement, *supra* note 39, at P 8. The FERC defined this requirement in terms of total capital assets or operating income. Interestingly, the FERC did not define this requirement in terms of total operating revenues, a more typical proxy variable for regulated operations.

43. 2008 Policy Statement at P 8, *supra* note 39.

44. *Id.* at P 116.

45. *Trailblazer Pipeline Company*, 106 F.E.R.C. ¶ 63,005 (2004); *Wyoming Interstate Company, Ltd.*, 96 F.E.R.C. ¶ 63,040 (2001); *Mountain Fuel Resources, Inc.*, 28 F.E.R.C. ¶ 61,195 (1984).

for determining a given pipeline's allowed rate of return.[46] As the number of eligible companies that satisfied the three-prong proxy group parameters shrank, the FERC was forced to revise the parameters, first in a rate proceeding and later with the 2008 Policy Statement.

The FERC relaxed the Pipeline Operations Requirement for the first time in a rate case involving Williston Basin Interstate Pipeline Company when it expanded the proxy group to include companies with gas pipeline segments that constituted less than fifty percent of their total operations.[47] The FERC deemed the change necessary because only three companies at the time satisfied the historical three-prong proxy group parameters, and the FERC determined that a three-member proxy group was not sufficient to determine a just and reasonable ROE.[48] In pipeline rate cases immediately prior to *Williston Basin II*, the FERC had used a four-company proxy group comprised of: Coastal Corporation, El Paso Energy Corporation, Enron Corporation, and Williams Companies, Inc. However, El Paso and Coastal merged in 2001; this reduced the proxy group size to three by the time of the *Williston Basin II* case.[49]

In *Williston Basin II*, the FERC allowed five corporations to be included in the proxy group that were classified as diversified natural gas companies by the *Value Line Investment Survey*, that owned pipelines regulated by the FERC, and that had pipeline operations that constituted significantly less than fifty percent of their operations.[50] The FERC later used the return it had authorized in *Williston Basin II*—the median return on equity value for the nine-member proxy group—in *Petal Gas Storage, LLC*.[51] Thus, rather than determine a specific proxy group based on Petal Gas Storage's financial risks to determine an allowed return, the FERC simply assumed that the proxy group it adopted in *Williston Basin II* would be sufficiently comparable.[52]

Similarly, in *High Island Offshore System, LLC* (*HIOS*) and *Kern River I*,[53] the FERC used a subset of the *Williston Basin II* proxy group. Yet, at the time of the *HIOS* case, the *Williston Basin II* proxy group had shrunk from nine to four companies, three of which derived more revenue from distribution operations than pipeline operations.[54] The FERC based its *HIOS* decision on the now-reduced *Williston Basin II* proxy group—despite the fact that HIOS had a different business profile and, hence, faced different financial risks.[55]

Both HIOS and Petal sought relief in federal court, and the court addressed both complaints jointly.[56] In *Petal v. FERC*, the Court of Appeals vacated the

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46. 2008 Policy Statement, *supra* note 39.

47. *Williston Basin Interstate Pipeline Company*, 104 F.E.R.C. ¶ 61,036 (2003) [hereinafter *Williston Basin II*].

48. *Id.* at P 23.

49. *Id.* at P 35.

50. *Id*. at P 37-38.

51. *Petal Gas Storage, L.L.C.*, 97 F.E.R.C. ¶ 61,097 (2001), reh'g granted in part and denied in part, *Petal Gas Storage, L.L.C.*, 106 F.E.R.C. ¶ 61,325 (2004) [hereinafter *Petal*].

52. *Id.* at P 2.

53. *High Island Offshore System, L.L.C.*, 110 F.E.R.C. ¶ 61,043 (2005); *Kern River I*, *supra* note 41; *Kern River Gas Transmission Company*, 123 F.E.R.C. ¶ 61,056 (2008) [hereinafter *Kern River II*].

54. 110 F.E.R.C. ¶ 61,043 (2005).

55. *Id.* at P 61.

56. Petal Gas Storage v. FERC, 496 F.3d 695, 699-700 (D.C. Cir. 2007).

FERC's proxy group determinations in the *HIOS* and *Petal* Orders on grounds that the FERC failed to select proxy groups on the principles of relative risk.[57] The court explained as follows:

> What matters [in selecting proxy groups] is that the overall proxy group arrangement makes sense in terms of relative risk and, even more importantly, in terms of the statutory command to set 'just and reasonable rates,' 15 U.S.C. § 717c, assure that the company is financially sound and able to maintain its credit and attract capital.[58]

The Circuit Court found that the FERC did not explain how the Petal and HIOS proxy groups were "risk-comparable," and directed the FERC to explain how the final *HIOS* and *Petal* proxy groups reflect the relative risks of each company.[59] The FERC subsequently reevaluated its three-prong proxy group parameters and cited *HIOS* and *Petal* as one of the motivations behind its April 2008 Proxy Group Statement.[60] The FERC's 2008 Policy Statement about natural gas and oil pipelines represents one of the many instances when the FERC was compelled to change its approach towards comparable risk because of changes in the nature of the industry it regulated.[61]

3. Exclusion of MLPs

The FERC in its Proxy Group Statement also reversed the long standing precedent of excluding MLPs from proxy groups.[62] MLPs enjoy federal tax advantages and are comprised of a general partner and multiple limited partners.[63] Stakes, or "units," in the limited partnerships are publicly traded. MLPs do not pay dividends, but rather they remit available cash flow to partners in required quarterly distributions. By 2008, not a single oil pipeline company satisfied the FERC's proxy group standards[64] because as the FERC recognized "virtually all traded oil pipeline companies are owned by MLPs [by 2008]."[65]

Because distributions from MLPs are not subject to corporate income taxes, MLPs typically have more cash available for distribution than incorporated firms that pay dividends.[66] MLP quarterly distributions are also higher than corporate dividends because they can contain payments "of equity" rather than "on equity."[67] At one time, the FERC feared that using quarterly MLP distributions to estimate dividend payments would overestimate the subsequent dividend yields, and it had therefore excluded MLPs from proxy groups. However, in

57. 496 F.3d 695 (D.C. Cir. 2007).

58. *Id.* at 700.

59. *Id.*

60. 2008 Policy Statement, *supra* note 39.

61. *High Island Offshore System, LLC*, 123 F.E.R.C. ¶ 61,058 at P 6 (2008).

62. 2008 Policy Statement, *supra* note 39.

63. To qualify as an MLP, at least ninety percent of the partnership's income must come from certain lines of business, such as natural resources like natural gas and oil. MLPs are not subject to corporate income taxes, because the partners themselves are responsible for paying their individual portions of the MLP's income, gains, losses, and deductions.

64. 2008 Policy Statement, *supra* note 39, at P 1.

65. 2008 Policy Statement, *supra* note 39, at P 9; *see also, Transcontinental Gas Pipeline Corporation*, 90 F.E.R.C. ¶ 61,279 (2000).

66. *Kern River I*, *supra* note 41.

67. *Id.* at 149–50.

both *HIOS* and *Kern River I*, the pipeline companies requested that the FERC reconsider this restriction and allow MLPs in their respective proxy groups.[68] To support their arguments for a reversal of the FERC's position, the companies cited the lack of proxy group companies in the market that satisfied the FERC's three requirements.[69] Although the FERC initially denied both requests, in light of its 2008 Proxy Group Statement, it said it would rehear both cases.[70]

In January 2009, in *Kern River III*, the FERC further addressed the proxy group issue and allowed rate of return issues that had arisen in *Kern River I* and that were set for hearing in *Kern River II*.[71] In *Kern River III*, the FERC discussed the merits of including or excluding specific MLPs from the proxy group that would be used to establish a rate of return for Kern River.[72] First, the FERC allowed inclusion of corporations for which natural gas pipeline/transportation business accounted for at less than fifty percent of assets or income. For example, the FERC concluded that National Fuel should be included in the *Kern River III* proxy group because its natural gas pipeline and distribution components, which exceeded fifty percent of its business operations, effectively "offset" the more risky thirty-five percent of National Fuel's operations in exploration and production and marketing and trading.[73] In so doing, the FERC explicitly recognized that one type of risk, natural gas production and exploration, can be offset by another type of risk, natural gas distribution, thus creating a risk profile that represents a hybrid of the two segments and that is, in this case, comparable to the risks of natural gas transportation alone.[74] Second, the FERC allowed certain other MLPs that failed to meet the gas pipeline operations threshold, including Kinder Morgan Energy Partners (KMEP) and its general partner, Kinder Morgan Industries (KMI).[75] The FERC determined that KMEP could be included despite its oil pipeline operations, because the combined oil and gas pipeline operations accounted for over fifty percent of operating income and the operations were similar in size.[76] Third, the FERC staff, citing the FERC's decision in *Southern California Edison II*,[77] requested that one MLP, Enterprise, be excluded because it did not have an investment grade credit rating.[78] The FERC agreed, but apparently only because

68. *High Island Offshore System, L.L.C, supra* note 53; *Kern River II, supra* note 53.

