PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

UNITED WATER PENNSYLVANIA INC.
Docket No. R-2015-2462723

Exhibit to Accompany

the

Direct Testimony

of

Rachel Maurer

Bureau of Investigation & Enforcement

Concerning:

Rate of Return

Summary of Cost of Capital

Type of Capital	Ratio	Cost Rate	Weighted Cost
Long term Debt	44.91%	5.28%	2.37%
Common Equity	55.09%	8.77%	4.83%
Total	100.00%		7.20%

Ms. Ahern's Proxy Group of Non-Price-Regulated Companies

Ticker	Company	Industry
AMGN	Amgen	Biotechnology
BAX	Baxter	Medical Supplies (Invasive)
BMY	Bristol-Myers Squibb	Drug
BRO	Brown & Brown	Financial Services (Diversified)
DGX	Quest Diagnostics	Medical Services
DVA	DaVita Healthcare	Medical Services
HAE	Haemonetics Corp	Medical Supplies (Non-Invasive)
KR	The Kroger Co.	Retail/Wholesale Food
LANC	Lancaster Colony	Household Products
MCY	Mercury General	Insurance (Property/Casualty)
MKL	Markel Corp	Insurance (Property/Casualty)
NLY	Annaly Capital	Real Estate Investment Trust
NWBI	Northwest Bancshares	Thrift
ROST	Ross Stores Inc.	Retail (Softlines)
SHW	Sherwin-Williams	Retail Building Supply
SJM	Smucker (JM) Co.	Food Processing
SLGN	Silgan Holdings	Packaging & Container
SRCL	Stericycle Inc.	Environmental
TAP	Molson Coors	Beverage
TECH	Bio-Techne Corp.	Biotechnology
THG	Hanover Insurance Group	Insurance (Property/Casualty)
WMK	Weis Markets	Retail/Wholesale Food
NYSE	Alleghany Corp	Insurance (Property/Casualty)

Source   UWPA Exhibit No. PMA-1, Schedule 8.

With the calendar nearing the end of the first quarter of 2015, the Medical Services Industry continues its clean bill of health. After several years of average to subpar returns, the Affordable Care Act has woken up a number of sleeping dragons, particularly hospital chains. With that, the sector remains within our top-20 Industry Rankings.

We have said for some time that those entities that can get out ahead of the reform changes will distance themselves from the pack in terms of gains and many of the stocks within our coverage are doing just that. Too, when jittery investors have a flight to quality, there are now top-notch names waiting for them in this space. *United-Health Group* is a member of the Dow 30 and has been on a steady incline since the winds of reform began to blow. *Aetna* is another industry bellwether held in high regard.

Still, healthcare in the United States remains in an evolutionary stage, and more alterations to the way business is done are forthcoming. Those companies that have proven their acumen at adjusting should continue to prosper, while those that have struggled out of the gate are learning that the current landscape is not a sprint, but a marathon.

Hospitals Heat Up

Revenues at a number of the hospitals under our coverage are skyrocketing. Yes, a consolidation trend heading in to the onset of the Affordable Care Act played a large role, but an uptick in the percentage of patients with medical coverage has also been a boon. The simple fact that these operators are now laying out less money to care for uninsured patients was enough to spark a rally in share prices when the early whispers of reform began. True, some chains are having trouble getting the top-line success to transfer into bottom-line gains, however, the investment community is being patient (the virtue) in that regard. *Tenet Healthcare* is a perfect example of such a scenario.

For some time we have opined that hospitals will be the largest benefactor from the ACA when all is said and done, and we stand by that belief. In fact, those that aggressively added to their bed counts in the months/years heading up to the legislation will almost certainly reap the largest rewards when the dust of reform settles. *Tenet* and *Universal Health Services* are two entities that fit this bill. Enrollment figures for 2015 are off to a solid start and we see no reason why a slowdown might occur.

HMOs Now Fans Of The ACA

At first blush, health maintenance organizations were by no means enamored with the Obama Administration's ideas for altering healthcare in America. It was perceived that they would foot a good portion of the new taxes and fees that the industry was facing. Truth be told, many companies (see: *Aetna*) are operating at significantly higher tax rates, but making big profits nonetheless. Management was able to see the changes coming and invoke strategic price increases to help cushion the blow. Even more regulations are being put in place for 2015, so those with strong leadership will continue to shine. Spending floors are going to be in place for individual accounts and some lines of business

may even need to be eschewed in the name of profitability, but these are all just signs of the new times.

UnitedHealth has played the game at an above-average level as well. Its position in the Dow got this stock trending in the right direction and then international expansion (particularly to Brazil) made it even more of a market darling. Its leadership's ability to weather the reform is unparalleled and is the primary reason behind the fact that its stock has continually set new 52-week highs over the last several months. The public exchanges are boosting enrollment figures for a number of HMOs and these companies are churning profits out of these additional lives.

Some Distance In The Duopoly

The duopoly of *Laboratory Corporation of America* and *Quest Diagnostics* have both used reform as a stepping stone to greater market share. Lesser entities have been forced to put themselves up for sale and the large labs have feasted on them.

But, now that *LabCorp* has purchased Covance, it has been outperforming its brethren in terms of stock price momentum. The deal created a lab testing/drug development titan whose projections eclipse that of *Quest*. From an investment standpoint, the only real advantage that DGX has is that it pays a dividend, while LH has chosen to go the acquisition route Volumes remain blase for both members of the duopoly, however, brighter days look to be ahead.

Conclusion

These are exciting times in the Medical Services Industry. A prolonged period of blandness has given way to significant investor enthusiasm. With that, a number of selections on the following pages are timely for year ahead performance, or a solid play for appreciation aspirations three to five years hence. We do caution, however, that an equal amount of these stocks are viewed as fully valued at current prices.

We recommend, as always, that subscribers peruse each of the following pages to get a better idea of which investment options suit the needs they have in both the present day and for the stretch to 2018-2020.

Erik M. Manning

Medical Services
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100
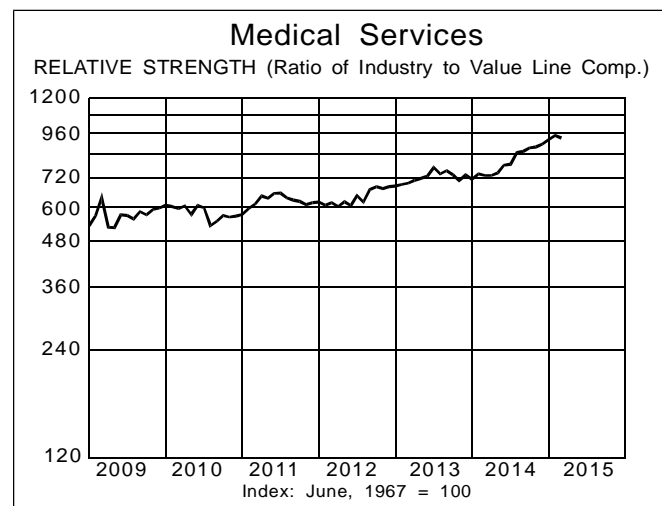
The Beverage Industry is comprised of both non-alcoholic and alcoholic drink makers. Most of these equities trailed the broader market over the past three months, though a few issues were able to buck the trend. The companies in this sector continue to face a tough operating environment due to the uneven macroeconomic climate and some unfavorable business trends. Regardless, many of these companies remain profitable, thanks to ongoing strategic efforts and their ability to find new growth opportunities.

Current Business Conditions

This group will likely face its share of challenges in the year ahead. Most notably, economic issues overseas and currency headwinds will probably weigh on results for some of the more established names in this sector. Specifically, companies with substantial business exposure to Europe and South America may experience lower revenues and earnings in the near term. Lean consumer spending in the United States is also worth noting. Consequently, results in the U.S. may be uninspiring for some of the companies in this group this year. Though near-term challenges will hinder top-line advances for some of the larger players, most of these companies will be able to weather these challenges one way or another.

Soft drinks are falling out of favor. Consumers are increasingly choosing alternatives to sodas due to an increased awareness of the health issues associated with these drinks. Notably, diet sodas have not been immune to the trend. As a result, "still" beverages (waters, juices, tea, etc.) are emerging as the new go-to choice for consumers. In fact, bottled water is on pace to assume the mantle as the number one drink in the not-too-distant future.

Wine and Spirits continue to gain ground on beer as the top selling alcoholic category. However, demand for flavored spirits, which has been a growth avenue for distillers, is starting to show signs of slowing. Whiskey continues to be a popular choice, though. Another notable trend is the rise of craft beer. This niche has grown at an enviable clip in recent years and has now become a formidable threat to large brewers.

Operating Strategies

This group has employed a variety of strategies to offset the aforementioned challenges. Cost-cutting remains a means to bolster profits. Beverage makers continue to develop new products in an effort to keep up with changing consumer tastes. Furthermore, these companies are seeking out new markets with more promising growth potential. What's more, numerous companies have ramped up their promotional efforts in order to grab market share in 2015.

Deal Activity

Consolidation will likely continue to be the main story here. After a busy year in 2014, we look for more transactions in the coming months. In fact, the new year already had its first deal. *Dr Pepper Snapple Group* and *Keurig Green Mountain* agreed on a partnership. *Keurig* will make single-serve capsules of *Dr Pepper Snapple* drinks for exclusive use in its upcoming cold beverage system. Note that *Keurig* reached a similar deal with industry leader *Coca-Cola*. The deal represents an interesting partnership for both companies and places more

pressure on *Keurig's* competitor *SodaStream*. Looking ahead, deal activity will probably remain busy, as beverage companies try to grab market share in a very competitive market.

Long-term Consideration

New growth opportunities remain key to the top and bottom lines given the mature nature of this industry. Like other businesses, beverages makers count on innovation for product differentiation, which has become increasingly important given the rise of small upstarts. As discussed, "still" and premium offerings should remain attractive markets for the foreseeable future. Lastly, brewers will likely continue to search for ways to tap the popularity of craft beer in the years ahead.
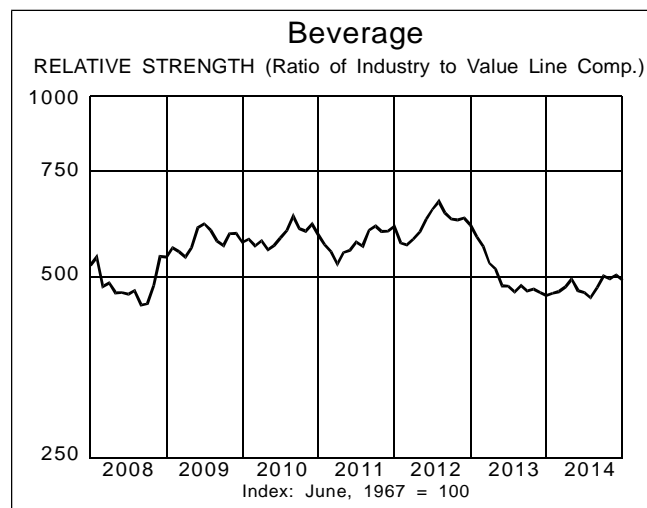
Beverage companies are searching for high-growth markets in an effort to increase their volumes. Accordingly, they remain focused on building their presence in emerging markets, which offers attractive prospects over the long term. Indeed, developing regions are an important opportunity, given the growing populations and rising income levels in these markets.

Conclusion

The Beverage Industry is ranked near the middle of the pack for all the industries covered by *The Value Line Investment Survey*. While this group has some challenges ahead of it, there is still much to cheers going forward. Short-term accounts are advised to take a closer look at timely ranked equities. Moreover, a number of stocks in this industry have attractive long-term investment prospects. Not every stock in the Beverage sector pays a dividend, however, the equities that do generally offer worthwhile yields. Also, of note, *Coca-Cola* is now a member of the Dogs of the Dow, which is a strategy where certain investors target underperforming Dow stocks with high yields.

We advise that investors carefully study the reports that follow to identify stocks that offer the best fit for their portfolios, both for the year ahead and for the 2017-2019 time frame.

Richard J. Gallagher

Beverage
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100

March 13, 2015   **BIOTECHNOLOGY INDUSTRY**   I&E Exhibit No. 1
Schedule 2
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The Biotechnology Industry differs from its pharmaceutical counterpart in that these companies' research deals with the utilization of living organisms, such as genes and cells, in efforts to discover novel therapies for a wide range of diseases. The process is time consuming, scientifically intense, and costly. This makes generic duplication difficult, hence leading to longer patents and a greater exclusivity time frame.

Some of this execution has changed, however. With the implementation of the Affordable Care Act, new laws are now allowing the generic duplication of some of these drugs under the biosimilars umbrella. In order to augment profitability, companies such as *Amgen* have created a biosimilars unit in the business in order to capitalize on this trend. Speculatively, this scenario will likely lead to some profit erosion, since patients may opt to use these less expensive drugs. Changes will probably manifest themselves in further volatile stock-price movements, particularly once any of these respective companies creates a generic duplicate to a high-demand drug.

Equity Price Movement Influences

Within the past three months, several biotechnology companies have experienced volatile stock-price movements. Most notably, the main influence on these equities has been ongoing news developments. For instance, *BioMarin Pharmaceutical*'s share price spiked once the company released favorable clinical data from an ongoing trial. This is typical of biotechnology firms, and investor enthusiasm (or disfavor) is quickly evident.

Also, the ameliorating economic landscape favors higher spending patterns than in the recent past. Biotechnology firms had practiced a period of constrained spending in order to conserve cash. However, ongoing signs of a sustained economic recovery are likely contributing to an increase in outlays. This is positive, in our opinion, since arguably the main catalyst for driving potential growth is the advancement of a company's pipeline.

Intriguing Pipeline Prospects

There are many companies in the industry whose promising research endeavors suggest that they may be on the brink of further or first-time commercial success. This group includes stalwart, *Amgen*, whose gilt-edged financial position facilitates numerous clinical trials in different arenas. Another is flavor-enhancer firm *Senomyx,* whose vast array of developing compounds continues to intrigue food and beverage companies. Other firms are advancing their respective pipelines by seeking to expand the utilization of already commercialized drugs. This is being done through ongoing clinical trials. This group includes *United Therapeutics* and *BioMarin Pharmaceutical.*

Regardless of the type of research, it is evident at this juncture that the wheels of innovation are once again turning at an accelerated rate.

Consolidation Picks Up

Acquisition activity is not too characteristic of the Biotechnology Industry. However, of late, some companies have embarked on this path as a means of expanding the business. One such case was that of *NPS Pharmaceuticals,* which was bought by Ireland-based Shire plc and, consequently, taken out of the *Survey*. On the other hand, we welcome *Medivation plc* to the *Survey*. This company's top- and bottom-line prospects have been enhanced, in our opinion, by an acquisition (see individual report).

The High Risk/Reward Scenario

Although aforementioned growth platforms appear solid, tides are quick to turn. The main setback comes from failed or discouraging clinical readouts that oftentimes send investors headed for the exits. On the flipside, commercial success and blockbuster potential can easily lead to boons for account seekers that have a penchant for risk.

The Regulatory Environment

The regulatory environment is highly favorable, at this juncture, in our view. Many of these companies' pipelines involve the discovery of treatment options for rare diseases and for which there is a dearth of market options. Hence, the FDA and other regulatory agencies abroad typically expedite the review process.

Conclusion

The vast majority of biotechnology companies in our *Survey* are unfavorably or neutrally ranked for year-ahead relative price performance. This is partly due to speculation of the pipeline, and investors often adopt a wait-and-see approach.

On-the-other hand, many of the 16 companies included in our review possess above-average capital appreciation potential over the 2018-2020 time frame. Our optimism stems mainly from promising pipelines.

As always, we advise investors to read the individual reports that follow before committing any funds to this highly speculative space.

Nira Maharaj

Biotechnology
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100
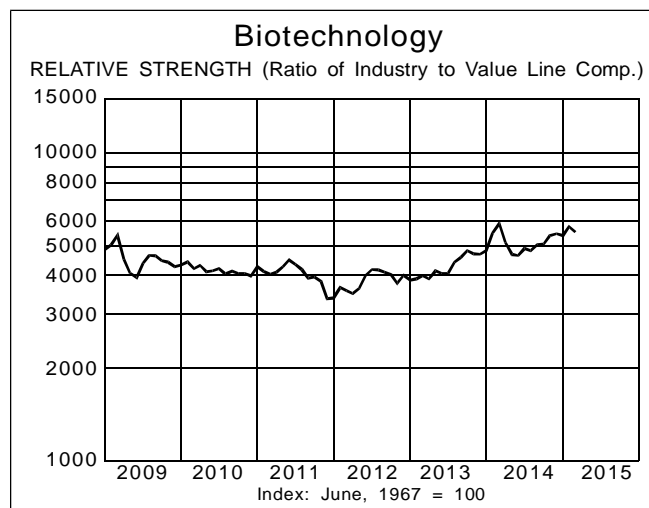
February 13, 2015   **FINANCIAL SERVICES (DIVERSIFIED)**   I&E Exhibit No. 1
Schedule 2
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The Financial Services (Diversified) Industry consists of a collection of corporations that offer a wide array of products and services. Asset management and credit card companies make up the two biggest groups but, after that, few similarities exist. Insurance, banking, brokerage, aircraft leasing, and pawn lending are among the many businesses that are included within this industry. This broad range makes it difficult to formulate any consensus about the overall health and prospects of this sector.

Since our November report, the industry's Timeliness rank has remained towards the midpoint of the 97 industries covered by *Value Line*. As the bull market for equities continues, money-market funds will likely lag for the short haul. Too, asset managers exposed to fixed income will be impacted by interest rate changes, which are expected to materialize later this year. That said, companies will look to offset such pressures through cost-cutting initiatives and business expansion. Regulatory concerns remain among most companies in this industry, as the three segments outlined in this report: Asset Managers, Pawn Lenders, and Credit Card companies, are all exposed to regulatory changes on a constant basis. Investors will want to look at the companies with the least exposure to such risk and those that hold stronger capital positions when making investment decisions.

Credit Card Companies

Card issuers are focused on driving profits by taking advantage of low credit costs. Too, the Federal Reserve reported that 2014 had the lowest level of card delinquencies since they began tracking the metric. This, coupled with growth in overall employment figures should help maintain low consumer credit costs. However, despite such positive factors, credit card providers, such as *American Express*, *Discover Financial Services*, and *MasterCard*, will need to focus on improving loan growth and maintaining adequate reserves as competition heats up in this segment of the industry. *Apple* recently announced the launch of its Apple Pay service, a digital wallet service that enables contactless acceptance at many merchant locations. While other digital payment companies have struggled to take over the industry due to difficulties building a new network, *Apple* already has an existing network with its customer base which will help it build on relationships to expand its new product offering. This could be a potential headwind, along with the upcoming PayPal spinoff, as credit card companies will need to adapt to new technological advancements in the payment industry.

Economic trends suggest a continuation of favorable trends in jobless claims and employment figures which augurs well for credit costs. Too, increased discretionary spending and available income will likely keep delinquencies low for the time being. *American Express* recently announced a hike in its merchant fee to improve profits. However, interchange regulation could prevent some of this growth if merchants succesfully push back against the higher fees. Risks include losing customers to cheaper payment options, which could lead to a loss in market share. Note: there has been extensive litigation over "anti-steering", where merchants argue credit card companies violate antitrust law by making merchants agree not to steer customers to specific payment methods. There could be a strong headwind against revenue growth if the judge rules credit card companies will have to lower fees.

Asset Managers

Asset managers will maintain a close eye on the expected upcoming interest rate rises as they are concerned with the impact potential rate changes could have on fixed-income portfolios. Some companies may look to consolidate this part of their business through fund mergers and liquidations. In addition, many managers are exposed to foreign exchange risks as the dollar continues to strengthen. Companies such as *Invesco* have significant exposure to the pound sterling and have taken measures to hedge such risks through option contracts. Other investment managers, such as *Gladstone Capital*, are exposed to fluctuations in oil prices, given that their portfolios consist of oil- and gas-related companies. Building strong reserves, maintaining expenses, and business restructuring efforts might be needed to remain competitive in such a changing and volatile landscape.
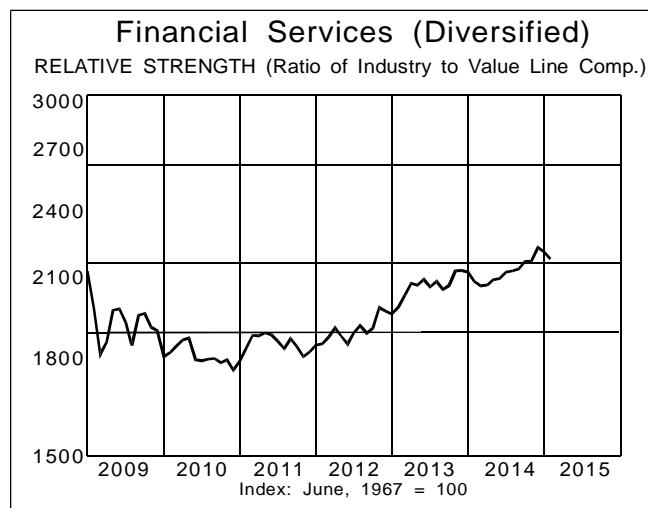
Pawn Lenders

As gold prices remain muted and consumer economics improve, pawn lenders seem to be having difficulty generating merchandise-based loan growth. Domestic pawn loan balances have fallen in 2014, However, companies such as *First Cash Financial* and *EZCORP*, have a solid foothold in Latin America which could offset such declines. That said, *Cash America* recently sold off its risk-heavy online payday lending facility and has restructured its business to improve its core pawn-based portfolio and generate organic growth. This company is the only one ranked favorably for Timeliness in the pawn sector.

