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BALTIMORE BUSINESS REVIEW

A MARYLAND JOURNAL

CFA Society Baltimore

150 years TOWSON UNIVERSITY

Baltimore Business Review
A Maryland Journal — 2016

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Message from the Dean

Towson University, College of Business and Economics

Dear Colleagues and Friends,

It's that time of the year to share with you the delightful outcome from the ongoing collaboration between the College of Business and Economics at Towson University (CBE) and the Baltimore CFA Society—the seventh issue of the *Baltimore Business Review: A Maryland Journal*. Since its inception in 2010, the *Baltimore Business Review* has garnered attention from both the academic and professional worlds, and we have increasingly received comments and feedback that reflect positively on the vibrant academic and professional activities of our faculty.

These are exciting times for Towson University as we continue to celebrate our 150th anniversary year, which began last May. While we commemorate this milestone by reflecting on our achievements, we are enthusiastically looking to the future. At CBE, we will continue to build and fortify our relationships with the regional business community. We want to continue to be a resource by providing applicable and cutting-edge research from our faculty and students. We also plan to continue our collaborative partnerships with organizations like the Baltimore CFA Society.

At CBE, we believe it is our mission to remain relevant to practice, to have an impact on regional policy, and to be an integral part of the local business community. In this issue, you will find out how our faculty mirrors this mission and connects theory to practice in curricular, extracurricular and research activities. You also will learn how our students benefit from extracurricular activities and acquire concepts and knowledge from the business world.

I would like to express my appreciation to all who contributed to this issue of the *Baltimore Business Review*. Their generous contributions of time and effort made this publication possible. As always, we welcome your feedback and ideas.

Best regards,

Shohreh A. Kaynama, Ph.D.
Dean, College of Business and Economics

Message from the President

www.baltimorecfasociety.org

Dear Colleagues and Friends,

It gives me great pleasure to share with you the seventh edition of the Baltimore Business Review. This publication represents an important partnership between CFA Society Baltimore and Towson University that I hope will continue for many years to come. It also represents the fruits of labor of the editorial team – Michael Dewally and Yingyang Shao from Towson University and Niall O'Malley and yours truly from CFA Society Baltimore – as well as Rick Pallansch and Chris Komisar from the Towson University Creative Services design team. Last but not least, we couldn't have produced this excellent journal without all the contributors who have done such a great job. Thank you all.

I want to take a few minutes to talk about CFA Society Baltimore and its Board of Directors' vision for the society.

To set the stage, our primary mission is to help our members achieve professional growth through topical programming, to promote the informal exchange of ideas and information through networking events, and help students through exam preparation and career developments initiatives. Our membership, including regular and affiliate members of the CFA Institute, has grown to over 650 members. The biggest employers of society can be seen in the Top 10 Employers table. Having the CFA designation is not a requirement for membership.

There are two key elements of our vision for the society:

1. Expand membership to other finance-related and non-finance professionals to serve the general public, including financial advisors, wealth planners, bankers, accountants, actuaries, professors and lawyers, just to name a few. These professions share many elements of the CFA Institute's ethical standards, including placing professional integrity and client interests above our own interests, acting with integrity, competence and respect, and developing professional competence. We want to create formal and informal partnerships between CFA Society Baltimore and other professional organizations to create mutually beneficial opportunities to learn from each other, serve our respective clients and advance our professional careers.

2. Promote financial literacy among the younger generation. The general public remains wary of the investment profession in the wake of the financial crisis and several surveys and studies show that Americans are not saving enough for retirement. We want to educate everyone about the benefits of investing for the long run and there is no better place to make an impact than on our youth. CFA Society Baltimore members have the experience and expertise to do this; indeed, a number of local investment firms are already key partners with educational initiatives directed at Baltimore-area youth. We believe CFA Society Baltimore should further these efforts, especially in partnership with other professional organizations, as discussed above. Beyond the societal benefit of supporting such initiatives, these partnerships also provide a very real economic benefit of developing a more engaged and educated investing public.

Thank you for your attention. Now I invite you to enjoy a variety of excellent articles in the pages ahead. As always, we would love to hear any feedback you might have. To learn about upcoming programs and becoming a member go to the CFA Society Baltimore website.

Farhan S Mustafa, CFA
President, CFA Society Baltimore

Top 10 Employers of CFA Society Baltimore Members

1.	T. Rowe Price	184
2.	Brown Advisory	29
3.	Stifel Financial	28
4.	Legg Mason	25
5.	PNC Financial	24
6.	Wells Fargo	18
7.	Aegon	15
8.	Morgan Stanley	13
9.	Wilmington Trust	12
10.	1919 Investment Counsel	9

The Space Telescope Science Institute: Gateway to the Universe

Hussein D. Jirdeh, PhD

Head of Communications and Public Outreach Space Telescope Science Institute

Mark Clampin

Full-scale James Webb Space Telescope Model in Baltimore

Astronomers say there is no center to the universe. But for space enthusiasts a key hub for the world of astronomical research is here in Baltimore, on the Homewood campus of The Johns Hopkins University.

Opened in 1981, the Space Telescope Science Institute (STScI) is the science planning and operations center for the most celebrated science research instrument of our time: NASA's Hubble Space Telescope. For the past 25 years, Hubble has unveiled new information about the universe that for most of human history has only been probed in the imagination. Hubble's vibrant space photos have fundamentally changed humanity's understanding of the universe, and Hubble Space Telescope science operations are managed right here in Baltimore. STScI will also conduct the science & mission operations for the JamesWebb Space Telescope after its launch. The Webb Space Telescope will explore the infrared universe, following up on many of Hubble's investigations and discoveries.

STScI is operated for NASA by the Association of Universities for Research in Astronomy (AURA), a consortium of 40 U.S. institutions and four international affiliates that operates world-class astronomical observatories. In carrying out space astronomy, the Institute partners with local and national companies. Bethesda-based Lockheed Martin (112,000 employees) built the spacecraft portion of the Hubble Space Telescope, Falls Church-domiciled Northrup Grumman built the spacecraft portion of the Webb Space Telescope (10,000 employees in Maryland), and Computer Sciences Corporation provides engineering support for the Hubble Space Telescope. STScI's staff of approximately 600 astronomers, engineers, computer technicians, outreach professionals, and support personnel provides the skill, dedication, and perseverance to ensure that Hubble is at the forefront of discovery. STScI oversees Hubble's science program selection, grant administration, planning, scheduling, and public engagement activities. The Institute's world-class astronomers not only facilitate Hubble's science mission, but do their own groundbreaking research as well.

Given the enormity, demand for excellence, and excitement of the Hubble mission, it's no wonder that STScI was cited as one of the "best places to work in Baltimore" in the February 2012 issue of Baltimore Magazine. The editors gave high grades to STScI for its contributions to employee retirement plans, tuition reimbursement,

Hubble Space Telescope 25th anniversary image of Westerlund 2

Credit: NASA, European Space Agency, the Hubble Heritage Team (STScI/AURA), A. Nota (ESA/STScI), and the Westerlund 2 Science Team

flexible work scheduling, and telecommuting opportunities. The magazine editors added, "In addition to doing fascinating stuff related to space, STScI pushed hard to recruit women and under-represented minorities into careers in science."

Bringing the Universe Down to Earth

Astronomers from as many as three dozen countries compete annually for observing time on Hubble. The demand is so great that for every observing proposal accepted, seven are rejected for lack of observing time. Proposals are submitted to peer-review committees of astronomy experts, who select the most scientifically promising. The STScI Director makes the final acceptance of the most highly ranked observing programs. The Director also reserves discretionary time to use Hubble for special observation opportunities that may arise.

Accepted proposals must be meticulously planned and scheduled by experts at STScI to maximize the telescope's efficiency. This has substantially expanded research opportunities in the world of astronomy. Since 1990, Hubble has made over 1.2 million observations of more than 38,000 celestial objects. This has yielded nearly 13,000 science papers, including research results that led to Dr. Adam Riess' 2011 Nobel Prize award. Dr. Riess shared the Nobel Prize in Physics for the discovery of the accelerating expansion of the universe through observations of distant supernovae.

(Top) Clean Room assembly at the Goddard Space Flight Center of the Webb Space Telescope.

(Bottom)James Webb Space Telescope is being assembled and tested at the Goddard Space Flight Center, Greenbelt, Maryland.

A data pipeline, assembled and maintained by STScI, ensures that all observations are stored on optical disk for archival research. The data are sent to research astronomers for analysis, and then made available to astronomers worldwide one year after the observation. The STScI data center is called the Barbara M. Mikulski Archive for Space Telescopes (MAST), and it is located in the STScI campus in Baltimore. The archive also stores and distributes data for all of NASA's space missions that observe the universe in visible and ultraviolet light. This astronomical treasure trove will serve future generations of astronomers for decades to come, long after Hubble has been decommissioned.

Hubble Space Telescope

STScI's news and public outreach resources help astronomers communicate the wonder and excitement of their discoveries to U.S. taxpayers. STScI's education branch has had a nationwide impact on bringing the excitement of astronomical discoveries into classroom activities. This collective effort has gone a long way to making "Hubble" a household name. This paid off in dividends when there was a public outcry to "save Hubble" when, in 2004, NASA canceled the last space shuttle astronaut servicing mission to upgrade Hubble. The cancellation was later rescinded in part due to our nation's admiration of the achievements of the Hubble Space Telescope. Among Hubble's greatest achievements are: observations that have shown that monster black holes, with masses millions to billions times the mass of our Sun, inhabit the centers of most galaxies and Hubble's ability to detect faint supernovae that contributed to the discovery that the expansion rate of the universe is accelerating, indicating the existence of mysterious "dark energy" in space.

Through Rugged Ways to the Stars

Baltimore played a prominent role in space exploration in 1865—at least in fiction. That year Jules Verne published the novel *From the Earth to the Moon.* In Verne's story the Baltimore Gun Club builds a huge cannon that hurls three explorers into space.

The Verne novel inspired a generation of rocket scientists, including Hermann Oberth, who in 1923 proposed the construction of an observatory in space. Princeton astrophysicist Lyman Spitzer published a report for the RAND Corporation in 1946 that described the advantages of a space telescope that he predicted would "uncover new phenomena not yet imagined." When NASA received authorization to develop the space shuttle in 1972, with its large payload capacity, a major space telescope became a real possibility. What was then simply called the ST—Space Telescope—was named in the early 1980s in honor of the great American cosmologist Edwin Hubble.

NASA's Goddard Space Flight Center in Greenbelt, Maryland, was given the task of developing scientific instruments and the ground-control center for remotely operating the telescope. Because the space telescope was to be a general-user facility for scientists worldwide, the astronomy community proposed establishing a separate science operations center at a university that could draw world-class astronomers.

Veil Nebula

Credit: NASA, ESA, STScI

Former Johns Hopkins University president Steven Muller was instrumental in establishing STScI in Baltimore. Hopkins teamed up with AURA to win the contract from NASA for establishing the Hubble science operations center on the Homewood campus in Baltimore. This created enormous collaborative opportunities for Hopkins' Physics and Astronomy faculty, which includes two Nobel Prize winners, Adam Riess and Riccardo Giacconi (STScI's first director). The STScI building on San Martin Drive now bears Muller's name.

To Infinity and Beyond

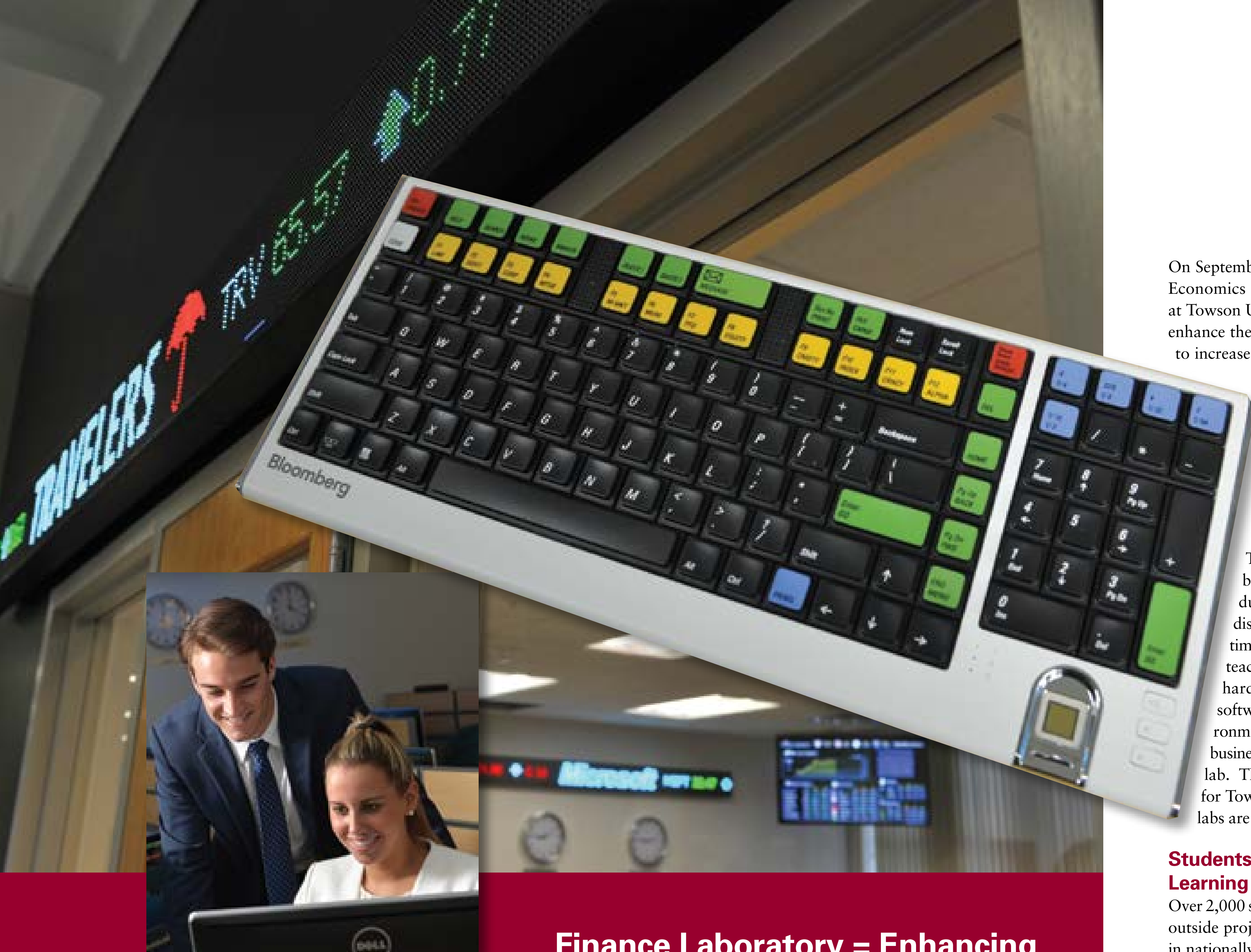
As far back as the late 1980s, STScI scientists were already thinking ahead to what kind of space telescope would succeed Hubble's capabilities. Several design studies eventually led to the National Academy of Sciences endorsing the building of a "next generation" space telescope with a segmented mirror much larger than Hubble's. Now called the James Webb Space Telescope (JWST), it is being built by our nation's leading aerospace contractors across the country and assembled at Goddard Space Flight Center. When Webb is launched in 2018, STScI will manage the science operations for the science telescope. Webb will be capable of seeing farther back in time than Hubble to possibly uncover the earliest galaxies that formed after the big bang. Looking much closer to home, Webb will look for evidence of oceans on neighboring extrasolar planets, using a mirror that is more than five times bigger than the mirror on Hubble

Looking beyond Webb, STScI astronomers are developing plans for operating a "wide-angle" version of Hubble that could take sweeping views of a few hundred million galaxies over its operational life. The Hubble-sized observatory will catalog planets around other stars and measure the characteristics of so-called "dark energy," which is pulling the universe apart at an ever-faster rate. Called the Wide-Field Infrared Survey Telescope (WFIRST), the observatory is planned for launch in 2024.