69. *Kern River II, supra* note 53at P 5.

70. *Kern River II, supra* note 53; 123 F.E.R.C. ¶ 61,058.

71. *Kern River III* also raised numerous other issues, including the use of data from 2004 to establish the allowed rate of return rather than data from 2008, the growth rates used in the FERC's discounted cash flow analysis, the desired size of a natural gas pipeline proxy group, and the use of the median value within the zone of reasonableness established by the FERC. Addressing these issues in any comprehensive way would require a separate article. *Kern River III, supra* note 41.

72. *Id.* at P 50-105.

73. *Id*. at P 94.

74. *Id.* at P 98.

75. *See generally, Kern River III, supra* note 41.

76. In *Kern River I*, the FERC found that MLPs that primarily transport oil and other refined products should not be included in a natural gas pipeline proxy group. 117 F.E.R.C. ¶ 61,077 at P 154, n.248 (2006).

77. *Southern California Edison Company*, 122 F.E.R.C. ¶ 61,187 at n. 27 (2008) [hereinafter *Southern California Edison II*]. The FERC's order in that case stated that "The [FERC] believes that companies within one credit rating level can be considered comparable in risk."

78. *Kern River III, supra* note 41, at P 77.

Enterprise's 2004 merger with another firm, Gulf Terra, had changed its risk profile.[79]

Finally, the FERC addressed inclusion of companies that were classified by Value Line as "diversified natural gas companies" could be included in the proxy group.[80] The FERC, citing to the 2008 Policy Statement, determined that they could, if circumstances warranted, and that its determination did not conflict with the order in *Petal v. FERC*.[81] The FERC went on to state that comparing the relative risks of a diversified natural gas company's operations to those of a pipeline company were complex, and that:

> The potential complexity of such an analysis is why the [FERC] adopted its historical standard of 50 percent of pipeline income, revenue, or assets for inclusion in a gas pipeline proxy group. This preferred threshold standard reduces the variance of the offsetting factors that may have to be evaluated. For the same reason, if a diversified gas corporation with substantial gathering and processing, exploration and production, and trading and marketing functions is to be included in the proxy group, no one of these components should exceed either of the less risky gas transmission or distribution functions to prevent overweighting the riskier components.[82]

The FERC's statement about relative risk is confusing. While having abandoned the fifty percent natural gas pipeline/transportation threshold in *Williston II*, in this decision, it appears to have amended and reinstated it to include both natural gas distribution and transportation, at least as firms classified as "diversified natural gas companies" are concerned. The FERC ordered that "if the [candidate proxy firm] has a total of more than 50 percent of gathering and processing, exploration and production, and trading and marketing components, the firm should be excluded from the proxy group."[83] Importantly, the FERC is silent as to why this fifty percent threshold, as opposed to some other threshold, establishes a prima facie determination of comparability.

C. Electric Industry Issues

Restructuring of the electric industry and FERC Orders 888 and 2000 expanded the authority of the FERC over interstate transmission lines and spurred numerous cases in which the FERC was required to determine rates of return for transmission assets with regional transmission organizations (RTOs).[84] The parameters for determining proxy groups of comparable risk also evolved with the restructuring of the electric industry and with the establishment of RTOs. Specifically, the FERC has addressed comparability issues focused on

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79. *Id.* at P 78.

80. *Id.* at P 63.

81. *Id.* at P 85. The FERC quotes from the 2008 Policy Statement. "[T]he probable difference in the risk of the natural gas pipeline business and the risk profile of a diversified gas corporation with substantial local distribution activities has been highlighted by the parties and specifically recognized by the court in Petal." 2008 Policy Statement, *supra* note 39, at P 51.

82. *Kern River III*, *supra* note 41, at P 91.

83. *Id*. at P 92.

84. *Regional Transmission Organizations*, 89 F.E.R.C. ¶ 61,285, 65 Fed. Reg. 809 (1996) (codified at 18 C.F.R. pt. 2); Order No. 888, *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, 75 F.E.R.C. ¶ 61,080, 61 Fed. Reg. 21,540 (1996) (codified at 18 C.F.R. pts. 3, 385).

business profile, firm size, ownership of nuclear generating facilities, credit rating levels and, most recently, geographic proximity.

1. Business Profile

In *Southern California Edison I*,[85] the FERC established several precedents in connection with proxy groups for transmission owners that operate in regional electricity markets (i.e., RTOs and ISOs). In rejecting alternate proxy group proposals, the FERC outlined its beliefs about comparable risk.

Specifically, Southern California Edison proposed a thirteen member proxy group comprised of companies with revenues over one billion dollars and bond ratings of A or A+.[86] The FERC found the company's proxy group to be "overly-broad," and lacking "the detailed risk analysis" of the other proxy groups.[87]

Pacific Gas & Electric, an intervenor in *Southern California Edison I*, developed a proxy group that included both natural gas distribution companies and electric utilities.[88] The FERC also rejected this proxy group. It reasoned that "significant differences" existed between the gas industry and electric industries and that, because of these differences, natural gas companies could not be included in proxy groups for electric utilities.[89] The FERC cited trial Staff arguments that gas pipelines have low dividend payout ratios and reinvest a high proportion of their earnings into their businesses, whereas electric utilities generally have higher dividend yields than both natural gas companies and other industrial companies.[90]

The business profile restriction worked both ways; the FERC refused to allow electric utilities in natural gas pipeline proxy groups in *Williston Basin II*.[91] However, in *Williston Basin II*, the FERC also noted that "as the natural gas industry continues to evolve, and if electric and gas companies continue to combine, we may have to revisit this issue in future cases."[92]

It is typical to focus on businesses within the same industry when determining comparability. However, there is no analytical basis for excluding firms from different industries, especially if the industries are subject to the same regulatory principles or, as in *Williston Basin II*, they are overseen by the same regulator.[93] Rather than imposing blanket prohibitions against the inclusion of pipelines in electric transmission comparable groups, or vice versa, one could broaden the examination and test for comparability using the methods we discussed in Section III.

85. *Southern California Edison* Company, 92 F.E.R.C. ¶ 61,070 (2000) [hereinafter *Southern California Edison I*].

86. *Id.* at p. 61,264.

87. *Id.*

88. *Id.* at p. 61,258.

89. *Id.* at p. 61,265.

90. *Id.* at p. 61,262.

91. *Williston Basin II*, *supra* note 47, at P 43.

92. *Id.*

93. ASWATH DAMODARAN, CORPORATE FINANCE: THEORY AND PRACTICE (Wiley 1997).

2. Firm Size and Composition

In addition to business profile, in *Southern California Edison* the FERC addressed the ownership of nuclear generation capacity and firm size in terms of revenue.[94] For example, the FERC rejected the proxy group of one intervenor, Sacramento Municipal Utility District.[95] In doing so, the FERC noted that some of the utilities in the group did not own nuclear generation facilities, and others had much lower total revenues.[96] The FERC concluded that those firms should not be included in the proxy group.[97] The distinctions made by the FERC were somewhat arbitrary, and it is not clear why the relative size of a firm and its ownership of nuclear generation imply risk comparability.[98]

Firm size is an important metric of risk, however, and company risk premiums related to the "size effect" have been well documented in asset pricing studies.[99] A company's electric generation portfolio may also be important, especially given the safety-related compliance costs of nuclear generation and financial risks that have traditionally not been faced by companies with fossil-fuel generation capacity. But recognizing differences in risks faced by nuclear generation owners and others does not mean proxy groups must be expressly limited to those of non-nuclear generation owners. A more nuanced approach is preferable, where nuclear ownership risks can be addressed in conjunction with other financial risks faced by firms.