Conclusion

Conservative investors will want to avoid stocks with elevated Beta coefficients and Below-Average ranks (4 or 5) for Safety, as they are subject to higher risk. Interested investors should peruse the following reports with care before making any investment decisions and, as always, focus on stocks that are favorably ranked for Timeliness.

Eugene Varghese

Financial Services (Diversified)
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)
Index: June, 1967 = 100

April 10, 2015

DRUG INDUSTRY

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In terms of share-price performance, the Drug Industry has been among the most-rewarding sectors under *Value Line's* coverage in recent years. Combined, the group advanced 25% in value during 2014, which followed up an even more impressive 35% gain in 2013. Although top-line generation for branded companies has proven challenging over this time, largely due to the loss of several big-name patents, a slew of M&A activity and some encouraging late-stage pipeline news has been sufficient in driving positive investor sentiment. During the first quarter, the consolidation trend continued with the announcement of several more multibillion deals. Whether it be generic companies trying to gain scale, or their branded counterparts trying to become leaner, M&A activity continues to reshape the pharmaceutical landscape.

In the following report, we touch on recently completed deals and those that are pending. We also provide a few recommendations for investors seeking to add drug exposure to their portfolios.

AbbVie Eyes Pharmacyclics

The former pharmaceutical arm of Abbott Labs had been rather quiet since terminating its $55 billion acquisition of *Shire* last year. However, all that changed in early March when *AbbVie* announced intentions to buy *Pharmacyclics* in a deal valued at $21 billion. Under the terms, the company will pay $261.25 a share in cash and stock, representing a premium of 13% to PCYC's preannouncement closing price. The transaction stands to greatly enhance *AbbVie's* clinical and commercial presence in oncology and will provide access to *Pharmacyclic's* cornerstone cancer drug, Imbruvica.

Actavis to become Allergan

Of all the companies in this space, none can match the torrid M&A spree seen by *Actavis plc* in recent years. The drugmaker's meteoric rise from a company with annual sales of $3.5 billion in 2010, to one with anticipated sales of $21 billion in 2015, has been unparalleled. *Actavis* has refused to take its foot off the gas, highlighted by its purchase of Watson Pharmaceuticals in 2012, Warner Chilcott in 2013, Forest Laboratories in 2014, and most recently *Allergan* in March, 2015. While some worry that the company may be overextending, this is yet to be seen. What is clear, is that *Actavis* has now established itself as a top-10 player in the industry. Management indicated that it would be changing its name to *Allergan* this year. The combined entity is expected to top $20 billion in annual revenues in 2015.

Glaxo, Novartis, and Lilly Complete Asset Swap

The three drugmakers completed a near $30 billion asset swap in the first quarter, geared toward strengthening what they considered to be their core businesses. Under the terms, *Novartis* paid $16 billion for *Glaxo's* oncology assets, while *Novartis* sold its vaccines unit to *Glaxo* for $7 billion and its animal health business to *Eli Lilly* for $5.4 billion.

Valeant Returns to the Deal Table to Grab Salix

Valeant Pharmaceuticals has been one of the biggest advocates of growth through M&A in recent years. Its buying spree has transformed it from a $1 billion entity in 2008, to a near $50 billion giant today. Despite being thwarted in its attempt to buy *Allergan* late last year,

Valeant responded in the first quarter with its $173-a-share ($11.1 billion) deal for North Carolina-based *Salix Pharmaceuticals*. The company fended off rival *Endo International* in a brief bidding war, and as a result will gain access to *Salix's* gastrointestinal drug *Xifaxan*. The transaction closed just as this Issue was going to press.

Pfizer Puts Strong Balance Sheet to Use

In early February, the New York-based drugmaker announced intentions to buy *Hospira*, a leading provider of injectable drugs and infusion technologies. Under the terms of the deal, *Pfizer* would pay $90 a share, which represents a 39% premium to HSP's preannouncement closing price. If successful, the acquisition would give *Pfizer* access to *Hospira's* attractive lineup of biosimilars and significantly enhance its Global Established Pharmaceuticals business (GEP). The deal is expected to close in the second quarter and would represent a nice response from *Pfizer* after its failed bid to acquire *AstraZeneca* last year.

Core Holdings

The Drug Industry offers a wide base of 3%+ yielding equities with superior marks for Safety and Financial Strength. A few recommendations for investors seeking income with relative stability include *Pfizer*, *Merck & Co.*, *Novartis*, *GlaxoSmithKline*, and *Eli Lilly & Co.* For momentum accounts seeking year-ahead growth, *Actavis* and *Merck* currently hold Above Average (2) ranks for Timeliness.

Conclusion

In terms of Timeliness, the Drug Industry has remained relatively flat since our January review, ranking just outside of the upper half of sectors under our coverage (60th out of 97). Besides *Actavis* and *Merck*, the majority of big-name players in the group are currently ranked Average (*AstraZeneca*, *Novartis*, *Valeant*) or Below Average (*Pfizer*, *Eli Lilly*). At this time, momentum accounts are likely to find a larger selection of appealing investment targets elsewhere. That said, the sector still provides a strong base of safer, well-established options with above-average income components.

Michael Ratty

Drug
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100
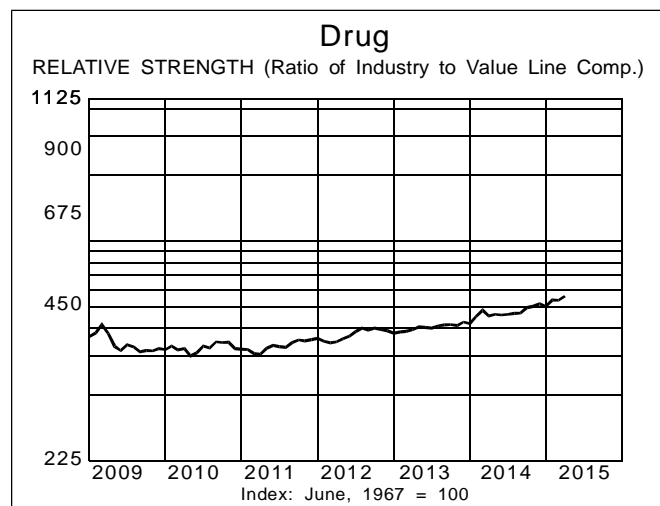
February 27, 2015

ENVIRONMENTAL INDUSTRY

I&E Exhibit No. 1
Schedule 2
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Between early 2008 and mid-2012, the leading companies in the Environmental Industry generally experienced declines in their industrial and special waste revenues. The reversal of this trend has since resulted in decent top-line organic gains by the three largest waste collection companies, *Waste Management*, *Republic Services*, and *Waste Connections*. Also, thanks to easing competitive pressures, the industry's overall pricing has generally risen well above the inflation rate over the past four years, and prospects for a continuation of this trend in 2015 are good. Moreover, ample cash flow, which has been allocated lately to acquisitions, share repurchases, and dividend increases, is a plus. We also look at *Stericycle* and *Tetra Tech*. They specialize in medical waste disposal and environment-related engineering and consulting services, respectively.

Current Operating Environment

Mainly due to the economic malaise that surfaced in 2008, waste volumes generated by industrial and commercial customers were below prior-year levels through mid-2012. Since then, though, industrial/rolloff and special waste markets volumes have generally picked up, particularly at *Waste Connections*. Also, price increases of 3%-4%, excluding surcharges, were the norm between 2008 and 2010, before subsiding somewhat last year. Meanwhile, a challenging recycling business hurt 2014's fourth-quarter profits at *Waste Management* and *Republic Services*. But, planned fee hikes and cost-cutting measures suggest a modest recovery as 2015 progresses. Meanwhile, *Waste Management* is being aided by further consolidation synergies and a recently completed restructuring program at the core operation. Too, headwinds resulting from lower prices at its recycling and waste-to-energy operations are abating. And *Republic Services* will likely get a lift in 2015 from its just-completed acquisition of a leading waste solutions provider serving domestic oil and natural gas producers. Finally, thanks to increased contributions from two acquisitions in 2012, *Waste Connections*' earnings increased by 39% over the two-year period ending December, 2014.

Calgon Carbon is a leading domestic producer of activated carbon and should benefit from a number of prospective regulations by federal and state agencies. That is, powdered activated carbon (PAC) is the prime abatement technology for mercury in flue gas generated by coal-powered plants. This will likely become the largest market for activated carbon. Following the significant expansion in 2013 and 2014 of the company's PAC production capacity in the United States and overseas, additional steps in this regard are slated to be completed this year at its Kentucky plant. Also, regulatory requirements related to the treatment of ballast water discharged by vessels and potable water released by municipalities are slated to be phased in over the next year or so. This scenario augurs well for *Calgon*, since it's a leader in the development and deployment of related water-treatment systems.

Acquisition Benefits

US Ecology's mid-2014 purchase, for about $465 million, of Michigan-based EQ has significantly bolstered some of its key financial metrics. Notably, the addition has almost tripled *USE*'s revenues, and this year's estimated cash flow is $1.50 (67%) above 2013's level.

Moreover, it has provided numerous cross-selling opportunities, and should enable *US Ecology* to achieve steadier top- and bottom-line growth. Also, thanks to proceeds from *Waste Management*'s sale of two sizable operations, its cash assets jumped to $1.3 billion at the close of 2014. The company plans to use much of these funds in 2015 for acquisitions and share repurchases. It has signed a letter of intent to purchase a sizable waste collection operation, and that transaction should close shortly. Too, board authorized stock repurchases for 2015 are $1 billion. Finally, *Waste Connections*' $1.3 billion purchase in late 2012 of a sizable company that provides oil field waste-treatment services was a key factor behind the resumption of its earnings uptrend.

Leaders In Two Waste Treatment Niches

Stericycle is one of the largest providers of regulated medical waste management services in the U.S., with about a 40% market share. Its growth prospects in foreign markets are bright, as well. Owing to the costs involved in upgrading existing waste treatment facilities, many laboratories and hospitals are using *Stericycle*'s outsourcing services to comply with more-stringent regulations. Accelerated acquisition activity lately is another plus.

Meanwhile, we think *Tetra Tech* longer-term revenue- and earnings-growth prospects are impressive. Over the pull to decades end, it should see strong order improvement from both domestic and international clients, particularly for its technical support services and its environmental remediation business. Notably, *Tetra*'s exposure to industrial water projects is quite promising, while the recent exiting of its riskiest and least unprofitable units is a plus.

Conclusion

Of the stocks discussed above, the timely shares of *US Ecology* offer attractive 3- to 5-year appreciation potential. Also, good-quality, *Waste Management* stock should appeal to income-oriented investors, given its above-average dividend yield and the prospect of increased annual payments. Finally, neutrally ranked *Calgon Carbon* and *Tetra Tech* shares have good appreciation potential to 2018-2020.

David R. Cohen

Environmental
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)
Index: August, 1971 = 100
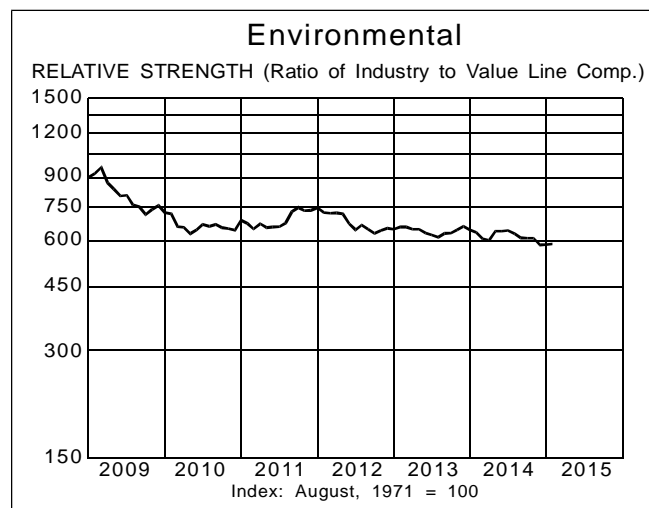
The Food Processing Industry is a broad group, with companies that operate in various subsectors. For the most part, it is comprised of North American packaged foods manufacturers, meat processors, and agricultural businesses.

Competition in the Food Processing Industry is fierce, as consumers often have many similar offerings from which to choose. Too, economic growth outside the U.S. remains underwhelming, and foreign currency translations are a concern for many companies. A recent outbreak of avian flu has prompted China and other countries to temporarily ban imports of poultry products from the U.S. Still, profits may well rise as commodity prices have generally fallen, and external growth has added to companies' bottom lines. As it stands now, this group's Timeliness rank edged up to 39 from 46 previously.

Commodity Price Environment

Although they spiked near the end of the year, record harvests allowed prices for corn and soybeans to decline about 15% and 10%, respectively, in 2014. In a recent report, the USDA noted that stockpiles remain elevated, which in turn should keep price levels of these commodities subdued in 2015. Such an environment augurs well for profits of poultry and egg processors like *Tyson Foods*, *Pilgrim's Pride*, *Sanderson Farms,* and *Cal-Maine Foods*, since grain-based feeds comprise the majority of the cost of goods for each of these companies.

Similarly, wheat prices are forecast to remain relatively benign in the year ahead. Issues such as *J&J Snack Foods* and *Snyder's-Lance*, whose gross margins are tied heavily to this commodity, stand to benefit from this trend. Although more diversified, companies including *General Mills* and *Kellogg*, would also see an upward bias to gross margins from lower wheat costs.

On the other hand, coffee prices jumped more than 20% in 2014 and may remain elevated, owing largely to drought conditions in Brazil. As such, certain producers of branded packaged coffee, such as *J.M. Smucker*, and *Mondelez International*, will likely continue to see some adverse effect on their P&Ls.

Finally, after increasing about 15% in the first seven months of 2014, cocoa prices largely retreated through year end. That, coupled with the fact that sugar now trades about 13% below year-ago levels, should benefit sweets purveyors like *Hershey Co.* and *Tootsie Roll*.

Overall, expectations point to a broadly accomodative input cost environment in 2015. And, with improving unemployment and the precipitous drop in oil prices since mid-2014 (translating to more discretionary income for consumers), we think food manufactures in general may be able to pare back promotional offerings, which could provide a profitability tailwind.

M&A And Restructuring

Overall global packaged food sales are expected to rise 2.4% annually through 2019. Given this meager organic growth outlook, we expect food processors to tap generally strong balance sheets to augment growth via M&A in 2015 and beyond. For example, both *Pinnacle Foods* and *Pilgrim's Pride* have publicly stated interest in pursuing acquisitions. In addition, there is every reason to expect *Treehouse Foods*, an established leader in private label industry consolidation, to continue along this strategic path.

INDUSTRY TIMELINESS: 39 (of 97)

One noteworthy recent transaction involved Chiquita Brands. Two Brazilian companies initially stepped forward with similar offers to buy the company outright. After much negotiation, on January 6th a tender offer for Chiquita was completed by Cutrale-Safra for $14.50 a share, for a total of $1.3 billion including Chiquita's net debt.

Earlier this month, media reports concluded that 3G Capital Partners is mulling over the idea of acquiring food or beverage companies. Indeed, 3G reportedly has received pledges from investors totalling $5 billion for a new takeover fund. Potential targets cited were *Campbell*, *Kellogg,* and *PepsiCo*, all of which traded higher in response to the speculation.

In terms of restructuring, a few years ago *Dean Foods* created value by spinning-off *Whitewave Foods*, while *Kraft* did the same via a split to form *Mondelez*. Today, several companies, including *Kellogg*, *General Mills*, and *Archer Daniels Midland*, are instituting (or continuing) restructuring/cost-saving efforts aimed at bolstering long-term earnings growth.

### Favorable Long-Term Outlook For Food Sales

Notwithstanding near-term uncertainties, over the next 10 years, GDP per capita is expected to rise nearly five times faster in emerging economies than in developed nations. Indeed, the World Bank projects that in year 2030 the vast majority of the world's population will not be impoverished.

To serve this expected boom in demand, the world will have to produce as much food in the next 40 years as it has in the past 10,000. In addition, the rising middle class will likely demand higher-quality diets, which bodes well for natural/organic players such as *Hain Celestial*, *Whitewave Foods*, and *Boulder Brands*.

Conclusion

Many companies herein are consistently profitable and are committed to returning cash to shareholders. And despite tough food industry conditions, we believe most portfolios would benefit from including some members of this traditionally defensive sector. As always, we advise investors to carefully evaluate each company report prior to making investment decisions.

Michael Lavery

Food Processing
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)
Index: June, 1967 = 100
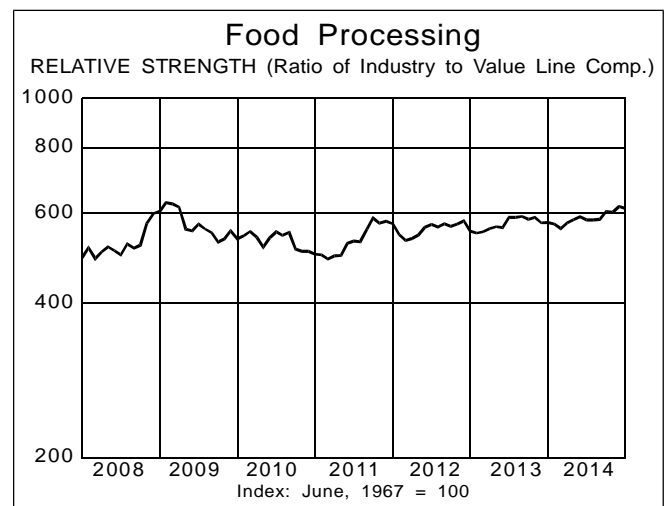
The Household Products Industry has continued to trudge along over the past few months. And the group is ranked in the bottom third of the *Value Line Investment Universe* for year-ahead relative price performance.

Nevertheless, the members herein have been hard at work. Will their internal improvements, portfolio expansion, and diversification efforts brighten the consumer goods conglomerates' near- and long-term prospects?

Cleaning House

During, and following, the recent recession, many conglomerates began widescale restructuring efforts to offset inflationary pressures and higher operating expenses. Most are no longer relying on aggressive streamlining moves as heavily as they once did. Some, such as *Jarden* or *Spectrum Brands,* are liable to use the integration of new acquisitions as an opportunity to optimize their businesses.

Some may still consider divesting less-profitable divisions. *Newell Rubbermaid* is in the midst of overhauling its business. And *Energizer Holdings'* plan to split its company in two (spinning off its personal care segment) is well under way.

Too, ongoing cost-cutting activities ought to bolster operating margins. And even though some input expenses have been declining, thanks to falling prices for oil and other commodities, the consumer goods makers may still rely on pricing measures to boost profit returns.

Improving the Product Pipeline

The household goods makers will likely use discretionary capital to invest in their portfolios. Many here have a long history of mergers & acquisitions, and will probably scan the market for assets that will complement their current businesses. Too, some have used recent additions to better diversify their holdings, to expand their international presence, or to help them enter new markets. We would not be surprised if the manufacturers pursued smaller, yet accretive, additions in the coming years.

Others have been ramping up their research & development budgets, and have been improving their pipelines by launching new offerings. Technological improvements may also play an important role moving forward. Still, these companies operate in a pretty competitive environment, and will continue to fight for shelf space.

Consumers tend to buy household necessities even when times are tough. And since most of the companies here sell items deemed "everyday luxuries" they fared pretty well during the latest recession. But, the household goods makers are still trying to regain the consumers that eschewed pricier brand names for private-label and generic products when they tightened their purse strings. Consequently, the companies increased marketing and advertising efforts over the past few months. They will probably emphasize brand-building initiatives, to increase customer loyalty. Plus, several are utilizing social media to better promote their products and to grow their customer base.

INDUSTRY TIMELINESS: 82 (of 97)

Global Growth Efforts

Geographic diversification has led to dynamic top- and bottom-line growth for many here over the past several years. The consumer goods makers turned their attention overseas in pursuit of undersaturated niche markets.

Some even moved facilities abroad to take advantage of lower operating costs in emerging nations. While others improved their global distribution efforts to extend their market reach.

Nevertheless, overseas investments were not without risk. The companies can be vulnerable to less-stable political and economic environments.

In recent months, the strength of the U.S. dollar has negatively impacted foreign currency exchange rates. Consequently, companies with a large exposure to international markets, particularly South America (such as *Colgate-Palmolive, Kimberly-Clark*, and *Clorox*) will likely struggle in the coming months.
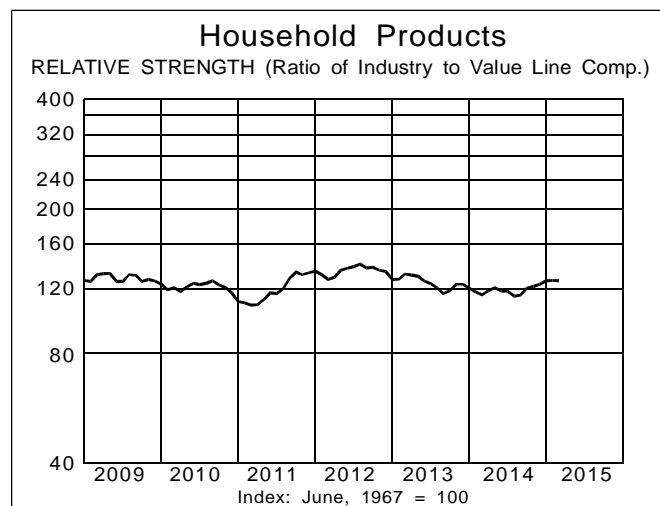
Conclusion

This industry has long been lauded for its defensive nature. Namely, the members herein tend to perform well regardless of the economic backdrop. And the mature companies' slow-and-steady growth profile and sterling finances help boost their conservative appeal.

But those seeking near-term momentum may want to look elsewhere for now. The Household Products Industry has struggled over the past few months, and continues to loiter in the bottom half of the index for year-ahead Timeliness. And few of the members stand out for relative price performance, even though some of the issues have gotten lifted by the recent market rally.