In 2015, AURA published a science study defining the science goals for building a large, segmented High Definition Space Telescope that would provide much sharper images and be far more sensitive than Hubble. Such observational firepower would promise to yield the first circumstantial evidence for life around other stars by chemically sniffing out the atmospheres of exoplanets for the chemical signature of biological processes.

Hubble has made many important accomplishments during its lifetime, including discovering that galaxies evolve from smaller structures, finding that supermassive black holes are common in galaxies, providing an accurate measurement of the universe's expansion rate, verifying that dark energy exists, and providing a sampling of the atmospheres from extrasolar planets.

Still, some of humanity's most compelling questions remain unanswered: Are we alone in the universe? Are other Earth-like worlds common? How did the first stars and galaxies form? Curious humans have asked these questions for millennia, but for the first time we can foresee actually answering them. The discovery of new worlds and star systems is happening right here in Baltimore with the help of our international partners. To learn more visit our website (www.stsci.edu) and the Hubble Image Library (http://hubblesite.org/gallery/).



Finance Laboratory = Enhancing Student Learning

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On September 6, 2012, the College of Business and Economics opened the T. Rowe Price Finance Lab at Towson University. The goals of the Lab were to enhance the graduate and undergraduate curricula, to increase opportunities for applied research, and to provide additional resources to the community on topics such as financial literacy. The Lab has also been showcased to visitors from several universities in China, including the Shanghai Finance University, Suzhou University, and Wuhan Business School.

The Lab, originally funded by a grant from T. Rowe Price, is a glass-enclosed room that boasts eleven Bloomberg terminals with dual flat-screen monitors, an LED ticker display, two flat screens for displaying real-time market data as well as a smart screen for teaching. In addition to the state- of-the-art hardware, the Lab is equipped with leading software to create an innovative learning environment for the students. Only about 18% of business schools in North America have a finance lab. Thus, the Lab provides an elite experience for Towson students as universities with finance labs are a minority.[1]

Students' Hands-On Learning Experience

Over 2,000 students have used the Lab for class work, outside projects, and research needed to participate in nationally and internationally recognized business competitions. It is also used extensively by the Towson University Investment Group to manage the student investment fund.

A primary objective of the Lab is to enhance the education of business students by introducing them to the Bloomberg terminal technology used by financial professionals and thereby strengthen their applied skills, while teaching students how to aggregate research. This technology provides a bridge between coursework in financial theory and its application in the same context as a Wall Street research analyst or trader.

A Bloomberg terminal is a computer system used by financial market professionals. While it was once a physical terminal, today the Bloomberg terminal represents a software connection with a distinct keyboard.

T. Rowe Price CFO and alumnus Ken Moreland, T. Rowe Price Foundation President Ann Boyce, CBE Dean Shohreh Kaynama and TU President Maravene Loeschke cut the ribbon for the T. Rowe Price finance lab on September 6, 2012.

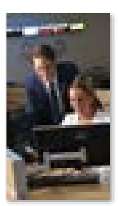
The Bloomberg service streams news, price quotes, analyst coverage, historical data, and charts for all asset classes and may also act as a trading platform. It allows users to monitor real-time data to conduct analysis and to take market positions.

Based on discussions with advisory groups, alumni, and regional employers, it was clear that current job opportunities require students to have more applied experience and to be able to interpret data and analyses.

Preparing students to be successful, innovative, and to perform at a high level immediately after graduation requires that they are trained in industry standards. For business majors, a familiarity with financial data and its uses is necessary for both professional and personal reasons. For finance concentrators, Bloomberg experience is a must.

All Towson business school students are required to attain some level of Bloomberg certification (Bloomberg Essentials Online Training or BESS). The BESS training introduces users to basic Bloomberg terminal functionality as well as a Market Sector Program covering equities, fixed income, foreign exchange, and commodities. The certification helps users negotiate this dense information system and how to find data and market information. In addition to BESS, finance students are required to take the Bloomberg Markets Course (BMC). The BMC focuses less on functionality and more on primary market data and analyses used by finance professionals. This course covers economics,

currencies, fixed income, and equity. Students have appreciated the applied focus and the integration of technology and theory. Chi Hou Chan, a recent graduate, commented that "I used the Bloomberg terminal for the projects in classes. I found it very useful as it provided much more detailed information than websites, and it gave me a very good experience because it was the software that most professionals use." He also noted that it was beneficial to link what he was learning to the real world through Lab software.



The T. Rowe Price finance lab was an invaluable asset in helping our team win the local level of the CFA Institute's Research Challenge.

The Towson University Investment Group (TUIG), the student-managed fund, which manages part of the Towson University endowment, has utilized the Lab's capabilities extensively for fund research. Stefan Bordonaro, a TUIG member and the fund's current portfolio manager, noted that "The T. Rowe Price Finance Lab and its resources have been instrumental for the success of the Towson University Investment Group. The lab's professional environment and the Bloomberg terminals have dramatically aided in TUIG's equity research. The terminals have also doubled as a perfect platform to teach students from a range of educational backgrounds. It also enables students to experience the essentials of financial analysis. The Bloomberg terminals have significantly helped to prepare TUIG members for their personal investing endeavors and / or careers in finance. The Towson University Investment Group has come a long way since the fund's inception, and with the critical resources from the T. Rowe Price Finance lab, our group has dramatically improved on our goal of spreading financial literacy throughout our campus and community." Of the 18% of business programs in North America that have a finance lab, only 56% of those labs host a student-managed fund.[2] Thus, having a student managed fund is an important and unique experience for business school students.

This focus on professional-level training has already provided additional employment opportunities for graduating students. Several employers have commented that recent Towson graduates have significant applied skill sets, and Towson finance students have been actively recruited for higher-level entry positions in the finance industry.

Students have also used the Lab to take part in local and international competitions. Towson students participate annually in the Chartered Financial Analyst (CFA) Institute's Research Challenge. CFA Institute administers the Chartered Financial Analyst program, which is a globally respected professional designation. The Research Challenge has student teams research and analyze a publicly traded company. The competition requires high-level analysis using complex data. The teams prepare a written report and oral presentation judged by industry professionals. The competition moves through three levels: local, regional (the Americas, the Asia Pacific, and the Europe, Middle East, and Africa regions), and globally. This event is cohosted annually by the CFA Society Baltimore and CFA Society Washington at the local level.

In 2015, the Towson University team won the local competition and moved on to the regional event. Tyler Reese, a 2015 team member, noted: "The T. Rowe Price finance lab was an invaluable asset in helping our team win the local level of the CFA Institute's Research Challenge. From behind the Bloomberg terminal, we had access to industry-grade insights and precise data. The finance lab offered both the tools to complete our research and a place to assemble our ideas. During winter break, it was rare for a week to go by where I wasn't staring at a Bloomberg terminal for hours on end."

Research Data Hub For Faculty

While students have benefited from the Lab, Towson faculty has been able to utilize data and analysis for multiple projects in various disciplines. Faculty has access to large data sets and unique analysis to further investigate financial policy and theory.

Dr. Tobin Porterfield, a faculty member in e-business and Technology Management, used Bloomberg's supply chain map feature to examine company-level information on manufacturers in Washington County, Maryland. Dr. Herbert Zhao, from the Economics department, used both consumer confidence data and Bloomberg forecasts of major macroeconomic indicators. He investigated the five components of the University of Michigan's Index of Consumer Sentiment and identified the main determinants of these measures. He also used Lab resources to study the role of consumer confidence in forecasting real personal consumption expenditure. Dr. Zhao commented that "having access to this data allows almost real-time analysis and monitoring of macroeconomic conditions around the world. Access to this valuable source of information is one of several distinct advantages we have over sister institutions." Dr. Lijing Du, a faculty member in the Department of Finance, has used credit-default swap (CDS) data collected from Bloomberg on four of her research projects: *When Do Stocks Lag Credit Derivatives? The Role of Information Uncertainty and Short-Sale Constraints*; *Credit Default Swap Market Reactions to Restatement Announcements*; *Do Credit Default Swaps Affect the Pricing of Audit Services?* and a recent paper on the ability of CDS rates to influence stock returns.

Community Outreach

The Lab is open to the community and to area schools. Several initiatives have been developed to introduce high school students and families to the uses of the Lab and to increase financial literacy in the region.

While the Towson University finance lab has only been open for three years, it has had significant impact on both students and faculty. The Lab provides an essential experience to students and provides better-trained employees to the regional business community. Students have developed enhanced applied skills, and faculty have benefited through the advancement of their research by using Lab data.

References:

[1] http://universityfinancelab.com/finance-lab-stats/; retrieved October 1, 2015

[2] http://universityfinancelab.com/finance-lab-stats/; retrieved October 1, 2015

Breaking Down the Student-Loan Barrier to Homeownership in Maryland for Millennials

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2015 marked the turning point when the Millennial generation (adults ages 18 to 34) eclipsed "Baby Boomers" and "Generation X" as the largest segment in both the workforce and general population in the United States. With this demographic shift, the dynamics of home ownership will be considerably influenced by Millennials as they enter into the home buying market over the next 10 years. In fact, looking at long-term averages of homeownership rates, the Mortgage Bankers Association (MBA) projects that in the next 10 years, Millennials in the U.S. could boost homeownership among 18 to 44 year olds by 4.3 million households.

Although Millennials have not been as quick to seek homeownership as past generations, their reasons for wanting to own a home are quite traditional: starting a family and wealth creation (investing in property instead of paying high rent). According to a 2015 MBA report, Millennials are getting a later start on families than earlier generations due to educational/career aspirations as well as residual financial effects from the recession. However, as Millennials continue to enter their 30's and head new households, the demand for homes will continue to rise.

This notion holds true in Maryland. In a recent survey of Maryland Mortgage Program (MMP) first-time home buyers over the past two years, an overwhelming 76.3% indicated they decided to buy a home "to raise a family" or were "tired of paying rent/wanted to invest in the future."

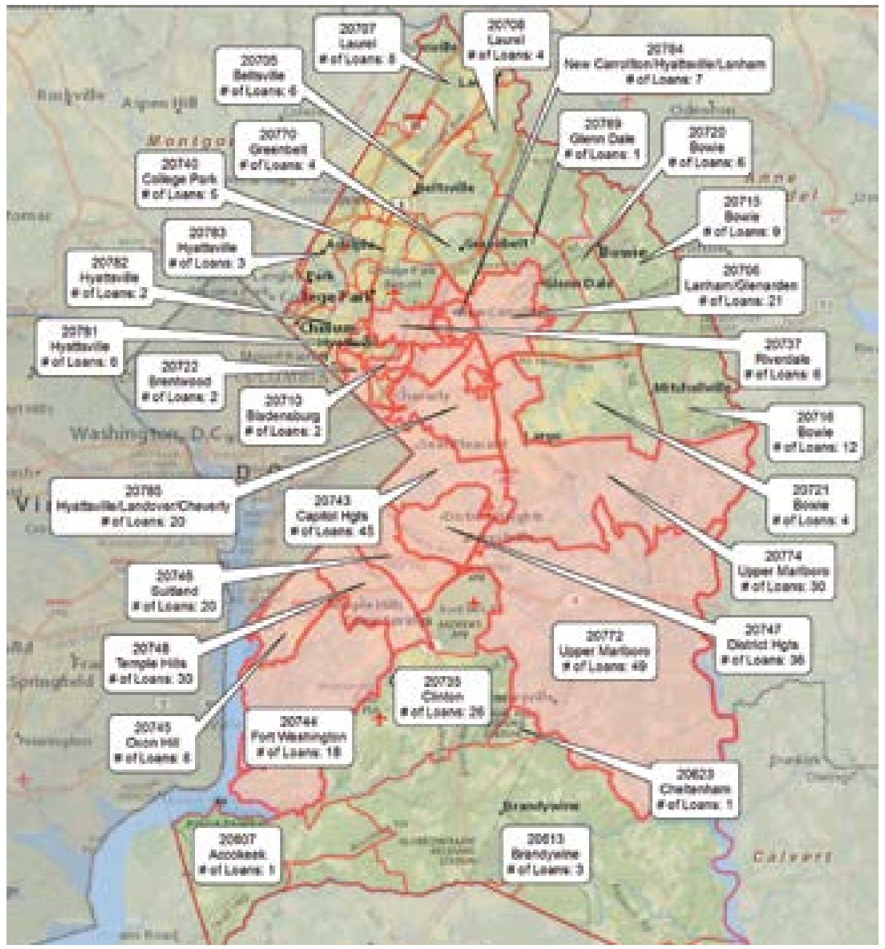
Although Millennials are poised to enter into homeownership, there is a growing perception that student loan debt is a barrier to owning their first home. NeighborWorks America in 2015 found that 28% of adults knew someone who delayed the purchase of a home due to student loan debt and 57% said that the debt was "somewhat or very much" an obstacle to homeownership. Analysis from a 2015 Harvard University's Joint Center for Housing study indicated that between 2004 and 2013, the share of 25- to 34-year-old renters paying more than 30% of income for housing increased from 40% to 46%. During the same time period, the average amount of debt for this cohort increased 50%. The same study found that among 25- to 34-year-olds, typical renters met the minimum 5% down payment requirement in only 5 of the 168 largest metro areas in the country. This facet of debt – the inability to gather down payment costs – is echoed in Fannie Mae's National Housing Survey which found that although most Millennials want to own a home, the main obstacle anticipated was insufficient savings to make a down payment/pay closing costs.

