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Message from the Dean

2

Message from the President

3

Financing Baltimore's Growth – Measuring Small Companies' Access to Capital

4

Mary J. Miller, CFA – Visiting Senior Fellow, The Johns Hopkins 21st Century Cities Initiative
Ben Siegel – Executive Director, The Johns Hopkins 21st Century Cities Initiative
Mac McComas – Program Coordinator, The Johns Hopkins 21st Century Cities Initiative

Regulatory Compliance Cost for Small Maryland Banks

8

Michaël Dewally, Ph.D. – Associate Professor, Department of Finance, Towson University
Yingying Shao, Ph.D., CFA – Associate Professor, Department of Finance, Towson University

Why Are Technology Companies So Difficult to Invest In?

12

Niall H. O'Malley, MBA – Portfolio Manager,
Blue Point Investment Management

Maryland IPOs: High Tech in the Hub

18

Lijing Du, Ph.D. – Assistant Professor, Department of Finance, Towson University
Jian Huang, Ph.D. – Assistant Professor, Department of Finance, Towson University
Adam Macek – President, Towson University Financial Management Association
Annaliese Winton – Major in Financial Economics, Towson University

The Fintech Transformation

22

Nicola Daniel – Executive Director, CFA Society Baltimore

Disasters Strike – Ready or Not?

28

Jasmin Farahani – Graduate Student of MS in Marketing Intelligence, Towson University
Tobin Porterfield, Ph.D. – Associate Professor,
Department of eBusiness & Technology Management, Towson University

Importance of Knowing the Value of Your Trade Secret

32

Zachary Reichenbach, CFA, CPA/ABV – Manager, Ellin & Tucker

Entrepreneurship Education: A Summary of Meta-Analytic Findings and Their Applications at Towson University

36

Shanshan Qian, Ph.D. – Assistant Professor, Department of Management, Towson University

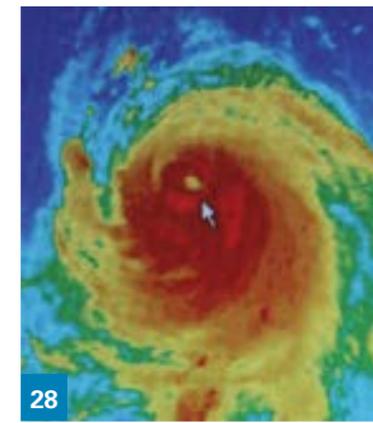
Can Towson Students Beat the Market? Evidence from a TU Survey Portfolio

40

Silas Hoxie – Portfolio Manager, Towson University Investment Group
Regis Breen – President, Towson University Investment Group

Contributors

44



28

32



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Message from the Dean

Towson University, College of Business and Economics



Dear Colleagues and Friends,

We are thrilled to share with you the ninth issue of the *Baltimore Business Review: A Maryland Journal*. It represents the delightful outcome of the ongoing collaboration between the faculty of the College of Business and Economics at Towson University (CBE) and the Baltimore CFA Society. This journal leverages the relative strengths of both organizations to create an outstanding resource which showcases Maryland's business opportunities.

This issue reflects the range of expertise our partnership provides and mirrors CBE's mission to connect theory to practice in curricular, extra-curricular and research activities. In this issue, you will find two collaborated articles between our faculty and students: one studies the initial public offerings (IPOs) for Maryland based firms, and the other addresses best practices in business continuity planning and infrastructure restoration. You will also read about the entrepreneurship program at Towson University as an example to illustrate the development and application of entrepreneurship education, as well as compliance costs for smaller Maryland banks following the implementation of the Dodd-Frank Act.

I would like to express my appreciation to all contributors to this issue of the *Baltimore Business Review*. It is their generous contributions of time and effort that made this publication possible. As always, we look forward to hearing any feedback.

Best regards,

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

Message from the President

CFA Society Baltimore



Dear Colleagues and Friends,

It gives me great pleasure to share with you the ninth edition of the Baltimore Business Review, a product of an important and fruitful partnership between the CFA Society Baltimore and Towson University's College of Business and Economics. We at the CFA Society Baltimore hope that this partnership continues to strengthen for many years to come. Many individuals have worked tirelessly on this edition. First, I want to thank all the contributors who wrote a variety of thought provoking and informative articles. I also would like to extend special thank you to the editorial team, Farhan Mustafa from CFA Society Baltimore and Jian Huang and Lijing Du from Towson University, and the design team, Rick Pallansch and Chris Komisar from the Towson University Creative Services.

CFA Society Baltimore traces its history back to 1948 and has over 750 members today. The collective mission of CFA Society Baltimore and the CFA Institute is to lead the investment profession globally by promoting the highest standards of ethics, education and professional excellence for the utmost benefit of society. Participation and membership in the CFA Society Baltimore is open to all professionals who are dedicated to these high standards, and next to this message you can see a list of the top ten employers of our society's members.

We at the CFA Society Baltimore work hard to create valuable educational and networking opportunities for our current and future members and continue to look for ways to engage our membership and broaden our reach. We hope to engage with you in conversations about timely topics and trends that are affecting the broader financial services industry ranging from gender diversity to the growth of passive investing. In addition to our frequent speaker events, we also organize a variety of events for our members to connect and build a community of like-minded professionals committed to professional excellence and ethics whether that is through a Baltimore Running Festival relay team or volunteering. We invite you to join us for an event in the near future.

Please enjoy this excellent publication. As always, we would love to hear any feedback you might have. To learn more about how CFA Society Baltimore can help support your career development and professional growth, please visit our website or find us on social media.

Tuugi Chuluun, CFA, PhD
President, CFA Society Baltimore



Top 10 Employers of CFA Society Baltimore Members

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PNC Financial	22
Legg Mason	18
Stifel Financial Corporation	17
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Aegon	12
Wells Fargo	11
Morgan Stanley Smith Barney	10
Adams Express	9
Wilmington Trust	9



Financing Baltimore's Growth – Measuring Small Companies' Access to Capital

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Editor's note: this article is a summary of a longer paper published in September 2017 by the 21st Century Cities Initiative at Johns Hopkins University. We are grateful to the authors for their research on this important topic and for including it in the Baltimore Business Review. Please access the full report at <http://21cc.jhu.edu/wp-content/uploads/2017/09/21cc-financing-baltimore-growth-sept-2017.pdf>

Baltimore has the potential to be a city that is truly hospitable to small business growth, with all the economic benefits of jobs and tax revenue such growth would bring. But for new and established small businesses to thrive, the city needs a financing system with capacity to meet their needs.