But for those with a longer-term bent, a few issues here hold decent capital appreciation potential out to 2018-2020. Moreover, several offer attractive dividend yields, which, combined with their relative stability, should bolster their risk-adjusted total return possibilities.

All told, we caution readers from painting with too broad a brush, and recommend evaluating each individual report before making any capital commitments.

Orly Seidman

Household Products
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100

March 13, 2015   **INSURANCE (PROPERTY/CASUALTY)**   I&E Exhibit No. 1
Schedule 2
Page 10 of 18   **758**

The Property/Casualty Insurance Industry has roughly held its own over the past three months. The sector remains ranked below the middle of the pack for Timeliness. Many P/C insurers reported year-to-year earnings gains during the December quarter of last year, reflecting reduced industrywide catastrophes. However, there are many factors that affect an insurer's financials. We will dig a bit deeper in the paragraphs below as to how certain factors impact the bottom line.

A Recap Of 2014

Net premiums earned increased for many companies under our perusal last year. Gains in this line item can be attributed to two main factors. First, is the amount of new business on the company's books. This can be measured fairly easily by looking at policies in force (PIF), which is a measure of the aggregate dollar amount of all policies that are insured. Another variable is rate increases, particularly during policy renewal season. (Most insurers' policies renew once a year, though there are situations when renewals are biannually.) At this juncture, the insurance industry remains in an up cycle, though the rate of increase has diminished in recent months. This is particularly the case with standard insurance policies. More-specialized products generally fared a bit better.

Another line item that was a positive factor last year was the combined ratio. This metric is comprised of both the loss and expense ratios. The loss ratio was generally very favorable relative to historical averages for most companies we review. This largely reflects a quiet hurricane season on the domestic front, along with below-average catastrophe-related losses in aggregate. Furthermore, more-stringent underwriting standards lent a helping hand. Indeed, insurers for the most part have shored up their underwriting book, by insuring only those policies that adhere to their risk/return guidelines. Most companies seemed to have learned their lesson from the late 1990s when they were writing policies with attention mainly on garnering new business, with less focus on margins. The industry expense ratio also declined last year, as costs were spread over a larger premium base. Tight cost-control was also likely a factor.

Finally, investment income decreased for the aggregate insurance sector. While increased premiums helped to boost invested asset levels, low bond yields made increases in this line item difficult, if not impossible, for many insurers. Fixed-income returns are near historical nadirs, which means that companies are reinvesting at even lower yields in many instances. Some insurers invest in equities, limited partnerships, and other instruments in order to shore up returns, but this adds a measure of risk to their portfolios and, thus, exposure to such instruments is generally modest to moderate.

What's Ahead?

The million dollar question is, "what are the prospects for the insurance market in 2015 and 2016?" Currently, we look for the rate of increases in policy renewals to continue to decelerate over the next year or two, barring a pickup in storm activity. Weather-related catastrophes can be viewed as a double-edged sword for insurers. On one hand, reduced catastrophe-related losses (individual events that amount to more than $25 million in losses) help to lift earnings, as fewer claims are paid out. On the other hand, when insurers are paying out fewer claims, industrywide capacity levels tend to rise, which makes

price increases more difficult to attain. Furthermore, when rate conditions are good, insurers tend to write more business, which tends to increase aggregate supply. Thus, in a nutshell, we look for slight-to-moderate rate increases across most insurance lines over the next 12 to 18 months; however, our outlook could change, depending on the weather.

The other factors are somewhat of a mixed bag and are even more difficult to project. It appears that the recent string of quiet hurricane and storm years may soon come to an end, though, of course, the weather is nearly impossible to predict. Hence, we expect an uptick in the industry loss ratio this year, as recent years' levels appear unsustainable. This would cut into earnings, in aggregate, though it might produce a better supply/demand balance.

Meanwhile, investment income growth is highly correlated with interest rates. Therefore, we expect short-term rates to remain low until the Federal Reserve begins tightening (raising) them to keep inflation in check. Based on recent statements by Fed Chairwoman Janet Yellen, this is unlikely to occur until the fourth quarter of this year, at the earliest. Hence, we don't foresee a significant uptick in investment income for the insurance industry until 2016.
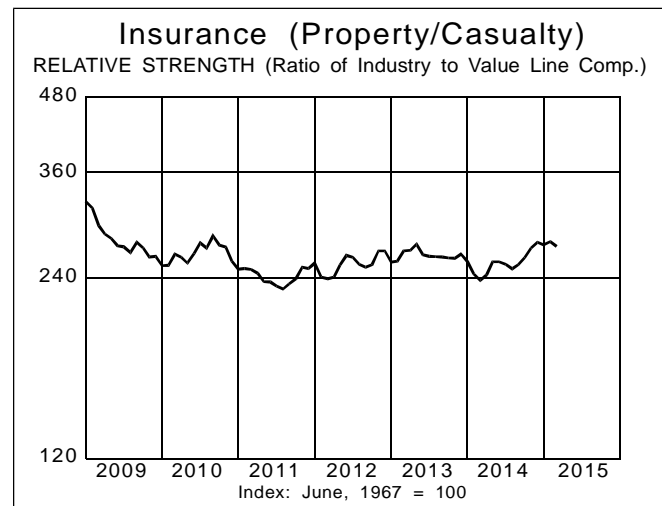
Our View To 2018-2020

Much of the long-term fortunes of the insurance industry are correlated with the broader economy. A good economy gives insurers leverage to increase rates, while the level of competition in each segment also plays a vital role. Another variable to keep an eye on is industrywide supply. Historically, overcapacity is the primary factor behind industry downturns. During such times, companies with a stronger book of business tend to hold up better, though earnings, of course, are pressured.

Conclusion

We advise that investors carefully study the reports on the following pages to identify those stocks that offer the best risk/reward prospects for their portfolios, both for the year ahead and over the 3- to 5-year pull.

Alan G. House

Insurance (Property/Casualty)
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100

Companies housed in the Medical Supplies Industry (Invasive) have closed the book on 2014. There continue to be common themes coursing throughout the industry that have influenced equity movements. On a larger scale, the ameliorated economic landscape has somewhat restored consumer confidence, and this is mainly being manifested through enlivened hospital admissions in the U.S.

Still though, there are likely to be persistent near-term challenges. Amongst these include foreign exchange translation losses and overall weak economic conditions in certain countries. Indeed, prospects for lackluster year-ahead equity performances are evidenced by the industry's low Timeliness rank (87 of 97).

The Near-Term Landscape

Companies in the Medical Supplies Industry have performed admirably in the face of persistent headwinds. One way many have done so has been through product diversification. Firms such as *Medtronic* and *Boston Scientific* have shifted their respective focuses in light of weak segment performances over the past couple of years. High-growth arenas that have stood out include neuromodulation, endoscopy, and urology. We anticipate that these units should continue to progress, given heavy investments in these lucrative medical fields.

On the flipside, *Cyberonics'* attempts to reenter the depression space were dealt a blow after the regulatory powers recently rejected reimbursement privileges for the company's vagus nerve stimulation device as a tool to effectively treat depression. This hurt the equity's performance a bit, but the stock has since rebounded. Undoubtedly, the company continues to perform well, and the equity is one of the rare ones that stand out for above-average year-ahead relative price performance.

Another notable development has been signs of market stabilization in a once-suffering category. Specifically, companies such as *Boston Scientific* and *St. Jude Medical* have faced severe headwinds with regard to the cardiovascular arms of their businesses. As mentioned, such companies have successfully traversed these challenges through a shift in focus, but it is a plus that this important category is once again being enlivened.

The Regulatory Environment

The healthcare landscape has gone through some notable transformations within the recent past. Some of these policies have favored companies in this space, while other decisions have hurt performances.

First, the full execution of the Affordable Care Act should increase hospital admissions. This is expected to happen because all Americans should have health insurance and therefore be able to visit hospitals for lower out-of-pocket costs.

On the flipside, the implementation of the 2.3% excise tax imposed on medical device manufacturers has caused some bottom-line hemorrhaging. Although this law was expected to limit R&D efforts, it has not done so to a large extent. In fact, after a long period of curtailed spending practices, companies are once again investing in their pipelines.

Such investments are paying off, as firms such as *Medtronic* and *Boston Scientific* have recently achieved FDA approvals or are seemingly on the cusp of doing so.

Noteworthy Consolidation Trends

Acquisition activities have been rampant for medical device purveyors, of late. However, the biggest consolidation activity has been *Medtronic's* purchase of *Covidien* (which has since been removed from The Survey). The transaction amounts to $49.9 billion and has made *Medtronic* one of the biggest players in the industry. The more diverse product portfolio, owing to greater penetration into nontraditional segments will likely complement the company's growth agenda. The new company's headquarters will be based in Ireland, and the product and segment categories have been exponentially augmented.

Growth Catalysts

In summation, these companies have several growth catalysts that should spur top- and bottom-line prospects. One other platform has been penetration into emerging markets that are currently in the early stages of healthcare infrastructure, including Brazil and India.
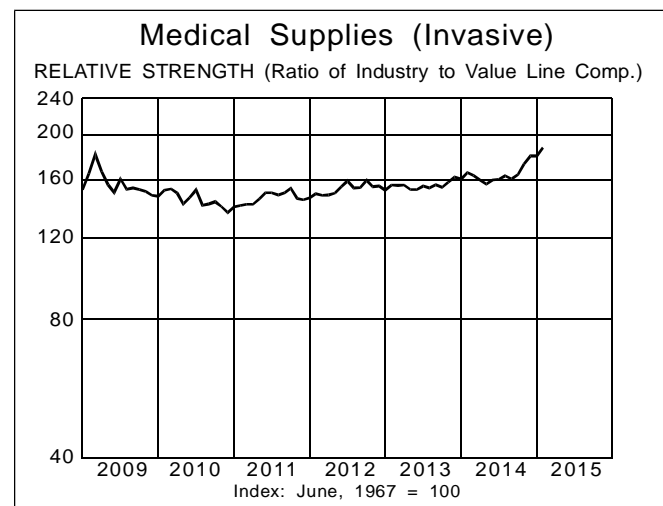
Conclusion

There is a dearth of attractive short-term selections in the Medical Supplies Industry (Invasive). These include *Cyberonics* and *C.R.Bard.* Indeed, these firms are still in somewhat of transition due to healthcare policy changes and diversification attempts.

That said, many of these equities possess above-average capital appreciation potential over the 2018-2020 time frame. We are optimistic that aforementioned growth efforts and a sustainable economic recovery will bear fruit over the longer term.

As always, we advise investors that are considering committing funds in this industry to read the individual reports that follow before making any investment decisions. To do so would give individuals a clearer picture of company specific agendas, including pipeline opportunities and other noteworthy growth catalysts.

Nira Maharaj

Medical Supplies (Invasive)
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100

February 20, 2015   **MEDICAL SUPPLIES (NON-INVASIVE)**   I&E Exhibit No. 1
Schedule 2
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The Medical Supplies (Non-Invasive) Industry has historically offered some of the best risk-adjusted returns in the market. Many companies in the industry have relatively modest capital spending needs relative to their earnings. This abundance of free cash flow has led to exceptionally strong balance sheets for some, generous payout ratios among others, and plenty of cash available for acquisition activity, which is driving consolidation in the industry.

While these factors have often given stocks in this industry an advantage in terms of risk-weighted returns for shareholders, many of the issues on the following pages have gotten ahead of themselves in price. As a result, many otherwise impressive companies are projected to underperform the broader market in both the short and long term.

Untimely Shares

A number of stocks here have low Timeliness ranks, and are thus expected to underperform the market in the year ahead. *CryoLife*, a developer of biomaterials and implantable medical devices that also preserves and distributes human tissues for cardiac and vascular transplant applications, has our Lowest (5) rank for Timeliness. Indeed, the company has struggled to deliver sustained earnings growth in recent years, and the stock price for this small-cap stock has a history of large fluctuations. However, a solid, debt-free balance sheet, as well as growth in some of its high-margin product categories, may attract the attention of long-term investors. Shares of *Cutera*, a maker of laser and other light-based aesthetic systems used for hair and skin treatments, are untimely, as well. The company suffered a large loss in 2014, and is not expected to turn a profit in 2015, either. However, an improving U.S. economy may lead to a rise in demand for discretionary procedures, which could improve Cutera's business fundamentals and lead to profitability in future years.

Industry Consolidation

Some of the largest companies in this industry have been its strongest performers of late, largely due to relatively large acquisitions. For example, *Thermo Fisher Scientific* earns our Highest (1) Timeliness rank. The provider of analytical technologies, specialty diagnostics, and laboratory products and services surpassed our expectations for fourth-quarter performance. Its acquisition of Life Technologies has provided more accretion to companywide sales and earnings than some had anticipated. *McKesson*, meanwhile, has performed strongly in the wake of its acquisition of Celesio, a German generic drug producer with a strong market position in Europe. This addition has been integrated into *McKesson* as its International Pharmaceutical Distribution segment, which contributed over $7 billion in sales in the most recent quarter. The company is experiencing solid organic growth as well, and is set for double-digit earnings growth over the next 3 to 5 years.

Regulatory Changes

The broader healthcare sector is experiencing significant regulatory changes, largely because of the Afford-

able Care Act (ACA). One particularly controversial aspect of the ACA is a 2.3% excise tax imposed on the sales of medical device manufacturers. The effect on most companies in the industry has been relatively minor, as much of the cost has been passed through to consumers. Capital spending, which many believed would be inhibited due to the tax, has held up fairly steadily, as well. Nonetheless, there is significant support in Congress for repealing the medical device tax, and the issue is likely to be included in future political negotiations. Another political factor that will likely affect the sector is the outcome of trade negotiations, such as an accord reached last November between the U.S. and China to reduce tariffs on high-tech products, including medical equipment. The U.S.-China agreement led to a push for a global accord at the World Trade Organization (WTO) meeting in December, but the body failed to reach an agreement due to a dispute between China and South Korea over whether flat panel displays should be included. If such a deal eventually is reached, it would likely give a boost to this industry, as the medical device market becomes increasingly consolidated and globalized.
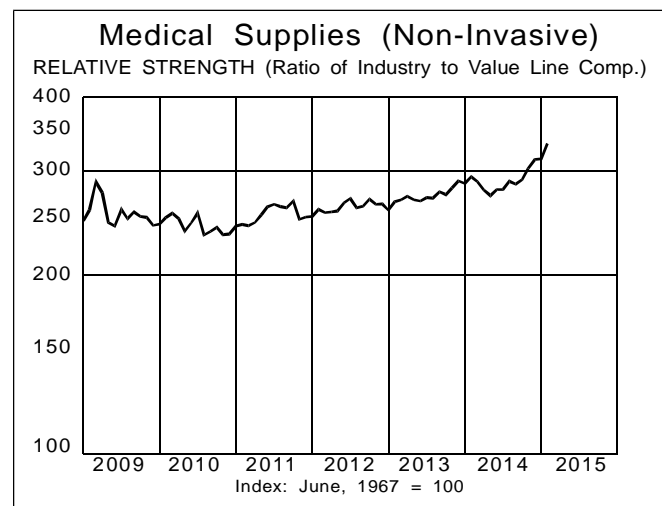
Dividend Payers

While many companies in the industry have prioritized acquisitions or cash-rich balance sheets, some have used their reliable free cash flows to give investors an impressive payout. For example, *Meridian Bioscience*, a maker of diagnostic test kits, has maintained a policy of paying out to shareholders 75% to 85% of its expected annual earnings. The strong payout ratio has led to a dividend yield that is currently more than double the *Value Line* median for that metric. Industry behemoth *Johnson & Johnson*, meanwhile, has maintained a payout ratio of about 46%, and is expected to do so for the next few years, as well. As a result, it also provides shareholders with a significantly above-average payout.

Conclusion

While this sector includes many issues with impressive investment characteristics, high valuations have reduced the appreciation potential of many otherwise attractive stocks.

Adam J. Platt

Medical Supplies (Non-Invasive)
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)
Index: June, 1967 = 100

Members of the Packaging & Container Industry have been busy lately. Stock prices were up earlier this year, as merger activity was off to a strong start in 2015. Two large deals were announced, feeding speculation over additional deals in the near term. More recently, however, a number of companies reported sharp sales declines due to weaker performances abroad and unfavorable currency translations. This cooled off much of the merger-driven enthusiasm. Still, the vast majority of stocks in this group are up considerably in value so far in 2015, with *MeadWestco* leading the way. Meanwhile, *Crown Holdings* completed its previously announced acquisition of *EMPAQUE* from *Heineken N.V.* for $1.2 billion.

Industry Overview And Insights

The Packaging & Container Industry is composed of entities that manufacture and sell metal, plastic, glass, and paper products, and related packaging. These materials are used in various consumer and industrial goods. The sector is significantly impacted by the broader economy, as demand for packaging products generally moves in step with commercial activity. This relatively defensive industry offers, for the most part, below-average dividend yields. However, stock prices here are usually less sensitive to economic downturns than are other equities.

Like other businesses, packaging companies count on innovation for product differentiation and competitive advantage. Consequently, R&D investments are crucial to support continuous replacement of out-of-date technologies. In recent years, the general trends point toward smaller, lighter, and thinner packaging, as companies attempt to satisfy environment-conscious customers while reducing raw material costs. Also, the increased popularity and flexibility of online sales should be a factor in the designing of next-generation packaging.

Not all packages are created equal. In some cases, certain materials are better suited to protect, preserve, and promote a specific family of products. Knowing this, a number of players in this industry concentrated their investments on a particular kind of packaging. For example, *AptarGroup* focuses on dispensing systems; *Owens-Illinois* produces glass containers; and *Packaging Corp.* and *Rock-Tenn* manufacture corrugated packaging and containerboard offerings.

The Rising U.S. Dollar

The relative value of this major currency is on the rise, thanks partly to the strengthening domestic economy and poor business prospects in some international markets. Indeed, lingering economic problems and expansionary monetary policies in Europe and Asia have contributed to weaker currencies there. Notably, the value of the euro and the Japanese yen are down double digits in relation to the American dollar since September 30, 2014.

These translation rates have lowered reported sales for a number of constituents of this highly consolidated industry. The majority of packagers in this section have significant operations abroad. Foreign sales are often converted to U.S. dollars for reporting purposes. For example, AptarGroup and Greif generate 75% and 55% of their revenues overseas, respectively. First-quarter

sales for both companies were below expectations, with unfavorable currency rates doing much of the damage.

The trend is likely to stabilize over time. Nevertheless, year-over-year sales comparisons will certainly be hurt in 2015. Management teams are able to mitigate some of the effects of currency translations on earnings through financial instruments (hedges).

Merger Talk Is At Full Force

There were two large merger proposals lately. At the end of January, *Rock-Tenn Co.* and *MeadWestco Corp.* announced a deal to combine forces and create a corrugated packaging giant valued at $16 billion. The goal is to better position both businesses and achieve $300 million in synergy savings over three years. In addition, both companies reported better-than-expected results for the final quarter of 2014, driving stock prices even higher.
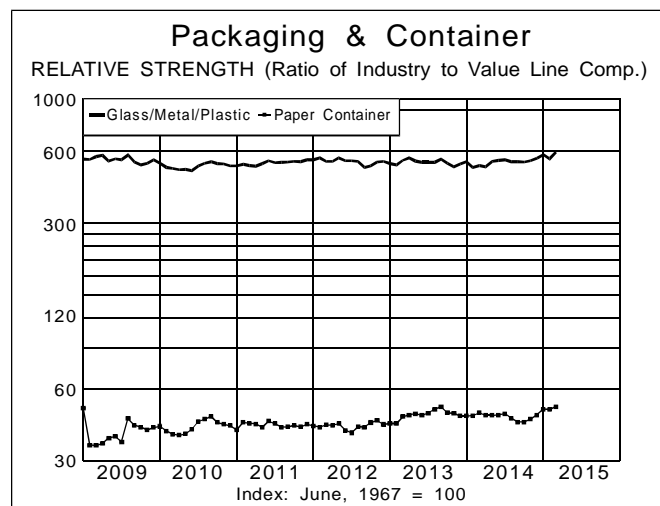
A month later, *Ball Corp.* also made a move. The manufacturer of metal and plastic packaging announced an agreement to buy *Rexam plc*, in a transaction valued at roughly $8.4 billion. *Rexam* is a producer of beverage cans. This purchase should expand *Ball Corp*'s global footprint and complement its product line up nicely. The companies expect to realize $300 million in synergy savings, which should boost overall cash generation. On the down side, sales for *Rexam* were down 3% in 2014. The combined entity had pro forma sales of $15 billion last year.

Both deals are pending customary approvals from shareholders and regulating authorities. For more information, please consult our full-page reports.

Conclusion

Investors are advised to proceed with extra caution here, as the majority of these packaging stocks rose in price during the early months of 2015. However, opportunities for significant returns remain in place. The Packaging & Container Industry resides in the top quintile of our Timeliness spectrum. As usual, short-oriented accounts should take a closer look at timely ranked stocks. More-conservative investors should focus on the Safety ranks and volatility indicators.

Wilkeiy Tan

Packaging & Container
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)
Index: June, 1967 = 100

April 10, 2015   **REAL ESTATE INVESTMENT TRUST**   I&E Exhibit No. 1
Schedule 2
Page 14 of 18   **1513**

The Real Estate Investment Trust (REIT) Industry is ranked (89) for year-ahead price performance. This positions the group in the lower quartile of all industries covered by *The Value Line Investment Survey*. This unfavorable ranking likely reflects a number of key factors. For one, REITs generally do not deliver sizable annual earnings increases, especially when compared to the stocks in other, more vibrant, industries. Too, REIT shares tend to be quite stable in price, reflecting a predictable, but often subdued, business outlook. Notably, REITs are widely held by dedicated investors, not traders looking for large capital gains. Nonetheless, these high-yielding issues do have some specific appeal, especially for income-oriented investors.