3. Geographic Proxy Groups

In *Midwest ISO*, the FERC reasoned that a nine-member proxy group of transmission-owning members (or parent company members) of the Midwest ISO with publicly traded common stocks was the best available proxy group, and it included "comparable risk companies that are similar in profiles and size."[100] This was the first time the FERC included a geographic factor in its comparability criteria and marked a significant departure from *Southern California Edison*, which used a national proxy group.[101] Subsequently, the FERC used geographic location as a proxy group parameter in *Bangor Hydro-Electric*.[102] In that case, the proxy group was comprised of transmission-owning

94. *Southern California Edison I, supra* note 85, at p. 61,264.

95. *Southern California Edison I, supra* note 85.

96. *Id.*

97. *Id.* at p. 61,265.

98. *Southern California Edison I, supra* note 85.

99. *See, e.g.*, Rolf W. Banz, *The Relationship Between Return and Market Value of Common Stocks*, 9 J. OF FIN. ECON. 3, 3-18 (1981); Eugene F. Fama & Kenneth R. French, *The Cross-Section of Expected Stock Returns*, 47 J. OF FIN. 427, 427-65 (1992) [hereinafter *Cross-Section*].

100. *Midwest Independent Transmission System Operator Inc.*, 100 F.E.R.C. ¶ 61,292 at P 9 (2002); *Platte Pipe Line Co.*, 99 F.E.R.C. ¶ 63,001 at 12 (2002).

101. The national proxy group adopted in that case included the following firms: Pacific Gas & Electric, Constellation Energy, Duke Energy, and Southern Company. 92 F.E.R.C. ¶ 61,070 (2000).

102. Interestingly, the FERC also discussed benchmarking in this case, but rejected it, stating: "A base-level ROE should be determined in this case …without specific reference to an ROE result established for another public utility RTO in a proceeding in which a different proxy group, separate input values, and other data for a prior, distinguishable period were relied upon by the [FERC]," 109 F.E.R.C. ¶ 61,129 at 61,147.

companies operating in three northeast regional transmission organizations, ISO New England, the New York ISO, and PJM Interconnection.[103]

Despite incorporating geographic preferences in these cases, it was not until its decision in *Atlantic Path 15* that the FERC explicitly stated a preference for regional proxy groups as a matter of policy:

> As a matter of policy and consistent with our order in *Bangor Hydro* and *Midwest ISO*, we find that it is appropriate to use a proxy group with companies from the region in which the utility is located. . . . We find that being located in the same geographic and economic region is a relevant factor to consider in determining whether companies face similar business risks.[104]

However, the FERC never stated *why* geographic proximity implies risk comparability. Instead, it simply concluded that "region-wide proxy groups simplify rate proceedings, reduce litigation costs and produce reasonable return allowances based on the fact that companies within the same region will typically face similar business risks."[105]

Subsequent FERC orders, including those in *Golden Spread Electric Cooperative*,[106] *Southern California Edison II*,[107] *Pepco Holdings, Inc*.,[108] and *Northeast Utilities*,[109] used regional proxy groups to determine allowed returns. This suggests that the FERC will now *require* regional proxy groups for companies that belong to an RTO.

D. Conclusions

The FERC's practice of constantly changing, and at times reversing, its preferred determinants for selecting proxy groups of comparable firms places an additional burden on regulated companies and benefits neither those companies nor ratepayers. Some of the reasons for the changes to the FERC's proxy group requirements, such as the inclusion of MLPs, and detailed discussion of which MLPs were sufficiently comparable in *Kern River III*, have been designed to enable the FERC to create proxy groups. Other changes, however, such as the geographic comparability requirement formally introduced in *Atlantic Path 15*, do not appear to have any underlying economic or financial basis.[110] A more systematic approach to selecting comparable firms is needed, and this is the focus of the remainder of this article.

III. IDENTIFYING COMPARABLE FIRMS

The use of proxy groups must consider the financial "uniqueness" of every firm in developing comparable groups of enough firms to provide some form of statistical validity.[111] By far the most prevalent method of selecting proxy

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103. *Id.*

104. *Atlantic Path 15*, LLC, 122 F.E.R.C. ¶ 61,135 at P 22 (2008) [hereinafter *Atlantic Path 15*].

105. *Id*. at P 1.

106. *Golden Spread Electric Cooperative, Inc*., 123 F.E.R.C. ¶ 61,047 (2008).

107. *Southern California Edison Company*, 122 F.E.R.C. ¶ 61,187 (2008).

108. *Pepco Holdings, Inc*., 124 F.E.R.C. ¶ 61,176 (2008).

109. *Northeast Utilities Service Co. and National Grid USA*, 125 F.E.R.C. ¶ 61,183 (2008).

110. *Atlantic Path 15* at P 22.

111. By statistical validity, we refer to the tendency of the calculated estimates not to vary significantly because of errors in measurement, the presence of statistical "outliers," and so forth. For a complete discussion

groups is a "direct approach" in which comparable firms are selected based on a group of qualitative and quantitative measures that serve as proxies for business and financial risk.[112] For example, geographic proximity, which the FERC used in *Atlantic Path 15*, is a qualitative measure, whereas firm size, as measured in annual revenues, is a quantitative measure.[113] The quantitative and qualitative measures are used by ROE witnesses to reduce the set to a small number of comparable firms.[114] The resulting group of firms can be sensitive to the criteria selected, and this is one reason for disputes regarding which allowed returns truly meet the "comparative risk" requirement under *Hope*.

A. An Example of the Direct Approach

The composition of proxy groups can be highly sensitive to the direct approach parameters that are used to select the proxy companies. This sensitivity raises a potential issue regarding true "comparability," because individual firms may be either included or excluded from a proxy group based solely on preset "cutoff" values, such as, the Pipeline Operations Requirement discussed in section II.

To understand the limits of the direct approach further, consider the following table, which presents data on all of the electric utilities followed by Value Line. The table shows data for fifty-eight companies, including vertically integrated utilities, distribution-only firms, firms with both electric and natural gas operations, pure-play transmission companies, to name a few.[115] Suppose we are interested in determining an appropriate comparable group of firms for Company 19, whose data is highlighted in Table 1. As shown, Company 19 has a corporate credit rating of BBB-, a safety rank of 3, and a financial strength rank of four. The company has almost forty billion dollars of assets and just over thirteen billion dollars of revenues, eighty percent of which is derived from its regulated operations. Its capital structure consists of forty-nine percent equity. Of the other fifty-seven companies shown in Table 1, which should be included in a "comparable" group to determine Company 19's allowed return on equity?

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on issues of sample sizes, DAVID FREEDMAN, ROBERT PISANI, & ROGER PURVES, STATISTICS 355-74 (W.W. Norton, 4th ed. 2007). For an example of the potential variability of return on equity estimates using the discounted cash flow model, Jonathan Lesser, *DCF Utility Valuation: Still the Gold Standard?*, PUBLIC UTILITIES FORTNIGHTLY 141, 14-21 (2003).

112. *See generally* Fiona MacPhail, *Moving Beyond Statistical Validity in Economics*, 45 Social Indicators Research 119, 119-149 (1998).

113. *Atlantic Path 15*, *supra* note 104.