Capital is certainly not the only ingredient necessary for successful business growth, but it is a critical input. If companies lack access to appropriate types of capital at critical stages of growth, they are likely to never take off and achieve scale, or even worse, to go out of business or leave Baltimore and relocate where financial support is more readily available, depriving the local economy of jobs and economic growth.

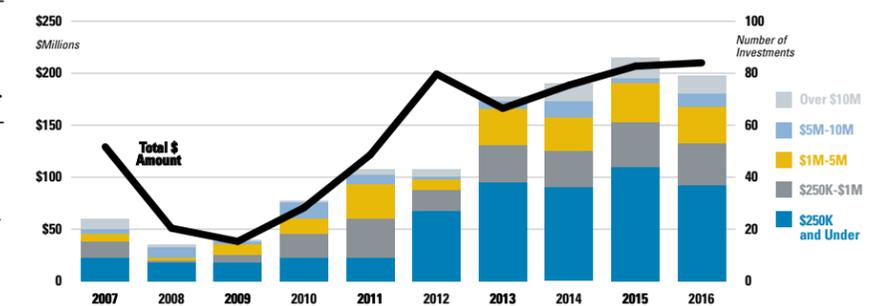
To better understand Baltimore's financing system and the flow of capital to small businesses, the 21st Century Cities Initiative at John Hopkins University embarked on this project to answer the following questions:

- What are the sources and amounts of financial investments, both private and public, going to small businesses in Baltimore?
- How much capital is from local sources versus regional or national sources?
- Where are there gaps in financing in terms of types of capital and funding amount ranges?
- Are successful businesses leaving Baltimore because they can't access adequate growth capital?

Over the five-year period from 2011 through 2015 about \$560 million per year was invested or loaned to startups and small businesses in Baltimore City (Figure 1). Around 75 percent of the capital came from private sources, including banks and venture capital investors. Public sources made up the remaining 25 percent and included government subsidized and guaranteed loans, state and federal equity investments, and federal research grants to startups.

Equity investments in Baltimore's startups and small businesses have grown significantly over the past decade and especially the past two years when venture capital and other forms of equity investment exceeded \$200 million annually, compared to \$50 million invested per year nine years ago. Despite this impressive growth, most equity investments are

Figure 1: Equity Investments by Total \$ Amount and # of Investments, Baltimore City Small Businesses, 2007-2016



on the smaller side, less than \$1 million (Table 1); and nearly 60 percent of venture capital investors are based outside of Baltimore and Maryland (Table 2), making growing firms highly dependent on outside capital as they grow.

On the lending side, the total amount of loans to small businesses has grown in recent years, but has not reached pre-recession levels, which peaked in 2007. National trends in bank consolidations have hit Baltimore especially hard. The total current small business lending activity of the consolidated banking system does not equal the sum of the parts from the early 2000s. The loss of local banks has also left a void in larger, working capital loans, as national banks are more likely to focus on credit card loans, and smaller local institutions have struggled to fill the gap. Small Business Administration (SBA) guaranteed loans and state and city loan programs can fill key gaps in providing loans to small businesses that would not otherwise qualify for bank loans and in providing larger, working capital loans. However, these programs are very small within Baltimore's financing system.

The overall picture of Baltimore's financing system leads to a view that it needs to grow and modernize to meet the needs of small companies in the city. The system is both fragmented and underdeveloped to provide the full continuum of capital for small business growth. It is also not a system that is easy to navigate. Based on our findings, we have developed four recommendations for strengthening and growing Baltimore's startup and small business financing system.

**Table 1: Total Financing System by Private and Public Sources
Baltimore City Small Businesses, 2011-2015**

2011-2015			2015		
Source	# of transactions	\$ Amount	Source	# of transactions	\$ Amount
Private	33,858	\$2,115,730,315	Private	8,221	\$493,066,301
Public	1,124	\$676,908,597	Public	279	\$110,704,110
Total	34,982	\$2,792,638,912	Total	8,500	\$603,770,411

Private includes Venture Capital, IPOs, FDIC Insured Banks, and Private University and Foundation Grants.

Public includes Small Business Administration 7a and 504, Export-Import Bank, Community Development Financial Institution, Federal Grants, Maryland Department Commerce, Maryland Department of Housing and Community Development, Maryland Technology Development Corporation grants (TEDCO), and Baltimore Development Corporation.

**Table 2: Origin of Venture Capital Funding From Identifiable Source
Baltimore City Small Businesses, 2007-2016**

	Seed	Early	Late	All
Individual Investments	174	231	88	493
% Investors from Baltimore	29%	16%	14%	21%
% Investors from Maryland	28%	25%	18%	21%
% Investors outside Maryland	43%	59%	68%	58%
\$ Amount	\$48,100,000	\$376,968,276	\$417,721,846	\$842,790,122

Sources: Abell Foundation, Baltimore Angels, Camden Partners, Crunchbase, Maryland Technology Development Corporation (TEDCO), Pitchbook, and Propel.

Recommendation #1: Measure, track, and report

We cannot truly know the effectiveness of Baltimore's small business financing system unless we continuously measure it and track and report on successes, challenges, and changes over time. This should include tracking individual companies and their access to capital, as well as measuring the amount of capital present in Baltimore that could potentially support small business growth.

Recommendation #2: Connect, convene, and retain

One of the biggest challenges with the current small business financing environment in Baltimore is that startups and small businesses struggle to navigate the various financing programs, and similarly, funders, investors, and lenders don't have easy ways to connect with opportunities. We recommend a new initiative in Baltimore for showcasing growing companies at a regular convening of equity investors

from Baltimore and elsewhere to make them aware of the opportunities. We also propose the creation of a navigation and concierge capacity within the city that can better connect businesses with investors and lenders.

Recommendation #3: Build more lending capacity

The data show that Baltimore's lending capacity has shrunk and changed with bank consolidation and a shift to real estate backed loans and credit card loans as the principal forms of credit extension to small businesses in need of working capital. We need to rebuild the art and practice of small business lending in Baltimore.

To do this, public and private leaders need to work together to: 1) develop more lenders skilled in executing SBA 7a loans, 2) expand the role of Baltimore's community development financial institutions to have a greater focus on small business lending, and 3) leverage public dollars more effectively to grow working capital lending.

Recommendation #4: Expand the range of financial institutions

There is a larger conversation to have about what is missing from the local financing system. For example, a concerted effort could be made to build corporate venture capital that could invest in local companies. There is also room for raising capital for a new Business Development Corporation or Small Business Investment Company that would provide working capital to growing companies in Baltimore. Another area to explore is whether there are opportunities to strengthen and grow some of the smaller, local banks and credit unions that are more likely to provide working capital loans.