<u>Testing the Millennial Market in Maryland:</u> The housing market in Maryland has been gaining measurable momentum since 2012. Lower home prices and record low mortgage rates create an ideal situation for first-time home buyers to enter the market before prices and interest rates start their imminent climb. Affordability in Maryland also favors home buyers, as measured by the "housing affordability index." The index measures the financial ability of a typical family residing in a Maryland jurisdiction to qualify for a mortgage loan, given that month's mortgage rate and the jurisdiction's median home price. A home buyer index with a value of 100 portrays an average household with the exact median income to qualify for a mortgage on a median priced home. An index with a value above 100 signifies a household with ample income to qualify for a mortgage loan on a median priced home. The average quarterly housing affordability index for a first-time homebuyer in Maryland towards the end of the 2015 home buying season (Q3) was 111.0.

While Millennials may be timid to enter the home market, the Maryland Department of Housing and Community Development through MMP (mmp.maryland.gov) decided to investigate the suggested "debt barrier" to home ownership by offering, on a trial basis, a mortgage product tailored to Millennials with significant student loan debt. The "You've Earned It" initiative, which launched in May 2015, offered Millennials with over $25,000 in student loan debt as well as military veterans a low, fixed mortgage rate of 2.75%, down payment assistance of $10,000 (in the form of a 0% deferred loan) and housing counseling to ensure borrowers understood the full financial obligations of homeownership.

The department found that the average credit score of a "You've Earned It" borrower was 7 points higher than the average MMP credit score. At the same time, the median purchaser age decreased to 30 years old, squarely putting the customer range for the initiative well within the Millennial generation. Interestingly, excluding veteran borrowers from the "You've Earned It" cohort, the average home loan amount for the initiative was more than $13,000 higher than the average MMP loan amount. It appeared that the "You've Earned It" initiative successfully mitigated down payment concerns and resonated with Millennials in Maryland who exceeded the credit score and loan capacity of the

Figure 1: Prince George's County Triple Play (Nov. 20, 2014 to March 23, 2015)



"No Grant" Zip Codes
"Grant-eligible Zip Codes
Total # of Loans: 395

typical first-time home buyer by more than the department had seen over the past five years.

The "You've Earned It" program was continued after the trial period due to high demand, but this time with half the down payment assistance and a quarter percent off the regular conventional/government rate. Applications decreased with the more modest incentive, further indicating the necessity and demand for down payment assistance and competitive interest rates to help Millennials realize the dream of owning their own home.

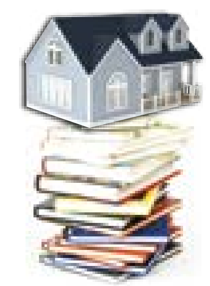
<u>Exploring Down Payment Assistance as a Tool for Revitalizing Neighborhoods:</u> The results from the "You've Earned It" initiative fortified a key finding from a 2015 survey conducted by the department, which found that the largest single incentive that attracted future home owners to the MMP loan was down payment assistance. Nearly 80% of survey respondents indicated down payment assistance as their reason for using the program and for over 50%, down payment assistance was the only form of financial assistance the home owner received.

In fact, down payment assistance is such an influential incentive that it can entice home buyers to consider purchasing even in neighborhoods that are on the cusp of economic revitalization. In addition to concentrating on Millennials, "You've Earned It" also focused on Sustainable Communities, which refers to older neighborhoods that have transportation and other infrastructure but are eligible for additional restoration funds. All "You've Earned It" loans were required to be used to purchase homes in Sustainable Communities. Despite limiting the geographic area of the initiative, $20 million in funds were used up in less than six weeks.

Similarly, in November 2014, the department, in partnership with Prince George's County, created another initiative to incentivize homeownership in the County, particularly in areas hardest hit by foreclosure events during the Great Recession. Under the "Triple Play" initiative, homeowners received (1) a quarter percent reduction in interest rate, (2) a waiver of fees for a Maryland credit certificate/tax credit and (3) $10,000 in down payment assistance through a 0% deferred loan, plus an additional $10,000 grant for homebuyers who purchased in one of 14 select zip codes.

Although the program was launched in November, entering the slowest season for home buying," Triple Play" funds were largely used up in only four months and created 395 new homeowners in Prince George's County. The unprecedented uptake of the program saw an increase in MMP production by 100% over the average for the past five year in that area. More importantly, loan activity was highest in the zip codes with the additional down payment assistance grant (see Prince George's County Triple Play map). The effects of down payment assistance on the decision for first-time homebuyers to purchase a home immediately were so successful in both "You've Earned It" and "Triple Play" that a new incentive for Baltimore City – "Grand Slam" – has been initiated.

<u>Down Payment Assistance as the Key to Unlock Homeownership:</u> As Millennials continue to grow in the workforce, they will be increasingly motivated to figure out how to make homeownership a reality for themselves and their future families. As we have seen in Maryland, student debt is not an insurmountable



As Millennials continue to grow in the workforce, they will be increasingly motivated to figure out how to make homeownership a reality for themselves and their future families.

barrier to entry and insufficient funds for down payment and closing costs are more direct factors in deferring a potential homeowner's decision to purchase.

Importantly, while student debt is a charged topic, policy makers can successfully increase homeownership by assisting with down payment and closing costs. Local governments such as Prince George's County and Baltimore City have provided down payment assistance to attract potential buyers who were sitting on the fence to get into a home. Regional organizations, such as LIVE Baltimore, also use the approach of linking potential home buyers to down payment assistance to bring new residents that can revitalize neighborhoods. The financial industry has also shown interest in combining down payment assistance and homebuyer/financial education to entice homebuyers to consider sustainable communities that have weathered the recession. For example, the Wells Fargo Housing Foundation created the LIFT Program that collaborated with nonprofit organizations in more than 30 cities, including Baltimore.

According to a 2015 joint analysis by RealtyTrac and Down Payment Resource, 87% of homes would qualify for down payment assistance in the county where they are located – this equates to more than 68 million homes across America. However, despite the use of technology, most Millennials are not aware of down payment assistance programs. In fact, 70% of adults in the U.S. are unaware of down payment assistance programs in their areas, according to NeighborWorks America's 2015 survey.

To help Millennials embrace homeownership now and in the coming decade, marketing and messaging about down payment assistance programs will be the next step forward. Encouraging purchases in Sustainable Communities further offers great value for first-time homebuyers while bringing vitality to Maryland communities.

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The Initiatives & Developments of Maryland's BioHealth Technology Industry Cluster

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Ranked 5th according to Genetic Engineering & Biotechnology News[1], the Maryland biohealth technology cluster area is famous for being the first to map the human genome, and is a leader in personalized medicine.[2]

Introduction to Clusters

Industry clusters consist of industry-related entities like companies, their suppliers, service providers, industry incubators / accelerators, technological support, governmental agencies, and other institutions that provide specialized training and education – all of which are concentrated in a specific location. These industry clusters often are supported by state incentives such as tax credits, subsidies and other aid. These clusters provide infrastructure for both mature and early-stage companies, which produce jobs, innovative products, and important services to their surrounding communities, and throughout the world.

Maryland's BioHealth Technology Cluster Initiatives

Maryland's Department of Commerce has been working for several years to support four strategic priorities developed by the state's industry-led Maryland Life Sciences Advisory Board: sustained growth and future industry competitiveness; access to capital; strengthening technology transfer from universities; and talent generation / workforce development.

Two of the more popular programs that were developed to support these strategic priorities were the Maryland Biotechnology Investor Incentive Tax (BIITC) credit program and the Maryland Innovation Initiative (MII).

The BIITC program, most recently funded at $12 million per year,[4] provides investors a refundable income tax credit of 50 percent of the investments made in qualified Maryland biotechnology companies. The MII program, managed by the Maryland Technology Development Corporation (TEDCO), was created as a partnership between the State of Maryland and five Maryland academic research institutions (Johns Hopkins University, University of Maryland College Park, University of Maryland Baltimore, University of Baltimore County and Morgan State University). The program is designed to promote commercialization of research conducted in the partnership universities and leverage each institution's strengths. Together, both these programs have been very successful in providing funding resources to support translational research, emerging and early-stage companies.

The Maryland Industrial Partnerships (MIPS) program at the University of Maryland, the Department of Commerce's Research &Development Tax Credit, TEDCO's Technology Validation Fund, the VOLT Fund (managed by the Anne Arundel Economic Development Corporation), and the Maryland Venture Fund also provide financial support to companies commercializing new technologies in Maryland.

Other Important Cluster Components

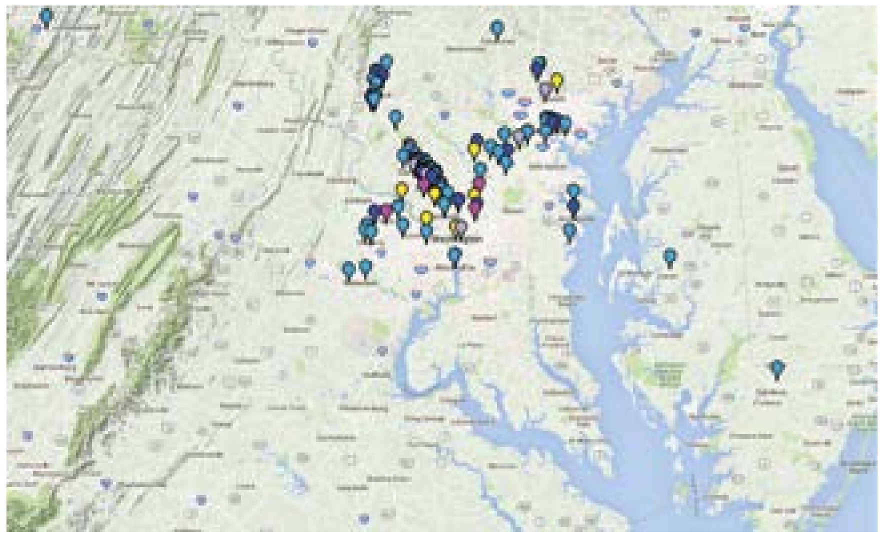
Other important components of the Maryland biohealth technology cluster are the numerous federal research facilities, universities, incubators, accelerators, and private sector companies working in the region.

The most notable federal research facility in the cluster is the National Institutes of Health (NIH). Comprised of 27 institutes and centers, the NIH is the largest source of medical research funding in the world. As of September 7, 2015, the NIH has funded more than $20 billion for the year 2015 to support research projects, facilities, and workforce education.[5] Cutting-edge research also takes place at other federally funded organizations throughout Maryland, including the U.S. Army's Edgewood Chemical Biological Center, the U.S. Medical Research Institute of Infectious Diseases, the Walter Reed Army Institute of Research, the Frederick National Lab for Cancer Research, universities such as Johns Hopkins University and the University of Maryland system, and nonprofit organizations including the Henry M. Jackson Foundation.

The U.S. Food and Drug Administration (FDA), the U.S. Pharmacopeial Convention (USP) and the U.S. Department of Commerce's National Institute of Standards and Technology (NIST) also are important members of Maryland's biohealth technology cluster. Companies from around the world seeking to sell human and veterinary drugs, vaccines and other biological products, medical devices, dietary supplements, and tobacco products to the large U.S. market must first have them approved by the FDA. USP is a nonprofit organization that sets standards enforced in the U.S. and used in 140 countries for the identity, strength, quality, and purity of medicines, food ingredients, and dietary supplements manufactured, distributed and consumed worldwide. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

Figure 1: The Distribution of Some of Maryland's Companies and Research Parks:

1a: Distribution of Biopharma-related Companies



1b: Distribution of Maryland's Research Parks

Source: Map figures obtained from BioMaryland[6]

According to the Maryland Department of Commerce, the state of Maryland is home to more than 2,000 private sector establishments involved in life sciences work – ranking it as the 5th highest by concentration in the United States.

First to map the human genome, Maryland is a world leader in personalized medicine. The state is home to nine of the top 50 influencers in vaccine development as ranked by their peers. The first FDA approvals for a mobile health application, wireless device and information data center all were granted to Maryland companies. Maryland is home to the world's largest producer of adult stem cells, and the recipient of the first rapid test for Ebola to be approved by the FDA (through Emergency Use Authorization) and the World Health Organization.

The locations of a number of these innovative companies and many of Maryland's research parks, incubators and accelerators which support innovation in Maryland are included in the Maryland map in Figure 1. Johns Hopkins University's Fast-Forward accelerator, the University of Maryland's BioPark, BWTech@UMBC, the Montgomery County Business Incubator Network, the Frederick Innovation Technology Center, Hagerstown Community College's Technology Innovation Center, and the Chesapeake Innovation Center are just a few of the university- and county-supported innovation centers located in Maryland. Other innovation hubs such as the Relevant Health Accelerator and Launch labs in Montgomery County and BetaMore in Baltimore have been launched by a public-private partnerships. Similar to their university and local government-run counterparts, these centers offer unique resources for early-stage technology companies. Life sciences research parks are expanding at Johns Hopkins University, the University of Maryland, Montgomery College and at the brand new "Viva White Oak" research center which is being developed adjacent to the new, consolidated FDA headquarters campus. These research perks provide bioentrepreneurs affordable physical and virtual office space, mentoring, co-working and networking opportunities, visibility for their new start-ups, and access to education and business services.

Results

According to the Maryland Department of Commerce, the 75+ companies whose investors have utilized the BIITC program subsequently raised more than $450 million in follow-on investments. TEDCO reported that the MII program awarded a total of $6.45 million in FY 2014 to organizations in three phases of commercialization: proof of concept, business case, and business creation; and 22 start-ups were supported by MII.

Staff members at the Maryland Department of Commerce's Office of BioHealth Technology, Maryland university technology transfer offices, TEDCO, MIPS, local economic development offices, and nonprofit organizations supporting economic development (i.e. BioHealth Innovation, the Economic Alliance of Greater Baltimore, the Tech Council of Maryland) work together to cross-refer companies and faculty innovators to each other for relevant resources. Maryland's Department of Commerce also works with local economic development teams and nonprofit organizations to support business retention, expansion and recruitment activities.