114. *Id.*

115. In fact, one of these firms has a large commercial banking subsidiary.

TABLE 1: VALUE LINE ELECTRIC UTILITIES

Company Number	S&P Credit Rating[1]	Financial "Safety" Rank	Financial Strength Rank[2]	Total Assets (Million$)	Revenues (Million$)	Market Cap. (Million$)	Regulated revenues (Million$)	Pct regulated revenues	Equity Pct
1	BBB-	3	4	$ 9,907	$ 3,307	$ 10,637	$ 2,820	85%	39%
2	BBB+	2	3	$ 1,644	$ 842	$ 1,219	$ 724	86%	64%
3	BBB+	2	3	$ 7,190	$ 3,438	$ 4,491	$ 3,084	90%	66%
4	BBB	3	5	$ 40,366	$ 13,380	$ 19,648	$ 12,101	90%	41%
5	BBB-	2	3	$ 20,728	$ 7,546	$ 11,292	$ 5,886	78%	49%
6	BBB-	3	5	$ 3,190	$ 1,418	$ 1,140	$ 1,288	91%	59%
7	BBB-	3	5	$ 2,473	$ 696	$ 1,667	$ 303	43%	62%
8	BB+	3	6	$ 540	$ 329	$ 316	$ 329	100%	52%
9	BBB	3	6	$ 17,872	$ 9,623	$ 5,607	$ 191	58%	17%
10	A	1	3	$ 1,495	$ 1,197	$ 702	$ 782	65%	55%
11	BBB	3	5	$ 2,711	$ 1,031	$ 1,666	$ 993	96%	57%
12	BBB-	3	6	$ 14,196	$ 6,464	$ 3,913	$ 6,064	94%	30%
13	A-	1	1	$ 28,343	$ 13,120	$ 13,288	$ 10,821	82%	52%
14	BBB+	2	3	$ 21,946	$ 21,193	$ 18,295	$ 3,391	16%	54%
15	A-	2	4	$ 39,123	$ 15,674	$ 27,379	$ 8,249	53%	39%
16	BBB	3	4	$ 3,567	$ 1,516	$ 3,367	$ 1,206	80%	37%
17	BBB	3	3	$ 23,754	$ 8,506	$ 7,176	$ 6,775	80%	42%
18	A-	2	3	$ 49,704	$ 12,720	$ 25,455	$ 9,740	77%	67%
19	**BBB-**	**3**	**4**	**$ 37,562**	**$ 13,113**	**$ 17,389**	**$ 10,476**	**80%**	**49%**
20	BBB	2	4	$ 1,854	$ 877	$ 1,151	$ 751	86%	50%
21	BBB-	3	4	$ 1,472	$ 490	$ 767	$ 487	99%	48%
22	BBB+	2	4	$ 11,879	$ 5,178	$ 4,307	$ 4,653	90%	45%
23	BBB	2	3	$ 33,643	$ 11,484	$ 23,082	$ 9,255	81%	45%
24	BBB+	1	1	$ 45,894	$ 18,916	$ 53,964	$ 8,167	43%	45%
25	BBB	2	3	$ 32,068	$ 12,802	$ 22,052	$ 10,194	80%	48%
26	A	1	2	$ 40,123	$ 15,263	$ 27,586	$ 11,622	76%	47%
27	BBB	2	3	$ 4,827	$ 3,267	$ 2,531	$ 1,293	40%	52%
28	BBB	2	5	$ 10,294	$ 2,536	$ 1,900	$ 2,091	82%	29%
29	BBB	3	5	$ 3,653	$ 879	$ 1,587	$ 875	100%	47%
30	A-	2	5	$ 11,234	$ 10,292	$ 3,946	$ 3,350	33%	55%
31	BBB	3	6	$ 3,213	$ 426	$ 2,421	$ 426	100%	20%
32	BBB+	1	2	$ 5,592	$ 4,248	$ 5,036	$ 1,096	26%	69%
33	AA-	1	3	$ 1,112	$ 538	$ 779	$ 532	99%	56%
34	BBB-	3	5	$ 18,005	$ 7,940	$ 5,179	$ 6,895	87%	43%
35	BBB	3	5	$ 11,582	$ 5,822	$ 4,856	$ 5,403	93%	40%
36	A+	1	3	$ 7,760	$ 3,262	$ 3,869	$ 3,131	96%	37%
37	BBB+	2	3	$ 5,238	$ 3,798	$ 3,331	$ 1,835	48%	51%
38	BBB+	2	3	$ 1,455	$ 1,239	$ 1,033	$ 322	26%	55%
39	BBB	3	4	$ 15,111	$ 9,366	$ 5,881	$ 5,244	56%	44%
40	BBB+	2	4	$ 36,648	$ 13,237	$ 15,242	$ 13,237	100%	46%
41	BBB-	2	3	$ 11,244	$ 3,524	$ 4,262	$ 2,925	83%	50%
42	BB-	3	5	$ 5,872	$ 1,914	$ 1,648	$ 1,271	66%	47%
43	BBB+	2	5	$ 4,108	$ 1,743	$ 1,737	$ 1,743	100%	50%
44	BBB	2	4	$ 19,972	$ 6,498	$ 19,449	$ 4,114	63%	46%
45	BBB+	2	4	$ 26,286	$ 9,153	$ 12,592	$ 9,134	100%	48%
46	BBB	3	4	$ 28,392	$ 12,853	$ 24,979	$ 8,493	66%	46%
47	BBB-	3	5	$ 7,599	$ 3,220	$ 3,557	$ 3,206	100%	46%
48	A-	2	3	$ 10,165	$ 4,621	$ 4,932	$ 2,481	54%	46%
49	BBB+	2	3	$ 30,091	$ 11,438	$ 16,151	$ 7,053	62%	60%
50	BB	3	6	$ 9,465	$ 3,601	$ 3,971	$ 3,601	100%	42%
51	A	1	3	$ 45,789	$ 15,353	$ 29,590	$ 15,306	100%	47%
52	BBB-	3	6	$ 6,765	$ 3,536	$ 3,630	$ 2,788	79%	39%
53	BB+	2	4	$ 1,776	$ 982	$ 925	$ 981	100%	48%
54	BB-	3	7	$ 3,186	$ 1,381	$ 1,114	$ 1,381	100%	31%
55	A-	2	3	$ 4,296	$ 2,282	$ 2,213	$ 1,718	75%	41%
56	BBB-	2	4	$ 6,395	$ 1,727	$ 2,476	$ 1,690	98%	46%
57	BBB+	2	4	$ 11,720	$ 4,238	$ 5,696	$ 4,187	99%	43%
58	BBB+	2	4	$ 23,185	$ 10,034	$ 9,678	$ 10,034	100%	46%
Minimum	**BB-**	**1**	**1**	**$ 540**	**$ 329**	**$ 316**	**$ 191**	**16%**	**17%**
Maximum	**AA-**	**3**	**7**	**$ 49,704**	**$ 21,193**	**$ 53,964**	**$ 15,306**	**100%**	**69%**
Average	**6.3 (BBB)**	**2.3**	**4.0**	**$ 15,263**	**$ 6,294**	**$ 8,858**	**$ 4,452**	**78%**	**47%**
Std. Deviation	**1.7**	**0.7**	**1.3**	**$ 13,951**	**$ 5,434**	**$ 10,319**	**$ 3,970**	**22%**	**10%**

1 - Average and std. deviation calculated by converting to numerical index.
2 - Values converted to numerical index (VL uses alphabetic index).
Source: Value Line Investment Survey, Bloomberg

The answer is not obvious. The table shows nine different financial statistics, all of which have merit as risk measures. For example, a corporate credit rating is a good indicator of the firm's overall ability to meet its debt obligations. That ability will be related to the degree to which the firm is leveraged (i.e., what fraction of its total capitalization is in the form of debt financing). Size is another indicator of financial risk, because larger firms tend to be less financially risky than smaller firms.[116]

The Value Line Financial Safety and Financial Strength measures in Table 1 may also be problematic. For example, the Safety Rank defined by Value Line provides a relative ranking of the approximately 1,700 firms that Value Line follows, with relative rankings between 1 (the highest safety rank) to 5 (the lowest rank). Value Line describes its rankings as follows:

> Safety is a quality rank, not a performance rank, and stocks ranked 1 and 2 are most suitable for conservative investors; those ranked 4 and 5 will be more volatile. Volatility means prices can move dramatically and often unpredictably, either down or up. The major influences on a stock's Safety rank are the company's financial strength, as measured by balance sheet and financial ratios, and the stability of its price over the past five years.''[117]

Similarly, the Financial Strength Ratio is a nine-step rank of relative financial strength. However, Value Line provides no information as to how it defines "financial strength." Presumably, for both Safety and Financial Strength, Value Line has some form of internal ranking mechanism.