The focus of this report has been on making what Baltimore has today work better, but our hope is that this initial exercise will unleash a discussion around infusing new capital into the system. There are many initiatives in Baltimore to support small business growth and a political leadership that is committed to growing the city's economy. We hope this report can be a resource to every stakeholder interested in seeing Baltimore thrive.



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Regulatory Compliance Cost for Small Maryland Banks

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In the 2014 Baltimore Business Review, we noted a decline in FDIC-insured commercial banks in Maryland. The numbers had fallen from 106 in 1989 to 45 in 2013. At last count, this number stands at 35¹. Meanwhile, in the most recent Annual Report of the Maryland Department of Labor, Licensing and Regulation for the period ending June 2016, the number of state-chartered banks is down to 41². The recent trend stems from 10 mergers in the past three years. Robert DeAlmeida, CEO of Hamilton Bank, cited “low interest rates, increased regulatory demands after the recession and pressure from shareholders” as reasons for the tough times for the banking community.³

As early as 2012, representatives for The American Bankers Association pegged the annual compliance costs for the industry at \$50 billion or 12 percent of total operating expenses.⁴ The recent enactment of the Dodd-Frank Act added to the regulatory pressures exerted on all banks but more critically on smaller banks, whose compliance cost as a share of operating expenses is two-and-half times greater than for large banks. Joe Rizzi, a banking industry consultant, finds that banks felt the effects more acutely in this most recent period of increased regulation as “low interest rates and higher capital requirements combined to cut deep into bank profits.”⁵ Kathleen Murphy, President and CEO of the Maryland Bankers Association, reports that “one of the major reasons cited when a bank says they’re going to have to align with another bank, it’s because of the crush of regulations.”⁶ The costs of compliance range from having to hire additional personnel, additional training requirements for existing personnel, upgrades and acquisition of new software to diverted attention from the bank’s leadership.

Compliance Cost Measures

Whereas it is difficult for outsiders to measure the direct costs of regulatory compliance, Ken Cyree (2016)⁷ proposes six indirect measures to capture the extent of regulatory burden on banks. Table 1 presents Cyree’s suggested measures.

Using Pretax Return on Assets (ROA) is a good first order measure to study the impact of increased regulatory costs on a bank’s performance. Since ROA does not only depend on regulatory costs but also current market conditions, we will compare community banks’ (defined as banks with less than \$1 billion in total assets) measures to non-community banks’. The baseline of this second group allows us to study if smaller banks bear a higher cost of implementation of new regulations.

Table 1: Cyree’s six indirect measures of the cost of regulatory compliance

Measure	Impact of Regulation
Pretax ROA	↓
Loans per Employee	↓
Employee Growth	↑
Average Salary	↑
Salaries to Assets	↑
Expenditures to Assets	↓ or ↑

Loans per employee is a measure of productivity. If regulatory compliance takes more employee time than before, productivity should suffer. Moreover, insofar as banks need to hire new compliance employees, Loans per employee would also decline. This leads to the next measure of Employee Growth, expected to increase as a response to the increased regulatory burden. If instead of adding compliance employees a bank simply shifts its workforce towards higher paid specialized compliance employees, higher Average Salary and Salaries to Assets measures would still capture the effect.

Finally, the impact of new regulation on technology expenses is ambiguous. If banks repurpose funds from technology improvement to cover new compliance costs, we would expect a decline in technology expenses following the implementation of new rules. Conversely, technological solutions might spur spending to meet the new compliance requirements. In either case, the regulatory environment does influence technology spending decisions.

Historical Perspective

While the Dodd-Frank Act’s 2,300 pages and more than 400 new rules and mandates are at the forefront of today’s bankers’ concern, the industry has experienced in the past the introduction of other regulation reforms. Cyree (2016) focuses on two other introductions to compare the intensity of Dodd-Frank’s effect in the current period. Correspondingly, we compare the new regulation to the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 and the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act (USA PATRIOT) of 2001. In each instance, we use a window of 18 quarters to highlight the immediate effect of the new regulation on banks’ measures.

The Evidence in Maryland

In the following set of charts, we present the time series of all the six measures from 1991 to the most current period with available data. In grey, we highlight the periods during which the banking community adjusts to the three new

regulatory environments highlighted above. In Figure 1, we see that banks in Maryland experienced a long stable period of profitability that ended with the Great Recession. From the depth of the crisis, profitability has steadily risen though it remains inferior to the pre-crisis period. While community banks experienced a strong recovery in their profitability, their performance lags that of non-community banks more than before the crisis. This is the first evidence that regulatory costs may exert greater pressure on smaller institutions.

Figure 1: Historical Series of Pretax ROA

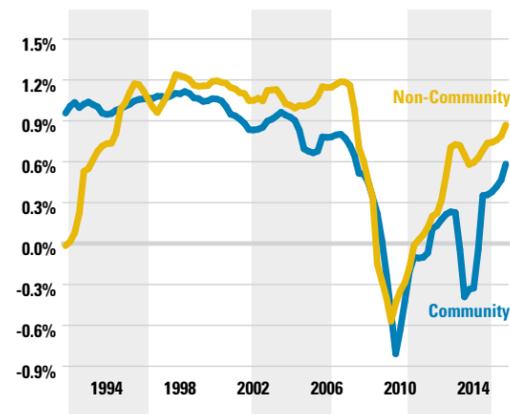
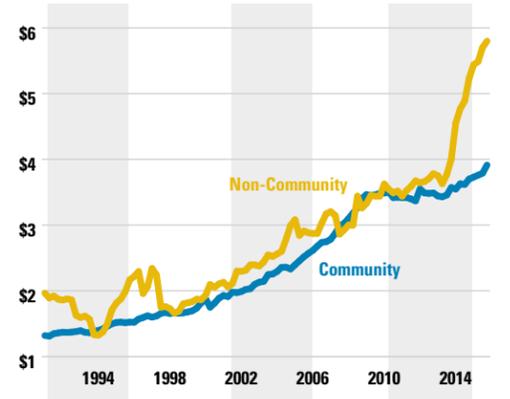


Figure 2 reveals that banks' productivity has been on an upward swing since the early 1990's. While an employee generated \$2 million in loans in 1991, an employee in 2014 generates more than twice that amount. This stems from a combination of ever-increasing credit availability and improvement in credit-scoring technology. Whereas the trends for community and non-community banks aligned for most of the period, community banks are currently not able to match the recent improvement of non-community banks. For the first time in 20 years, community banks' employees generate significantly fewer loans than their non-community banks counterparts do. If fewer employees are involved in profit center activities (lending) and more employee time is dedicated to cost center activities (compliance), this can explain the difference in profitability as seen in Figure 1.