Maryland's Life Sciences Economy

Maryland's economy has enjoyed a variety of direct and indirect impacts from years of state initiatives. As a direct impact, Maryland has hosted nearly 3,500 clinical trials since 1999. Furthermore, these state initiatives have helped to support approximately 41,560 life sciences jobs. This sector is also responsible for generating approximately $15 billion of Maryland's gross domestic product (2013). Another direct impact from all these jobs comes from the salaries generated from life sciences researchers. In 2014, total employee salaries amounted to $4.05 billion.

Secondary impacts have included support for more than 160,000 jobs and $9.6 billion in Maryland salaries, along with the attraction of billions of dollars' worth of investments.[7] Between 2010 and 2014, Maryland's biotechnology industry attracted more than $1.2 billion in venture capital funding, $500 million from federal sources, roughly $200 million from angel investors, billions in corporate partnerships, $200 million from non-profits, and more than $300 million from initial public offerings (IPOs). Companies that have gone public during the last few years include Intrexon, GlycoMimetics, MacroGenics, and RegenXBio.

Comparing Maryland to Other Leading Biotechnology Clusters

When focusing on life sciences and biotechnology, the San Francisco Bay area and San Diego in California and the Boston-Cambridge region in Massachusetts rank as the top three biotechnology clusters. Maryland's investor tax credits, research tax credits, technology transfer, workforce development, and state-supported venture capital funding programs are among a few initiatives similar to those offered within these three leading biotechnology clusters.

The most noticeable differences are in NIH funding awards and venture capital (see Figures 2 & 3) funding received by companies in each of these regions. Between California, Washington, D.C., Maryland, and Massachusetts, the states collectively accounted for roughly 31.7% of the total amount of granted NIH funding in 2014 (see Table 1).

Figure 2: NIH Biotechnology Funding Data for, California, Washington, D.C., Maryland, & Massachusetts

Figure 2a. NIH Funding Amount

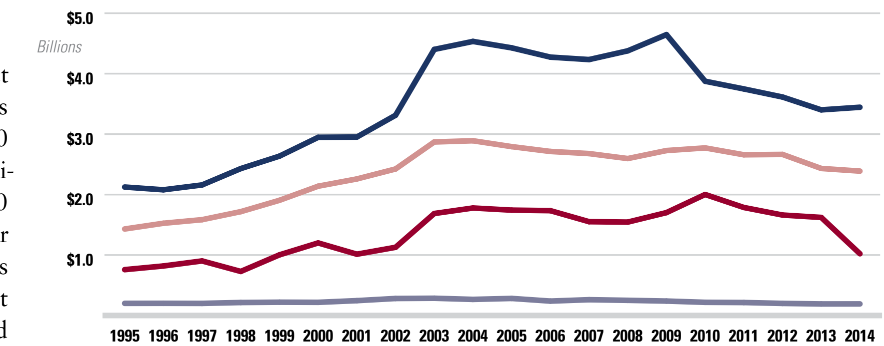
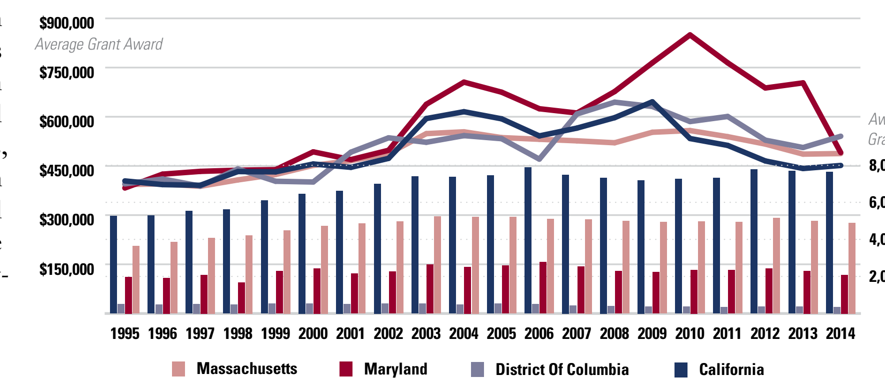


Figure 2b. Average NIH Award Amount Per Grant

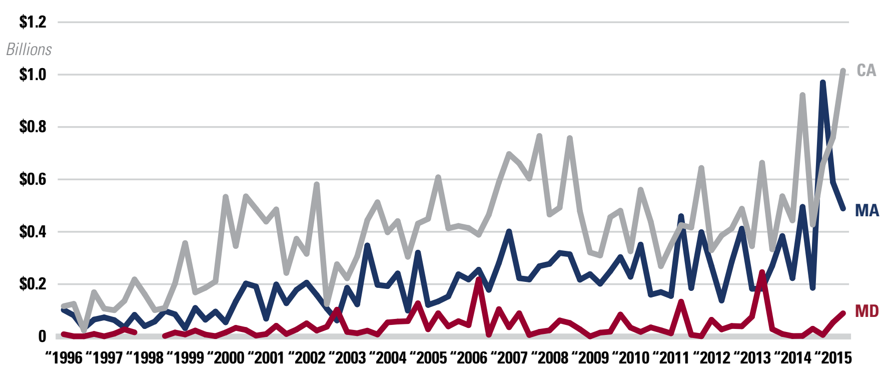


Data obtained from NIH Website[8]

Table 1:
2014 Percent of Total USA NIH Funding Awards

State	% of Total	% Change Y/Y
California	15.5%	0.49%
DC	0.9%	0.02%
Maryland	4.6%	-2.56%
Massachusetts	10.7%	0.02%

Figure 3: Biotechnology Venture Capital Investments for California, Maryland, & Massachusetts



Data obtained from PwC Money Tree and Thomson Reuters.[9]

Aside from individual state percentages of total NIH funding, the actual dollar amount awarded from the NIH experienced a considerable decline since the financial crisis (See Figure 2a). Beginning in 2008, total US NIH award amount declined from approximately $25.6 billion to approximately $22.3 billion in 2014 – a decline of 13.4%. During this same period, California, Washington, D.C., Maryland, and Massachusetts NIH awards (adjusted for inflation) declined by approximately 21%, 24%, 34%, and 8%, respectively. Maryland experienced the largest decline in NIH funding; however, as a result of the decline, Maryland's inflation-adjusted average award amount per grant became on par with the other compared leading state clusters (see Figure 2b).

Another notable challenge the Maryland cluster faces is access to venture capital. While the Maryland – Washington, D.C. cluster collects approximately 5.5% of the total amount of US NIH funding, the region collects significantly less venture capital financing compared to California and Massachusetts (see Figure 3). Venture capital financing is critical for start-ups and very early-stage companies – and is reflective of the state's ability to commercialize on its research.

Discussion & Conclusion

This weakness in venture capital activity recently was raised at the 2015 Maryland Regional Biotech Forum. As stated by Scott Koenig, co-founder of Macrogenics, "Pharmaceutical companies and venture capitalists need to see the Greater Washington area as having the same kind of ecosystem as other leading biotech hubs."[10] Maryland is using initiatives such as the MII and BIITC to increase the success rate of federal and academic research commercialization. The Maryland Department of Commerce is working under the leadership of Governor Larry Hogan and the Maryland Economic Development Commission to improve the business climate in Maryland. According to Maryland Secretary of Commerce Mike Gill, "With the resources here in Maryland, and a government that supports research commercialization but then gets out of the way of business growth, there is no reason we can't be top three by 2020... no need to wait until 2023." According to Gill, two important parts of his department's business development efforts are building effective public-private partnerships to leverage the expertise that exists in both sectors in the state, and to build Maryland's reputation outside the region as the go-to hub for biohealth technology entrepreneurs and investors. If the Maryland-DC cluster can do this, increased entrepreneurial activity, venture capital and outside investment will surely follow.

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Johns Hopkins Technology Ventures: Commercializing Innovations for the World While Cultivating Community and a Strong Business Ecosystem in Baltimore

Christy W. Wyskiel, MBA

Senior Advisor to the President of The Johns Hopkins University and Head of Johns Hopkins Technology Ventures

Every day at Johns Hopkins Technology Ventures (JHTV), we work to make Baltimore a great place for innovation — for researchers in the lab, students in dorm rooms and nascent startup companies just getting off the ground.

We feel Baltimore has it all: affordability; world-class research institutions; proximity to established technology hubs like Boston and Washington, D.C.; and increasing interest from investors like Steve Case, who started his fall 2015 Rise of the Rest tour, a nationwide tour of cities with great startup potential, right here in Baltimore. Steve Case believes Baltimore has a bright future as a major hub of innovation, and so do we.

The mission of our team at JHTV is to steward innovations and discoveries made across the university from lab to market. We help researchers commercialize technologies with the potential to improve lives all over the world — from new drugs to more accurate medical devices, precision screening technologies and so much more.

In fiscal year 2015, JHTV received a record 516 invention disclosures from Johns Hopkins researchers, and the office stewarded 16 startups through the incorporation process. Given Johns Hopkins has received more federal research funding than any other institution in the country for 35 years in a row, these numbers aren't surprising.

But our mission expands beyond the Johns Hopkins community. We believe we have the potential to make a significant impact on economic development in Baltimore. By fostering conditions that support the growth of startups, encourage outside capital investment, and attract and retain top talent, we can nurture an environment that promotes organic growth of new industries and creates jobs. These innovative startups can transform Baltimore into a top technology city, with more jobs at all skill levels, reinvigorated communities and rejuvenated neighborhoods — places for all Baltimoreans to grow and thrive.

How Are We Organized?

JHTV is an intellectual property administration center for Johns Hopkins that serves researchers and inventors affiliated with the university. We offer a licensing, patent and technology commercialization office to help inventors and entrepreneurs protect and license their innovations. We also foster collaboration with business partners who specialize in launching new inventions and

we support startup companies formed at the university.

Our team recently reorganized itself to focus on our objectives and improve our customer service not only for the faculty, students and staff members we serve at the university, but also for our industry, venture capital and foundation partners. Our group is organized into three areas:

1. Technology transfer: When faculty, students and staff members disclose inventions to our team, we help them determine the best path forward, from intellectual property protection and patenting to commercialization and licensing.

2. Corporate partnerships: We facilitate industry funding for faculty members to pursue research projects with high commercial potential. One recent example is a five-year collaboration agreement to jointly develop

FastForward Homewood innovation hub under construction

ophthalmic therapies targeting retinal diseases with global biopharmaceutical company Bayer HealthCare.

3. FastForward: Our FastForward program supports the development of startups from the university and beyond — companies can apply to FastForward even if they're not affiliated with the university — by providing education, mentorship, funding and space at our FastForward Homewood and FastForward East innovation hubs. FastForward has new leadership and a team that's ready to help startups, from developing a concept to obtaining institutional funding.

How Will We Accomplish Our Goals?

Two years ago, when I had the privilege of joining the JHTV team at Johns Hopkins, we formed a committee to examine what it would take to create a fully developed innovation ecosystem at the university and in Baltimore. This committee was led by two of our most innovative faculty members, Drew Pardoll, director of Johns Hopkins' Cancer Immunology Program and a professor of oncology, and Jennifer Elisseeff, director of Johns Hopkins' Translational Tissue Engineering Center and a professor of biomedical engineering and ophthalmology. We toured the country examining best practices at other academic and research institutions to uncover key characteristics of localities like Cambridge, Massachusetts, and San Diego, California, where commercialization thrives.

The committee's findings provided a prescriptive road map for our team to follow in developing our own innovation ecosystem, and that is what we have been doing ever since — addressing these critical needs identified in the report:

- The need for affordable, flexible space, particularly lab space
- The need for funding — both early-stage translational funding to get newly formed teams past the so-called valley of death, in which many startups flounder without adequate funding, and later-stage capital to ensure our startups in a position to take institutional funding have the option to stay in town instead of leaving to follow the money to San Francisco, Boston or elsewhere.
- The right kinds of services — such as mentoring, educational programming, startup acceleration, and legal and accounting advice — in place to support entrepreneurs and innovation.

Space

One of the biggest challenges for any entrepreneur — especially in the life sciences — is finding affordable, flexible space in close proximity to other like-minded innovators and researchers. We are addressing this pain point head-on with two FastForward innovation hubs — and a third under construction at 1812 Ashland Ave. FastForward Homewood, near our schools of arts and sciences and engineering, opened in 2014, while FastForward East, near our schools of medicine, nursing and public health, opened in early 2015. Both offer co-working and dedicated office space as well as dedicated and shared wet lab space with affordable and flexible lease terms, and both are at capacity. Our new space at 1812 Ashland will open in the fall of 2016 providing a marquis location for all manner of startup activity – from work space (lab, office and co-working) to event and educational space – and at 25,000 square feet will be our largest innovation hub to date.

Funding

Our team is seeking to address the acute need for translational funds in several ways. Thanks to a philanthropic gift, we recently established the $5.4 million Louis B. Thalheimer Fund for Translational Research for promising technologies at the university. We are also working closely with innovative teams across the university to uncover ideas eligible for translational grant funding from the state through the Maryland Innovation Initiative (MII) administered by the Technology Development Corporation. In fiscal year 2015 alone, 26 different Johns Hopkins projects with commercial potential received more than $2.6 million in MII funding.

This year, along with other partners in town, we supported the DreamIt Health Baltimore accelerator program, which provided capital and intensive training to promising health information technology companies in Baltimore for the second year in a row. Additionally, we work regularly with local and outside angel, corporate and venture investors to identify startups and ideas worthy of investment consideration.

Services

We know innovators need more than just space and money — they also need the right kind of support services to help smooth the path forward to commercialization. Over the past 18 months, we've put in place an array of services, including a new Mentor-in-Residence Program, an express license for startups, a new pro bono legal program and an entrepreneurial boot camp, and we continue to develop more. In just one year, our Mentor-in-Residence Program has more than doubled the number of exited entrepreneurs and investors working tirelessly to support our startups by providing them with guidance, support and introductions. And startups are thrilled with the new pro bono legal incorporation services provided by four local firms committed to developing Baltimore's entrepreneurial ecosystem.

We Believe In Connecting And Building

To make our dreams of a new innovation economy in Baltimore a reality, we've participated in or sponsored a number of events to ensure collaboration across Baltimore.