REITs are often classified by the various property sectors within which they operate. As the outlook can be variable, it is worth looking at these different REIT categories when evaluating investment alternatives.

Retail REITs Hold Promise

This property sector is amongst the largest, and should perform quite well in the year ahead, thanks to a strong underlying environment. For one, consumer confidence, as tracked by The Conference Board, has gradually edged higher over the past couple of years. As consumers spend more, this should, in turn, boost profits for leading retail tenants, many of which are renovating and expanding locations. This is ultimately a plus for retail landlords.

Value Line covers quite a few retail REITs. For one, *Kimco Realty*, a major owner and operator of neighborhood and community shopping centers, is a name to watch. Given robust demand in its core markets, *Kimco* should be able to lift rental rents on new and renewal leases. Too, while acquisitions have been a part of the game plan, the REIT has been upping its ownership in its existing joint-venture assets. Given that these properties are well known, this strategy represents a low-risk means of expansion. Elsewhere in the retail area, *General Growth Properties*, which emerged from bankruptcy protection in 2010, is still a leading retail REIT. With a better financial footing, *General Growth* has been adding to its portfolio, which is dispersed throughout the United States.

Apartment Sector Still Strong

This property category has done nicely over the past year, or so, as the overall climate has improved. Apartment demand is largely tied to the job market, which continues to recover at a nice pace. Jobs are being created in the government and private sectors, and the headline unemployment rate has dipped to under 6% in recent months. With many people back in the workforce, and landing better paying positions, demand for apartment rentals has firmed up.

It is true that some consumers have been buying single-family homes, in contrast to renting. But supply in this market has not expanded too quickly, as many developers may still feel uneasy about investing in real estate, due to the sharp market drop that ensued a few years ago. Too, securing mortgages has become a lengthy

and challenging process, where it had once been quite easy.

Equity Residential is a large operator in this space. This REIT owns a substantial amount of property concentrated in a few large markets, which provides it with a foothold in the major metropolitan areas on the East and West Coasts. Elsewhere in the apartment sector, *AvalonBay Communities* is a leading real estate operator. It has a high-quality property portfolio and an attractive development pipeline, as well as a substantial land bank, which offers promising potential.
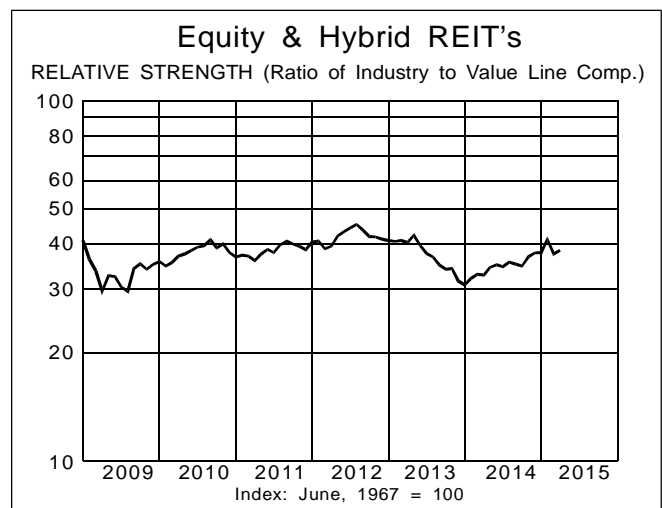
Health Care Sector Also Interesting

Demand for this type of real estate remains quite strong, as the population ages and more people require various kinds of medical and nursing assistance. *Value Line* provides coverage of the largest names in this group. Specifically, *Health Care REIT* is a sizable operator that has been expanding its reach through a series of targeted acquisitions and transactions. It has assets in the United States, Canada, and the United Kingdom. Notably, its U.K. assets are likely quite important, as this market is quite large and holds vast potential. Based on this, the REIT may contemplate investing in neighboring markets on the Continent. The survey also reports on *HCP Inc*, another large REIT in this space. Both of these REITs have solid operating histories and offer investors attractive dividend yields.

Conclusion

REITs provide investors with a steady stream of income, as well as modest capital appreciation potential. Income investors may be interested in those REITs that have a history of delivering solid annual dividend increases.

As always is the case, investors are directed to consult the full-page company report in *Value Line*, before making any specific investment decisions. It is further suggested that investors be aware of the Timeliness ranks assigned to any issues under consideration, as well.

Adam Rosner

Equity & Hybrid REIT's
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)
Index: June, 1967 = 100

Overall, it has been a good three-month stretch for the Retail Building Supply Industry, and it would have been even better were it not for troubles at *Lumber Liquidators*, which was the subject of a damaging news report that accused the flooring company of selling products with high levels of formaldehyde (more below). Consequently, LL stock has plunged recently. However, the rest of the group (save for *Fastenal*) has performed very well, with six of the eight components notching double-digit percentage returns since our last full-page reports went to press in late December. Lower energy prices, employment gains, growth in our nation's gross domestic product, and strength in the home-improvement market have all contributed to the gains. All told, owning one share of each stock under this review would have resulted in a gain of roughly 9%, versus something closer to a 5% advance for the broader market as measured by the S&P 500 Index. Despite all of this, however, the Retail Building Supply Industry's Timeliness rank has slipped a few notches and continues to sit in the middle of the *Value Line* universe.

The Housing Market

While the housing market is not pushing ahead at the breakneck pace it once was, gains in this important sector of the economy have been decent and supportive of the Retail Building Supply Industry. True, the sector has seen some choppiness after recovering steadily for years, but we hardly think its comeback is in jeopardy. Harsh winter weather clearly weighed on housing in the first two months of 2015, with annualized housing starts falling to 897,000 units in February, from 1.08 million in January. The February showing was the lowest building rate in a year.

However, this step back is likely to be short-lived, and a spring rebound is probably in the cards (although gains could be slow and uneven), reflecting the onset of warmer weather, historically low interest rates, and ongoing job creation. Indeed, building permits, a more forward-looking indicator, notched a sequential increase of 3.0% in February.

The Home Depot And *Lowe's*

As usual, we will give special attention to *The Home Depot* and *Lowe's*, the world's leading home-improvement retailers, respectively. This is because these two companies operate throughout North America, offer a vast array of products and services, and focus on the residential section of the market. Consequently, they are bellwethers for the industry.

Both companies turned in impressive performances in the January period, with broad-based strength across geographies and merchandise categories, supported by favorable conditions in the housing and remodeling markets. Large-ticket purchases were also solid, as were online sales and those to professional customers. Comps jumped 7.9% at *The Home Depot*, edging out *Lowe's* 7.3% advance.

The good times should continue for these big-box stores. The housing and remodeling markets, which are

likely to be buoyed by lower energy prices, favorable home affordability levels, and growth in jobs, incomes, and the use of credit, should continue to provide a tailwind from a macroeconomic prospective. On a corporate level, efforts to court professional customers, build stronger online and omnichannel retail presences, and increase customer satisfaction are promising.
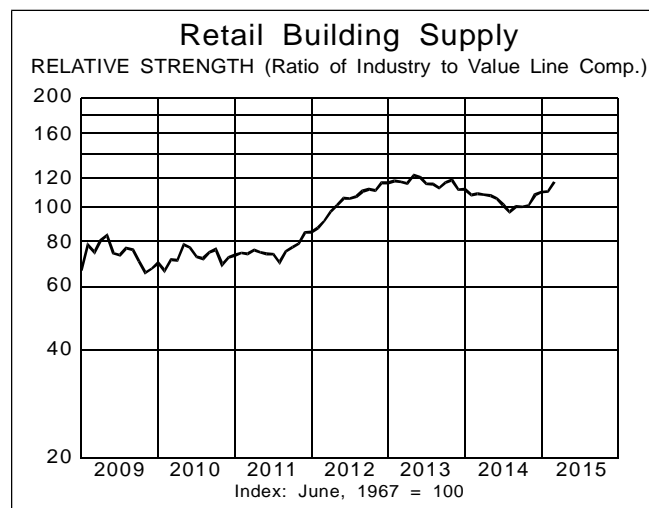
The Niche Retailers

The biggest story has undoubtedly been *Lumber Liquidators.* The stock, a Wall Street darling from mid-2011 to the end of 2013, had been under pressure even before questions surfaced regarding the safety of its products. Management has been adamant that its merchandise is safe and its business practices above board, but its words have not appeared to reassure the majority of investors, sending many for the exits. All told, the stock has been quite volatile lately, a trend that is apt to persist. While it is still too early to gauge the full impact of these allegations, rising legal costs and a tarnished brand will likely be thorns in the company's side for some time.

The rest of the group has done well, although *Fastenal* stock has been a laggard as management has closed some stores and scaled back expansion plans. Exposure to energy-leveraged states may also have spooked investors, given low oil prices. Otherwise, shares of *Sherwin-Williams, Tractor Supply, Watsco,* and *Tile Shop* have all been on nice runs, of late.

Conclusion

While this group has done well lately, our Timeliness Ranking System suggests that near-term performance will likely be more in line with the broader market averages. So, momentum investors will not find an abundance of stocks here to their liking. Indeed, only *Lowe's* stock is ranked favorably for relative price performance in the year ahead. Conservative investors will probably find the most here, as all stocks under this review are ranked Above Average (1 or 2) for Safety, except for *Tile Shop* and *Lumber Liquidators.* Regardless, we urge readers to study our full-page reports carefully before making any investment decisions.

Matthew E. Spencer, CFA

Retail Building Supply
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100

Things could certainly be better in the Retail (Softlines) Industry. While some retailers fared well during the key holiday period, the final stretch of 2014 was not without challenges. Indeed, although the retail space didn't seem to exhibit the level of competitiveness seen in prior years, there was plenty of promotional activity seen across the market.

Retail and economic data, meanwhile, have continued to be a mixed bag, and we imagine this will be the case through the initial months of the new year. With the winter holidays over, Softliners are now shifting their attention to the upcoming spring season and keeping their offerings on trend. Too, many will likely remain focused on growing their businesses, whether via global expansion and/or by building up their online presence. Elsewhere, some retailers have faced pressure from activist investors.

Since we last went to press in October, the group's Timeliness rank has fallen from the middle of the range, which means there are few equities here that are pegged to beat the broader market in the year ahead. But investors with a long-term view have much to choose from, including some stocks that pay dividends.

Retail By The Numbers

No doubt, the macroeconomic situation is far from ideal, as there are both pockets of strength and weakness. Although trends appear to be moving in an overall positive direction, retail data have continued to show unevenness. For instance, U.S. consumer confidence (a key metric that gauges the public's sentiment on the economy and its direction) picked up after a brief retreat. Notably, following a decline in November, the Consumer Confidence Index rebounded in December (the latest reading available at the time of this writing). The improvement, albeit modest, was certainly welcome for retailers. Consumers seemed more upbeat about current business conditions and the job market, but were moderately less optimistic regarding the short-term outlook. Expectations for personal earnings growth also declined. Nonetheless, the overall tone of the data was favorable.

This good news, however, was tempered by a disappointing retail spending report for December. To wit, U.S. retail sales slipped by a worse-than-anticipated 0.9% in the final month of 2014, behind the increase of 0.4% logged in November. Excluding the auto component, core sales fell 1.0% in December, with declines across many categories, including clothing. While this was a letdown, we note that sales for the year were up more than 3%. Still, looking at the big picture, the report was a minus amid strength seen in other parts of the economy. The data are noteworthy as they give clues as to where consumer spending (constitutes more than two-thirds of gross domestic product) is headed.

Teens and Fashion Hits & Misses

It's no secret that many of today's hottest fashion trends are actually set by adolescents and young adults. But as a consumer segment, they are perhaps among the most capricious of shoppers. Indeed, this group often dictates which fashions will take off and which ones won't, and trends can change virtually overnight. That makes it especially imperative for teen apparel retailers to offer a compelling assortment and strong brands. And

although price is not necessarily an obstacle, teens have been balking at high-priced apparel lately, adding to the challenges facing some Softliners. It seems "fast-fashions", or inexpensive mass-produced versions of high-end designerwear, are growing more popular these days, creating headwinds for retailers like *Aeropostale* and *Abercrombie & Fitch*, where merchandise has been largely focused on logo-centric styles.

Expansion Initiatives

For retailers facing a mature market, driving profit growth is surely challenging. To compensate for that, some companies are seeking to expand globally, tapping markets where economies are holding up and their fashions are gaining popularity. Expanding the online channel (or e-commerce) is another opportunity being pursued by many Softliners. With greater access to smartphone technology, e-commerce offers consumers the convenience of shopping without making the trip to the mall. As Internet shopping rises and online competition heats up, those with brick-and-mortar stores are becoming evermore focused on building up their own presence on the Web to gain market share.

Miscellaneous

Although there have been a few takeover deals along the way, the Softlines space typically doesn't draw much leveraged buyout activity, given the volatile nature of the business and unsteady fundamentals. But on a few occasion, activist investors (or private equity firms) have turned up the heat on some companies, urging for improved profitability, better returns, or even a sale of operations. *Express* was recently a takeover target, though the deal fell through as we went to press.

Conclusion

The Retail (Softlines) Industry is a good destination for investors seeking equities with solid 3- to 5-year capital appreciation potential. Many members here also reward shareholders by doling out dividends. And though this crowd isn't top-ranked for Timeliness, there are several picks appropriate for short-term accounts. As always, subscribers should examine each stock report individually prior to making any decisions.

J. Susan Ferrara

Retail (Softlines)
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100
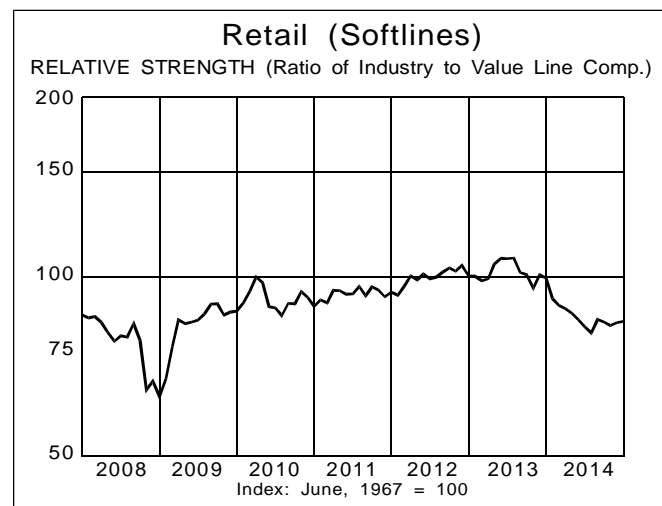
The Retail/Wholesale Food Industry enjoyed solid support from investors in 2014, particularly in the closing months of the year, when most of the stocks we follow in this group outperformed the broader equity markets. Improving economic conditions in the U.S. and limited indications of overheated competitive activity suggest a decent operating environment is in place for these companies, most of which should be able to show profit increases when they tally the results for their 2014 fiscal years.

This week, we welcome two new additions to our coverage of the industry, *Metro, Inc.* and *Sprouts Farmers Market*. The former is one of the leading grocers in Canada, operating more than 600 stores in Quebec and Ontario. *Sprouts*, meanwhile, is focused on the southern United States, where it owns more than 190 stores, which emphasize natural and organic foods. Meanwhile, we will likely be saying good-bye to other members of the group. Supermarket operator *Safeway* is being acquired by privately held AB Acquisition, and that deal will likely wrap up within the next week or two. Too, *The Pantry*, which operates convenience stores in the southeastern United States, reached a deal last month to sell itself to a larger rival, Canada's Couche-Tard.

Wrapping Up 2014

Many of the food retailers and wholesalers we follow have yet to report final sales and earnings for their 2014 fiscal years. In most cases, we expect the results will make for good reading. *Kroger*, the biggest of the traditional supermarket operators, continues to make steady progress. The company has been generating healthy same-store sales and stable margins inside its stores. Too, recent results have even gotten an added boost from the sharp decline in energy prices, which has led to a temporary spike in margins at the fuel centers that it operates at many of its locations. (The convenience store chains have also been benefiting from wider per-gallon profits on their gasoline sales.) Elsewhere in the industry, the performance of *Whole Foods* has been uncharacteristically pedestrian of late, as the natural-foods retailer looks to halt an ongoing deceleration in "comps".

Overall, the industry, though fairly noncyclical, still stands to benefit from stronger economic activity. Notably, the group has a fairly limited geographic footprint. Most of the companies we follow operate primarily in the United States, where the economic indicators paint a much more encouraging picture than is the case elsewhere in the world, especially Europe. Meanwhile, the battle for market share can become quite heated in this relatively mature arena, though competitive activity appears reasonably restrained for now. Inflation seems to have heated up, but companies of late look to have been more inclined to pass along these higher costs, rather than accept narrower margins in order to capture or defend market share.

More Natural

This week marks the debut of *Sprouts Farmers Market* to the *The Value Line Investment Survey*. In the natural-foods space, *Whole Foods* is the dominant player, with 400-plus stores, but *Sprouts* is quickly making a name for itself. The Arizona-based company opened its first market in 2002 and through new store development and two sizable acquisitions has grown into

a 190-store chain. As suggested by its motto, "Healthy Living For Less", *Sprouts* aims to distinguish itself from *Whole Foods'* high-end shopping experience by a more value-oriented approach, particularly in its produce department, which is typically found in the center of its stores.

Aside from its day-one pop (more than doubling the IPO price of $18.00 a share), *SFM* stock has generated only lukewarm support from investors since debuting in 2014. The company has produced strong same-store sales growth and rising earnings, but its share price, even with a late 2014 rally, is still down more than 10% from its day-one close. The aforementioned lackluster operating results at *Whole Foods* has likely been a contributing factor, probably raising concerns about increasing competitive pressures. Notably, larger retailers, including *Kroger* and Wal-Mart, appear intent on expanding their share of the natural foods market.
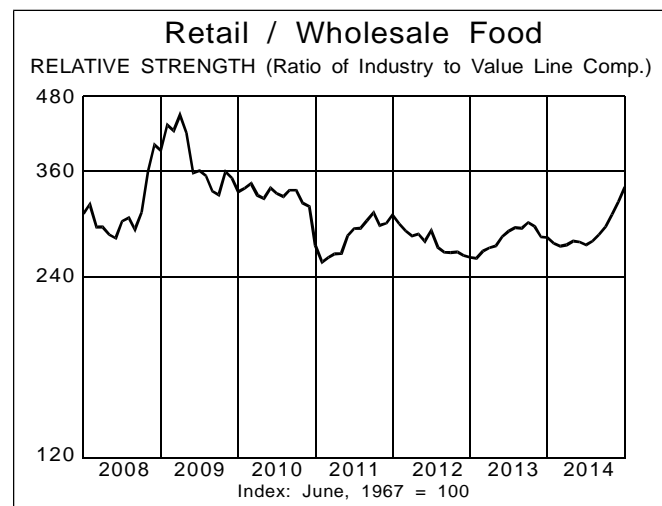
e-Grocery

Food retailing, thus far, has been relatively immune to the impact of e-commerce. Companies, though, can't afford to be too complacent, as two of the biggest names on the Internet, Amazon.com and Google, are among those trying to carve out a niche in this space. The company making the biggest noise in recent months, though, is less familiar to most. Instacart, a grocery delivery service founded two years ago, recently raised $220 million to fund its expansion into more markets. The deal, which included some of Silicon Valley's leading venture capital firms, values the company at about $2 billion. Its business model centers around connecting customers to "personal shoppers" who pick up and deliver groceries from local stores. As such, Instacart appears to be positioning itself as a partner, rather than a competitor, to traditional brick-and-mortar retailers. The company and *Whole Foods*, for instance, are working on plans to offer one-hour delivery of products in 15 markets.

Conclusion

The Retail/Wholesale Food Industry includes a handful of selections pegged to outperform the market in the year. On the whole, the group ranks in the top third of all industries for Timeliness.

Robert M. Greene, CFA

Retail / Wholesale Food
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100

April 10, 2015

THRIFT INDUSTRY

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1501

The Thrift Industry will likely endure another year of thinner margins as a more substantial rate environment, expected to be engineered by the Federal Reserve, is pushed out.

The lack of a sustained rise in bond yields is keeping loan rates under pressure.

Lending trends are improving, but narrowing margins may keep profits flattish into 2016.

A loosely affiliated coalition of regional banks has formed to combat what it sees as an overzealous regulatory environment.

The industry remains poorly ranked for Timeliness.

Economy Not Indicating Major Rate Hikes Ahead

Six years into a business expansion, with a reasonable level of GDP growth and essentially normalized employment levels, and the key benchmark for short-term interest rates remains near zero. That strikes a number of observers as curious at this late date. The last time the unemployment rate was where it is now, around 5.5%, was in the spring of 2008. At that time, the Fed funds rate was 2.0%. Of course, the economy was already in recession at that point. The Federal Reserve would end up reducing its target for short-term interest rates to near zero by the end of 2008, where it has remained ever since.

Given the progress in the economy, there is a case to be made that the fed funds rate should be more like 2.0% than the 0.0%-0.25% in place. The feeling in some corners is that the central bank should get on with its rate-normalization plans, if it is ever going to. But the Fed clearly will not be hurried into action it does not deem fully warranted. Mixed business data of late, weakness overseas, the effect of the strong dollar on U.S. companies, and the lack of inflation are among the factors holding it back. Eventually, the Fed plans to raise rates, but perhaps not until later this year or even 2016. For most thrifts, the sooner the Fed hikes rates the better, since it would mark a step toward improved lending margins.

Bond Market Not Too Fearful Of Rates Rising

Having the Federal Reserve raise interest rates is not the only thing needed to create a better margin environment. In fact, short-term rate hikes by the Fed could broadly lead to higher funds costs. The key dynamic is instead having yields in the bond market, where long-term interest rates are determined, move higher in reaction to, and ahead of, the Fed. That is because bank loans are commonly made on a five- or 10-year basis, tying their rates to longer-term yields in the bond market.