Figures 3 and 4 compare Employee Growth and Average Salary for the two groups. Employee Growth has been steady over the past 20 years. On average, banks today have 2.5 employees for each one they had in 1991. This results from the increase in the industry's complexity with the multiplication of products and services and the continued trend of consolidation whereby we have fewer but larger banks.

Figure 2: Historical Series of Loans per Employee



In all three new regulation periods, we observe a spike in employee growth. This is particularly sharp for the FDICIA and the USA PATRIOT periods. While the spike in Employee Growth is less pronounced for the Dodd-Frank period, there is a clear increase in Average Salary. Taken in combination, it appears that banks have been substituting compliance positions for lending positions.

Figure 3: Historical Series of Employee Growth

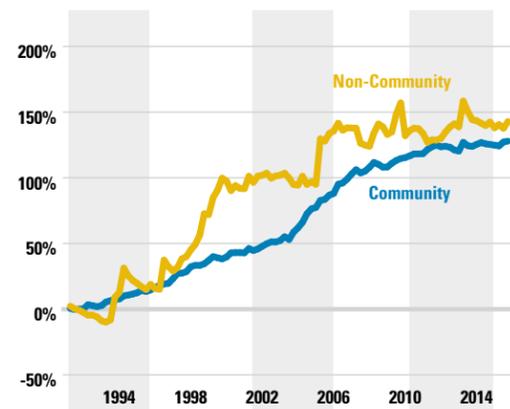


Figure 5 sheds further light on this trend and presents the history of Salaries to Assets. Here, the costs of accumulated new regulations are particularly striking for community banks. Up until 2003, both community and non-community banks dedicated slightly over one and a half percent of assets for salaries. Today, while non-community banks spend less than in 2003, community banks pay upwards of 2.5% of assets in salaries. This agrees with the idea of a changing composition of the workforce with higher skilled and higher paid compliance and technological employees accounting for a higher proportion of banks' personnel.

Figure 4: Historical Series of Average Salary

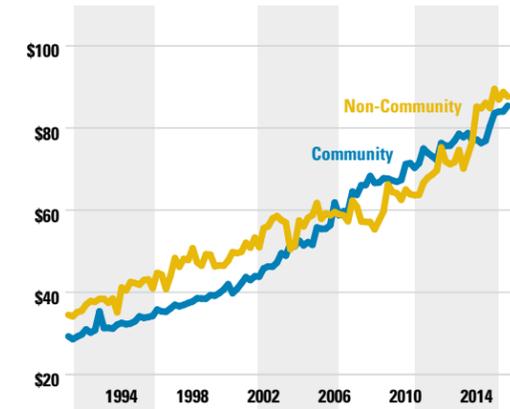
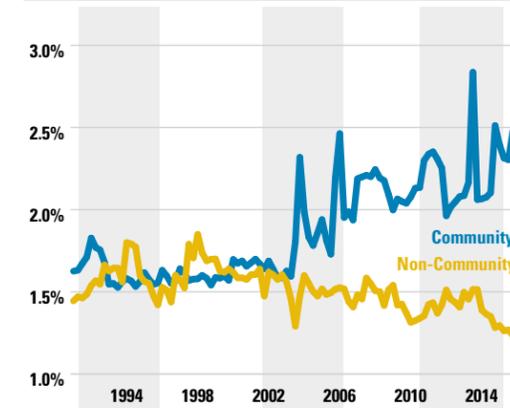
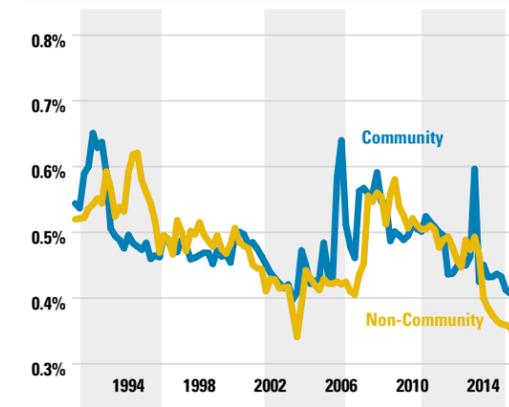


Figure 5: Historical Series of Salaries to Assets



Finally, Figure 6 shows that since the introduction of the Dodd-Frank Act, both community and non-community banks have dedicated a lower percentage of assets to expenditures, including for technological assets. This represents a missed opportunity for banks. Under a constrained budget, with more resources shifting to answer the new regulatory demands, banks are under-investing in their technological future. This is a risk at a time they face increasing competition from non-traditional lenders that tend to rely on technological advances to connect with potential clients, to manage their lending risks and their overall costs. Any diversion from remaining competitive on this front will hurt the future profitability of the more heavily regulated institutions.

Figure 6: Historical Series of Expenditures to Assets



Conclusion

On balance, our investigation uncovers some noticeable changes in banks' behavior following the implementation of the Dodd-Frank Act. Smaller community banks in Maryland are: 1) not recovering profitability as fast as non-community banks, 2) not increasing productivity as fast as non-community banks, 3) dedicating more employees and a higher budget to compliance functions and 4) not investing into technology as they have in the past. A picture of impaired competitiveness emerges, reflected in the sector's stock performance lagging the overall market's post-crisis recovery prior to the recent election bank rally. In light of these facts, the industry is looking at continued consolidation to remain competitive which would continue to decrease its presence in the Maryland marketplace. While pre-crisis in 2008 Maryland State Chartered banks accounted for 43% of all bank branches in Maryland, they recently only represented 30% (500 out of 1,679 in 2015) of all branches. In this environment, the industry is looking with anticipation at potential changes in the regulation. In particular, the Financial CHOICE Act aims to amend some of the rules enacted under Dodd-Frank. Kathleen Murphy stated, "the Choice Act, while not perfect from our perspective because it sets certain reserve requirements that we don't completely support, contains components that we support, particularly for community banks."

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Why are Technology Companies So Difficult to Invest In?

Niall H. O'Malley, MBA
Portfolio Manager, Blue Point Investment Management

Technology companies are one of the most challenging industry sectors of the economy in which to invest. The risk of failure is above average. New technologies require huge amounts of capital investment before they realize their revenue potential, so the investor bears the cost of building before customers come. Further, valuations are enormous, and the profits are often nowhere to be found. The creative/destructive cycle associated with innovation means there is enormous change. It is important to remember change creates both dislocation and opportunity. Technology is changing how we access information and communicate. Many of the technologies that will shape tomorrow are already present today. The challenge, for the purpose of this article, is identifying the public companies that will offer innovations that will gain acceptance, be perceived as value-added products or services, or even become essential to daily life.