Given Company 19's safety rank of 3 and financial strength rank of 4, if we determine that comparable firms were like-ranked, only two other firms—Company 1 and Company 21—would be deemed "comparable." Yet, those two firms are far smaller, as measured by total assets and revenues.

Suppose we instead focus solely on corporate credit ratings, specifically deeming "comparable" only those firms with BBB- credit ratings. In that case, 11 firms would be included, as shown in Table 2.

TABLE 2: COMPARABLE GROUP, BASED ON S&P CREDIT RATING

Company Number	S&P Credit Rating[1]	Financial "Safety" Rank	Financial Strength Rank[2]	Total Assets (Million$)	Revenues (Million$)	Market Cap. (Million$)	Regulated revenues (Million$)	Pct regulated revenues	Equity Pct
1	BBB-	3	4	$ 9,907	$ 3,307	$ 10,637	$ 2,820	85%	39%
5	BBB-	2	3	$ 20,728	$ 7,546	$ 11,292	$ 5,886	78%	49%
6	BBB-	3	5	$ 3,190	$ 1,418	$ 1,140	$ 1,288	91%	59%
7	BBB-	3	5	$ 2,473	$ 696	$ 1,667	$ 303	43%	62%
12	BBB-	3	6	$ 14,196	$ 6,464	$ 3,913	$ 6,064	94%	30%
19	**BBB-**	**3**	**4**	**$ 37,562**	**$ 13,113**	**$ 17,389**	**$ 10,476**	**80%**	**49%**
21	BBB-	3	4	$ 1,472	$ 490	$ 767	$ 487	99%	48%
34	BBB-	3	5	$ 18,005	$ 7,940	$ 5,179	$ 6,895	87%	43%
41	BBB-	2	3	$ 11,244	$ 3,524	$ 4,262	$ 2,925	83%	50%
47	BBB-	3	5	$ 7,599	$ 3,220	$ 3,557	$ 3,206	100%	46%
52	BBB-	3	6	$ 6,765	$ 3,536	$ 3,630	$ 2,788	79%	39%
56	BBB-	2	4	$ 6,395	$ 1,727	$ 2,476	$ 1,690	98%	46%

116. For example, one of the factors in the so-called Fama-French 3-Factor Model is "size factor risk." *Cross-Section*, *supra* note 107.

117. Value Line University, *Safety Rank*, http://www.valueline.com/vlu/4-safety.html (Feb. 4, 2009).

While all firms have the same credit rating, however, they still differ markedly in terms of total revenues and total assets. For example, Company 19 is almost twice the size of the nearest ranked firm, Company 2.

Now, suppose instead we focus on asset size, specifically, only firms with total assets between twenty billion dollars and sixty billion dollars. The results are shown in Table 3.

TABLE 3: COMPARABLE GROUP, BASED ON TOTAL ASSETS

Company Number	S&P Credit Rating[1]	Financial "Safety" Rank	Financial Strength Rank[2]	Total Assets (Million$)	Revenues (Million$)	Market Cap. (Million$)	Regulated revenues (Million$)	Pct regulated revenues	Equity Pct
4	BBB	3	5	$ 40,366	$ 13,380	$ 19,648	$ 12,101	90%	41%
5	BBB-	2	3	$ 20,728	$ 7,546	$ 11,292	$ 5,886	78%	49%
13	A-	1	1	$ 28,343	$ 13,120	$ 13,288	$ 10,821	82%	52%
14	BBB+	2	3	$ 21,946	$ 21,193	$ 18,295	$ 3,391	16%	54%
15	A-	2	4	$ 39,123	$ 15,674	$ 27,379	$ 8,249	53%	39%
17	BBB	3	3	$ 23,754	$ 8,506	$ 7,176	$ 6,775	80%	42%
18	A-	2	3	$ 49,704	$ 12,720	$ 25,455	$ 9,740	77%	67%
19	**BBB-**	**3**	**4**	**$ 37,562**	**$ 13,113**	**$ 17,389**	**$ 10,476**	**80%**	**49%**
23	BBB	2	3	$ 33,643	$ 11,484	$ 23,082	$ 9,255	81%	45%
24	BBB+	1	1	$ 45,894	$ 18,916	$ 53,964	$ 8,167	43%	45%
25	BBB	2	3	$ 32,068	$ 12,802	$ 22,052	$ 10,194	80%	48%
26	A	1	2	$ 40,123	$ 15,263	$ 27,586	$ 11,622	76%	47%
40	BBB+	2	4	$ 36,648	$ 13,237	$ 15,242	$ 13,237	100%	46%
45	BBB+	2	4	$ 26,286	$ 9,153	$ 12,592	$ 9,134	100%	48%
46	BBB	3	4	$ 28,392	$ 12,853	$ 24,979	$ 8,493	66%	46%
49	BBB+	2	3	$ 30,091	$ 11,438	$ 16,151	$ 7,053	62%	60%
51	A	1	3	$ 45,789	$ 15,353	$ 29,590	$ 15,306	100%	47%
58	BBB+	2	4	$ 23,185	$ 10,034	$ 9,678	$ 10,034	100%	46%

Seventeen firms (in addition to Company 19) have total assets within that range. However, as table 3 shows, these firms have widely varying credit ratings, safety rankings, percentages of revenues derived from regulated activities, and so forth. Moreover, there is no way to determine whether the firms in table 2 are more or less comparable than those in table 3.

Clearly, there are numerous sets of "comparable" firms that can be developed by selecting different criteria and cutoff values for those criteria. Note the lack of overlap between firms appearing under both sets of comparability criteria. In fact, since only Company 5 is common to both groups, establishing a comparable group using both criteria (BBB- and total assets between twenty billion and sixty billion dollars) would not provide a statistically robust sample of firms.

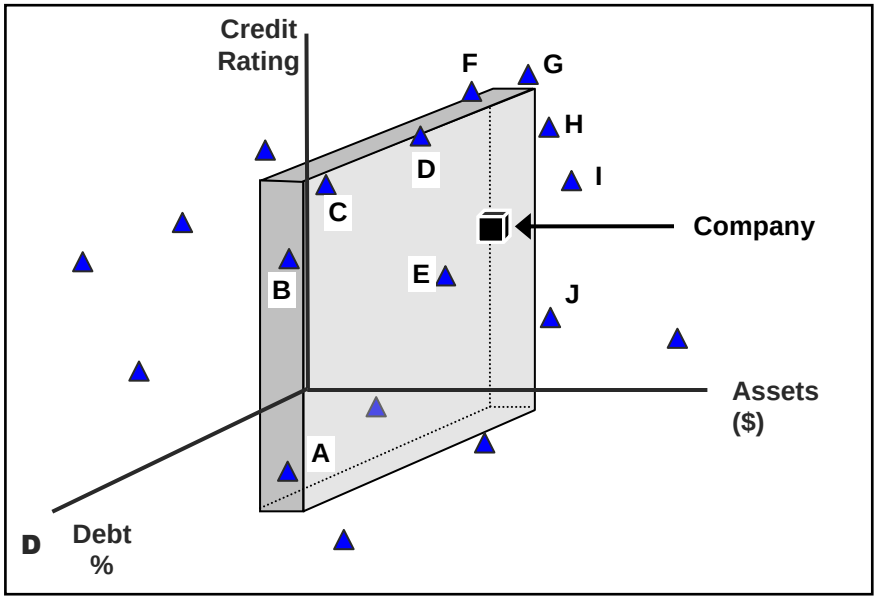
Tables 2 and 3 reveal a serious limitation of the direct approach: it fails to allow for any "substitution" between risks. In other words, suppose there is a firm that is similar to Company 19 in all respects except that its corporate crediting is BBB+, two "notches" above BBB-.[118] If our selection criteria limited comparable firms to just one notch above or below BBB-, this company would be excluded. On the other hand, if we widened the acceptable criteria to include all firms with credit ratings two notches either above or down from

118. One "notch" in the Standard & Poor's credit rating system in this example would be from BBB- to BBB. The next higher rating would be BBB+.