Lately, though, the benchmark 10-year Treasury note has traded under 2.0%, hardly a sign that bond investors are worried that inflation from an overheated economy is hurting their investments. But at least the yield on the 10-year T-note appears to have bottomed out at 1.64% at the end of January. Overall, there are signs that yields are inching higher after a declining notably in 2014. But with domestic interest rates higher than in many large international economies, foreign buyers of U.S. bonds are putting a lid on yields here. That may keep the spread between funding costs and asset yields relatively narrow. However, assuming the economy shifts into a higher gear and the Fed finally boosts rates, there is more promise for margins in 2016 and beyond.

Lending To Main Street America Picking Up

Not being big fee generators for the most part, thrifts rely on loan volume, along with the associated margins, for the bulk of their income. One large lending arena the group is making headway in is the multifamily apartment market. The need for housing is the driving force here although, as with all loans, pricing discipline is necessary with competition rife.

While these lenders might not be financing large corporations, they serve an important niche by backing small to medium-sized businesses. Small businesses account for much of the employment growth in this country. The industry's clientele very much represents Main Street America, with loans on medical office buildings, dry cleaners, auto dealers and a sprinkling of restaurants making up a portion of the list. Overall, profits are being supported by moderate loan growth.

Unfortunately, margin pressure is eroding much of the benefit of balance sheet expansion. Loan-loss provisions have probably declined about as much as they may, too, with credit issues from the last down cycle cleared up and the need to provision for new loans. Thus, for the most part, it is shaping up as another year of flattish earnings for thrifts.

Pushback On Stringent Regulatory Climate

The lending business as a whole has become more burdened by red tape since the last recession–a steep one. Expenses are higher, capital requirements are greater, and mergers have been scrutinized more closely through a new set of regulations. Last month saw a group of midsized banks form the Regional Bank Coalition, aimed at pushing for the removal of the $50 billion-in-assets threshold for enhanced prudential standards. It is not clear if the group will achieve its goal but, if it is attained, *New York Community* would be a major beneficiary. NYCB has been going to great lengths lately to stay under the $50 billion mark.

Conclusion

The Thrift Industry is ranked near the bottom of all industries ranked for Timeliness. There are a few good dividend-yielding stocks here for income-minded investors. But it will probably take a shift in the interest-rate environment for sentiment toward the group to improve and for performance to perk up.

Robert Mitkowski, Jr.

Thrift
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100
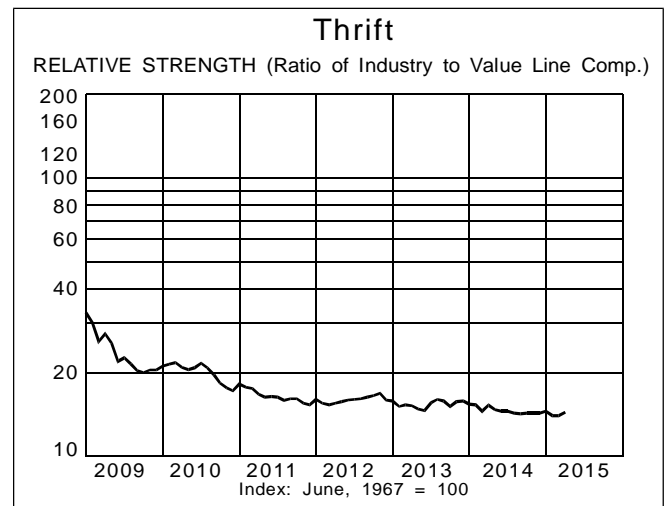
Summary of Cost of Capital

Type of Capital	2013 Ratio	2012 Ratio	2011 Ratio	2010 Ratio	2009 Ratio
American States Water Co					
Long term Debt	39.84%	42.24%	45.44%	44.26%	45.97%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	60.16%	57.76%	54.56%	55.74%	54.03%
	100.00%	100.00%	100.00%	100.00%	100.00%
Aqua America					
Long term Debt	48.90%	52.70%	52.72%	56.61%	55.56%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	51.10%	47.30%	47.28%	43.39%	44.44%
	100.00%	100.00%	100.00%	100.00%	100.00%
California Water Service Group					
Long term Debt	41.58%	47.84%	51.71%	52.39%	47.08%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	58.42%	52.16%	48.29%	47.61%	52.92%
	100.00%	100.00%	100.00%	100.00%	100.00%
Connecticut Water					
Long term Debt	46.86%	48.95%	53.20%	49.49%	50.59%
Preferred Stock	0.21%	0.21%	0.30%	0.34%	0.35%
Common Equity	52.94%	50.84%	46.49%	50.16%	49.06%
	100.00%	100.00%	100.00%	100.00%	100.00%
Middlesex Water					
Long term Debt	40.38%	41.54%	42.29%	43.11%	46.62%
Preferred Stock	0.90%	1.06%	1.07%	1.08%	1.26%
Common Equity	58.72%	57.40%	56.63%	55.81%	52.12%
	100.00%	100.00%	100.00%	100.00%	100.00%
SJW Corp.					
Long term Debt	51.05%	55.00%	56.57%	53.69%	49.41%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	48.95%	45.00%	43.43%	46.31%	50.59%
	100.00%	100.00%	100.00%	100.00%	100.00%
York Water					
Long term Debt	45.06%	45.97%	47.15%	48.26%	45.72%
Preferred Stock	0.00%	0.00%	0.00%	0.00%	0.00%
Common Equity	54.94%	54.03%	52.85%	51.74%	54.28%
	100.00%	100.00%	100.00%	100.00%	100.00%
Long term Debt	44.81%	47.75%	49.87%	49.69%	48.71%
Preferred Stock	0.16%	0.18%	0.20%	0.20%	0.23%
Common Equity	55.03%	52.07%	49.93%	50.11%	51.06%
5 Year Average					
Long term Debt	48.17%				
Preferred Stock	0.19%				
Common Equity	51.64%				

Source: Compustat

Since our October report, the stocks of water utilities have, for the most part, been excellent performers. This is unusual as these equities are known as defensive plays and typically lag in bullish markets.

The industry continues to face the same problems that have existed for years. Chronic underinvestment in the infrastructure of water utilities in the past has resulted in most domestic investor owned and municipal systems being antiquated and in great need of repair.

To bring these water systems up to par, companies are increasing their capital budgets. Since these expenditures can't be financed entirely with internal funds, the difference must be made up by issuing new debt and equity.

Acquisitions of small municipally-owned water districts will most likely continue to be made by the larger companies in the group.

State regulators have generally been fair in dealing with water utilities.

The average dividend yield of the industry has declined from 3% last October, to 2.7%. This has reduced the yield spread between water utilities and the median-dividend paying stock covered by *Value Line* from 100 to 60 basis points. (The average yield has increased from 2.0% to 2.1%, over this period.)

No stock in the industry is ranked to outperform the market in the year ahead. Moreover, the recent strength in the price of most of these stocks has significantly reduced their long-term appeal.

An Excellent Three Months

The stock prices of water utilities have performed extremely well over the past three months. What makes this all the more surprising is that this occurred when the market averages were rising and hitting or coming close to all-time highs. Water utility stocks are mostly defensive in nature and typically lag markets with upward momentum and outperform when stock prices are declining. Most holders of water stocks are conservative in nature. Earnings-per-share growth may be lower than the average company, but profits are very well defined. These stocks are also known for both their high dividend yields and solid dividend growth prospects. Moreover, they are regulated, which while limiting the upside, almost guarantees a decent return on investment.

America's Water Infrastructure Is In Poor Shape

For years, water utilities cut costs by deferring capital improvements on their pipelines and waste water facilities. Consequently, many now have to do extensive construction to modernize and update these assets. Water distribution in the U.S. is very different from the electric utility business, which is owned by about 50 large investor-owned companies. In the water sector, there are more than 50,000 small water authorities, mostly owned and operated by local municipalities. This is clearly an inefficient system. Furthermore, as more cities and towns find themselves facing financial difficulties, they are continuing to postpone upgrading their facilities.

One trend that has been ongoing is that larger, better-capitalized investor-owned water utilities are purchas-

ing these cash-poor undersized water authorities. Since there are a myriad of redundancies in the business, the bigger company can invest the funds needed to upgrade the small acquisitions and generate more profits at the same time. Both *Aqua America* and *American Water Works* have made this a central part of their long-term strategy.

External Financing Will Be Required

Almost no utilities generate a sufficient amount of funds internally to cover the rising capital budgets. Therefore, there should be a fair amount of new debt and equity issued in the years ahead. Since no regulated utility currently has subpar finances, as of now, we don't foresee a major deterioration in the group's balance sheet. However, most will likely be in worse shape by the end of the decade.

Regulation Has Been Fair

Most state commissions realize that huge sums are required to mostly replace aging pipelines networks. Therefore, they have been relatively reasonable when it comes to allowing the companies to increase their customers bills to recoup their investment. This is in stark contrast to the sometimes cantankerous relations that electric utilities have with these authorities. Investors should understand that a harsh regulatory environment is one of the major risks that any kind of utility faces.

Conclusion

As we mentioned earlier, these stocks have been on a remarkable run the past few months. The sharp increases in the price of the equities has removed much of the previous appeal that this group offered. Indeed, almost every water stock seems to be fully valued for both the long and short term. Only one equity does stand out for investors with a long-term horizon, *Aqua America.*

In any case, we caution all subscribers to read the individual page of every water utility to gain a better understanding of the particular risks associated with each stock.

James A. Flood

Water Utility
RELATIVE STRENGTH (Ratio of Industry to Value Line Comp.)

Index: June, 1967 = 100
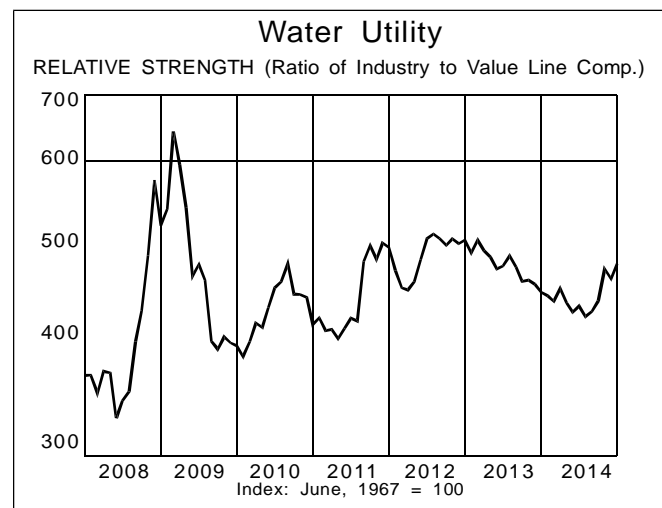
	2013		
	Interest Charges	**Long-term Debt**	**Debt Cost**
American States Water Co	22.685	326.08	6.96%
Aqua America	77.754	1468.58	5.29%
California Water	30.897	426.14	7.25%
Connecticut Water	6.13	175.04	3.50%
Middlesex Water	5.807	129.80	4.47%
SJW Corp	20.827	335.00	6.22%
York Water	5.244	84.89	6.18%
Range:	Low		3.50%
	High		7.25%
	Average		5.70%

Source: Compustat

The New York Times	**Business Day**

Market Place; A Study Shakes Confidence In the Volatile-Stock Theory

By ERIC N. BERG
Published: February 18, 1992

One of the most enduring ideas of modern finance is facing its most serious challenge. Two scholars of finance say they have disproved the theory, common among investors, that stocks more volatile than the market as a whole are the best performers.

Eugene F. Fama and Kenneth R. French, business professors at the University of Chicago, traced the performance of thousands of stocks over 50 years but found no link between relative volatility and long-term returns. The many investors who try to beat the market by buying widely swinging issues are misguided, they say.

The importance of "beta," the investment community's term for a stock's volatility relative to the market, has long been under challenge. But it is still closely watched by analysts, and business students are still taught that they can earn higher returns by buying stocks whose swings are wider than the market's.

"The fact is," Professor Fama said in a recent telephone interview, "beta as the sole variable explaining returns on stocks is dead."

Some still favor relatively volatile stocks, among them William F. Sharpe, a retired Stanford University professor who won the 1990 Nobel Memorial Prize in Economic Science for theories based on beta. "It is a remarkable set of empirical results about what happened in the past," he said of the University of Chicago study. "But I am not willing to make investment decisions based on the theory that there is no relationship between beta, properly measured, and expected returns."

If Professors Fama and French are right, however, the impact could be far reaching. Some highly volatile groups of stocks that have enjoyed wide followings -- airlines, for example -- could lose a portion of their appeal if beta-believing investors side with the professors.

Additionally, many executives of publicly held companies have taken the view that if their own company's stock is more volatile than the market as a whole, any project they invest in -- from a lowly piece of new equipment to a huge joint venture -- must generate an extra high return to compensate investors for swings in the stock's price and earnings. The professors' work could force many companies to rethink the way they approach capital spending, finance scholars say.

Finally, many publicly held utilities have used beta to justify rate requests. They figure the returns that investors demand, given their companies' betas, and develop rate structures that allow them to earn these returns. But recognizing that their low betas tend to argue against large rate increases, a growing number of utilities had already turned to other approaches. More will probably do so if the research of Professors Fama and French gains currency.

And if investors decide to quit following betas, other theories of market behavior are likely to gain influence. "What we are really taking about is opening the floodgates to a whole new generation of research into what truly drives stock prices," said Anthony B. Sanders, an Ohio State University professor of finance who is currently a visiting professor at the University of Chicago. "Once you hammer a model like the old one closed, you generate all sorts of additional academic interest."

Professor Fama has already won worldwide recognition for his efficient-markets theory -- the notion that because investors all have essentially the same information it is impossible to consistently earn returns greater than those justified by the risks.

Professor Sharpe used Professor Fama's theory as an assumption to develop the capital-asset pricing model, which links returns to risk, as measured by beta.

Professor Sharpe says that a diversified portfolio can reduce the risks peculiar to individual companies -- that General Motors stock, for example, will be hurt by a strike. Investors, therefore, earn no rewards for bearing this risk, according to the Sharpe theory.

But investors do earn higher returns for bearing the other type of risk, known as market risk, Professor Sharpe says. This risk, which remains even after an investor diversifies, depends on how much an individual stock is dragged up or down by the market as a whole. Stocks like that of the biotechnology company Genentech, which have betas of more than 1.0, are more volatile than the market, while stocks like that of the power company Consolidated Edison, which have betas of less than 1.0, are calmer than the market.

To calculate market risk, or beta, finance professionals compare changes in the prices of individual stocks with changes in market indicators like the Standard & Poor's 500- stock index. Professor Sharpe and his followers say that in general, the higher a stock's beta, or volatility relative to the market, the greater its long-term returns.

Professors Fama and French disagree. Their paper, just published by the University of Chicago's Center for Research in Security Prices, says that long-term returns depend not on beta, but on company size and price-to-book ratios. Smaller companies, as measured by the market value of their shares, and those with low prices relative to their book values have in fact outperformed the market, they say.

The professors theorize that investors view smaller companies as more vulnerable to economic downturns and therefore demand higher returns. They also say that low price-to-book ratios typically reflect financial problems, another reason for investors to demand higher returns.

Professors Fama and French are by no means the first to fire an intellectual salvo at the capital-asset pricing model. Since Professor Sharpe developed the model in the early 1960's, a broad array of rival theories has emerged to explain stock price movements: the January effect, which says that stocks usually gain at the beginning of the year, to the weekend effect, which says stocks generally perform poorly on Mondays. Most recently, the arbitrage pricing theory says that stocks are driven by powerful economywide forces like unanticipated inflation and spikes in interest rates.

But finance experts say that Professors Fama and French have presented the most conclusive evidence against beta.

"What they have proven fairly rigorously is what other academics have been talking about for some time," said Richard Roll, a finance professor at the University of California at Los Angeles, who with others developed the arbitrage pricing theory.

The Capital Asset Pricing Model: Theory and Evidence

Eugene F. Fama and Kenneth R. French

The capital asset pricing model (CAPM) of William Sharpe (1964) and John Lintner (1965) marks the birth of asset pricing theory (resulting in a Nobel Prize for Sharpe in 1990). Four decades later, the CAPM is still widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios. It is the centerpiece of MBA investment courses. Indeed, it is often the only asset pricing model taught in these courses.[1]

The attraction of the CAPM is that it offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor—poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model. For example, the CAPM says that the risk of a stock should be measured relative to a comprehensive "market portfolio" that in principle can include not just traded financial assets, but also consumer durables, real estate and human capital. Even if we take a narrow view of the model and limit its purview to traded financial assets, is it

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[1] Although every asset pricing model is a capital asset pricing model, the finance profession reserves the acronym CAPM for the specific model of Sharpe (1964), Lintner (1965) and Black (1972) discussed here. Thus, throughout the paper we refer to the Sharpe-Lintner-Black model as the CAPM.

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legitimate to limit further the market portfolio to U.S. common stocks (a typical choice), or should the market be expanded to include bonds, and other financial assets, perhaps around the world? In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid.

We begin by outlining the logic of the CAPM, focusing on its predictions about risk and expected return. We then review the history of empirical work and what it says about shortcomings of the CAPM that pose challenges to be explained by alternative models.

The Logic of the CAPM

The CAPM builds on the model of portfolio choice developed by Harry Markowitz (1959). In Markowitz's model, an investor selects a portfolio at time $t - 1$ that produces a stochastic return at t. The model assumes investors are risk averse and, when choosing among portfolios, they care only about the mean and variance of their one-period investment return. As a result, investors choose "mean-variance-efficient" portfolios, in the sense that the portfolios 1) minimize the variance of portfolio return, given expected return, and 2) maximize expected return, given variance. Thus, the Markowitz approach is often called a "mean-variance model."

The portfolio model provides an algebraic condition on asset weights in mean-variance-efficient portfolios. The CAPM turns this algebraic statement into a testable prediction about the relation between risk and expected return by identifying a portfolio that must be efficient if asset prices are to clear the market of all assets.

Sharpe (1964) and Lintner (1965) add two key assumptions to the Markowitz model to identify a portfolio that must be mean-variance-efficient. The first assumption is *complete agreement*: given market clearing asset prices at $t - 1$, investors agree on the joint distribution of asset returns from $t - 1$ to t. And this distribution is the true one—that is, it is the distribution from which the returns we use to test the model are drawn. The second assumption is that there is *borrowing and lending at a risk-free rate*, which is the same for all investors and does not depend on the amount borrowed or lent.

Figure 1 describes portfolio opportunities and tells the CAPM story. The horizontal axis shows portfolio risk, measured by the standard deviation of portfolio return; the vertical axis shows expected return. The curve *abc*, which is called the minimum variance frontier, traces combinations of expected return and risk for portfolios of risky assets that minimize return variance at different levels of expected return. (These portfolios do not include risk-free borrowing and lending.) The tradeoff between risk and expected return for minimum variance portfolios is apparent. For example, an investor who wants a high expected return, perhaps at point *a*, must accept high volatility. At point *T*, the investor can have an interme-

Figure 1
Investment Opportunities
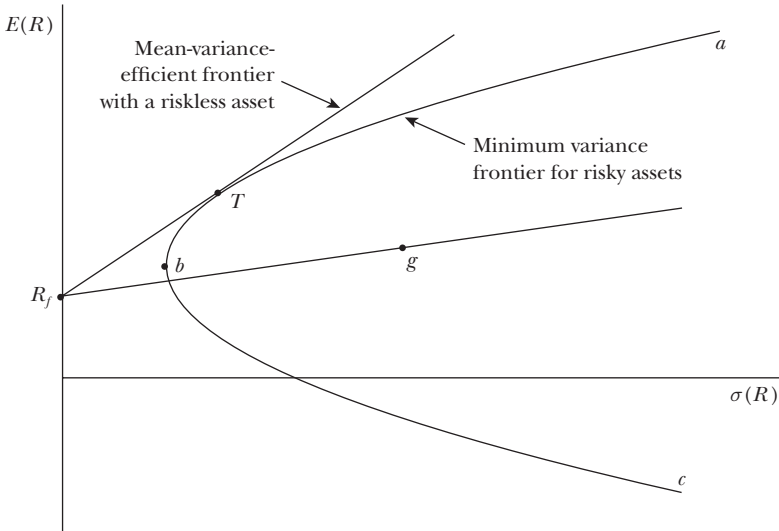
diate expected return with lower volatility. If there is no risk-free borrowing or lending, only portfolios above *b* along *abc* are mean-variance-efficient, since these portfolios also maximize expected return, given their return variances.

Adding risk-free borrowing and lending turns the efficient set into a straight line. Consider a portfolio that invests the proportion *x* of portfolio funds in a risk-free security and $1 - x$ in some portfolio *g*. If all funds are invested in the risk-free security—that is, they are loaned at the risk-free rate of interest—the result is the point R_f in Figure 1, a portfolio with zero variance and a risk-free rate of return. Combinations of risk-free lending and positive investment in *g* plot on the straight line between R_f and *g*. Points to the right of *g* on the line represent borrowing at the risk-free rate, with the proceeds from the borrowing used to increase investment in portfolio *g*. In short, portfolios that combine risk-free lending or borrowing with some risky portfolio *g* plot along a straight line from R_f through *g* in Figure 1.[2]

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[2] Formally, the return, expected return and standard deviation of return on portfolios of the risk-free asset *f* and a risky portfolio *g* vary with *x*, the proportion of portfolio funds invested in *f*, as

$$R_p = xR_f + (1 - x)R_g,$$

$$E(R_p) = xR_f + (1 - x)E(R_g),$$

$$\sigma(R_p) = (1 - x)\sigma(R_g), \ x \leq 1.0,$$

which together imply that the portfolios plot along the line from R_f through *g* in Figure 1.