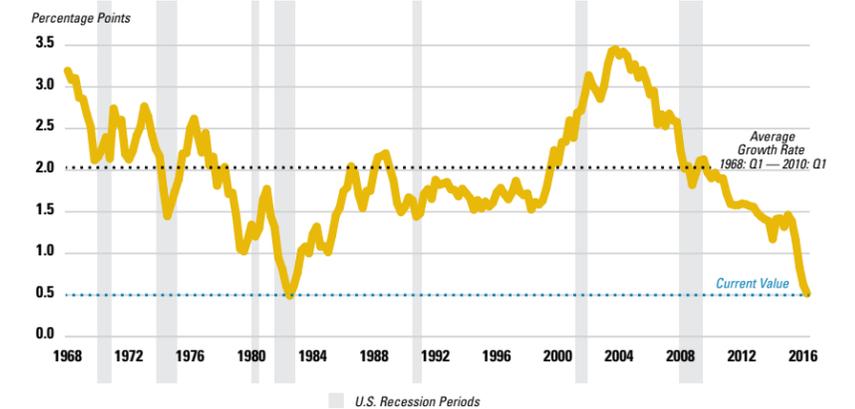
Why Are Productivity and Technology Going in Different Directions?

In our day-to-day lives, technology increasingly impacts our use of time: both positively and negatively. Emails speed communication, but each time we open an email account we often scan for the emails which can be deleted and for those that might be malicious. We also engage with a variety of social media for entertainment, browsing posts and videos, generally not a productive use of time. At the other end of the spectrum, online shopping can be incredibly efficient, allowing us to order in minutes cars, homes, trips, and to research medical treatments. The contradiction is that technology creates both time savings and the ability to squander time. At the positive end of the spectrum, when technology saves time, it proves challenging to measure if the number of goods/services produced does not change. Traditional metrics for economic activity measure the value of transactions during a given period, but do not factor in time savings. At a macro-level, the traditional measure of economic activity, Gross Domestic Product (GDP), multiplies the number of transactions that occur in a measurement period times the value of the transactions. Time savings is not factored into GDP, which is a traditional measure of economic activity.

Why is Productivity Important?

Productivity and labor force drives increases in living standards. New and more effective methods of accomplishing tasks – productivity – allow people to accomplish more with less. Productivity enhancements drive living standard increases. When productivity increases 1% annually, the living standard doubles in approximately 70 years, but if productivity increases 2% annually, the living standard

Figure 1: Productivity Growth 25 Quarter Rolling Average



Source: Federal Reserve Bank of St. Louis Using output per hour in nonfarm business sector. Calculations made by Mark Bognanni and John Zito of Federal Reserve Bank of Cleveland.

doubles in approximately 35 years. Productivity helps fulfill the traditional wish of parents: for their children to have a better life than they experienced.

Why is it that when technology seems to permeate our everyday lives more and more that productivity in the U.S. has fallen from a 2% annual increase prior to the 2008 financial crisis to below 1% today? There is no easy answer to this disconnect, but there are structural factors in the U.S. economy that are impacting productivity.

A key challenge is that time savings associated with new technology and software applications are more difficult to measure than past technological advances. For example, in agriculture, mechanized technology, seed research and fertilizer have dramatically reshaped productivity. In 1900, over 38% of the U.S. labor force worked in agriculture, however today less than 2% of the U.S. labor force works in agriculture. Labor force participation in agriculture has dropped to a fraction of turn of the century levels while at the same time productivity of U.S. crop lands has skyrocketed. There are many concerns about technologies eliminating jobs, but have you ever heard anybody complain about not having to till a field. All of the increases in agricultural productivity, including packaging, cooling and transportation, are easy to measure in terms of crop yields. The amount of agricultural product produced times the price of the agricultural product creates a measurable economic impact. Unlike agricultural productivity, which is easy to measure, many of the new technologies today save time but the productivity impact is not showing up in traditional economic measures like GDP.

Why is there a disconnect between productivity in the economy when investors are falling over themselves to invest in large-cap technology companies such as FAANG (Facebook, Apple, Amazon, Netflix and Google) stocks? While new technologies save time, they do not guarantee that the time saved is used productively. Facebook viewing, while entertaining, is not a source of productivity. The same can be said for YouTube videos and cleaning out an overcrowded email box.

Technology Sector Valuation Considerations

As the effectiveness of technology has grown, job losses have moved from blue to white collar jobs. Continued advances in technology and automation threaten job categories across a wide variety of industry sectors. It can be argued that fear and the seeming inevitability of job loss is driving above average investment in technology companies. If white collar investors cannot enjoy the benefit of employment, they can at least recoup rewards as investors. This defensive reaction – while difficult to prove – is a potential driver pushing technology valuations higher.

The unusual level of interest in FAANG stocks may be driven by more than just passive investing and stock indexes like the NASDAQ Index that favor FAANG stocks. When are you paying too much? Understanding valuation is one of the most challenging aspects of investing in technology stocks. For example, Facebook is valued at over 14 times sales at the time this article goes to print. This means every dollar of increased sales causes the market-capitalization (the number of Facebook shares outstanding times the share price) value to increase \$14. When is the valuation too rich?

How Can a Loss Generating Company Be an Investment?

Other important considerations with new technology are the lifecycle and strategic development of the company. First and foremost, technology companies have to build the product or service before the customer will come. The dramatic losses and capital needs associated with the up-front investment typically create a sea of red in the income statement. This raises a variety of questions for an investor to consider: to what extent will the company differentiate its product and/or service? What are the customer acquisition costs? Has the company largely completed the research and product development process? Does the company intend to build market share by pricing the product as a loss leader in order to gain market share? Careful attention needs to be placed on market share gains. Investing in a market

share-leading company can be a hedge, but one with the unpleasant reality that the company's valuation relative to sales and later earnings can be priced to the moon.

Further complicating issues, there is an increasing winner-take-all trend in today's market. The trend is not unique to the technology sector, but it is more pronounced there. Understanding where technology companies can take market share from historic providers is key. For example, Amazon is creating value propositions for its customers that traditional brick-and-mortar retail companies cannot match. At the same time, building an increasingly complex logistics and technology platform and competing with more and more retailers has enormous risks.

Other technology-enabled companies are lowering the cost and ease of a service, whether it be requesting ride sharing or reserving overnight accommodation. By offering customers more optionality than traditional taxi services or hotel providers, technology-enabled service providers are taking market share from traditional service providers who find themselves increasingly forced to be price takers rather than price setters. Scalable technologies in this sector are creating economies of scale and ease of use that traditional taxi services and hotels struggle to compete with.

If the Income Statement Bleeds Red What Do You Look For?