Company 19, we would include all but twelve of the fifty eight firms shown in Table 1. In other words, the direct approach creates arbitrary "cutoff" points for individual attribute risks rather than a systematic approach that can "substitute" between different financial risks and meaningfully filter a large set of firms into a group of comparable ones.[119]

Figure 1 provides an illustration. In the figure, we assume that the comparability selection criteria are corporate credit rating, the degree of leverage (percentage of debt), and firm size (total capital assets). We set specific limits on each of the three criteria, such as a credit rating between BBB- and BBB+, to determine which of the other firms are "comparable" to Company 19. The allowable range in which firms can fall in order to be deemed "comparable" is shown as the bar-shaped figure. Under this approach, we determine that five firms, A–E, fall within our specified comparability limits. As shown, however, our comparability definition excludes firms F–J, even though the latter five firms appear to lie "closer" to Company 19 then do firms A, B, and C. As a result, we may be excluding firms that are "more" comparable to Company 19 and including firms that are "less" comparable, contrary to the requirement in *Hope*.

FIGURE 1: DIRECT APPROACH TO SELECTING PROXY FIRMS



119. An alternative approach that is much less common is an indirect one, in which the specific financial characteristics of the firm under study are used to adjust the allowed rate of return from an industry average. For a brief discussion, ROGER A. MORIN, NEW REGULATORY FINANCE, *supra* note 17, 355-74. Morin notes that the allowed ROE for the individual firm can be adjusted to account for differences in capital structure, size, credit ratings, and so forth. However, the need for such adjustments raises the question of comparability to the broader industry group in the first place. Moreover, the empirical relationships between return and financial characteristics, such as creditworthiness, change over time.

B. Using Cluster Analysis to Select Proxy Group Firms

The goal of any method to establish a proxy group should be the same: to identify firms that are risk-comparable and to include a large enough sample of firms to provide statistically valid results. As discussed previously, the direct identification approach commonly used today is based on selecting one or more "relevant" criteria—selected by the individual performing the analysis—and then establishing arbitrary "bounds" for those criteria. Firms that fall within those bounds are deemed "comparable." As we saw in Figure 1, however, this approach can be arbitrary, because it excludes firms that may be "closer" to the target firm than those firms eventually selected. Rather than establish arbitrary bounds, an alternative technique called "cluster analysis" can be used to distinguish between similar and dissimilar firms.

The term "cluster analysis" was first used by the American psychologist Robert Tryon, and it has been applied in many fields wherever there is a need to group data.[120] Cluster analysis is not a single statistical technique but encompasses methodologies that can be used to group (i.e., cluster) data meaningfully.[121] The goal of cluster analysis is to create groups that are as internally homogenous as possible, while being as externally heterogeneous as possible from all other groups.[122]

Cluster analysis has been used for decades to analyze the financial risks faced by firms, including identifying firms that face similar financial risks.[123] Cluster analysis converts different financial attributes into a measure of the "distance" of each firm from the target company. The more financially comparable a candidate firm is, the "shorter" the distance.[124] This is illustrated in Figure 2.

120. ROBERT C. TRYON, CLUSTER ANALYSIS: CORRELATION PROFILE AND ORTHOMETRIC ANALYSIS FOR THE ISOLATION OF UNITIES IN MIND AND PERSONALITY (1939).

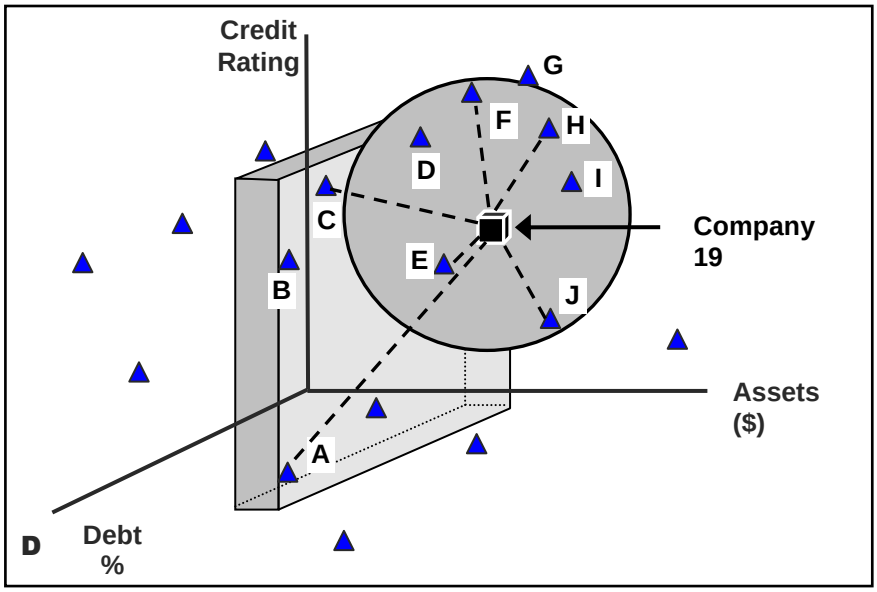
121. G. David Garson, *Cluster Analysis*, available at: http://faculty.chass.ncsu.edu/PA765/cluster.htm.

122. *Id.*

123. *See generally* Edward I. Altman, *Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy*, 23 J. FIN. 589-609 (1968); Robert E. Jensen, *A Cluster Analysis Study of Financial Performance of Selected Business Firms*, 46 ACCT. REV. 36-56 (1971); M. Gupta & R. Huefner, *A Cluster Analysis Study of Financial Ratios and Industry Characteristics*," 10 J. ACCT. RES. 77-95 (1972).

124. A common "distance" measure is based on the square of the distance in each dimension, where each dimension has been "scaled" or "normalized" so as to not to bias the analysis because one variable is defined in, say, millions of dollars while another is defined as a percentage between 0% and 100%.

FIGURE 2: CLUSTER ANALYSIS APPROACH TO SELECTING PROXY FIRMS



As shown in Figure 2, the idea is to calculate the "distance" between the firm under study (in this case, Company 19) and other firms based on the three financial criteria shown. In the example, firms A, B, and C are no longer deemed "comparable," whereas firms F, H, I, and J are deemed comparable. Firms D and E, which were previously deemed comparable, are still included with the set of comparables.

Different methodologies can be employed in performing cluster analysis. One of the most common methodologies is "partition clustering." This approach groups observations into a prespecified number of groups using an iterative process. Partition clustering minimizes the differences between the observations within each cluster and maximizes the differences between clusters.[125]

Partition clustering analysis starts with one cluster. For example, if we were determining the allowed return for an electric distribution company, we might begin with all of the firms included by Value Line under its Electric Utility industry.[126] The first iteration would partition the utilities into two groups, the second iteration into three groups, and so forth. Of course, there is a tradeoff between the number of partitions and the "closeness" of each observation in each partition. At one extreme is one partition, in which the cluster includes, by definition, all of the observations. At the other extreme, the number of partitions equals the number of observations, i.e., every observation is considered as its own cluster.