Every year, we co-host an event with the University of Maryland, Baltimore, that showcases early technologies in development at the two universities to members of the Johns Hopkins Alliance for Science and Technology Development and the University of Maryland, Baltimore, Commercial Advisory Board. These two groups include investors and industry partners interested in hearing from faculty members, researchers and startups about the latest technologies being created.

This year, we also joined forces with Greenspring Associates, a local venture capital firm, for the first University Technology Day. Twenty-four Johns Hopkins startups pitched their technologies to a dream audience of possible funders, including angel and venture capital investors from around the country. The next event will take place in April 2016.

We took part in planning Steve Case's visit to Baltimore during his September Rise of the Rest tour. We worked closely with our friends at Betamore, Under Armour, Impact Hub and Startup Maryland to ensure our city would shine under the national spotlight.

What Does The Future Look Like?

Based on some of the successes we are seeing with the startups we're supporting, I believe the future looks really bright. Just this past fall, for example, Personal Genome Diagnostics (PGDx), a Johns Hopkins startup providing cancer genome testing products and services, announced completion of a $21 million Series A funding round led by New Enterprise Associates. PGDx has already created 63 jobs in Baltimore and plans to add many more as it builds out its location in Canton.

Or take Emocha, a startup that provides a mobile health platform that streamlines the continuum of care. Emocha recently doubled the amount of space it's renting in our FastForward East innovation hub to accommodate its own job growth fueled by recent investment and revenue growth.

These are just two of many examples that get me excited to come to work every day. I am in constant awe of the amazing array of groundbreaking technologies in development right here in Baltimore. These technologies have the potential to change the world — and to impact the future of Baltimore by providing jobs, growth and hope.

To learn more about our team, the exciting technologies we are creating and ways to get involved, please check out our website http://ventures.jhu.edu/ or check us out on twitter (@JHTechVentures) or Facebook (https://www.facebook.com/pages/Johns-Hopkins-Technology-Transfer/334108406671886)

Best Practices in Cybersecurity: Processes and Metrics

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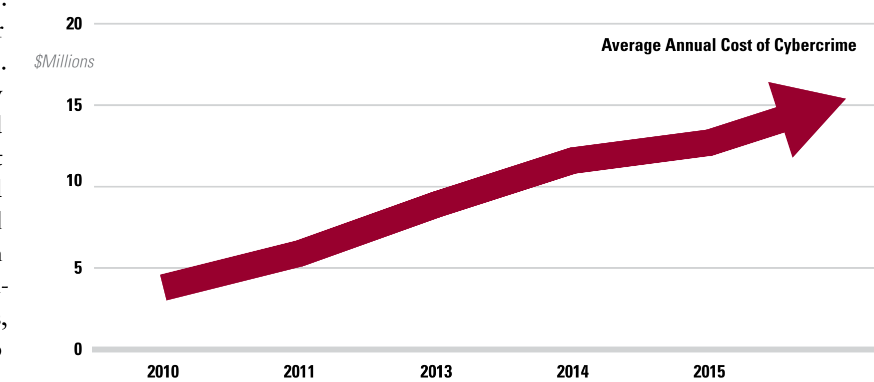
Securing company data and information systems is becoming more difficult with advancing technology, greater interconnectedness, and interdependencies. More publicly available information regarding cyber hacking, techniques, and tools compounds the issue. One of the most impactful data breaches in history occurred over a period of months and was discovered in April 2015. The Office of Personnel Management (OPM) in Washington, D.C., had been compromised more than once, with a total of 22 million federal employees being affected. Sensitive information such as social security numbers, fingerprints, security background investigations (including usernames, passwords, financial and health records), personnel files, and job assignments were compromised (Nakashima, 2015). Federal employees, as well as their families and relatives, feared their information might be sold on the black market or used by a nation state. OPM, which failed to notice and correct the organization's weaknesses in their IT and cyber security systems, now offers victims identify theft and credit monitoring services for a three-year period as a means of protection; the General Services Administration also bid a $500 million multiple-provider contract for five years of continuing data breach support (Lyngaas, 2015).

Besides OPM, companies in various industries have been victims of cyber attacks. According to the Identity Theft Record Center, the number of recognized cyber attacks increased from 157 in 2005 to 783 in 2014 (ITRC, n.d.). For large U.S. companies, these attacks come with a high and growing price tag for a knowledge based economy, as Figure 1 indicates. These results are based on a Ponemon Institute study that examined the total cost of responding to cybercrime incidents, including detection, recovery, investigation and incident response (Fowler, 2015). In some instances, company revenue was affected. For example, Target witnessed a drop of 46% in their profits by the end of fourth quarter 2013 after data from 110 million customers were compromised; Sony lost at least $171 million after a breach in its PlayStation video game online network (Ford, 2014).

Although economic losses are a big part of the aftermath of cyber breaches, the loyalty and trust of customers also needs to be regained. Once sensitive data has been compromised by hackers, companies face difficulty in assuring customers that systems are secure and the chance of future breaches has been minimized. One direct consequence of cyber breaches is the cost companies have to pay to make their systems secure. Cyber experts have to be hired and contracts with security companies have to be established in order to gain an appropriate level of protection. The costs for ongoing protection can be sizeable, as we have seen with the massive OPM breach.

Figure 1 – Average Annual Cost of Cybercrime for Large U.S. Companies



Fowler, 2015; Ponemon Institute, 2015

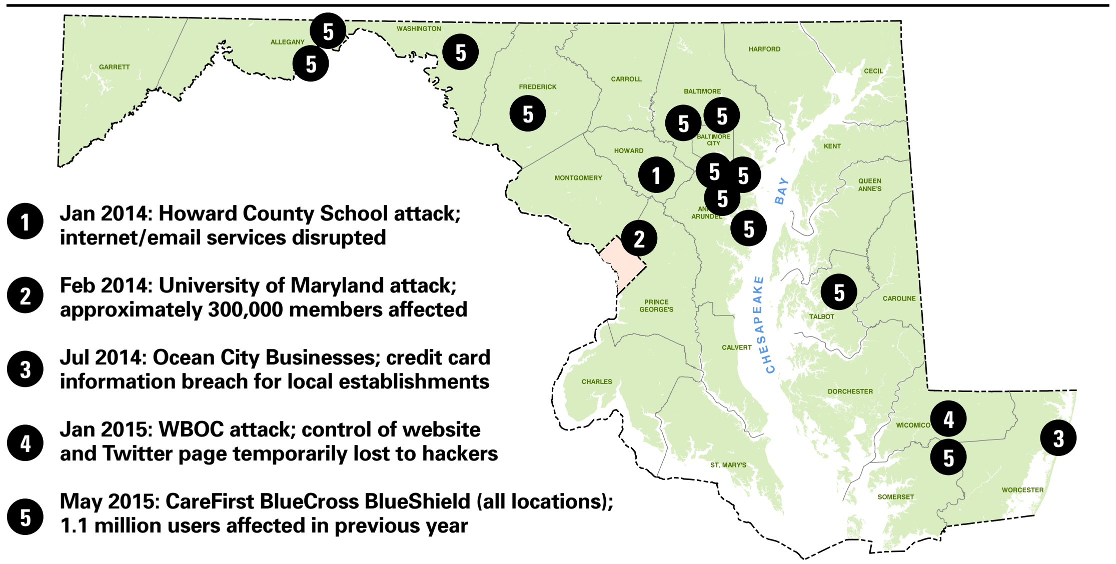
Cyber breaches are not limited to the federal government or major retail and social media companies. As Table 1 indicates, attempted and successful attacks can happen to any company, even those that do business locally. In just the last two years, Maryland and the National Capital Region have seen a dramatic increase in the number of cyber attacks, some of which are noted in Figure 2. For instance, CareFirst Blue Cross Blue Shield, headquartered in Owings Mills, Maryland, experienced a recent incident where members' data (such as names, birth dates, and email addresses) were

Table 1 – Cyber breaches and their impact

Year	Company	Attack Size
2014/2015	CareFirst – BlueCross BlueShield	1,100,000
2015	Office of Personnel Management	22,000,000
2015	Ashley Madison	32,000,000
2014	University of Maryland	300,000
2014	eBay	233,000,000
2014	JP Morgan Chase	83,000,000
2014	Home Depot	56,000,000
2014	Sony Pictures Plaza	50,000
2013	Target	110,000,000
2012	Global Payments Inc.	1,500,000
2011	Citi Bank	360,000

Walter, 2014; Goldstein and Abelson, 2014; Nakashima, 2015; Zetter, 2015; Associated Press, 2015; Information Security Media Group, 2013; Svitek and Anderson, 2014; Adams, 2011

Figure 2 – Several Major Cyber Breaches in Maryland (2014-2015)



Howard County Schools (Toth, 2014), University of Maryland (Svitek and Anderson, 2014), Ocean City Businesses (Sanginiti, 2014), WBOC (Chesney, 2015), CareFirst BlueCross BlueShield (Goldstein and Abelson, 2014)

stolen (Goldstein and Abelson, 2015). The University of Maryland, College Park, was also compromised, with 300,000 affiliate records (including names, social security numbers, birth dates and university IDs) stolen (Svitek and Anderson, 2014). The need for securing systems remains a top priority.

The expanding nature of online business and data storage, including cloud storage and data warehouses, coupled with the Internet's global reach has contributed to the severity and danger of cyber attacks. Furthermore, recent data breaches indicate that hackers are getting more sophisticated. This is a difficult reality for businesses, as protecting their clients' personal data is a vital part of keeping the company's reputation intact. Hackers are usually highly organized groups, who can be tied to organized crime and have matured into using specialized black markets (Verizon, 2014). In order to hack into a company's IT system, the attackers can use exploit kits, as well as viruses and bugs, to infect IT systems. Once the hacker gets into a company's system, employee and customer data (for example, credit card or identity information) can be stolen and sold on the black markets. With increasing connectivity to the Internet, attackers have more engagement opportunities—now, not only cell phones and computers are targets, but also other items which connect to the Internet of Things, such as cars, pacemakers, toasters, and refrigerators (Verizon, 2014). The exponential growth of social media networks and mobile apps are also a reason why closer attention must be paid to cybersecurity in order to protect our personal data from unauthorized third parties (Verizon, 2014).

As government, industry, and academia succumb to cyber attacks, a revolution in cyberdefense is needed. The National Security Agency (NSA), headquartered at Fort Meade, Maryland, responded to the need by sponsoring the Science of Security (SoS) initiative, aimed at the development of scientific cybersecurity foundations, rigorous research, and growing the SoS community. The program is a component of the President's plan for Federal cybersecurity research and development (SoS, 2015). This program funds public and unclassified foundational cyber research through four lablets and twenty-six subsidiaries housed at academic institutions across the United States and United Kingdom. SoS provides scientific understanding and predictive principles to make the cyber world more trustworthy and secure (Schneider, 2012). Science of Security is a transdisciplinary effort bringing to bear not only the principles of computer science, mathematics and electrical engineering, but also psychology, economics, and other social and behavioral sciences (SoS, 2015). Further information about the SoS Initiative can be found at the SoS virtual organization site: http://sos-vo.org.

The Science of Security lablets in collaboration with the NSA have identified five major cybersecurity challenges that need scientific advances, also known as "The Five Hard Problems." Lablet researchers strive

Table 2 – Selected Metrics and Best Practices

Practice, Approach, Measures	Definition	Relevance to Businesses
Honeybots (Zhu, 2013)	Approach to attract attackers who use social media for reconnaissance or launching attacks	Honeybots are fake social media accounts that allow companies to detect attacks not previously seen.
Personalized Application Whitelisting (Gates, 2012)	Allowing only preapproved applications to operate	Application whitelisting prevents running unapproved software. It assists by protecting the company from previously unseen malware and data theft.
Anonymization (Cormode, et al., 2013)	Removal of any personal information associated with data	Keeping customers' identities safe and hidden, while still sharing other data, is important to ensure privacy.
CleanURL (West, 2014)	Mechanism used to identify parts of a URL that contain personally sensitive information	CleanURLs assist company employees from accidently disclosing sensitive information. Many users do not realize that URLs might contain user names, passwords, email addresses or other personal or company information.
Probability of System Vulnerability (Nicol, et al., 2015)	Useful predictor to measure vulnerability of a system and likelihood of being compromised	Supports a risk management framework in regards to software use, identifying vulnerable software pieces in order to decide if the software should be used.
Measuring Attack Surface Area (Nicol, et al., 2015)	Metric to suggest where vulnerability is in a system and predict the conditions in which the vulnerability might occur	Ability of knowing the location of the vulnerability allows mitigation efforts to be focused.
Time System is Vulnerable Before a Patch Deployed (Nicol, et al., 2015)	Metric to determine rate of speed at which a vulnerability is fixed	The speed of resolving a vulnerability is critical to prevent compromise. Companies should use software from vendors who quickly release patches and implement policies to support installation of those patches.

to make progress in these difficult areas. The ongoing problem of *scalability and composability* examines combining secure components into a larger secure item, as vulnerabilities often lie in the gaps between two components. The second problem is *policy-governed secure collaboration*. Addressing this problem develops methods and requirements to guarantee data protection while enabling information sharing and collaboration. The third hard problem is *resilience*, which is the ability of a system to resist an attack by unauthorized parties. The next problem involves accounting for and understanding *human behavior*. Researching the unpredictability and complexity of human behavior aids in the development of models that have increased accuracy while minimizing potential vulnerabilities from humans interacting, possibly insecurely, with systems. Finally, the fifth problem concerns *security metrics*, which measure the security or vulnerability of a system. Metrics are especially difficult because systems are extremely complex with small details potentially having significant impact (Nicol, et al., 2015).

Our specific research ties the leading foundational SoS academic research with best practices from engineering to develop an application toolkit for companies to use to increase their cybersecurity posture. We focus primarily on, but are not limited to, metrics. Many metrics and best practices exist that can be used to monitor networks and assess security. The challenge for senior management is to identify the metrics that are most suitable to their company and address the elements of the system that need to be monitored. Companies who are beginning to implement cybersecurity practices should start with a basic set of measures and expand their scope as their maturity increases. Companies who are seasoned in cybersecurity may be interested in a different set of metrics, while those who have been breached would have a third set of needs. Table 2 presents a sampling of metrics and best practices that can be implemented to increase cybersecurity posture.

Our research identifies which metrics and best practices are most appropriate for companies, based on their current cybersecurity posture, needs, and operating industry. Then, from those metrics, we are developing a value-focused decision model where senior management can assess the importance of these metrics against the unique needs of each company. The output of the model will be a rank-ordered list of metrics in order of importance to the company. Technology departments can then work on implementing the most important metrics. Tradeoffs between the costs to implement best practices against added security can also be evaluated by our models, thus providing a holistic assessment to support a plan of action to protect a company's cyber assets.