Once technology companies leave the emerging stage, they have largely completed the research and development phase and enter the build-it-and-they-will-come stage. The scalability during this growth stage is impressive, but revenue potential has been only fractionally realized. The cost associated with building out their platform creates a sea of red in the income statement as losses often exist below the gross margin level on down. Access to public markets becomes very important as secondary stock offerings become a primary source of capital. From an expense perspective, the biggest cost is often human capital. Key talent is attracted by stock options which align the individual's financial success with the success of the company. The scalability during the growth stage is impressive, but the staggered rollout of updates and new features can lead to dramatic double-digit losses in the company's common stock as interruptions in growth occur.

So How Do You Gauge Success?

Investors should look for a product or service that resonates with consumers. Something that is more than a fad, and has scalable, long-term economic potential. Strong founder involvement is often key. Are the founders cashing out, or are they committed to the company's growth? Do they have

an executable vision? Financial flexibility is a necessity: does the company have the ability to weather the inevitable setbacks associated with scaling a new product? Are there barriers to entry? Is the product easily mimicked? Growth will attract competition, but the extent to which the company is protected by switching costs, cost advantages and economies of scale help it become a market leader.

An important measure of success is cash from operations. Simply put, if you run a lemonade stand, is there cash in the till after selling the product? This can be a more relevant measure for software companies that have almost no marginal cost for an additional software license versus technology companies producing a physical product. Software companies can have powerful business models that benefit from networks effects, and low cost scalability. Successful software companies see an above average portion of incremental revenue convert to cash flow. Technology companies that produce a physical product will have a growing inventory cost which, in a high-growth scenario, can create negative operating cash flow when the inventory cost absorbs the cash generated by product sales.

A Global Perspective on Technology and a Local Twist

Risk Taking Culture

With the leap of faith necessary to start and grow a technology company, these ventures need a risk-taking culture to succeed, and from a cultural perspective, the U.S. has a unique risk-taking culture that has created an unrivaled development center in places like Silicon Valley. The combination of ingredients that enables a technology company to succeed include an endorsement of disruption, gifted entrepreneurs and human capital, venture capital, and later, public market capital. The most important consideration is a risk-taking culture that also protects intellectual capital. Areas such as Silicon Valley attract intellectual talent from around the world, and stock options are used to align human capital with companies' success. Attracting the best human capital with their ideas, technological know-how and the willingness to take large risks is key to staying one step ahead of the competition. From a cultural perspective, the U.S. encourages risk taking. It is this appetite for risk that is a critical, though relatively silent, ingredient to the success of technology companies.

Compare the American success in the technology sector with that of Germany, long favored as a leader in manufacturing. Germany is largely a debt-based society where

public equity ownership accounts for only approximately 15% of publicly traded investments. Due to risk aversion, Germans favor fixed-income investments such as bonds, real estate and insurance products. In the U.S. public equity ownership typically exceeds 50% of investments because U.S. investors use Individual Retirement Accounts (IRAs) and 401(k)s to save for retirement. Germany has a strong pension system and does not offer IRAs, which help fuel the U.S. equity risk-taking culture. In Germany, nine out of ten companies are private. Germany is a world leader in manufacturing and is very willing to invest in manufactur-



There are over 50,000 employees working for the National Security Agency which is based in Fort Meade, Maryland. The surrounding area has become a hotbed for government contractors

ing, but when you look for public technology companies in Germany, they are hard to find. Why? The equity culture, as a proxy for willingness to assume risk, does not exist there to the same extent as in the U.S.

Is the Barn Door Open?

Risk averse cultures, like Germany, do not embrace disruptive technologies as readily as the U.S., but other countries embrace forced technology transfer by appropriating and re-branding technology. In the U.S., this is viewed as theft, but governments in other countries have strategic plans designed to accelerate forced technology transfer. Unfortunately, access to the Chinese market is designed to facilitate this kind of technology transfer. Multinational companies desire access to the world's largest single market, but those seeking access to the Chinese market must think very carefully about how they structure the required joint ventures. The Chinese government encourages harvesting foreign intellectual property to create domestic competitors, whether it is a joint venture partner becoming a competitor or outright theft of intellectual property. It is a curious relationship since China dominates the production of technology hardware. For multinational companies, participating in the Chinese market is not an option. Whether at either the production

Footnote:

This article represents personal opinion and should not be considered investment advice. The intent of the article is to be educational.

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or consumption level, the Chinese market is simply too important to be ignored. Segmenting production elements and protecting source code or design elements are key precursors to developing a presence in the Chinese market. Software companies are exposed to an above average risk as they seek to protect their source code, as was the case for Google in 2010. For smaller technology companies, avoiding the Chinese market may be the best course of action.

How Do You Protect Intellectual Property from Cyber Theft?

It is as important to safeguard technological innovation domestically as it is globally. How to protect intellectual property from cyber theft is perhaps one of the most challenging questions because while the threat is very real, the specific nature of the threat is not known. From a business perspective, most technology companies provide a service which can be benchmarked against alternative options. For example, ride sharing can be benchmarked against traditional taxi services and overnight reservation services can be benchmarked against hotel companies. However, cyber security threats are black boxes; the nature of the solution is not known since the nature of the code-based threat is not known. The best protection is a layered defense with redundancies because the weakest link is often not known. Given the unusual nature of cyber security threats that may come from an exploited weakness in an operating system or a phishing email that gets a victim to compromise their computer and potentially a network with an encryption program, it is extremely difficult to protect companies against an unknown threat that may require a yet-undeveloped solution.

A Local Twist

Maryland has a leading position in cyber security. There are over 50,000 employees working for the National Security Agency which is based in Fort Meade, Maryland. The surrounding area has become a hotbed for government contractors and has progressively become an innovation cluster of incubators, universities, and the state and federal government, all of whom actively facilitate the necessary ingredients to spur innovation and the formation of cyber technology companies. That Maryland is at the forefront of this industry should come as no surprise as the state has a long history of investing in new technology. Whether through venture capital, private equity, investment banking or buy-side investor Maryland has a strong history of investing in technology. Some of the representative firms are the Abell Foundation, New Enterprise Associates, ABS Capital Partners, Camden Partners, Stifel, Brown Advisory and T. Rowe Price.

Investing in Technology Companies Not for the Faint of Heart

Investing in technology companies is challenging and not for the faint of heart. While the potential upside can be tremendous, the winner-take-all trend means there are a lot of losers out there too. Investors in publicly-traded companies can experience a loss of capital that exceeds 40% in a single day which means diversification is paramount. Diversification both within the technology sector and across other industries is necessary to protect against downside risk. Key questions include, but most certainly are not limited to: Is the technology scalable? Is the company a market share leader? Is the company gaining market share? Can the company become profitable? Does cash flow from operations exhibit a positive trend? Is growth coming from internally generated sales, or is the company a roll-up that is dependent on acquiring other companies? Does the company have financial flexibility to survive setbacks? Is customer adoption strong? Is the company protected by high switching costs and/or barriers to entry? If the investment is a failure, when will you cut your losses? There is no complete list on how to invest in technology companies, but the importance of technology in our daily lives is growing. A thoughtful approach to investing in public technology companies allows direct participation in the creative/destructive cycle that represents some of the highest levels of growth in our technology-enabled economy.