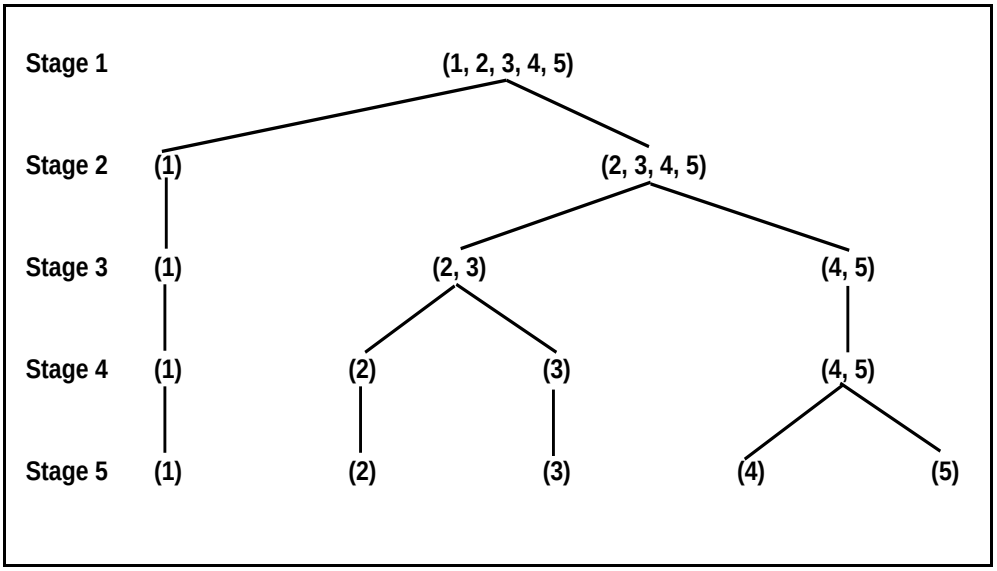
125. For readers with some statistical background, partition clustering can be thought of as an analysis of variance (ANOVA) exercise backwards, by partitioning data into the groups that minimize "within-group" variation while maximizing "between-group" variation. For an excellent introduction to ANOVA, s*ee generally* GUDMUND R. IVERSEN & HELMUT NORPOTH, ANALYSIS OF VARIANCE (2nd ed. 1987).

126. Value Line separates these firms into three geographic segments: Electric Utilities–East, Electric Utilities–West, and Electric Utilities–Central.

The two most common partition methods are Mean Partition and Median Partition. Mean Partition cluster analysis uses as the basis for clustering the differences in the average (mean) values of the different variables. Median Partition cluster analysis uses differences in the medians of those variables. The two approaches can yield different data clusters if the observations are skewed such that the mean and median of a given attribute differ significantly. Therefore, it is useful to perform both types of analysis when determining comparable groups.

Figure 3 demonstrates the partition clustering approach, in which a group of five individuals is gradually partitioned. As shown, the first-stage grouping contains all five firms. The second-stage grouping then separates firm 1 from firms 2 through 5. In the third stage, firms 2 through 5 are separated into two distinct groups; one group contains firms 2 and 3, and the other group contains firms 4 and 5. In stage 4, firms 2 and 3 are separated. Finally, in stage 5, the five firms are separated into five groups, and each firm defines its own, unique group.

FIGURE 3: ILLUSTRATION OF THE PARTITION METHOD



As with the direct approach discussed previously, with cluster analysis there is a tradeoff between the number of variables used to characterize firms and the ability to cluster them. Since no two firms are identical and every firm can be described using different sets of attributes,[127] one can easily derive a set of variables that is too discriminatory. Therefore, as with the goal of any "multi-attribute" analysis, one aims to characterize business and financial risks as completely as possible using the fewest number of attributes.[128] In developing a

127. These attributes might include geographical attributes (e.g., location, weather severity, terrain, etc.), physical attributes (e.g. customers served, generating resource mix, miles of pipeline or high-voltage transmission circuits, etc.), and financial attributes (e.g., total revenues, total assets, capital structure, etc.).

128. For an introduction to multi-attribute analysis, *see generally* RALPH L. KEENEY & HOWARD RAIFFA, DECISIONS WITH MULTIPLE OBJECTIVES (1993).

set of financial attributes, for example, one should avoid variables that are duplicative or highly correlated. For example, one would not include as separate variables both equity and debt fractions, since total capitalization is defined as the sum of debt and equity, meaning the variables are not independent.

C. Applications of Cluster Analysis in Estimating Allowed Returns

Cluster analysis was first proposed to select a proxy group for purposes of estimating regulated rates of return in a 1987 NOPR issued by the Federal Communications Commission (FCC).[129] In this NOPR, the FCC raised the prospect of using cluster analysis to determine the rate of return for the interstate access service of AT&T Communications and local exchange carriers (LECs).[130] The FCC "prescribed" a single rate of return on investment for the nation's estimated 1,400 LECs rather than hold separate hearings for each LEC.[131] In previous years, the FCC based the rate of return on a group of "comparable firms" that was selected based on a direct approach screen, such as eliminating all firms with an S&P bond rating lower of AA.[132] The FCC expressed interest in using cluster analysis to select comparable firms and sought comments from stakeholders for its next biennial proceeding to set the allowed rate of return for LECs.[133] The FCC noted that with its then-current methodology, "[m]inor variations in the screening criteria produced large fluctuations in the number and identity of companies in the 'comparable' groups."[134] The FCC explained its determination that cluster analysis was desirable as follows:

> [Cluster analysis] has several advantages over the screening approach utilized initially. First, it readily allows us to expand the number of risk indicia without concern that we must necessarily know with precision the values to assign to any particular risk measure used as a screen . . . . With cluster analysis, in contrast, any one measure of risk will not have the effect of wholly removing a company from consideration as a "comparable" firm. A single cluster could accommodate companies with different debt ratings if other risk indicia were sufficiently similar. Cluster analysis also has the advantage of more readily accommodating additional risk indicia because the indicia do not have the effect of eliminating firms from consideration. As discussed more fully below, we intend to take advantage of this ability to increase the risk indicia and thereby examine a much more robust measurement of risk.[135]

The FCC provided an example application that used "numerous indicia" to "establish groups of companies which share similar risk characteristics."[136]

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129. Refinement of Procedures and Methodologies for Represcribing Interstate Rates of Return for AT&T Communications and Local Exchange Carriers, 2 F.C.C.R. 6491 (adopted Oct. 8, 1987) [hereinafter 1987 NOPR].

130. *See generally*, Interstate Services of AT&T Communications and Exchange Telephone Carriers, 51 Fed. Reg. 1795 (proposed Aug. 17, 1984) (to be codified at 47 C.F.R. pt. 65); Authorized Rates of Return for the Interstate Services of AT&T Communications and Exchange Telephone Carriers, 104 F.C.C.2d 1404 (1986); Authorized Rates of Return for the Interstate Services of AT&T Communications and Exchange Telephone Carriers, 51 Fed. Reg. 32920 (to be codified at 47 C.F.R. ch. I).

131. 1987 NOPR, *supra* note 129.

132. *Id.* at ¶ 21.

133. In re Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers, 5 F.C.C.R. 7507 (1990) [hereinafter 1990 Represcription].

134. 1987 NOPR, *supra* note 129, at ¶ 19.

135. *Id*. at ¶ 21.

136. *Id*. at ¶ 23.

In its Order in the 1990 Represcription proceeding, the FCC determined that the cluster analysis submitted by the United States Telecom Association (USTA) was flawed because several of the financial variables used by the USTA witness had, in the FCC's opinion, no clear link to financial risk.[137] Importantly, however, the FCC did not reject the merits of cluster analysis but rather its *application* by the USTA.[138] Cluster analysis was also applied in a telecommunications rate case before the California Public Utilities Commission in 1992.[139] In that case, the witness for Pacific Bell Telephone used cluster analysis to determine a proxy group and an allowed rate of return.[140]

The authors have applied cluster analysis in international venues. In 2007, Dr. Lesser prepared an analysis regarding dairy processors in the Commonwealth of Puerto Rico, which regulates the price of fresh milk. The regulator of the Commonwealth's two dairy processors, Suiza Dairy Corporation (Suiza) and Vaquería Tres Monjitas, Inc. (Tres Monjitas), set an authorized return on equity of ten percent.[141] In 2004, the processors appealed the decision and filed a complaint alleging that this return failed to account for the poor creditworthiness of the Commonwealth.[142] In 2007, the District Court ruled in favor of the two processors and required a new study to determine a risk-comparable rate of return.[143] For that study, Dr. Lesser performed a cluster analysis to identify a comparable group of U.S. food processing firms with which to estimate an allowed return on equity.[144]

D. An Example

In this section we present an example of a cluster analysis performed to determine the rate of return for the Guatemala electric utility, Empresa Eléctrica de Guatemala, S.A. (EEGSA).[145] The steps in a cluster analysis include: (1) identifying the appropriate clustering variables (standardization), (2) selecting the clustering method and distance formula, (3) determining the stage at which the analysis has identified the optimal number of clusters, and (4) validating the results of the analysis.[146]

The analysis began with the fifty-eight publicly traded firms listed as Electric Utilities in Value Line. Three firms were immediately eliminated

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137. 1990 Represcription, *supra* note 133, at ¶¶ 165-66; In re Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers, 6 F.C.C.R. 7193 (1991).