To obtain the mean-variance-efficient portfolios available with risk-free bor-rowing and lending, one swings a line from R_f in Figure 1 up and to the left as far as possible, to the tangency portfolio T. We can then see that all efficient portfolios are combinations of the risk-free asset (either risk-free borrowing or lending) and a single risky tangency portfolio, T. This key result is Tobin's (1958) "separation theorem."

The punch line of the CAPM is now straightforward. With complete agreement about distributions of returns, all investors see the same opportunity set (Figure 1), and they combine the same risky tangency portfolio T with risk-free lending or borrowing. Since all investors hold the same portfolio T of risky assets, it must be the value-weight market portfolio of risky assets. Specifically, each risky asset's weight in the tangency portfolio, which we now call M (for the "market"), must be the total market value of all outstanding units of the asset divided by the total market value of all risky assets. In addition, the risk-free rate must be set (along with the prices of risky assets) to clear the market for risk-free borrowing and lending.

In short, the CAPM assumptions imply that the market portfolio M must be on the minimum variance frontier if the asset market is to clear. This means that the algebraic relation that holds for any minimum variance portfolio must hold for the market portfolio. Specifically, if there are N risky assets,

(Minimum Variance Condition for M) $E(R_i) = E(R_{ZM})$

$$+ \, [E(R_M) - E(R_{ZM})]\beta_{iM}, \; i = 1, \ldots, N.$$

In this equation, $E(R_i)$ is the expected return on asset i, and β_{iM}, the market beta of asset i, is the covariance of its return with the market return divided by the variance of the market return,

(Market Beta) $\beta_{iM} = \dfrac{\text{cov}(R_i, R_M)}{\sigma^2(R_M)}.$

The first term on the right-hand side of the minimum variance condition, $E(R_{ZM})$, is the expected return on assets that have market betas equal to zero, which means their returns are uncorrelated with the market return. The second term is a risk premium—the market beta of asset i, β_{iM}, times the premium per unit of beta, which is the expected market return, $E(R_M)$, minus $E(R_{ZM})$.

Since the market beta of asset i is also the slope in the regression of its return on the market return, a common (and correct) interpretation of beta is that it measures the sensitivity of the asset's return to variation in the market return. But there is another interpretation of beta more in line with the spirit of the portfolio model that underlies the CAPM. The risk of the market portfolio, as measured by the variance of its return (the denominator of β_{iM}), is a weighted average of the covariance risks of the assets in M (the numerators of β_{iM} for different assets).

Thus, β_{iM} is the covariance risk of asset i in M measured relative to the average covariance risk of assets, which is just the variance of the market return.[3] In economic terms, β_{iM} is proportional to the risk each dollar invested in asset i contributes to the market portfolio.

The last step in the development of the Sharpe-Lintner model is to use the assumption of risk-free borrowing and lending to nail down $E(R_{ZM})$, the expected return on zero-beta assets. A risky asset's return is uncorrelated with the market return—its beta is zero—when the average of the asset's covariances with the returns on other assets just offsets the variance of the asset's return. Such a risky asset is riskless in the market portfolio in the sense that it contributes nothing to the variance of the market return.

When there is risk-free borrowing and lending, the expected return on assets that are uncorrelated with the market return, $E(R_{ZM})$, must equal the risk-free rate, R_f. The relation between expected return and beta then becomes the familiar Sharpe-Lintner CAPM equation,

(Sharpe-Lintner CAPM) $E(R_i) = R_f + [E(R_M) - R_f)]\beta_{iM}, \; i = 1, \ldots, N.$

In words, the expected return on any asset i is the risk-free interest rate, R_f, plus a risk premium, which is the asset's market beta, β_{iM}, times the premium per unit of beta risk, $E(R_M) - R_f$.

Unrestricted risk-free borrowing and lending is an unrealistic assumption. Fischer Black (1972) develops a version of the CAPM without risk-free borrowing or lending. He shows that the CAPM's key result—that the market portfolio is mean-variance-efficient—can be obtained by instead allowing unrestricted short sales of risky assets. In brief, back in Figure 1, if there is no risk-free asset, investors select portfolios from along the mean-variance-efficient frontier from *a* to *b*. Market clearing prices imply that when one weights the efficient portfolios chosen by investors by their (positive) shares of aggregate invested wealth, the resulting portfolio is the market portfolio. The market portfolio is thus a portfolio of the efficient portfolios chosen by investors. With unrestricted short selling of risky assets, portfolios made up of efficient portfolios are themselves efficient. Thus, the market portfolio is efficient, which means that the minimum variance condition for M given above holds, and it is the expected return-risk relation of the Black CAPM.

The relations between expected return and market beta of the Black and Sharpe-Lintner versions of the CAPM differ only in terms of what each says about $E(R_{ZM})$, the expected return on assets uncorrelated with the market. The Black version says only that $E(R_{ZM})$ must be less than the expected market return, so the

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[3] Formally, if x_{iM} is the weight of asset i in the market portfolio, then the variance of the portfolio's return is

$$\sigma^2(R_M) = Cov(R_M, R_M) = Cov\left(\sum_{i=1}^{N} x_{iM}R_i, R_M\right) = \sum_{i=1}^{N} x_{iM}Cov(R_i, R_M).$$

premium for beta is positive. In contrast, in the Sharpe-Lintner version of the model, $E(R_{ZM})$ must be the risk-free interest rate, R_f, and the premium per unit of beta risk is $E(R_M) - R_f$.

The assumption that short selling is unrestricted is as unrealistic as unrestricted risk-free borrowing and lending. If there is no risk-free asset and short sales of risky assets are not allowed, mean-variance investors still choose efficient portfolios—points above *b* on the *abc* curve in Figure 1. But when there is no short selling of risky assets and no risk-free asset, the algebra of portfolio efficiency says that portfolios made up of efficient portfolios are not typically efficient. This means that the market portfolio, which is a portfolio of the efficient portfolios chosen by investors, is not typically efficient. And the CAPM relation between expected return and market beta is lost. This does not rule out predictions about expected return and betas with respect to other efficient portfolios—if theory can specify portfolios that must be efficient if the market is to clear. But so far this has proven impossible.

In short, the familiar CAPM equation relating expected asset returns to their market betas is just an application to the market portfolio of the relation between expected return and portfolio beta that holds in any mean-variance-efficient portfolio. The efficiency of the market portfolio is based on many unrealistic assumptions, including complete agreement and either unrestricted risk-free borrowing and lending or unrestricted short selling of risky assets. But all interesting models involve unrealistic simplifications, which is why they must be tested against data.

Early Empirical Tests

Tests of the CAPM are based on three implications of the relation between expected return and market beta implied by the model. First, expected returns on all assets are linearly related to their betas, and no other variable has marginal explanatory power. Second, the beta premium is positive, meaning that the expected return on the market portfolio exceeds the expected return on assets whose returns are uncorrelated with the market return. Third, in the Sharpe-Lintner version of the model, assets uncorrelated with the market have expected returns equal to the risk-free interest rate, and the beta premium is the expected market return minus the risk-free rate. Most tests of these predictions use either cross-section or time-series regressions. Both approaches date to early tests of the model.

Tests on Risk Premiums

The early cross-section regression tests focus on the Sharpe-Lintner model's predictions about the intercept and slope in the relation between expected return and market beta. The approach is to regress a cross-section of average asset returns on estimates of asset betas. The model predicts that the intercept in these regressions is the risk-free interest rate, R_f, and the coefficient on beta is the expected return on the market in excess of the risk-free rate, $E(R_M) - R_f$.

Two problems in these tests quickly became apparent. First, estimates of beta

for individual assets are imprecise, creating a measurement error problem when they are used to explain average returns. Second, the regression residuals have common sources of variation, such as industry effects in average returns. Positive correlation in the residuals produces downward bias in the usual ordinary least squares estimates of the standard errors of the cross-section regression slopes.

To improve the precision of estimated betas, researchers such as Blume (1970), Friend and Blume (1970) and Black, Jensen and Scholes (1972) work with portfolios, rather than individual securities. Since expected returns and market betas combine in the same way in portfolios, if the CAPM explains security returns it also explains portfolio returns.[4] Estimates of beta for diversified portfolios are more precise than estimates for individual securities. Thus, using portfolios in cross-section regressions of average returns on betas reduces the critical errors in variables problem. Grouping, however, shrinks the range of betas and reduces statistical power. To mitigate this problem, researchers sort securities on beta when forming portfolios; the first portfolio contains securities with the lowest betas, and so on, up to the last portfolio with the highest beta assets. This sorting procedure is now standard in empirical tests.

Fama and MacBeth (1973) propose a method for addressing the inference problem caused by correlation of the residuals in cross-section regressions. Instead of estimating a single cross-section regression of average monthly returns on betas, they estimate month-by-month cross-section regressions of monthly returns on betas. The times-series means of the monthly slopes and intercepts, along with the standard errors of the means, are then used to test whether the average premium for beta is positive and whether the average return on assets uncorrelated with the market is equal to the average risk-free interest rate. In this approach, the standard errors of the average intercept and slope are determined by the month-to-month variation in the regression coefficients, which fully captures the effects of residual correlation on variation in the regression coefficients, but sidesteps the problem of actually estimating the correlations. The residual correlations are, in effect, captured via repeated sampling of the regression coefficients. This approach also becomes standard in the literature.

Jensen (1968) was the first to note that the Sharpe-Lintner version of the

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[4] Formally, if x_{ip}, $i = 1, \ldots, N$, are the weights for assets in some portfolio p, the expected return and market beta for the portfolio are related to the expected returns and betas of assets as

$$E(R_p) = \sum_{i=1}^{N} x_{ip}E(R_i), \text{ and } \beta_{pM} = \sum_{i=1}^{N} x_{ip}\beta_{pM}.$$

Thus, the CAPM relation between expected return and beta,

$$E(R_i) = E(R_f) + [E(R_M) - E(R_f)]\beta_{iM},$$

holds when asset i is a portfolio, as well as when i is an individual security.

relation between expected return and market beta also implies a time-series regression test. The Sharpe-Lintner CAPM says that the expected value of an asset's excess return (the asset's return minus the risk-free interest rate, $R_{it} - R_{ft}$) is completely explained by its expected CAPM risk premium (its beta times the expected value of $R_{Mt} - R_{ft}$). This implies that "Jensen's alpha," the intercept term in the time-series regression,

$$\text{(Time-Series Regression)} \quad R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \varepsilon_{it},$$

is zero for each asset.

The early tests firmly reject the Sharpe-Lintner version of the CAPM. There is a positive relation between beta and average return, but it is too "flat." Recall that, in cross-section regressions, the Sharpe-Lintner model predicts that the intercept is the risk-free rate and the coefficient on beta is the expected market return in excess of the risk-free rate, $E(R_M) - R_f$. The regressions consistently find that the intercept is greater than the average risk-free rate (typically proxied as the return on a one-month Treasury bill), and the coefficient on beta is less than the average excess market return (proxied as the average return on a portfolio of U.S. common stocks minus the Treasury bill rate). This is true in the early tests, such as Douglas (1968), Black, Jensen and Scholes (1972), Miller and Scholes (1972), Blume and Friend (1973) and Fama and MacBeth (1973), as well as in more recent cross-section regression tests, like Fama and French (1992).

The evidence that the relation between beta and average return is too flat is confirmed in time-series tests, such as Friend and Blume (1970), Black, Jensen and Scholes (1972) and Stambaugh (1982). The intercepts in time-series regressions of excess asset returns on the excess market return are positive for assets with low betas and negative for assets with high betas.

Figure 2 provides an updated example of the evidence. In December of each year, we estimate a preranking beta for every NYSE (1928–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stock in the CRSP (Center for Research in Security Prices of the University of Chicago) database, using two to five years (as available) of prior monthly returns.[5] We then form ten value-weight portfolios based on these preranking betas and compute their returns for the next twelve months. We repeat this process for each year from 1928 to 2003. The result is 912 monthly returns on ten beta-sorted portfolios. Figure 2 plots each portfolio's average return against its postranking beta, estimated by regressing its monthly returns for 1928–2003 on the return on the CRSP value-weight portfolio of U.S. common stocks.

The Sharpe-Lintner CAPM predicts that the portfolios plot along a straight

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[5] To be included in the sample for year t, a security must have market equity data (price times shares outstanding) for December of $t - 1$, and CRSP must classify it as ordinary common equity. Thus, we exclude securities such as American Depository Receipts (ADRs) and Real Estate Investment Trusts (REITs).

Figure 2

Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on Prior Beta, 1928–2003
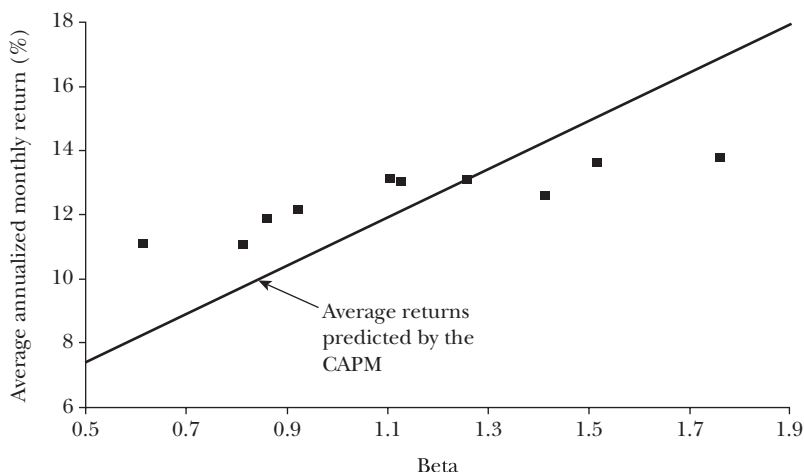
line, with an intercept equal to the risk-free rate, R_f, and a slope equal to the expected excess return on the market, $E(R_M) - R_f$. We use the average one-month Treasury bill rate and the average excess CRSP market return for 1928–2003 to estimate the predicted line in Figure 2. Confirming earlier evidence, the relation between beta and average return for the ten portfolios is much flatter than the Sharpe-Lintner CAPM predicts. The returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low. For example, the predicted return on the portfolio with the lowest beta is 8.3 percent per year; the actual return is 11.1 percent. The predicted return on the portfolio with the highest beta is 16.8 percent per year; the actual is 13.7 percent.

Although the observed premium per unit of beta is lower than the Sharpe-Lintner model predicts, the relation between average return and beta in Figure 2 is roughly linear. This is consistent with the Black version of the CAPM, which predicts only that the beta premium is positive. Even this less restrictive model, however, eventually succumbs to the data.

Testing Whether Market Betas Explain Expected Returns

The Sharpe-Lintner and Black versions of the CAPM share the prediction that the market portfolio is mean-variance-efficient. This implies that differences in expected return across securities and portfolios are entirely explained by differences in market beta; other variables should add nothing to the explanation of expected return. This prediction plays a prominent role in tests of the CAPM. In the early work, the weapon of choice is cross-section regressions.

In the framework of Fama and MacBeth (1973), one simply adds predetermined explanatory variables to the month-by-month cross-section regressions of

returns on beta. If all differences in expected return are explained by beta, the average slopes on the additional variables should not be reliably different from zero. Clearly, the trick in the cross-section regression approach is to choose specific additional variables likely to expose any problems of the CAPM prediction that, because the market portfolio is efficient, market betas suffice to explain expected asset returns.

For example, in Fama and MacBeth (1973) the additional variables are squared market betas (to test the prediction that the relation between expected return and beta is linear) and residual variances from regressions of returns on the market return (to test the prediction that market beta is the only measure of risk needed to explain expected returns). These variables do not add to the explanation of average returns provided by beta. Thus, the results of Fama and MacBeth (1973) are consistent with the hypothesis that their market proxy—an equal-weight portfolio of NYSE stocks—is on the minimum variance frontier.

The hypothesis that market betas completely explain expected returns can also be tested using time-series regressions. In the time-series regression described above (the excess return on asset i regressed on the excess market return), the intercept is the difference between the asset's average excess return and the excess return predicted by the Sharpe-Lintner model, that is, beta times the average excess market return. If the model holds, there is no way to group assets into portfolios whose intercepts are reliably different from zero. For example, the intercepts for a portfolio of stocks with high ratios of earnings to price and a portfolio of stocks with low earning-price ratios should both be zero. Thus, to test the hypothesis that market betas suffice to explain expected returns, one estimates the time-series regression for a set of assets (or portfolios) and then jointly tests the vector of regression intercepts against zero. The trick in this approach is to choose the left-hand-side assets (or portfolios) in a way likely to expose any shortcoming of the CAPM prediction that market betas suffice to explain expected asset returns.

In early applications, researchers use a variety of tests to determine whether the intercepts in a set of time-series regressions are all zero. The tests have the same asymptotic properties, but there is controversy about which has the best small sample properties. Gibbons, Ross and Shanken (1989) settle the debate by providing an F-test on the intercepts that has exact small-sample properties. They also show that the test has a simple economic interpretation. In effect, the test constructs a candidate for the tangency portfolio T in Figure 1 by optimally combining the market proxy and the left-hand-side assets of the time-series regressions. The estimator then tests whether the efficient set provided by the combination of this tangency portfolio and the risk-free asset is reliably superior to the one obtained by combining the risk-free asset with the market proxy alone. In other words, the Gibbons, Ross and Shanken statistic tests whether the market proxy is the tangency portfolio in the set of portfolios that can be constructed by combining the market portfolio with the specific assets used as dependent variables in the time-series regressions.

Enlightened by this insight of Gibbons, Ross and Shanken (1989), one can see

a similar interpretation of the cross-section regression test of whether market betas suffice to explain expected returns. In this case, the test is whether the additional explanatory variables in a cross-section regression identify patterns in the returns on the left-hand-side assets that are not explained by the assets' market betas. This amounts to testing whether the market proxy is on the minimum variance frontier that can be constructed using the market proxy and the left-hand-side assets included in the tests.

An important lesson from this discussion is that time-series and cross-section regressions do not, strictly speaking, test the CAPM. What is literally tested is whether a specific proxy for the market portfolio (typically a portfolio of U.S. common stocks) is efficient in the set of portfolios that can be constructed from it and the left-hand-side assets used in the test. One might conclude from this that the CAPM has never been tested, and prospects for testing it are not good because 1) the set of left-hand-side assets does not include all marketable assets, and 2) data for the true market portfolio of all assets are likely beyond reach (Roll, 1977; more on this later). But this criticism can be leveled at tests of any economic model when the tests are less than exhaustive or when they use proxies for the variables called for by the model.

The bottom line from the early cross-section regression tests of the CAPM, such as Fama and MacBeth (1973), and the early time-series regression tests, like Gibbons (1982) and Stambaugh (1982), is that standard market proxies seem to be on the minimum variance frontier. That is, the central predictions of the Black version of the CAPM, that market betas suffice to explain expected returns and that the risk premium for beta is positive, seem to hold. But the more specific prediction of the Sharpe-Lintner CAPM that the premium per unit of beta is the expected market return minus the risk-free interest rate is consistently rejected.

The success of the Black version of the CAPM in early tests produced a consensus that the model is a good description of expected returns. These early results, coupled with the model's simplicity and intuitive appeal, pushed the CAPM to the forefront of finance.

Recent Tests

Starting in the late 1970s, empirical work appears that challenges even the Black version of the CAPM. Specifically, evidence mounts that much of the variation in expected return is unrelated to market beta.

The first blow is Basu's (1977) evidence that when common stocks are sorted on earnings-price ratios, future returns on high E/P stocks are higher than predicted by the CAPM. Banz (1981) documents a size effect: when stocks are sorted on market capitalization (price times shares outstanding), average returns on small stocks are higher than predicted by the CAPM. Bhandari (1988) finds that high debt-equity ratios (book value of debt over the market value of equity, a measure of leverage) are associated with returns that are too high relative to their market betas.

Finally, Statman (1980) and Rosenberg, Reid and Lanstein (1985) document that stocks with high book-to-market equity ratios (B/M, the ratio of the book value of a common stock to its market value) have high average returns that are not captured by their betas.

There is a theme in the contradictions of the CAPM summarized above. Ratios involving stock prices have information about expected returns missed by market betas. On reflection, this is not surprising. A stock's price depends not only on the expected cash flows it will provide, but also on the expected returns that discount expected cash flows back to the present. Thus, in principle, the cross-section of prices has information about the cross-section of expected returns. (A high expected return implies a high discount rate and a low price.) The cross-section of stock prices is, however, arbitrarily affected by differences in scale (or units). But with a judicious choice of scaling variable X, the ratio X/P can reveal differences in the cross-section of expected stock returns. Such ratios are thus prime candidates to expose shortcomings of asset pricing models—in the case of the CAPM, shortcomings of the prediction that market betas suffice to explain expected returns (Ball, 1978). The contradictions of the CAPM summarized above suggest that earnings-price, debt-equity and book-to-market ratios indeed play this role.

Fama and French (1992) update and synthesize the evidence on the empirical failures of the CAPM. Using the cross-section regression approach, they confirm that size, earnings-price, debt-equity and book-to-market ratios add to the explanation of expected stock returns provided by market beta. Fama and French (1996) reach the same conclusion using the time-series regression approach applied to portfolios of stocks sorted on price ratios. They also find that different price ratios have much the same information about expected returns. This is not surprising given that price is the common driving force in the price ratios, and the numerators are just scaling variables used to extract the information in price about expected returns.

Fama and French (1992) also confirm the evidence (Reinganum, 1981; Stambaugh, 1982; Lakonishok and Shapiro, 1986) that the relation between average return and beta for common stocks is even flatter after the sample periods used in the early empirical work on the CAPM. The estimate of the beta premium is, however, clouded by statistical uncertainty (a large standard error). Kothari, Shanken and Sloan (1995) try to resuscitate the Sharpe-Lintner CAPM by arguing that the weak relation between average return and beta is just a chance result. But the strong evidence that other variables capture variation in expected return missed by beta makes this argument irrelevant. If betas do not suffice to explain expected returns, the market portfolio is not efficient, and the CAPM is dead in its tracks. Evidence on the size of the market premium can neither save the model nor further doom it.