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MY INVESTMENT PERFORMANCE IS A RESULT OF YEARS OF EXPERIENCE

AND A DEEP KNOWLEDGE OF MARKETS.

Christine Phillpotts, CFA

Ask firms why they employ investment managers with the CFA® designation and they'll tell you that those letters represent a proven understanding of investment management, commitment to ethics, and always putting clients' interests first. All of which contribute to the integrity and credibility of their organizations. Because, for our charterholders and their employers, those three letters are making a real difference every day.



Maryland IPOs: High Tech in the Hub

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An Initial Public Offering (IPO) is one of the most consequential events in the life of a company. An IPO creates liquidity for the firm's shares, provides an infusion of capital to fund growth, and provides cheaper and ongoing access to capital (Celikyurt, Sevilir, and Shivdasani, 2010). Maryland, with its location advantage, has been making good use of IPOs in funding its rapid economic growth, especially its growth in the high tech area. This article aims to provide an overview of the time/industry distribution of Maryland IPOs, and the crucial role they play in Maryland's economy.

Time Distribution of Maryland IPOs

Maryland IPOs trend with the overall country's economy by correlating with business cycles and adjusting to the availability of funds and financing options. Table 1 reports number, proceeds, firm size and firm age of Maryland IPOs from 1980 to 2010. The number of Maryland IPOs peaked in 1986, with 22 firms going public. In the 90s, a time that tech companies were fueling the stock market, the number of IPOs remained steady, with the highest number of 16 IPOs in the year of 1996. The market quickly changed in 2001, once the tech bubble burst and stock values depleted. In 2001 there was only one IPO, and not a single one in 2002. Similarly, during the recent financial crisis, there were two IPOs in 2008 and only one in 2009, followed by 5 in 2010 as the economy began to recover.

Figure 1 plots the number of Maryland IPOs and proceeds raised by year. As expected, Figure 1 indicates a positive correlation between the number of Maryland IPOs and the total proceeds raised by all firms every year. The largest Maryland IPO was USEC Inc. in 1998, which generated total proceeds of 1759.38 million dollars (\$2010).

Maryland IPOs in the 1990s: The Role of High Tech Firms

As indicated in Table 1 and Figure 1, Maryland had more IPOs in the 90s than any other decade examined, and more than twice as many firms went public in the 90's (84) than in the 2000's (38). IPOs in the 1990's were comprised of significantly smaller companies than the previous and post decades. The average firm size was 2/3 smaller than that of companies from either the 80's or 2000's. The largest firm of the entire sample, Commercial Credit Company, was approximately \$9.6 billion in 1986, greatly surpassing the largest firm from the 90's of only about \$3.1 billion.

Table 1. Maryland IPOs during 1980-2010

IPO Year	#Maryland IPOs	IPO Proceeds (Including Overallotment)*		Average Firm Size at the time of IPO*	Average Firm Age at the time of IPO
		Total Proceeds Raised by All Firms	Average Proceeds Per Firm		
1980	1	29.11	29.11	N/A	6.00
1981	11	97.67	8.88	N/A	13.00
1982	4	84.56	21.14	N/A	7.00
1983	9	470.30	52.26	197.26	8.00
1984	6	222.63	37.10	N/A	46.25
1985	4	70.32	17.58	34.18	32.25
1986	22	2,411.83	109.63	645.00	28.67
1987	9	317.45	35.27	449.82	29.75
1988	7	471.25	67.32	4.73	17.00
1989	1	105.23	105.23	442.79	N/A
1980-1989	74	4,280.35	57.84	442.62	24.02
1990	2	85.16	42.58	23.19	22.00
1991	5	290.52	58.10	60.12	9.60
1992	4	246.19	61.55	6.45	6.50
1993	12	1,474.53	122.88	128.02	9.25
1994	12	1,000.80	83.40	140.78	17.22
1995	7	393.16	56.17	187.39	10.43
1996	16	989.50	61.84	91.35	7.33
1997	10	713.02	71.30	33.50	11.56
1998	8	2,488.36	311.05	453.75	11.00
1999	8	1,040.83	130.10	124.34	5.50
1990-1999	84	8,722.08	103.83	144.45	10.31
2000	9	2,668.26	296.47	585.04	8.89
2001	1	24.63	24.63	11.45	5.00
2002	0	0.00	N/A	N/A	N/A
2003	3	607.04	202.35	548.50	3.50
2004	2	831.63	415.81	1,045.84	15.00
2005	6	1,200.79	200.13	602.63	19.40
2006	6	448.57	74.76	80.18	7.17
2007	3	205.78	68.59	110.58	8.50
2008	2	595.65	297.82	886.69	13.00
2009	1	409.10	409.10	N/A	0.00
2010	5	472.35	94.47	224.83	22.00
2000-2010	38	7,463.80	196.42	439.86	11.52
Full Sample	196	20,466.23	104.42	300.59	15.10

* \$ million in 2010 dollars

Figure 1. Time Distribution of Maryland IPOs

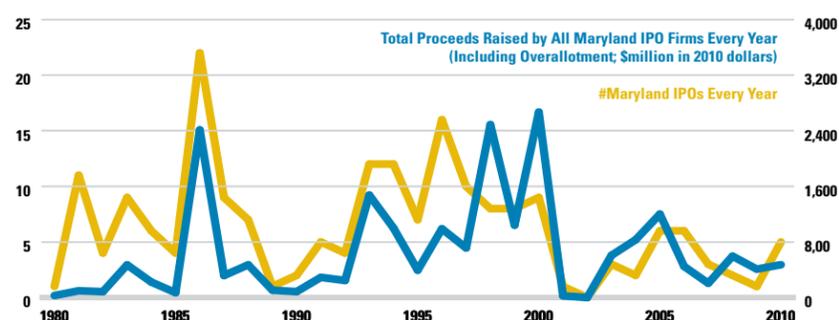


Table 2. Comparison of Maryland IPOs and IPOs Headquartered in the Other U.S. States