138. 1990 Represcription, *supra* note 133.

139. In re GTE California Inc., 153 P.U.R.4th 65 (1994). The case focused on the price cap mechanism to be applied to Pacific Bell and specific parameters thereof.

140. *Id.*

141. *Id.*

142. *Id.*

143. Vaqueria Tres Monjitas, Inc. v. Laboy, 448 F.Supp.2d 340 (D. Puerto Rico, 2006) [hereinafter July 11 Order].

144. Affidavit of Jonathan A. Lesser to Puerto Rican Milk Regulator on the rate of return for Puerto Rico fresh milk processing plants on behalf of Suiza Dairy, Inc. (Aug. 3, 2007). A copy of this affidavit is available from the author on request.

145. Although this analysis was never filed with Comisión Nacional de Energía Eléctrica (CNEE), the Guatemalan energy regulator, it provides a useful example on the application of cluster analysis to an electric utility. Interested readers may request a copy of the report by contacting the authors.

146. *See generally* Colleen Flynn Thapalia, *Multivariate Statistics: Cluster Analysis*, available at: http://www.socialresearchmethods.net/tutorial/Flynn/cluster.htm.

because they were in the midst of mergers with, or acquisitions by, other firms. For the remaining fifty-five electric utilities, information published in each utility's Annual 10-K Reports was used to select four financial risk variables on which to base the cluster analysis.[147] These variables are listed below.

- *Average common equity as a percentage of total capitalization for 2006.* The common equity ratio provides a measure of financial leverage. The lower the common equity ratio, the greater the proportion of debt. As a firm's proportion of debt increases, a firm is said to be more "leveraged." All other things equal, the more highly leveraged is a firm, the greater its financial risk is for both bondholders and equity holders. For bond holders, the risk increases that the firm's cash flow will not be sufficient to cover its debt payments. For equity holders, who have a secondary claim on a firm's assets below that of bond holders, a greater likelihood that a firm will default on its debt obligation means lower expected equity returns.
- *Average fixed asset turnover ratio (revenues/assets) for 2006*. A firm with a low fixed asset turnover ratio will generate less revenue relative to its assets. This indicates that the firm is relatively capital intensive (meaning that the firm must make large investments in fixed plant).
- *Percentage of regulated revenues*. Utilities that derive a greater proportion of their total revenues from unregulated operations have different risk characteristics than utilities deriving little or no revenue from unregulated operations.
- *Cash flow per share*. Cash flow per share is a useful measure of the strength of a firm and the sustainability of its business model. Most financial analysts place more weight on cash flow per share than earnings per share, because cash balances cannot be manipulated.

The cluster analysis was performed in two stages. In Stage 1, both the Mean Partition and Median Partition methods were applied to the fifty-five remaining utilities from *Value Line*, plus EEGSA itself, using the first three variables: equity percentage (EP%), fixed asset turnover ratio (FA), and percentage of regulated revenues (RR%) variables. (Cash flow per share was not used in the first stage analysis since, as a privately held firm, EEGSA does not report that data.) All fifty-six utilities were examined in terms of how they

147. All publicly traded firms in U.S. exchanges are required to file with the U.S. Securities and Exchange Commission (SEC). Even though firm size is a common financial risk measure, with smaller firms typically being financially riskier than larger ones, in our example, firm size was not a variable in our cluster analysis. The reason is that, in terms of revenues, EEGSA is much smaller than almost all of the U.S. utilities. Thus, if a revenue measure had been included, it would have been more difficult to identify firms clustered with EEGSA. For a discussion of financial size and financial risk, IBBOTSON STAFF, STOCKS, BONDS, BILLS AND INFLATION: VALUATION EDITION 2007 YEARBOOK at ch. 7 (2007).

clustered together as the number of separate groups (clusters) was increased to five, using both the mean and median partition methods. With five clusters, a total of seven utilities was grouped (or "clustered") with EEGSA when the mean partition method was performed. However, the median partition method was less discriminating, grouping a total of nineteen proxy firms with EEGSA.[148]

In the second stage of the analysis, the overall comparability of the seven utilities identified in the first stage was evaluated by the mean partition method. The second stage helped determine how comparable the seven utilities were to each other, rather than relative to EEGSA. To perform the second stage cluster analysis, a fourth financial variable was added—cash-flow per share—to the analysis. The seven utilities were then evaluated in terms of how they clustered as the number of partitions increased. Using both the mean and median methods, five of the seven utilities remained grouped together through the first four partitions. Therefore, it was determined that those five utilities were the most appropriate utilities to include in the proxy group, as shown in Table 1.

TABLE 4: EEGSA COMPARABLE GROUP OF UTILITIES

Stage 1 Analysis – Comparable Utilities to EEGSA	**Stage 2 Analysis – Comparable Stage 1 Utilities**
Central Vermont Public Service	√
El Paso Electric	√
MGE Energy	√
Northeast Utilities	√
NSTAR	
UIL Holdings	
Xcel Energy	√

E. Limitations of Cluster Analysis

No "perfect technique" exists for identifying comparable firms for the simple reason that all firms are unique. Cluster analysis is subject to uncertainty and limitations, just as estimation methods are.

In using cluster analysis to identify comparable groups, users should recognize the inherent tradeoff between the number of variables used to characterize firms and the ability to cluster them. All regulated firms can be described using multiple attributes, and financial analysts have developed fistfuls of measures and ratios by which financial performance and risk can be evaluated. None of those measures is a perfect predictor of firm performance, of course. One could certainly argue that the four variables we used to perform the EEGSA cluster analysis were not the "best" measures of comparability and that other variables would have been more appropriate.

148. With a six-partition analysis, the mean analysis grouped seven utilities with EEGSA, while the median analysis groups all but one of those seven (CH Energy Group). However, using a six-partition analysis yields only three utilities in the second stage analysis, too small a comparable group to be statistically relevant.

A second limitation of cluster analysis is that not all of the possible clusters can be evaluated. For example, with just ten firms, there are over 3.6 million possible groupings. With fifty five firms, such as we began with for our EEGSA analysis, there are trillions of possible groupings. Moreover, there is no generally accepted procedure for determining the optimal number of clusters. That decision must be guided by theory and practicality of the results, along with use of the intercluster distances at successive steps.

Third, cluster analysis does not resolve the median-midpoint debate that often arises when the FERC determines individual firm returns within the range of reasonableness determined by the proxy group. Of course, if using cluster analysis can more accurately identify the most comparable firms, the resulting range of reasonableness may be narrower, thus reducing the controversy over the appropriate value within a range at which a firm's return is set.

IV. CONCLUSIONS

Regulators must ensure that the rates charged to consumers are "just and reasonable" and that regulated firms are afforded the opportunity to earn returns comparable with the business and financial risks they face. Performing that balancing act has many facets, from measuring costs to developing tariff structures. One of the most critical issues has always been setting an appropriate rate of return, which in turn requires careful consideration of just what "comparable risk" really means.

Since there is no one measure of the "risk" firms face, nor indeed is it even possible to identify all of the possible risks firms face, establishing proxy groups of firms having comparable business and financial risk is far from trivial. Over time, the FERC's approach to identifying such firms has changed radically—from not being at all concerned about identifying such firms, to more recently being concerned enough about them to issue clarifications in its 2008 Policy Statement and in its recent orders in *Kern River III* and *Atlantic Path 15*. Yet, the common approach to selecting comparable firms remains arbitrary.

We believe that cluster analysis, despite its added complexity, can provide a more logical and methodical approach to determining risk comparability and thus better achieve the standards set out by the U.S. Supreme Court in *Hope*. Although not a panacea, cluster analysis can be used to circumvent some of the pitfalls of the direct approach to identifying comparable firms.