The synthesis of the evidence on the empirical problems of the CAPM provided by Fama and French (1992) serves as a catalyst, marking the point when it is generally acknowledged that the CAPM has potentially fatal problems. Research then turns to explanations.

One possibility is that the CAPM's problems are spurious, the result of data dredging—publication-hungry researchers scouring the data and unearthing contradictions that occur in specific samples as a result of chance. A standard response to this concern is to test for similar findings in other samples. Chan, Hamao and Lakonishok (1991) find a strong relation between book-to-market equity (B/M) and average return for Japanese stocks. Capaul, Rowley and Sharpe (1993) observe a similar B/M effect in four European stock markets and in Japan. Fama and French (1998) find that the price ratios that produce problems for the CAPM in U.S. data show up in the same way in the stock returns of twelve non-U.S. major markets, and they are present in emerging market returns. This evidence suggests that the contradictions of the CAPM associated with price ratios are not sample specific.

Explanations: Irrational Pricing or Risk

Among those who conclude that the empirical failures of the CAPM are fatal, two stories emerge. On one side are the behavioralists. Their view is based on evidence that stocks with high ratios of book value to market price are typically firms that have fallen on bad times, while low B/M is associated with growth firms (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1995). The behavioralists argue that sorting firms on book-to-market ratios exposes investor overreaction to good and bad times. Investors overextrapolate past performance, resulting in stock prices that are too high for growth (low B/M) firms and too low for distressed (high B/M, so-called value) firms. When the overreaction is eventually corrected, the result is high returns for value stocks and low returns for growth stocks. Proponents of this view include DeBondt and Thaler (1987), Lakonishok, Shleifer and Vishny (1994) and Haugen (1995).

The second story for explaining the empirical contradictions of the CAPM is that they point to the need for a more complicated asset pricing model. The CAPM is based on many unrealistic assumptions. For example, the assumption that investors care only about the mean and variance of one-period portfolio returns is extreme. It is reasonable that investors also care about how their portfolio return covaries with labor income and future investment opportunities, so a portfolio's return variance misses important dimensions of risk. If so, market beta is not a complete description of an asset's risk, and we should not be surprised to find that differences in expected return are not completely explained by differences in beta. In this view, the search should turn to asset pricing models that do a better job explaining average returns.

Merton's (1973) intertemporal capital asset pricing model (ICAPM) is a natural extension of the CAPM. The ICAPM begins with a different assumption about investor objectives. In the CAPM, investors care only about the wealth their portfolio produces at the end of the current period. In the ICAPM, investors are concerned not only with their end-of-period payoff, but also with the opportunities

they will have to consume or invest the payoff. Thus, when choosing a portfolio at time $t - 1$, ICAPM investors consider how their wealth at t might vary with future *state variables*, including labor income, the prices of consumption goods and the nature of portfolio opportunities at t, and expectations about the labor income, consumption and investment opportunities to be available after t.

Like CAPM investors, ICAPM investors prefer high expected return and low return variance. But ICAPM investors are also concerned with the covariances of portfolio returns with state variables. As a result, optimal portfolios are "multifactor efficient," which means they have the largest possible expected returns, given their return variances and the covariances of their returns with the relevant state variables.

Fama (1996) shows that the ICAPM generalizes the logic of the CAPM. That is, if there is risk-free borrowing and lending or if short sales of risky assets are allowed, market clearing prices imply that the market portfolio is multifactor efficient. Moreover, multifactor efficiency implies a relation between expected return and beta risks, but it requires additional betas, along with a market beta, to explain expected returns.

An ideal implementation of the ICAPM would specify the state variables that affect expected returns. Fama and French (1993) take a more indirect approach, perhaps more in the spirit of Ross's (1976) arbitrage pricing theory. They argue that though size and book-to-market equity are not themselves state variables, the higher average returns on small stocks and high book-to-market stocks reflect unidentified state variables that produce undiversifiable risks (covariances) in returns that are not captured by the market return and are priced separately from market betas. In support of this claim, they show that the returns on the stocks of small firms covary more with one another than with returns on the stocks of large firms, and returns on high book-to-market (value) stocks covary more with one another than with returns on low book-to-market (growth) stocks. Fama and French (1995) show that there are similar size and book-to-market patterns in the covariation of fundamentals like earnings and sales.

Based on this evidence, Fama and French (1993, 1996) propose a three-factor model for expected returns,

$$(\text{Three-Factor Model}) \quad E(R_{it}) - R_{ft} = \beta_{iM}[E(R_{Mt}) - R_{ft}]$$

$$+ \beta_{is}E(SMB_t) + \beta_{ih}E(HML_t).$$

In this equation, SMB_t (small minus big) is the difference between the returns on diversified portfolios of small and big stocks, HML_t (high minus low) is the difference between the returns on diversified portfolios of high and low B/M stocks, and the betas are slopes in the multiple regression of $R_{it} - R_{ft}$ on $R_{Mt} - R_{ft}$, SMB_t and HML_t.

For perspective, the average value of the market premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, which is 3.5 standard errors from zero. The

average values of SMB_t, and HML_t are 3.6 percent and 5.0 percent per year, and they are 2.1 and 3.1 standard errors from zero. All three premiums are volatile, with annual standard deviations of 21.0 percent ($R_{Mt} - R_{ft}$), 14.6 percent (SMB_t) and 14.2 percent (HML_t) per year. Although the average values of the premiums are large, high volatility implies substantial uncertainty about the true expected premiums.

One implication of the expected return equation of the three-factor model is that the intercept α_i in the time-series regression,

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t + \varepsilon_{it},$$

is zero for all assets i. Using this criterion, Fama and French (1993, 1996) find that the model captures much of the variation in average return for portfolios formed on size, book-to-market equity and other price ratios that cause problems for the CAPM. Fama and French (1998) show that an international version of the model performs better than an international CAPM in describing average returns on portfolios formed on scaled price variables for stocks in 13 major markets.

The three-factor model is now widely used in empirical research that requires a model of expected returns. Estimates of α_i from the time-series regression above are used to calibrate how rapidly stock prices respond to new information (for example, Loughran and Ritter, 1995; Mitchell and Stafford, 2000). They are also used to measure the special information of portfolio managers, for example, in Carhart's (1997) study of mutual fund performance. Among practitioners like Ibbotson Associates, the model is offered as an alternative to the CAPM for estimating the cost of equity capital.

From a theoretical perspective, the main shortcoming of the three-factor model is its empirical motivation. The small-minus-big (SMB) and high-minus-low (HML) explanatory returns are not motivated by predictions about state variables of concern to investors. Instead they are brute force constructs meant to capture the patterns uncovered by previous work on how average stock returns vary with size and the book-to-market equity ratio.

But this concern is not fatal. The ICAPM does not require that the additional portfolios used along with the market portfolio to explain expected returns "mimic" the relevant state variables. In both the ICAPM and the arbitrage pricing theory, it suffices that the additional portfolios are well diversified (in the terminology of Fama, 1996, they are multifactor minimum variance) and that they are sufficiently different from the market portfolio to capture covariation in returns and variation in expected returns missed by the market portfolio. Thus, adding diversified portfolios that capture covariation in returns and variation in average returns left unexplained by the market is in the spirit of both the ICAPM and the Ross's arbitrage pricing theory.

The behavioralists are not impressed by the evidence for a risk-based explanation of the failures of the CAPM. They typically concede that the three-factor model captures covariation in returns missed by the market return and that it picks

up much of the size and value effects in average returns left unexplained by the CAPM. But their view is that the average return premium associated with the model's book-to-market factor—which does the heavy lifting in the improvements to the CAPM—is itself the result of investor overreaction that happens to be correlated across firms in a way that just looks like a risk story. In short, in the behavioral view, the market tries to set CAPM prices, and violations of the CAPM are due to mispricing.

The conflict between the behavioral irrational pricing story and the rational risk story for the empirical failures of the CAPM leaves us at a timeworn impasse. Fama (1970) emphasizes that the hypothesis that prices properly reflect available information must be tested in the context of a model of expected returns, like the CAPM. Intuitively, to test whether prices are rational, one must take a stand on what the market is trying to do in setting prices—that is, what is risk and what is the relation between expected return and risk? When tests reject the CAPM, one cannot say whether the problem is its assumption that prices are rational (the behavioral view) or violations of other assumptions that are also necessary to produce the CAPM (our position).

Fortunately, for some applications, the way one uses the three-factor model does not depend on one's view about whether its average return premiums are the rational result of underlying state variable risks, the result of irrational investor behavior or sample specific results of chance. For example, when measuring the response of stock prices to new information or when evaluating the performance of managed portfolios, one wants to account for known patterns in returns and average returns for the period examined, whatever their source. Similarly, when estimating the cost of equity capital, one might be unconcerned with whether expected return premiums are rational or irrational since they are in either case part of the opportunity cost of equity capital (Stein, 1996). But the cost of capital is forward looking, so if the premiums are sample specific they are irrelevant.

The three-factor model is hardly a panacea. Its most serious problem is the momentum effect of Jegadeesh and Titman (1993). Stocks that do well relative to the market over the last three to twelve months tend to continue to do well for the next few months, and stocks that do poorly continue to do poorly. This momentum effect is distinct from the value effect captured by book-to-market equity and other price ratios. Moreover, the momentum effect is left unexplained by the three-factor model, as well as by the CAPM. Following Carhart (1997), one response is to add a momentum factor (the difference between the returns on diversified portfolios of short-term winners and losers) to the three-factor model. This step is again legitimate in applications where the goal is to abstract from known patterns in average returns to uncover information-specific or manager-specific effects. But since the momentum effect is short-lived, it is largely irrelevant for estimates of the cost of equity capital.

Another strand of research points to problems in both the three-factor model and the CAPM. Frankel and Lee (1998), Dechow, Hutton and Sloan (1999), Piotroski (2000) and others show that in portfolios formed on price ratios like

book-to-market equity, stocks with higher expected cash flows have higher average returns that are not captured by the three-factor model or the CAPM. The authors interpret their results as evidence that stock prices are irrational, in the sense that they do not reflect available information about expected profitability.

In truth, however, one can't tell whether the problem is bad pricing or a bad asset pricing model. A stock's price can always be expressed as the present value of expected future cash flows discounted at the expected return on the stock (Campbell and Shiller, 1989; Vuolteenaho, 2002). It follows that if two stocks have the same price, the one with higher expected cash flows must have a higher expected return. This holds true whether pricing is rational or irrational. Thus, when one observes a positive relation between expected cash flows and expected returns that is left unexplained by the CAPM or the three-factor model, one can't tell whether it is the result of irrational pricing or a misspecified asset pricing model.

The Market Proxy Problem

Roll (1977) argues that the CAPM has never been tested and probably never will be. The problem is that the market portfolio at the heart of the model is theoretically and empirically elusive. It is not theoretically clear which assets (for example, human capital) can legitimately be excluded from the market portfolio, and data availability substantially limits the assets that are included. As a result, tests of the CAPM are forced to use proxies for the market portfolio, in effect testing whether the proxies are on the minimum variance frontier. Roll argues that because the tests use proxies, not the true market portfolio, we learn nothing about the CAPM.

We are more pragmatic. The relation between expected return and market beta of the CAPM is just the minimum variance condition that holds in any efficient portfolio, applied to the market portfolio. Thus, if we can find a market proxy that is on the minimum variance frontier, it can be used to describe differences in expected returns, and we would be happy to use it for this purpose. The strong rejections of the CAPM described above, however, say that researchers have not uncovered a reasonable market proxy that is close to the minimum variance frontier. If researchers are constrained to reasonable proxies, we doubt they ever will.

Our pessimism is fueled by several empirical results. Stambaugh (1982) tests the CAPM using a range of market portfolios that include, in addition to U.S. common stocks, corporate and government bonds, preferred stocks, real estate and other consumer durables. He finds that tests of the CAPM are not sensitive to expanding the market proxy beyond common stocks, basically because the volatility of expanded market returns is dominated by the volatility of stock returns.

One need not be convinced by Stambaugh's (1982) results since his market proxies are limited to U.S. assets. If international capital markets are open and asset prices conform to an international version of the CAPM, the market portfolio

should include international assets. Fama and French (1998) find, however, that betas for a global stock market portfolio cannot explain the high average returns observed around the world on stocks with high book-to-market or high earnings-price ratios.

A major problem for the CAPM is that portfolios formed by sorting stocks on price ratios produce a wide range of average returns, but the average returns are not positively related to market betas (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1996, 1998). The problem is illustrated in Figure 3, which shows average returns and betas (calculated with respect to the CRSP value-weight portfolio of NYSE, AMEX and NASDAQ stocks) for July 1963 to December 2003 for ten portfolios of U.S. stocks formed annually on sorted values of the book-to-market equity ratio (B/M).[6]

Average returns on the B/M portfolios increase almost monotonically, from 10.1 percent per year for the lowest B/M group (portfolio 1) to an impressive 16.7 percent for the highest (portfolio 10). But the positive relation between beta and average return predicted by the CAPM is notably absent. For example, the portfolio with the lowest book-to-market ratio has the highest beta but the lowest average return. The estimated beta for the portfolio with the highest book-to-market ratio and the highest average return is only 0.98. With an average annualized value of the riskfree interest rate, R_f, of 5.8 percent and an average annualized market premium, $R_M - R_f$, of 11.3 percent, the Sharpe-Lintner CAPM predicts an average return of 11.8 percent for the lowest B/M portfolio and 11.2 percent for the highest, far from the observed values, 10.1 and 16.7 percent. For the Sharpe-Lintner model to "work" on these portfolios, their market betas must change dramatically, from 1.09 to 0.78 for the lowest B/M portfolio and from 0.98 to 1.98 for the highest. We judge it unlikely that alternative proxies for the market portfolio will produce betas and a market premium that can explain the average returns on these portfolios.

It is always possible that researchers will redeem the CAPM by finding a reasonable proxy for the market portfolio that is on the minimum variance frontier. We emphasize, however, that this possibility cannot be used to justify the way the CAPM is currently applied. The problem is that applications typically use the same

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[6] Stock return data are from CRSP, and book equity data are from Compustat and the Moody's Industrials, Transportation, Utilities and Financials manuals. Stocks are allocated to ten portfolios at the end of June of each year t (1963 to 2003) using the ratio of book equity for the fiscal year ending in calendar year $t - 1$, divided by market equity at the end of December of $t - 1$. Book equity is the book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Depending on availability, we use the redemption, liquidation or par value (in that order) to estimate the book value of preferred stock. Stockholders' equity is the value reported by Moody's or Compustat, if it is available. If not, we measure stockholders' equity as the book value of common equity plus the par value of preferred stock or the book value of assets minus total liabilities (in that order). The portfolios for year t include NYSE (1963–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stocks with positive book equity in $t - 1$ and market equity (from CRSP) for December of $t - 1$ and June of t. The portfolios exclude securities CRSP does not classify as ordinary common equity. The breakpoints for year t use only securities that are on the NYSE in June of year t.

Figure 3

Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on B/M, 1963–2003
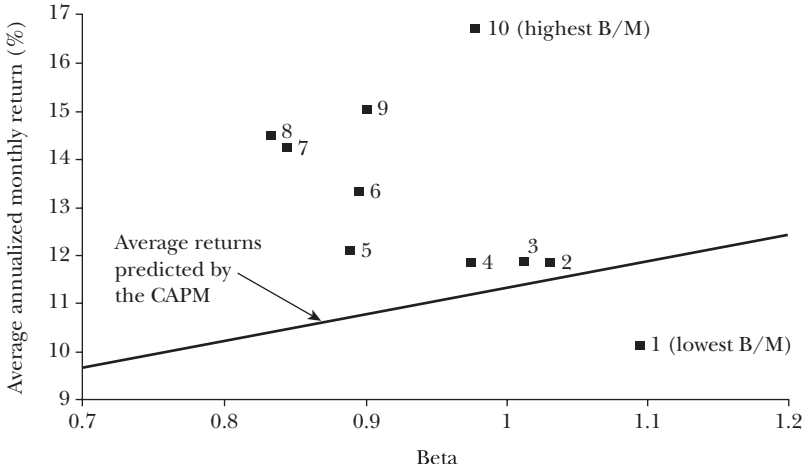
market proxies, like the value-weight portfolio of U.S. stocks, that lead to rejections of the model in empirical tests. The contradictions of the CAPM observed when such proxies are used in tests of the model show up as bad estimates of expected returns in applications; for example, estimates of the cost of equity capital that are too low (relative to historical average returns) for small stocks and for stocks with high book-to-market equity ratios. In short, if a market proxy does not work in tests of the CAPM, it does not work in applications.

Conclusions

The version of the CAPM developed by Sharpe (1964) and Lintner (1965) has never been an empirical success. In the early empirical work, the Black (1972) version of the model, which can accommodate a flatter tradeoff of average return for market beta, has some success. But in the late 1970s, research begins to uncover variables like size, various price ratios and momentum that add to the explanation of average returns provided by beta. The problems are serious enough to invalidate most applications of the CAPM.

For example, finance textbooks often recommend using the Sharpe-Lintner CAPM risk-return relation to estimate the cost of equity capital. The prescription is to estimate a stock's market beta and combine it with the risk-free interest rate and the average market risk premium to produce an estimate of the cost of equity. The typical market portfolio in these exercises includes just U.S. common stocks. But empirical work, old and new, tells us that the relation between beta and average return is flatter than predicted by the Sharpe-Lintner version of the CAPM. As a

result, CAPM estimates of the cost of equity for high beta stocks are too high (relative to historical average returns) and estimates for low beta stocks are too low (Friend and Blume, 1970). Similarly, if the high average returns on value stocks (with high book-to-market ratios) imply high expected returns, CAPM cost of equity estimates for such stocks are too low.[7]

The CAPM is also often used to measure the performance of mutual funds and other managed portfolios. The approach, dating to Jensen (1968), is to estimate the CAPM time-series regression for a portfolio and use the intercept (Jensen's alpha) to measure abnormal performance. The problem is that, because of the empirical failings of the CAPM, even passively managed stock portfolios produce abnormal returns if their investment strategies involve tilts toward CAPM problems (Elton, Gruber, Das and Hlavka, 1993). For example, funds that concentrate on low beta stocks, small stocks or value stocks will tend to produce positive abnormal returns relative to the predictions of the Sharpe-Lintner CAPM, even when the fund managers have no special talent for picking winners.

The CAPM, like Markowitz's (1952, 1959) portfolio model on which it is built, is nevertheless a theoretical tour de force. We continue to teach the CAPM as an introduction to the fundamental concepts of portfolio theory and asset pricing, to be built on by more complicated models like Merton's (1973) ICAPM. But we also warn students that despite its seductive simplicity, the CAPM's empirical problems probably invalidate its use in applications.

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[7] The problems are compounded by the large standard errors of estimates of the market premium and of betas for individual stocks, which probably suffice to make CAPM estimates of the cost of equity rather meaningless, even if the CAPM holds (Fama and French, 1997; Pastor and Stambaugh, 1999). For example, using the U.S. Treasury bill rate as the risk-free interest rate and the CRSP value-weight portfolio of publicly traded U.S. common stocks, the average value of the equity premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, with a standard error of 2.4 percent. The two standard error range thus runs from 3.5 percent to 13.1 percent, which is sufficient to make most projects appear either profitable or unprofitable. This problem is, however, hardly special to the CAPM. For example, expected returns in all versions of Merton's (1973) ICAPM include a market beta and the expected market premium. Also, as noted earlier the expected values of the size and book-to-market premiums in the Fama-French three-factor model are also estimated with substantial error.