Data are becoming more and more insecure as companies increasingly use software and cloud storage. Daily cyber attacks, big and small, demand that we find a solution to this ongoing problem. Although every company is different in their mission, vision, and values, a framework that incorporates continuous improvement with unique company and operating sector needs can provide value by assisting companies in identifying the most important metrics. Protecting assets from cyber threats is a daunting task, but it can be managed with proper focus and application of best practices. Our Towson University-driven research team looks to provide value through this framework and encourages interested companies to contact us at nscala@towson.edu for more information.

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Is Short Selling the Tail that Wags the Dog?

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Sometimes a simple question does not have a simple answer. To understand the role of short selling, one has to step back and try to understand how short selling impacts price discovery in equity markets. We are familiar with the terminology short squeeze, prime brokers, and short interest, but what does it all mean?

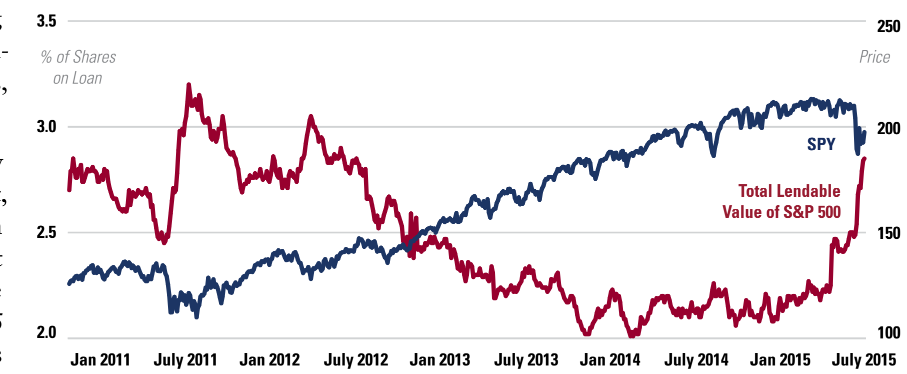
The history of short selling is almost as long as the history of equity markets. While the equity markets came first, written accounts of short selling date back to 1609 on the Amsterdam Stock Exchange. The impact of short selling is undeniable in today's equity markets. One information provider, Markit, provides data on $15 trillion of loanable securities and $2 trillion securities on loan . Looking at Chart 1, there is an inverse correlation between short selling and the 2011 European debt market crisis. In September 2012, the Federal Reserve announced the third round of Quantitative Easing, QE3, which was bullish for equities, and saw short interest fall for an extended period as printed money became a contributing factor to a rising S&P 500. The latest spike in short selling since the summer has been even more dramatic, coinciding with a correction in the Chinese equity market.

What Exactly is Short Selling?

If an investor disagrees with the valuation of a security, they can short sell the security, which is the opposite of buying a security. To profit, the investor needs to sell the security short, have the security fall in value, as expected and then buy the security back in the future at a lower price. How do you sell what you do not own? Short selling is the other side of the coin. The long side of the market is heads and the short side of the market is tails. Price discovery represents the balance of those who approve and those who disapprove of a security's valuation. Daily price corrections reflect the balance between supply and demand and incorporate the impact of news flow on the future earnings associated with a security.

But how can the disapproving investor sell what they do not own? The mechanics of a short sale require the disapproving investor to borrow the security from an investor that holds the security. The borrowed security is then sold, and 100% of the cash generated is deposited in a margin account. The Federal Reserve Board requires all short sale margin accounts to maintain collateral equal to 150% of the value of the security sold short, so an additional 50% worth of collateral is required to initiate a short sale. The lender of the

Figure 1. Average S&P 500 Short Interest %



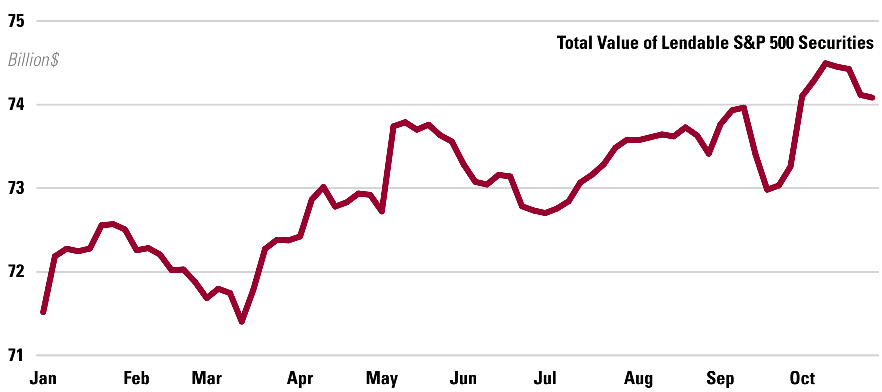
Source: Markit Group Limited

security, typically a broker-dealer, also charges interest on the borrowed security and dividends received by the short seller, which must be passed through to the security lender. The lender of the security also retains the right to recall the security if a special event occurs. Equity securities are freely exchangeable since a share represents a standardized right of ownership. Let us assume the short seller is right and can buy back the security in the future at a lower price, profiting after paying fees, dividends and interest. The shares bought at a lower price are delivered to the security's lender who returns them to their original owner and the short sale is closed out. The brokers that facilitate securities lending are called prime brokers, which is often a division within an investment bank's broker-dealer arm. The security holder is called the beneficial owner, which in financial markets is often called the custodial bank.

Who Lends Securities?

Securities lending is a long-standing practice that allows broker-dealers to avoid delivery failures associated with trade settlement. Prior to the adoption of electronic settlement in the 1970s through the Depository Trust & Clearing Corporation, broker-dealers had to physically deliver securities for trade settlement. Weather and logistical issues led to a practice of lending securities to reduce settlement risk. It is now common practice among institutional investors, such as closed-end investment companies, insurance companies, pension funds, exchange-traded products (e.g. ETFs), college endowments and unregistered investment funds. When retail investors borrow on margin, typically the custodian can lend the securities posted as collateral. In 1981, the Department of Labor amended its Prohibited Trans-

Figure 2. Total Value of Lendable S&P 500 Securities



Source: Markit Group Limited

actions Exemptions to allow pension funds to lend securities more freely, which dramatically increased the number of securities available for lending.

The evolving complexity of the financial markets means there is counterparty risk. When Lehman Brothers went bankrupt, it sent shock waves through the financial markets. One reason for the turmoil was that Lehman Brothers acted as prime broker on billions of dollars of borrowed and lent securities, and overnight the counterparties were denied access to their collateral.

This article focuses on equity securities lending, but to understand the securities lending market, one has to look at the interaction of the financial intermediaries involved. Securities can be borrowed from a custodian, who acts as an agent. Another option is to use a third-party agent. There are two banks in the U.S.: J.P. Morgan and BNY Mellon, which act as third-party agents. Looking at Charts 2 and 3, below, which show fixed income obligations, it is important to note that central banks, investment banks, and money market funds are important players in the securities lending market.

What Is the Motivation for Lending Securities?

The motivation for lending securities is additional income. Securities lenders charge interest on the borrowed shares, which varies widely as it is driven by supply and demand. The highest interest rates occur when there is "special" activity associated with the security, such as recent initial public offerings (IPOs), mergers, spinoffs, acquisitions, or deteriorating credit situations where bankruptcy is a legitimate concern. IPOs create unusual demand for a security while at the same time imposing share sale restrictions on insiders, which typically includes management, founders, venture capitalists and/or private equity investors. The lock-up provisions negotiated by investment banks create limited free float typically for four to six months, which means there are fewer shares available to borrow for a short sale.

For example, short sellers paid an interest rate of up to 30% annually to short Twitter securities prior to the company's lock-up expiration on May 6, 2014. The expiration of an IPO lock-up does not guarantee profits for short sellers since share price for recently listed companies can still surge. In June 2015, short sellers were willing to pay an annual interest rate over 100% to lenders for the right to short Shake Shack shares before the lock-up provision expired as Shake Shack shares rallied. Fitbit's lock-up expires on December 15, 2015. On October 30, short interest in Fitbit represented 41% of the company's share float. Lucrative returns entice beneficial owners of securities to lend more securities, as seen in Chart 2, which details the number of securities available to for S&P 500 securities.

The interest rate on securities lent is inversely related to a company's market capitalization. The average collateral lending interest rate for Russell 2000 securities, a popular small cap index, is 20 basis points, whereas the average collateral lending interest rate for S&P 500 equity securities is 2.5 basis points. The lower interest rate on S&P 500 securities is driven by huge share floats where, on average, 25% of shares outstanding for S&P 500 companies are available to borrow. Supply and demand determine the interest rate on borrowed securities. Typically the lending agent gets 15% of the securities lending proceeds and 85% goes to the custodial bank or beneficial owner.

The Value of Securities on Loan, Chart 3, shows how securities on loan have fallen by half since 2008. There are three primary factors to this trend. First, the dramatic equity market sell-off during the financial market crisis lowered the value of securities on loan. Second, the SEC instituted a ban on short selling shares of financial institutions during the financial crisis. Third, short sales were closed out as short sellers locked in profits made when the equity markets corrected. Financially, the Federal Reserve's ultra-accommodative zero interest rate policy has meant the interest realized on cash collateral pledged over the life of a short sale has become negligible.

While the value of securities on loan appears relatively flat between 2009 and 2015, the S&P 500 doubled in value during this period, so the percentage of equity securities borrowed and sold short has actually fallen. Looking at Chart 4, The Composition of Securities Lending by Security Type, it is apparent that equity securities account for a little less than half of the total value of securities on loan in the securities lending market. The primary users of the fixed income securities on loan are central banks and money market funds.

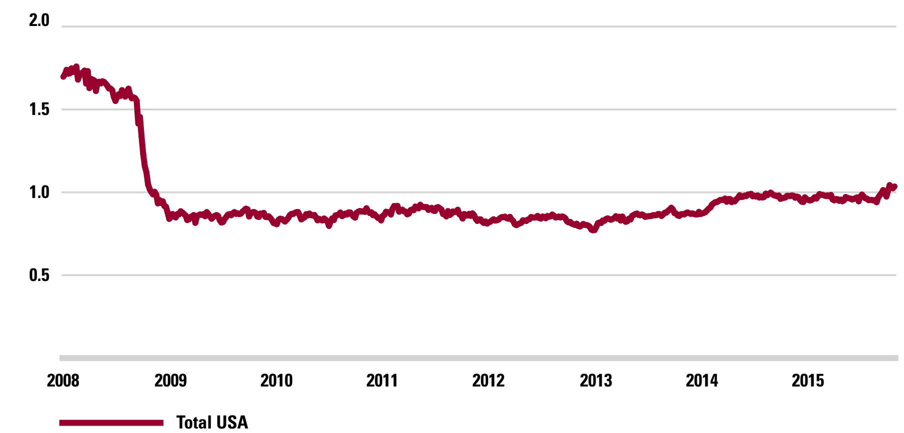
How Do Short Sellers Impact Price Discovery?

Short sellers have been repeatedly identified as a potential source of what ails the market, and so there have been numerous bans, restrictions and curtailments placed on short selling by regulators. A central question is what role do short sellers play in price discovery? If markets are efficient, should not regulators and investors be indifferent to short sellers? For the purposes of this article, short sellers are going to be grouped into three buckets. The first bucket represents Volatility Reducing Short Sellers, or short sellers who use fundamental research to identify overvalued companies or companies that appear to be frauds. From a profitability perspective, short sellers stand to profit the most from securities that could go to a value of zero due to fraud or bankruptcy. By shorting such companies, short sellers serve a public good by exposing potentially fraudulent corporate behavior.

The second group of short sellers is Hedgers. This bucket has grown considerably as "risk parity" and "hedged" investment strategies have grown in popularity. Following the risk imbalances exposed during the 2008 financial crisis, a number of investors have sought to reduce volatility by managing portfolio risks. Risk parity seeks to offset growth/contraction risks and inflation/deflation risks. The strategy requires risk rebalancing, which uses short selling amongst other techniques to rebalance risk. Hedged investment strategies are very diverse and range from banks hedging loan exposures to investors hedging risk exposures with options.

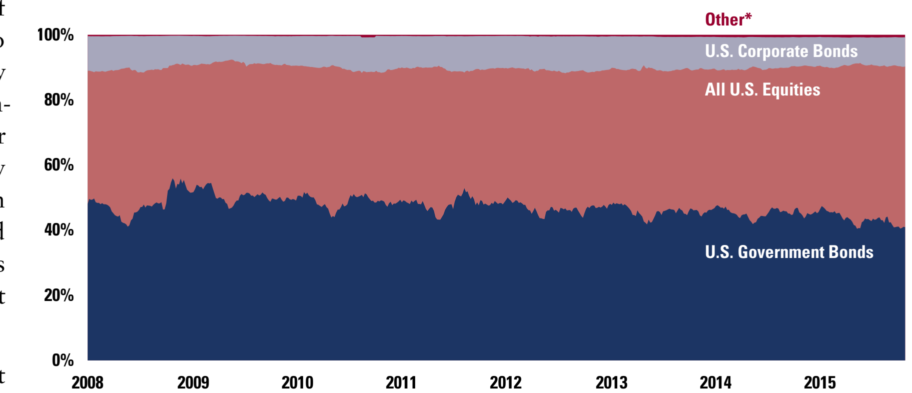
The third bucket of short sellers includes Volatility Creating Short Sellers. They seek to profit by aggressively shorting an equity security. Their sale of borrowed shares increases the supply of shares. This group of speculative traders is frequently blamed for introducing unwarranted volatility into specific equity securities. The short selling activities of these three types of investors receive significant media attention. It is important to note that the for-profit media have a natural incentive to build up the management teams behind equity securities since they are often primary source of advertising revenue.

Figure 3. Value of Securities on Loan in Trillions



Source: Markit Group Limited Note: Data is based on a survey of agent-based lenders

Figure 4. Composition of U.S. Securities Lending Market by Security Type in %



Source: Markit Group Limited Note: Data is based on a survey of agent-based lenders.
Other includes U.S. ETFs and American Depository Receipts

What Does All This Mean?