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Expected Market Cost Rate of Equity
Using Data for the Barometer Group of Seven Water Companies
5 Year Forecasted Growth Rates

	Time Period	Adjusted Dividend Yield(1) (1)	Growth Rate (2)	Expected Rate of Return (3=1+2)
(1)	52 Week Average Ending: January 28, 2015	2.87%	6.03%	8.90%
(2)	Spot Price Ending: January 28, 2015	2.60%	6.03%	8.63%
(3)	Average:	2.74%	6.03%	8.77%

Sources: Value Line January 16, 2015
Barrons January 28, 2015

Five Year Growth Estimate Forecast for Seven Company Barometer Group

Company	Symbol	Yahoo!	MSN Money	Morning Star	Value Line	Average
				Source		
American States Water Co	AWR	2.00%	2.00%	1.00%	6.50%	2.88%
Aqua America	WTR	4.00%	5.00%	5.80%	8.50%	5.83%
California Water Service Group	CWT	6.00%	6.00%	6.00%	7.50%	6.38%
Connecticut Water	CTWS	5.00%	5.00%	N/A	7.00%	5.67%
Middlesex Water	MSEX	2.70%	N/A	N/A	5.00%	3.85%
SJW Corp.	SJW	14.00%	N/A	14.00%	7.00%	11.67%
York Water	YORW	4.90%	N/A	N/A	7.00%	5.95%
						6.03%

Source:
Internet

January 28, 2015

Dividend Yields of Seven Company Peer Group

	Average	American States Water Co	Aqua America	California Water Service Group	Connecticut Water	Middlesex Water	SJW Corp.	York Water
Symbol		AWR	WTR	CWT	CTWS	MSEX	SJW	YORW
Div		0.90	0.69	0.67	1.05	0.77	0.79	0.60
52 wk high		41.70	28.22	26.37	38.55	23.68	35.67	24.97
52 wk low		27.02	23.12	20.33	31.00	19.06	25.46	18.85
Spot Price		41.25	27.70	25.54	37.26	22.65	35.14	24.31
Spot Div Yield	2.60%	2.18	2.49	2.62	2.82	3.40	2.25	2.47
52 wk Div Yield	2.87%	2.62	2.69	2.87	3.02	3.60	2.58	2.74
Average	2.74%							

Source:	Barrons	January 28, 2015
	Value Line	January 16, 2015

Company	Beta
American States Water Co	0.70
Aqua America	0.70
California Water Service Group	0.70
Connecticut Water	0.65
Middlesex Water	0.70
SJW Corp.	0.85
York Water	0.65
Average beta for CAPM	0.71

Source:
Value Line
                    January 16, 2015

CAPM with historical return

Re		Required return on individual equity security
Rf		Risk-free rate
Rm		Required return on the market as a whole
Be		Beta on individual equity security

Re = Rf+Be(Rm-Rf)

Rf	=	4.4169
Rm	=	11.2511
Be	=	0.7071
Re	=	9.25

Sources: Value Line January 16, 2015
Blue Chip 2/1/2015 & 12/1/2014

Risk Free Rate 10-year Treasury Note	Yield
61 Year Historic Average	5.51%
40 Year Historic Average	6.24%
20 Year Historic Average	4.35%
10 Year Historic Average	3.36%
5 Year Historic Average	2.62%
Average	4.42%

Source:
http://www.federalreserve.gov/releases/h15/data.htm

Required Rate of Return on Market as a Whole Historic

	Expected Market Return
5 yr S&P Composite Index Historical Return	17.94%
10 yr S&P Composite Index Historical Return	7.40%
20 yr S&P Composite Index Historical Return	9.22%
40 yr S&P Composite Index Historical Return	10.97%
61 yr S&P Composite Index Historical Return	10.72%
Average Expected Market Return =	11.25%

CAPM with forecasted return

Re		Required return on individual equity security
Rf		Risk-free rate
Rm		Required return on the market as a whole
Be		Beta on individual equity security

$$Re = Rf + Be(Rm - Rf)$$

Rf	=	2.8100
Rm	=	10.1329
Be	=	0.7071
Re	=	7.99

Sources: Value Line January 16, 2015
Blue Chip 2/1/2015 & 12/1/2014

Risk Free Rate

Treasury note 10-yr Note	Yield
4Q 2014	2.28
1Q 2015	2.10
2Q 2015	2.30
3Q 2015	2.50
4Q 2015	2.70
1Q 2016	3.00
2Q 2016	3.20
2016-2020	4.40
Average	2.81

Source:
Blue Chip
2/1/2015 & 12/1/2014

Required Rate of Return on Market as a Whole Forecasted

	Dividend Yield	+	Growth Rate	=	Expected Market Return
Value Line Estimate	2.00%		7.79%	(a)	9.79%
S&P 500	2.10%	(b)	8.37%		10.47%
Average Expected Market Return				=	10.13%

(a) ((1+35%)^.25) -1) Value Line forecast for the 3 to 5 year index appreciation is 35%
(b) S&P 500 Dividend Yield of 2.02% multiplied by half the growth rate

Company's Claim

Type of Capital	Ratio	Cost Rate	Weighted Cost	
Long term Debt	44.91%	5.28%	2.37%	
Common Equity	55.09%	10.55%	5.81%	
Total	100.00%		8.18%	
		Rate Base	$ 177,029,658.00	
		ROR Dollars		$ 14,481,026

Without 40 Basis Point Equity Adjustment

Type of Capital	Ratio	Cost Rate	Weighted Cost	
Long term Debt	44.91%	5.28%	2.37%	
Common Equity	55.09%	10.15%	5.59%	
Total	100.00%		7.96%	
		Rate Base	$ 177,029,658.00	
		ROR Dollars		$ 14,091,561
		Value of 40 Basis Point Risk Adjustment		$ 389,465

UTILITY STOCKS AND THE SIZE EFFECT: AN EMPIRICAL ANALYSIS

Annie Wong*

I. Introduction

The objective of this study is to examine whether the firm size effect exists in the public utility industry. Public utilities are regulated by federal, municipal, and state authorities. Every state has a public service commission with board and varying powers. Often their task is to estimate a fair rate of return to a utility's stockholders in order to determine the rates charged by the utility. The legal principles underlying rate regulation are that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks," and that the return to a utility should be sufficient to "attract capital and maintain credit worthiness." However, difficulties arise from the ambiguous interpretation of the legal definition of *fair and reasonable rate of return* to an equity owner.

Some finance researchers have suggested that the Capital Asset Pricing Model (CAPM) should be used in rate regulation because the CAPM beta can serve as a risk measure, thus making risk comparisons possible. This approach is consistent with the spirit of a Supreme Court ruling that equity owners sharing similar level of risk should be compensated by similar rate of return.

The empirical studies of Banz (1981) and Reinganum (1981) showed that small firms tend to earn higher returns than large firms after adjusting for beta. This phenomenon leads to the proposition that firm size is a proxy for omitted risk factors in determining stock returns. Barry and Brown (1984) and Brauer (1986) suggested that the omitted risk factor could be the differential information environment between small and large firms. Their argument is based on the fact that investors often have less publicly available information to assess the future cash flows of small firms than that of large firms. Therefore, an additional risk premium should be included to determine the appropriate rate of return to shareholders of small firms.

The samples used in prior studies are dominated by industrial firms, no one has examined the size effect in public utilities. The objective of this study is to extend the empirical findings of the existing studies by investigating whether the size effect is also present in the utility industry. The findings of this study have important implications for investors, public utility firms, and state regulatory agencies. If the size effect does exist in the utility industry, this would suggest that the size factor should be considered when the CAPM is being used to determine the fair rate of return for public utilities in regulatory proceedings.

II. Information Environment of Public Utilities

In general, utilities differ from industriales in that utilities are heavily regulated and they follow similar accounting procedures. A public utility's financial reporting is mainly regulated by the Securities and Exchange Commission (SEC) and the Federal Energy Regulatory Commission (FERC). Under the Public Utility Holding Company Act of 1935, the SEC is empowered to regulate the holding company systems of electric and gas utilities. The Act requires registration of public utility holding companies with the SEC. Only under strict conditions would the purchase, sale or issuance of securities by these holding companies be permitted. The purpose of the Act is to keep the SEC and investors informed of the financial conditions of these firms. Moreover, the FERC is in charge of the interstate operations of electric and gas companies. It requires utilities to follow the accounting procedures set forth in its Uniform Systems of Accounts. In particular, electric and gas utilities must request their Certified Public Accountants to certify that certain schedules in the financial reports are in conformity with the Commission's accounting requirements. These detailed reports are submitted annually and are open to the public.

The FERC requires public utilities to keep accurate records of revenues, operating costs, depreciation expenses, and investment in plant and equipment. Specific financial accounting standards for these purposes are also issued by the Financial Accounting Standards Board (FASB). Uniformity is required so that utilities are not subject to different accounting regulations in each of the states in which they operate. The ultimate objective is to achieve comparability in financial reporting so that factual matters are not hidden from the public view by accounting flexibility.

Other regulatory reports tend to provide additional financial information about utilities. For example, utilities are required to file the FERC Form No. 1 with the state commission. This form is designed for state commissions to collect financial and operational information about utilities, and serves as a source for statistical reports published by state commissions.

Unlike industriales, a utility's earnings are predetermined to a certain extent. Before allowed earnings requests are approved, a utility's performance is analyzed in depth by the state commission, interest groups, and other witnesses. This process leads to the disclosure of substantial amount of information.

III. Hypothesis and Objective

Due to the Act of 1935, the Uniform Systems of Accounts, the uniform disclosure requirements, and the predetermined earnings, all utilities are reasonably homogeneous with respect to the information available to the public. Barry and Brown (1984) and Brauer (1986) suggested that the difference of risk-adjusted returns between small and large firms is due to their differential information environment. Assuming that the differential information hypothesis is true, then uniformity of information availability among utility firms would suggest that the size effect should not be observed in the public utility industry. The objective of this paper is to provide a test of the size effect in public utilities.

IV. Methodology

1. Sample and Data

To test for the size effect, a sample of public utilities and a sample of industriales matched by equity value are formed so that their results can be compared. Companies in both samples are listed on the Center for Research in Security Prices (CRSP)

Daily and Monthly Returns files. The utility sample includes 152 electric and gas companies. For each utility in the sample, two industrial firms with similar firm size (one is slightly larger and the other is slightly smaller than the utility) are selected. Thus, the industrial sample includes 304 non-regulated firms.

The size variable is defined as the natural logarithm of market value of equity at the beginning of each year. Both the equally-weighted and value-weighted CRSP indices are employed as proxies for the market returns. Daily, weekly and monthly returns are used. The Fama-MacBeth (1973) procedure is utilized to examine the relation between risk-adjusted returns and firm size.

2. Research Design

All utilities in the sample are ranked according to the equity size at the beginning of the year, and the distribution is broken down into deciles. Decile one contains the stocks with the lowest market values while decile ten contains those with the highest market values. These portfolios are denoted by MV_1, MV_2, ..., and MV_{10}, respectively.

The combinations of the ten portfolios are updated annually. In the year after a portfolio is formed, equally-weighted portfolio returns are computed by combining the returns of the component stocks within the portfolio. The betas for each portfolio at year t, $\hat{\beta}_{pt}$'s, are estimated by regressing the previous five years of portfolio returns on market returns:

$$\tilde{R}_{pt} = \alpha_p + \hat{\beta}_{pt}\tilde{R}_{mt} + \tilde{U}_{pt} \qquad (1)$$

where

R_{pt} = periodic return in year t on portfolio p

R_{mt} = periodic market return in year t

U_{pt} = disturbance term.

Banz (1981) applied both the ordinary and generalized least squares regressions to estimate β; and concluded that the results are essentially identical (p.8). Since adjusting for heteroscedasticity does not necessarily lead to more efficient estimators, the ordinary least squares procedures are used in this study to estimate β in equation (1).

The following cross-sectional regression is then run for the portfolios to estimate γ_{it}, i = 0, 1, and 2:

$$R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{pt} + \gamma_{2t}\hat{S}_{pt} + U_{pt} \qquad (2)$$

where

$\hat{\beta}_{pt} =$ estimated beta for portfolio p at year t, t=1968, ..., 1987

$\hat{S}_{pt} =$ mean of the logarithm of firm size in portfolio p at the beginning of year t

$U_{pt} =$ disturbance term.

Depending on whether daily, weekly or monthly returns are used, a portfolio's average return changes periodically while its beta and size only change once a year. The γ_1 and γ_2 coefficients are estimated over the following four subperiods: 1968-72, 1973-77, 1978-82 and 1983-1987. If portfolio betas can fully account for the differences in returns, one would expect the average coefficient for the beta variable to be positive and for the size variable to be zero. A t-statistic will be used to test the hypothesis. The coefficients of a matched sample are also examined so that the results between industrial and utility firms can be compared.

V. Analysis of Results

1. Equity Value of the Utility Portfolios

The mean equity values of the ten size-based utility portfolios are reported in Table 1. Panels A and B present the average firm size of these portfolios at the beginning and end of the test period, 1968-1987. The first interesting observation from Table 1 is that the difference in magnitude between the smallest and the largest market value utility portfolios is tremendous. In Panel A, the average size of MV_1 is about $31 million while that of MV_{10} is over $1.4 billion. In Panel B, that is twenty years later, they are $62 million and $5.2 billion, respectively. Another interesting finding is that there is a substantial increase in average firm size from MV_9 to MV_{10}. Since these two findings are consistent over the entire test period, the average portfolio market values for interim years are not reported. These results are similar to the empirical evidence provided by Reinganum (1981).

The utility sample in this study contains 152 firms whereas Reinganum's sample contains 535 firms that are mainly industrial companies. Two conclusions may be drawn from the results of the Reinganum study and this one. First, utilities and industriales are similar in the sense that their market

values vary over a wide spectrum. Second, the fact that there is a huge jump in firm size from MV_9 to MV_{10} indicates that the distribution of firm size is positively skewed. To correct for the skewness problem, the natural logarithm of the mean equity value of each portfolio is calculated. This variable is then used in later regressions instead of the actual mean equity value.

2. Betas of the Utility and Industrial Samples

The betas based on monthly, weekly and daily returns are reported for the utility and industrial samples. For simplicity, they will be referred to as monthly, weekly, and daily betas. In all cases, five years of returns are used to estimate the systematic risk. The betas estimated over the 1963-67 time period are used to proxy for the betas in 1968, which is the beginning of the test period. By the same token, the betas obtained from the time period 1982-86 are used as proxies for the betas in 1987, which is the end of the test period.

The betas from using the equally-weighted and value-weighted indices are calculated in order to check whether the results are affected by the choice of market index. Since the results are similar, only those obtained from the equally-weighted index are reported and analyzed.

Table 2 reports the monthly, weekly and daily betas of the two samples at the beginning and end of the test period. Panel A shows the various betas of the industrial portfolios. Two conclusions may be drawn. First, in the 1960's, smaller market value portfolios tend to have relatively larger betas. This is consistent with the empirical findings by Banz (1981) and Reinganum (1981). Second, this trend seems to vanish in the 1980's, especially when weekly and daily returns are used.

The betas of the utility portfolios are presented in Panel B. The table shows that none of the utility betas are greater than 0.71. A comparison between Panels A and B reveals that utility portfolios are relatively less risky than industrial portfolios after controlling for firm size. The comparison also reveals that, unlike industrial stocks, betas of the utility portfolios are not related to the market values of equity.

The negative correlation between firm size and beta in the industrial sample may introduce a multicolinearity problem in estimating equation (2). Banz (p.11) had addressed this issue and concluded that the test results are not sensitive to the

multicolinearity problem. For the utility sample, this problem does not exist.

3. Tests on the Coefficients of Beta and Size

The beta and firm size are used to estimate γ_1 and γ_2 in equation (2). A t-statistic is used to test if the mean values of the gammas are significantly different from zero. The tests were performed for four 5-year periods which are reported in Table 3. The mean of the gammas and their t-statistic are presented in Panel A for the utilities and in Panel B for the industrial firms.

The empirical results for the utility sample are reported in Panel A of Table 3. When monthly returns are used, 60 regressions were run to obtain 60 pairs of gammas for each of the 5-year periods. When daily returns are used, over 1200 regressions were run for each period to obtain the gammas. The results are similar: in all of the time periods tested, none of the average coefficients for beta and size are significantly different from zero. When weekly returns are used, 260 pairs of gammas were obtained. The average coefficients for beta are not significant in any test period, and the average coefficients for size are not significant in three of the test periods. For the test period of 1978-82, the average coefficient for size is significantly negative at a 5% level.

The test results for the industrial sample are reported in Panel B of Table 3. When monthly returns are used, the average coefficient estimates for size and beta are significant and have the expected sign only in the 1983-87 test period. When weekly returns are used, only the size variable is significantly negative in the 1978-82 period. When daily returns are used, the coefficient estimates for betas and size are not significant at any conventional level.

According to the CAPM, beta is the sole determinant of stock returns. It is expected that the coefficient for beta is significantly positive. However, the empirical findings reported in this study and in Fama and French (1992) only provide weak support for beta in explaining stock returns. The empirical findings in this study also suggest that the size effect varies over time. It is not unusual to document the firm size effect at certain time periods but not at others. Banz (1981) found that the size effect is not stable over time with substantial differences in the magnitude of the coefficient of the size factor (p.9, Table 1). Brown, Kleidon and Marsh (1983) not only have shown that size effect is not constant over time but also have reported a reversal of the size anomaly for certain years.

The research design of this study allows us to keep the sample, test period, and methodology the same with the holding-period being the only variable. The size effect is documented for the industrial sample in one of the four test periods when monthly returns are used and in another when weekly returns are used. When daily returns are used, no size effect is observed. For the utility sample, the size effect is significant in only one test period when weekly returns are used. When monthly and daily returns are used, no size effect is found. Therefore, this study concludes that the size effect is not only time-period specific but also holding-period specific.

VI. Concluding Remarks

The fact that the two samples show different, though weak, results indicates that utility and industrial stocks do not share the same characteristics. First, given firm size, utility stocks are consistently less risky than industrial stocks. Second, industrial betas tend to decrease with firm size but utility betas do not. These findings may be attributed to the fact that all public utilities operate in an environment with regional monopolistic power and regulated financial structure. As a result, the business and financial risks are very similar among the utilities regardless of their sizes. Therefore, utility betas would not necessarily be expected to be related to firm size.

The objective of this study is to examine if the size effect exists in the utility industry. After controlling for equity values, there is some weak evidence that firm size is a missing factor from the CAPM for the industrial but not for the utility stocks. This implies that although the size phenomenon has been strongly documented for the industriales, the findings suggest that there is no need to adjust for the firm size in utility rate regulations.

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Table 1

Average Equity Size of the Utility Portfolios at the
Beginning and End of the Test Period
(Dollar figures in millions)

	A: Beginning (1968)	B: End (1987)
MV_1	$31	$62
MV_2	$77	$177
MV_3	$113	$334
MV_4	$161	$475
MV_5	$220	$715
MV_6	$334	$957
MV_7	$437	$1,279
MV_8	$505	$1,805
MV_9	$791	$2,665
MV_{10}	$1,447	$5,399

Table 2

Betas of the Two Samples at the Beginning and End of the Test Period

	Monthly Betas		Weekly Betas		Daily Betas	
	1963-67	1982-86	1963-67	1982-86	1963-67	1982-86
Panel A: Industrial Firms						
MV_1	0.89	1.00	1.15	0.95	1.11	0.92
MV_2	0.94	0.87	1.07	1.01	1.14	1.01
MV_3	0.88	0.82	1.12	0.86	1.14	1.04
MV_4	0.69	0.74	1.00	0.83	1.03	0.86
MV_5	0.73	0.80	1.05	0.96	1.13	1.01
MV_6	0.66	0.82	1.03	1.01	1.05	1.04
MV_7	0.64	0.81	0.97	1.04	0.98	1.09
MV_8	0.62	0.75	0.97	1.11	1.00	1.20
MV_9	0.52	0.78	0.84	1.06	0.94	1.16
MV_{10}	0.43	0.65	0.78	1.01	0.86	1.22
Panel B: Public Utilities						
MV_1	0.30	0.37	0.31	0.43	0.30	0.40
MV_2	0.28	0.38	0.37	0.47	0.36	0.44
MV_3	0.22	0.42	0.33	0.42	0.31	0.49
MV_4	0.27	0.35	0.36	0.52	0.34	0.54
MV_5	0.25	0.45	0.37	0.61	0.35	0.62
MV_6	0.25	0.41	0.39	0.54	0.40	0.65
MV_7	0.20	0.35	0.34	0.54	0.37	0.63
MV_8	0.17	0.38	0.34	0.65	0.33	0.68
MV_9	0.19	0.34	0.35	0.60	0.34	0.71
MV_{10}	0.18	0.29	0.38	0.59	0.39	0.71

Table 3

Tests on the Mean Coefficients of Beta (γ_1) and Size (γ_2)

$$R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{pt} + \gamma_{2t}\hat{S}_{pt} + U_{pt}$$

Returns Used:		Monthly (t-value)	Weekly (t-value)	Daily (t-value)
Panel A: Utility Sample				
1968-72	γ_1	-0.46% (-0.26)	-0.32% (-0.42)	-0.02% (-0.18)
	γ_2	-0.07% (-0.78)	-0.01% (-0.51)	-0.00% (-0.46)
1973-77	γ_1	-0.28% (-0.13)	0.14% (0.14)	-0.03% (-0.21)
	γ_2	-0.11% (-0.70)	-0.03% (-0.67)	-0.00% (-0.53)
1978-82	γ_1	0.55% (0.36)	0.54% (1.00)	0.05% (0.43)
	γ_2	-0.10% (-0.75)	-0.05% (-1.71)*	-0.01% (-1.60)
1983-87	γ_1	1.74% (1.28)	-0.24% (-0.51)	-0.02% (-0.18)
	γ_2	-0.16% (-1.54)	-0.03% (-0.86)	-0.01% (-0.63)
Panel B: Industrial Sample				
1968-72	γ_1	-0.36% (-0.27)	-0.28% (-0.55)	-0.02% (-0.32)
	γ_2	0.07% (0.43)	-0.01% (-0.19)	0.00% (0.51)
1973-77	γ_1	1.34% (0.64)	-0.23% (-0.31)	0.14% (1.45)
	γ_2	-0.01% (-0.06)	-0.04% (-0.85)	-0.00% (-0.64)
1978-82	γ_1	-0.84% (-0.28)	-0.56% (-0.91)	-0.09% (-0.81)
	γ_2	-0.29% (-0.75)	-0.01% (-1.72)*	-0.00% (-1.33)
1983-87	γ_1	2.51% (1.83)*	0.34% (0.64)	0.11% (1.40)
	γ_2	-0.25% (-1.90)*	-0.01% (-0.43)	0.00% (0.14)

* Significant at the 5% level based on a one-tailed test.

DOCKET# R-2015-2462723
UNITED WATER PENNSYLVANIA, INC.
OFFICE OF CONSUMER ADVOCATE
INTERROGATORIES SET VI

I&E Exhibit No. 1
Schedule 16

Witness: Pauline M. Ahern

OCA-VI-14:

With regard to UWPA Exhibit No. PMA-1, Schedule 6, please provide all data, source documents, and workpapers showing all computations required to develop:

       (a) GARCH coefficient;
       (b) Average Predicted Variance; and,
       (c) PPRM Derived Average Risk Premium.

In this response, provide in sufficient detail to enable the replication of each amount. Please provide in hardcopy as well as in executable electronic format.

Response:

The source documents and workpapers are contained in the responses to OCA-VI-12 and OCA-VI-13. However, in order to replicate the PRPM analysis, one must apply the GARCH model to the source data provided. There is not an Excel function that will perform a GARCH calculation, so one must purchase a statistical package such as EViews or SAS to execute the model. If OCA does not have a statistical package available to them, Ms. Ahern can make herself and the software available so that OCA can verify the results.