Perhaps the best way to summarize the importance of short interest in equity securities is to underscore that there are different drivers that motivate market participants to take short interest positions. Using an analogy, short interest can be compared to clouds. Clouds are an indicator that it may rain but their presence does not mean it will rain. Short interest is an indicator that there may be a price correction but the presence of short interest does not mean there will be a price correction. The circumstances of each equity security must be individually examined. Short selling is often focused on companies with inconsistent earnings.

When looking at the short interest of an equity security, it is important to measure the short interest relative to the days to cover, which is a ratio that measures how many days it takes to close out the short position based on the average daily trading volume of the security. There is no one-size-fits-all benchmark but when the days to cover exceed a week of trading volume, it is fair to say "the clouds" of short interest may be providing an indicator worth considering if an investor is considering going long a security.

Is it completely negative when the short interest exceeds 30% of shares outstanding? Yes and no. A 30% short interest is clearly a negative investor sentiment indictor, but do not forget short interest is an incomplete transaction. The short seller is contractually obligated to cover the borrowed shares sold short, i.e. they are a guaranteed buyer in order to close out their short sale.

A positive valuation surprise for an equity security with a large short interest position often results in a "short squeeze". Short sellers are quickly squeezed by the rising security value and margin requirements to close out their short positions. It is important to note that short selling does not have limited losses. Investors that go long, or buy equity securities, know their losses are limited to the invested principal. A short seller is exposed to huge losses that are larger than the invested capital if a "short squeeze" occurs. On October 16, 2015, Weight Watchers International closed at $6.79 a share. The last bimonthly stock exchange disclosure of short interest in Weight Watchers International indicated 27.5% of the share float (15.7 million shares) were short. On October 19, 2015, it was announced that Oprah Winfrey had agreed to buy 10% of the company (6.4 million shares). Her purchase created a powerful short squeeze that rocketed the share price to $18.27 on October 20, 2015. For each $10,000 an investor had sold short on October 16, 2015, they were looking at a ($26,907) loss on October 20, 2015.

How Does Short Selling Impact Public Companies in Maryland?

In varying levels, short selling impacts all publicly traded companies that operate in Maryland. A specific challenge with short interest is the limited disclosure. Currently, the investing public only receives bi-monthly short interest data from U.S. stock exchanges. It is also important to note that the data reported by U.S. exchanges is 10 to 13 days after the trade date, making the information quite stale. From a fair disclosure perspective, more transparency is needed from stock exchanges so investors can understand the sentiments of those who disapprove of an equity securities valuation. There are alternate data sources available. Markit, a leading gatherer of data in the securities lending market, reports short interest data based on securities lending four days after the trade date. Gathering the data is quite involved, since data comes from over 100 custodian banks and over 40 prime brokers on a daily basis. However, gaining access to the aggregated data requires a significant subscription expense.

Concluding Thoughts

In certain instances, those who disapprove of the valuation of a security are the tail that wags the dog – the market price. In other instances, it is the approval of investors buying the security that wags the dog. Price discovery is a dynamic process that represents both optimism and pessimism. Short selling is not as familiar as the traditional buy and hold and the mechanics are more complex. Another contributing factor is the lack of transparency, complicated by data gaps in the securities lending market, which makes the process unfamiliar to the investing public. The Flash Crash on May 2, 2010, and the more recent pricing irregularities on August 24, 2015, clearly indicates that price discovery is challenged by market fragmentation, high frequency trading and fewer market makers. The U.S. Treasury's Office of Financial Research is working with the Financial Stability Oversight Council and the Securities and Exchange Commission's Equity Market Structure Advisory Committee to identify the threats to financial stability. Short selling has been banned or restricted on a number of occasions because it is poorly understood. During the 2008 financial crisis, it was believed that short selling was causing financials to fall after Lehman Brothers' bankruptcy. Short selling is a valuable component of a healthy market since it provides insight into investors that disapprove of the current valuation, which enables more complete and accurate price discovery. Equally importantly, short selling keeps bubbles and fraud in check. The role of short selling in price discovery has often been misunderstood, but at the same time investors cannot trust what they do not know. U.S. stock exchanges need to move to weekly disclosures of short interest to address the transparency issue.

Resources:

http://www.investopedia.com/terms/m/margin.asp

https://www.khanacademy.org/economics-finance-domain/core-finance/stock-and-bonds/shorting-stock

http://www.markit.com/Commentary/Get/15092015-Equities-US-short-interest-shoots-up-to-three-year-high

Include SEC letter from Irving Klubeck BNY Mellon

https://www.sec.gov/divisions/investment/securities-lending-open-closed-end-investment-companies.htm

https://www.ici.org/viewpoints/view_11_securities_lending

https://blog.wealthfront.com/hedging-stock/

http://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/2015%20FSOC%20Annual%20Report.pdf

https://en.wikipedia.org/wiki/Risk_parity

http://www.bwater.com/Uploads/FileManager/research/All-Weather/All-Weather-Story.pdf

http://www.convergex.com/uploads/Pickard_Report_2014_Q2.pdf

http://www.markit.com/Commentary/Get/05082015-Equities-Shorting-IPO-lockup-expiration

http://www.haas.berkeley.edu/groups/finance/mustopaper2.pdf

http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471660205.html

Corporate Social Responsibility in Maryland

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In a society in which large corporations have the power to do good or fail to do so, Volkswagen's breach of trust in misrepresenting its products' environmental compliance will linger long on the corporation. Such a failure can ruin a corporation's reputation and change consumers' attitude to the company. We take a close look at the systems in place which help us monitor local companies' socially responsible actions and report on their initiatives.

Evolution of Corporate Social Responsibility

Corporate social responsibility (CSR) can be traced to early industrialists who recognized that their activities impacted the fabric of society, which led to a desire to realize the ensuing moral responsibility via philanthropy and charity. From this origin, CSR has evolved to be related more closely to its impact on stockholders. CSR is no longer a moral imperative but has become another driver of value through which a company can reduce risk and costs and simultaneously improve branding and media recognition. In this regard, CSR has evolved to include concrete activities that corporation can report. These answer society's pressure and satisfy investors' concerns. In that context, CSR no longer carries the same meaning for corporations, investors and consumers.

In its second annual public opinion survey,[1] Do Well Do Good reports that a majority of consumers (83%), expect corporations to accomplish their business goals while trying to improve society and the environment. The survey found 70% of consumers hold CEOs to a high level of responsibility for their company's impacts on the environment, employees, and their larger community. If an employee tells them why a cause is important and why the company supports it 61% of customers are willing to support the cause marketing. Employees have a positive view of their companies in general, and about 70% believe their employer is honest and transparent about their business practices and manufacturing processes and also effective in regularly contributing to charities and non-profit organizations. They are also satisfied with employers' attitudes in allowing employees to volunteer on company time.

Tracking Corporate Social Responsibility

Beyond this survey result on general attitude, MSCI provides Environmental, Social and Governance (ESG) ratings[2] for 3,100 companies. Their scoring spans six major categories: Environment, Community, Employee Relations, Diversity, Corporate Governance, and Product. Additionally, the ratings system contains indicators that track if a company is involved in controversial business activities: alcohol, gambling, firearms, military, nuclear power, and tobacco. This information is invaluable to the investment community as well as watchdog organizations that monitor corporate activities and their impacts on society.

The table below illustrates which corporate actions result in a positive (Strength) or negative (Concern) rating for each corporation for each category. These are some examples as the MSCI process contains more measures.

Table 1. A selection of MSCI ESG Rating indicators

	Strength	Concern
Environment	Waste Management Raw Material Sourcing	Supply Chain Management Climate Change
Community	Community Engagement Innovative Giving	Community Impact
Employee Relations	Employee Health & Safety Professional Development	Child Labor Supply Chain
Diversity	Board of Directors Diversity Employment of Underrepresented Groups	Workforce Diversity
Governance	Reporting Quality Financial System Instability	Governance Structures Controversial Investments
Product	Quality Access to Finance	Anticompetitive Practices Customer Relations

Using the available data for the majority of these measures, we aggregate companies' strengths and concerns in these various CSR areas to track the improvement of CSR actions by firms in the United States and contrast that to those of Maryland companies. The evidence is presented in Figure 1.[3]

Nationwide, the evidence indicates a troubling trend of decreasing ratings for U.S. corporations, which reflects increasing violations of the public trust in matters of executive compensation, lack of transparency and weakness in diversity policies. During this time, the Maryland scorecard did not deteriorate to the same extent showcasing that Maryland firms have improved their record.

Figure 1. Historical trend in CSR rating for United States and Maryland companies

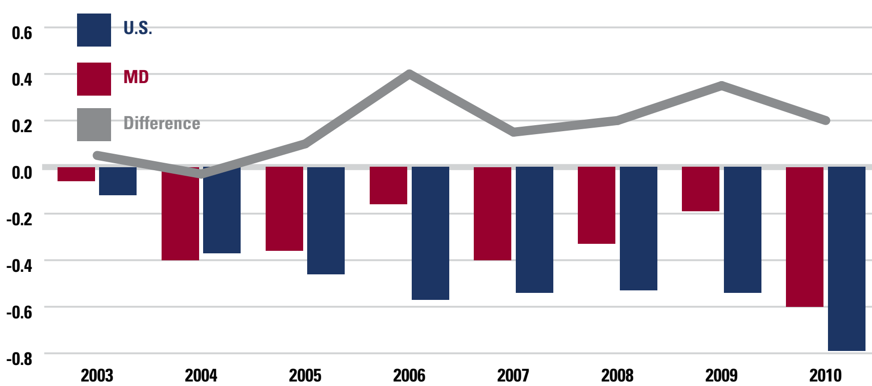

Table 2. MSCI CSR Scores for Sample Maryland Corporations

Company Name	CSR Score	Strengths	Concerns
W. R. Grace	-3	0	3
Legg Mason	2	3	1
McCormick	10	10	0
T. Rowe Price Group	4	4	0
Under Armour	-2	1	3

Investigating further at the individual category level, we uncover that the drivers of deterioration for the nation include a decline in quality governance and treatment of minorities. These declines are counterbalanced in part by improvement in companies' regard for the environment. In contrast, Maryland firms have improved against the national average because they have treated minorities better and have vastly improved their relationship and attitudes towards their workforce.

Legal Environment

While not under the direct purview of the state, Maryland demonstrated its commitment to support companies that put principles before profits. On April 13, 2010, former Governor Martin O'Malley created a legal structure for benefit corporations, which insulates them from shareholder lawsuits.[4] The protection allows the benefit corporations to blend more effectively business with social and environment good.[5] In order to be granted the status, these firms must continually report on their activities and submit to audits. Maryland's law was the first of its kind in the nation and has been quickly followed by similar initiatives in a dozen states including Vermont, New Jersey and Virginia.

Corporate Social Activities in Maryland

We disaggregate the data represented in Figure 1 and report the 2010 scores of five local companies in Table 2.

The scores range from a low of -3 to a high of +10. We highlight some of the strengths and concerns of each firm in the following section in which we cover the CSR initiatives and programs of these local firms.

W.R. Grace

W.R. Grace's CSR score of -3 reflects three concerns. W.R. Grace's lack of women on its corporate board back in 2010 was combined with issues related to the quality and safety of its product and its impact on the community. As of 2015, the company's current board of directors comprises 10 members, of which 3 are women: Marye Anne Fox, Diane H. Gulyas and Janice K. Henry.

Grace's community stewardship centers on STEM education and basic needs. Grace contributes to programs that improve quality of life in the most meaningful ways possible, including education, health and human services organizations, particularly in areas where Grace has a significant employee presence.

Legg Mason

Legg Mason's CSR score of +2 reflects strengths and one concern. Legg Mason is recognized for its standard of financial management as well as its stance on climate change with a single demerit for employee relationship.

Legg Mason's Corporate Citizenship program is affirmed through philanthropy, volunteerism, diversity and inclusion and respect for the environment. Its philanthropy invests primarily in education as a foundation for civic improvement but also supports health and human services, community development, arts and culture and the environment.

McCormick

McCormick's CSR score of +10 is the highest of the local companies. With no concerns, the MSCI ratings highlights McCormick's dedication to waste management in its operations, its commitment to employ directly and indirectly through contracting under-represented groups while maintaining high standards in its supply chain. Finally, the score reflects McCormick's commitment to high involvement of its workforce in the company as well as its charitable giving. The score reflects several of McCormick's initiatives as detailed below.

McCormick's CSR work demonstrates the Passion for Flavor. In a four-pronged approach, McCormick aims to promote Power of People to help employees improve communities, to invest in Taste You Trust by investing in sustainable agriculture, to provide Inspiring Healthy Choices focusing on educating consumers, and to improve Delivering High Performance by reducing resources consumption.

T. Rowe Price

T. Rowe Price's CSR score of +4 reflects strength and no concerns. T. Rowe Price's score reflects its commitment to diversity by employing underrepresented groups, adopting positive policies on gay and lesbian issues, and promoting women within its organization.

T. Rowe Price is committed to financial education for children and judges it a critical investment in our future. T. Rowe Price is a long-time partner to Junior Achievement whose mission emphasizes education and building financial capabilities. Together, they launched Money Confident Kids to encourage wise spending and saving. The program is intended to reach 75,000 children nationally in its first year online.

Under Armour

Under Armour's CSR score of -2 result from its positive of strong ties to the local communities tempered by concerns that at the time its corporate board had no women and that its reporting on CSR lacked transparency; since then, Karen W. Katz, President and Chief Executive Officer of Neiman Marcus Group LTD LLC, has been added to the board.

Under Armour's corporate giving is driven by its Give Back campaigns, which aims to transform communities by inspiring others. Under the Give Back umbrella, Under Armour supports Power in Pink, which celebrates women who use exercise to stay healthy and also raises awareness for breast health. The WIN Global initiative empowers athletes of the NEXT generation by providing access to sports to kids in underserved communities. And, finally, UA Freedom supports the brave by supporting annually First Responders, Military Support Organizations, Law Enforcement Officers and Veterans.

Endnotes

[1] The Do Well Do Good Second Annual Public Opinion Survey on Cause Marketing and Sustainability, 2010.

[2] MSCI ESG STATA – User Guide & ESG Ratings Definition, 2013. Note that MSCI series is a continuation of the RiskMetrics KLD STATS & ESG Ratings database it acquired in 2009.

[3] The RiskMetrics / MSCI data goes back as early as 1991 but firm coverage is stable from 2003 forward.

[4] New legal protections for social entrepreneurs by John Tozzi in Bloomberg Businessweek, April 22, 2010.

[5] Maryland creates new type of 'socially responsible' corporation by Nicole Wallace in the Chronicle of Philanthropy, April 15, 2010.

Towson University Index—Towson University Investment Group

Stefan Bordonaro

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The Towson University Index (TUI) was created in 2007 to measure the performance of publicly traded companies that had a connection to Towson students. The index is meant to serve as a sample of companies that have a history of hiring Towson University students, are thought to be possible hirers of Towson students, or have some other connection to the University or the state of Maryland. The original TUI had 30 Maryland-based companies and 10 companies located outside of the state.

Now composed of 50 publicly traded companies, the TUI contains 31 Maryland-based companies and 19 non-Maryland companies. In designing the index, we used a weighted approach based on market capitalization where companies with larger market capitalizations represented a greater representation than their smaller counterparts. Maryland based companies also received a greater weight in the TUI than companies based outside the state.

Figure 1 illustrates the performance of the Towson University Index ("TUI") in relation to the S&P 500 index for the period between July 2007 and August 2015. Since the TUI's inception in 2007, the index has outperformed the S&P 500 by 51.6%. The three most represented sectors in the TUI are Financials at 53.7%,

Table 1. Companies Based in Maryland

Ticker	Company	Market Cap	Sector	Quarterly Revenue*	Employees
ADX	Adams Express Co	1,269M	Financials	13	30
AGNC	American Capital Agency Corp	6,621M	Financials	629	392
AGX	Argan Inc	573M	Industrials	97	862
LEU	Centrus Energy Corp.	33M	Energy	63	507
CHH	Choice Hotels International Inc	2,944M	Consumer Discretionary	232	1,331
CIEN	Ciena Corp	3,076M	Information Technology	603	5,196
OFC	Corporate Office Properties Trust	2,050M	Financials	170	378
CSGP	CoStar Group Inc	5,889M	Industrials	171	2,444
DISCA	Discovery Holding Co	19,730M	Consumer Discretionary	1,654	6,800
FGL	Fidelity & Guaranty Life	1,358M	Financials	330	200
GPX	GP Strategies Corp	419M	Industrials	126	3,300
GVP	GSE Systems Inc	24M	Information Technology	14	335
LHO	LaSalle Hotel Properties	3,632M	Financials	341	35
LM	Legg Mason Inc	4,906M	Financials	709	2,982
LMT	Lockheed Martin Corp	63,320M	Industrials	11,643	112,000
MGNX	MacroGenics, Inc	967M	Healthcare	7	211
MAR	Marriott International Inc	19,010M	Consumer Discretionary	3,689	123,500
MKC	McCormick & Co Inc	10,220M	Consumer Staples	1,024	10,000
MED	Medifast Inc	337M	Consumer Discretionary	72	579
OHI	Omega Healthcare Investors Inc	6,350M	Financials	122	25
OSIR	Osiris Therapeutics Inc	645M	Healthcare	24	211
SASR	Sandy Spring Bancorp Inc.	628M	Financials	34	727
SBGI	Sinclair Broadcast Group Inc	2,497M	Consumer Discretionary	554	7,700
TROW	T Rowe Price Group Inc	18,550M	Financials	1,072	5,991
TSYS	TeleCommunication Systems Inc	211M	Information Technology	88	1,072
TESS	Tessco Technologies Inc	193M	Information Technology	148	786
SLCA	U.S. Silica Holdings, Inc	1,063M	Energy	148	1,092
UA	Under Armour Inc	22,460M	Consumer Discretionary	784	4,300
UTHR	United Therapeutics Corp	7,307M	Healthcare	347	740
UUU	Universal Security Instruments Inc	14M	Industrials	3	15
GRA	W.R. Grace & Co	7,252M	Materials	782	6,500
Total		**213,548M**	***numbers expressed in millions**		

Disclosure:

The current TUI is based on the 2015 TUI and was updated with the assistance of Towson University's Internship and Career Services program. Historical company prices were obtained from Yahoo Finance, employee figures were obtained from MSN Money, sectors of the companies and their respective quarterly revenues were obtained from NetAdvantage, a Standard and Poor's service. August 28, 2015 market capitalizations where obtained by dividing recent company market capitalizations by recent company prices and multiplying this number by the share price on August 28, 2015. This calculation assumes the effects of changes due to share insurances to be minimal.

Table 2. Companies Based Elsewhere

Ticker	Company	Market Cap	Sector	Quarterly Revenue*	Employees
BBT	BB&T Corp	27,200M	Financials	2,508	33,400
BBY	Best Buy Co Inc	12,360M	Consumer Discretionary	8,528	125,000
COF	Capital One Financial Corp	41,940M	Financials	6,072	47,500
C	Citigroup Inc	163,370M	Financials	17,682	237,000
KIM	Kimco Realty Corp	9,739M	Financials	294	580
MTB	M&T Bank Corp	15,850M	Financials	1,257	15,380
MS	Morgan Stanley	56,280M	Financials	9,743	55,795
NOC	Northrop Grumman Corp	31,020M	Industrials	5,896	64,300
PRXL	PAREXEL International Corporation	3,731M	Healthcare	605	18,660
PNC	PNC Financial Services Group Inc	46,860M	Financials	4,119	49,745
PG	Procter & Gamble Co	193,210M	Consumer Staples	17,790	110,000
RHI	Robert Half International Inc.	6,918M	Industrials	1,272	14,000
SHW	Sherwin-Williams Co	24,060M	Materials	3,132	39,274
LUV	Southwest Airlines Co	24,470M	Industrials	5,111	47,645
SWK	Stanley Black & Decker Inc	15,400M	Industrials	2,867	50,400
SF	Stifel Financial Corp	3,268M	Financials	598	6,338
MW	The Men's Warehouse, Inc	2,743M	Consumer Discretionary	920	18,600
UPS	United Parcel Service Inc	88,170M	Industrials	14,095	237,300
WFC	Wells Fargo & Co	269,710M	Financials	22,274	265,800
Total		**1,036,299M**	***numbers expressed in millions**		

Figure 1. TUI Relative to S&P 500

Consumer Staples at 16.3%, and Industrials at 17.0%. For the trailing 12 months, the TUI has outperformed the S&P 500 by 11.2%.

We noted three acquisitions / mergers and one bankruptcy in this year's Towson University Index. The companies acquired include Susquehanna Bancshares Riverbed Technology, and Micros Systems. The company that filed for chapter 11 bankruptcy restructuring was USEC. The companies that were acquired made up 4.61% of the TUI. The index weighting for the Chapter 11 restructured Centrus Energy Corporation, formerly USEC Inc., was only 0.02% of the TUI.

To account for the acquisitions / mergers and bankruptcies, we had to make a few replacements to the TU index. The edits made in the TUI for the Maryland-based companies were the replacement of Micros Systems, which was acquired by Oracle Corporation, with LaSalle Hotel Properties, and the Chapter 11-restructured USEC (Centrus Energy). LaSalle Hotel Properties and the new Centrus Energy are both based in Bethesda, Maryland. LaSalle Hotel Properties is a real estate investment trust (REIT) that engages in purchase, redevelopment, and leasing of luxury hotels throughout the United States. No replacement was required for USEC because the company recently emerged from its bankruptcy proceedings with a new name, Centrus Energy which supplies low enriched uranium for commercial nuclear power plants.

Table 3: Mergers & Acquisitions

Company	Ticker	Acquired by / merged with:	Closing date	TUI Weighting
Micros Systems	MCRS	Oracle Corp. (ORCL) for $5.3 Billion	9/9/2014	2.54%
Riverbed Technology, Inc	RVBD	Thoma Bravo (Private) for $3.6 Billion	4/24/2015	1.75%
Susquehanna Bancshares Inc.	SUSQ	BB&T Corp. (BBT) for $2.5 Billion	8/3/2015	0.31%
All companies were replaced with new additions for this year's TUI			**Total**	**4.61%**

As for the replacements and edits for non-Maryland based companies, we replaced Riverbed Technology, acquired by Thoma Bravo, with PAREXEL International Corporation, and Susquehanna Bancshares, acquired by BB&T Corp., with Stifel Financial Corporation. PAREXEL International Corporation is based in Waltham, Massachusetts, and is a multinational life sciences consulting firm. Stifel Financial Corporation is based in St. Louis, Missouri, and is a financial services holding company, whose capital marketing group is based in Baltimore.

One of the noticeable trends that have developed over the last few years is the amount of M&A activity exhibited in the TUI and the number of recently priced and filed Maryland initial public offerings (IPOs). Last year, the Towson University Index had six companies that were acquired. Among the 2014 acquired companies were Micros Systems (closed on 9/9/2014, but replaced this year), Jos A Bank Clothiers Inc., CapitalSource Inc., OPNET Technologies Inc., Arbitron, and Sourcefire Incorporated. Some of the most notable recently priced IPOs for Maryland-based companies are Inovalon Holdings, Inc., a cloud-based healthcare analytics company based in Bowie; Terraform Global Inc., a diversified renewable energy company based in Bethesda; OpGen, an early-commercial stage molecular testing company based in Gaithersburg; Regenxbio, an early-stage gene therapy biotechnology company based in Rockville; and Enviva Partners, the world's largest supplier of wood pellets based in Bethesda. And two companies recently filed for an IPO: Laureate Education Inc., the largest global for-profit college network based in Baltimore and Cerecore, a clinical-stage biopharmaceutical company that focuses on neurological and psychiatric disorders.

Based on the observable global trend in increased M&A activity and IPOs, it is no surprise that so many Maryland-based companies are also following the general market trends. This increase in activity is reflective of a changing market environment and the easy access to capital. As long as general market trends continue, Maryland-based firms should continue to benefit from the overall financing trends. Going forward, healthy Maryland-based companies will use this raised capital to support growth for themselves and promote jobs and economic activity for their surrounding communities.

The TUI serves to demonstrate the opportunities available to the students of Towson University. The index is meant to acknowledge the relative performance of publicly traded companies connected to the University and does not account for the private companies and government organizations that also contribute to growth in the area.

150 years

TOWSON UNIVERSITY

Towson University Investment Group

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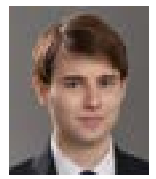
Contributors



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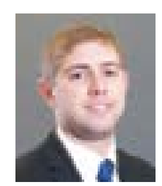

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Contributors

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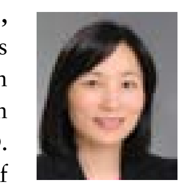

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Contributors

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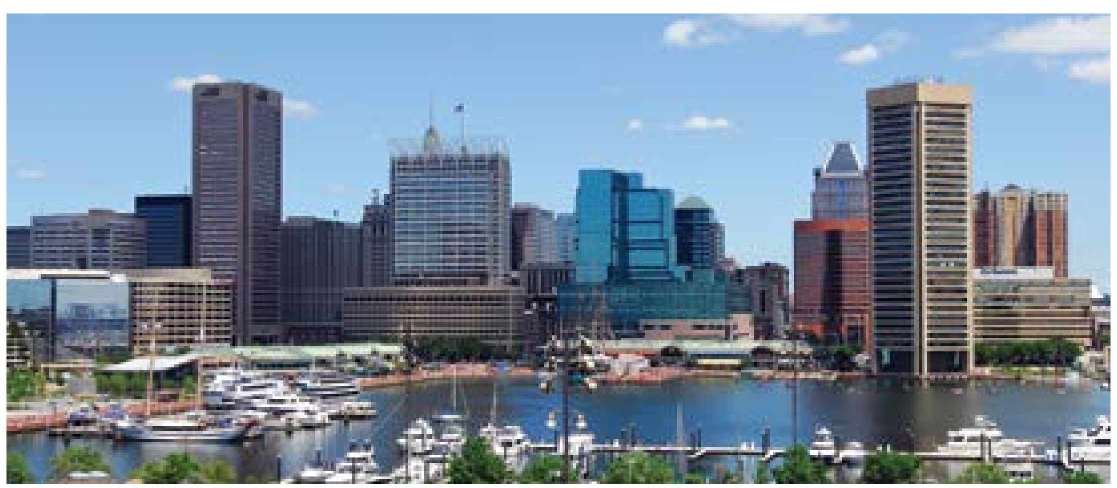
Christy is a seasoned entrepreneur and investor with 20 years of experience primarily focused on the life sciences and healthcare industries. Prior to her career as an entrepreneur, Christy was a Managing Director at Maverick Capital, a long-short equity hedge fund with over $12 billion under management, where she had a long track record of successful healthcare investing in both public and private companies. Prior to that, she was a healthcare and medical technology stock analyst at T. Rowe Price. Christy co-founded two Baltimore based start-ups and has served as a formal and informal advisor to many others.

At Johns Hopkins, Christy has responsibility for efforts related to technology transfer, commercial relations and business development, the Social Innovation Lab, the DreamIt HCIT accelerator, and all things entrepreneurial, including over 120 active JHU start-ups.

About Towson University

Founded in 1866, Towson University is recognized among the nation's best regional public universities, offering more than 100 bachelor's, master's and doctoral degree programs in the liberal arts, sciences and applied professional fields on its 328-acre campus. Serving more than 21,000 students, Towson University is one of the largest public universities in Maryland. The university provides innovative graduate courses and programs that respond to specific state, regional and national work force demands. As a metropolitan university, Towson plays a key role in the educational, economic and cultural life of its surrounding communities, the Baltimore metropolitan area and the state of Maryland.

About The CFA Society Baltimore



The CFA Society Baltimore is a local member society of CFA Institute, which has over 135,000 members in 150 countries/territories. The CFA Society Baltimore has over 650 members strong, draws from a diverse cross section of local investment firms, financial and educational institutions, and government agencies.

The CFA Society Baltimore's mission is to provide the financial community with information and knowledge, while advocating ethical conduct with regard to investments and financial management. The CFA Society Baltimore also seeks to encourage and aid the education of persons engaged in the investment profession, and to provide members of the society with opportunities to exchange ideas and information amongst their peers.

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Towson University Incubator

The Towson University Incubator serves as an entrepreneurial resource and activity hub inside and outside of Towson University. The TU Incubator assists quality early-stage companies and entrepreneurs who have an innovative idea and viable business plan for growth. Uniquely positioned to assist entrepreneurs, the incubator leverages university resources and expertise, particularly in the field of education. Members receive a wide range of support, including affordable office facilities, customized counseling, access to a seasoned advisory board and mentor network composed of business and economic leaders, and collaboration and networking opportunities with member companies and partners. Tap into TU Incubator's resources today!

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