	Maryland IPOs	Other States' IPOs	2-Sample t-statistic
Number of IPOs	196	11,724	
Issuance Characteristics			
IPO Proceeds (Including Overallotment; \$million in 2010 dollars)	104.40	129.00	1.61
IPO Shares (Including Overallotment)	5.24	7.06	2.85***
IPO Float	5.37	7.23	2.82***
Offer Price	14.09	16.44	0.86
Closing Price of First Trading Day	13.68	13.62	0.07
Underpricing	18.41	18.19	0.9517
Shares Outstanding	13.31	23.18	6.19***
Number of Underwriters	2.48	2.81	2.67***
Firm Characteristics			
Venture Capital-Backed	35.20%	27.07%	2.36**
High-Tech Firms	50.51%	38.67%	3.28***
Number of Analysts Following the IPO Firm	0.38	0.34	1.3
Firm Age at the time of IPO	15.10	15.52	0.25
Firm Size at the time of IPO (\$million in 2010 dollars)	300.60	444.10	1.66*

In addition to being smaller, IPO firms in the 90's were also younger companies, having the youngest average firm age of all decades at only 10 years old, a drastic decrease from 24 years in the previous decade. In fact, some firms that went public in the 90's were not even a year old, an occurrence that didn't happen at all in the 80's and not again until 2009.

These characteristics coincide with the fact that tech companies require fewer assets and employees than other industries, allowing smaller, younger, and additional companies the opportunity to go public, especially around the time of the tech bubble. Whether firms needed financing, or saw an opportunity of growth in the tech industry on a national and even global level, many of the Maryland companies that went public in the 90's were from the tech sector.

Maryland IPOs in the 2000s: When Alternatives Funds Were Available for High Tech

In the decade of 2000s, there were only 38 IPOs, a substantial drop from 84 IPOs in the 90's. Could this drastic decrease be due in part to more financing options becoming available for smaller firms, especially tech? In recent years, Maryland has implemented programs and incentives to assist tech firms. "Aiding the state's growth is the *InvestMaryland Program*, which added \$84 million to Maryland's high-tech base during Fiscal Year 2012, and is overseen by the Maryland Venture Fund Authority" (Maryland State Archives, 2017). In addition, there are potential tax refunds for tech companies, such as the Maryland Cybersecurity Investment Incentive Tax Credit, or CIITC, which "provides a refundable income tax credit to Qualified Maryland Cybersecurity Companies (QMCCs) that secure investment from investors. The purpose of this new program is to incentivize and attract cybersecurity companies to startup in or move to Maryland; and to attract investment to cybersecurity companies in order to help them grow, create jobs and retain intellectual property in Maryland (Maryland Department of Commerce)". These programs are just two examples of new financing incentives to help tech companies in Maryland grow and to bring tech companies from other states into Maryland, which we have already seen happen with Luminal. Luminal is a cybersecurity firm that relocated from West Virginia to Frederick and was awarded \$600,000 through the *InvestMaryland Program*. It was also one of the first companies to apply for the cybersecurity tax credit (MDBIZ News).

Maryland IPOs versus IPOs from the Other States

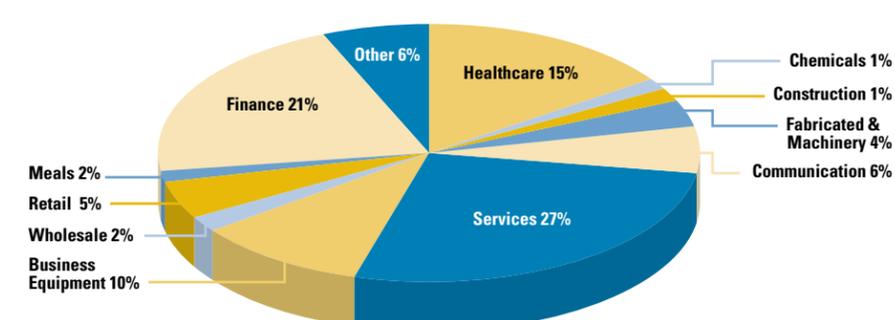
Table 2 presents a comparison of Maryland IPOs with IPOs in other states. Looking at IPOs across the U.S., Maryland-based firms were smaller, younger, and more likely to be in the high-tech industries compared to other states. Maryland's average firm size at the time of IPO was \$143.5 million less than the average firm size of other states. Consequently, other states had higher average IPO proceeds, approximately \$24 million more than Maryland proceeds. This overall picture coincides with the observation of smaller companies being tech-related, especially for Maryland IPOs in the 90s. Most strikingly, high-tech firms accounted for more than half of Maryland IPOs, which was 12% more high-tech IPOs than in other states.

Industry Distribution of Maryland IPOs

As more than half of Maryland IPOs are in the high tech industry, we take a finer look into the industry distribution. A high-tech industry was defined as the one that has greater than the national average of engineers, engineering technicians, computer scientists, mathematicians, and life scientists (Glasmeier, 2017). According to our data on high-tech firms in Maryland, the three largest high-tech industries are services, healthcare, and business equipment, respectively.

Figure 2 shows that healthcare, finance, and services account for the largest distribution of Maryland IPO's by industry. It is important to note that the finance industry is not included as high-tech firms. Specifically, of the 99 firms defined as high-tech Maryland IPO's, 38% are in the services industry, 28% are in healthcare, and 19% are in business equipment to name the largest. Even though the finance industry is not included as high-tech, this industry does use several high tech resources. These major industries are constantly adapting and utilizing technological advances, so it's logical that they are classified as high-tech. In the healthcare industry, technology ranges all the way from biotechnology to apps that allow doctors to speak directly into devices, and IT services such as computer programming and systems design make up part of the service industry.

Figure 2. Industry Distribution of Maryland IPOs



Conclusion

To conclude, Maryland IPOs trended with the national economy, and were mostly made up of high-tech companies, with services, healthcare, and business equipment as the three leading high-tech industries. Maryland also took part in the tech bubble of the late 90's by going public with smaller, younger companies. With the significant proportion and role of high tech in Maryland, innovative programs and incentives have been put into place by the Maryland government to support the growth of local tech firms, and to bring tech firms from other states into Maryland.

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The Fintech Transformation

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Fintech — or financial technology — is the latest disruptive innovation taking aim at the huge institutions that deliver financial services to individuals and businesses today. According to consulting firm KPMG, close to \$13 billion was invested in U.S.-based fintech companies in 2016. Globally, venture capital-backed fintech companies raised \$5.2 billion in the second quarter of 2017, a number that will surpass last year’s global record if sustained through the end of the year.

“Unicorns” — companies, usually start-ups, without an established performance record valued at more than \$1 billion — are considered the Holy Grail of the venture capital investing space. Globally, the fintech space claims **26 unicorns valued at \$83.8 billion**. North America leads with 15 fintech unicorns, followed by Asia with seven, and Europe with four.¹

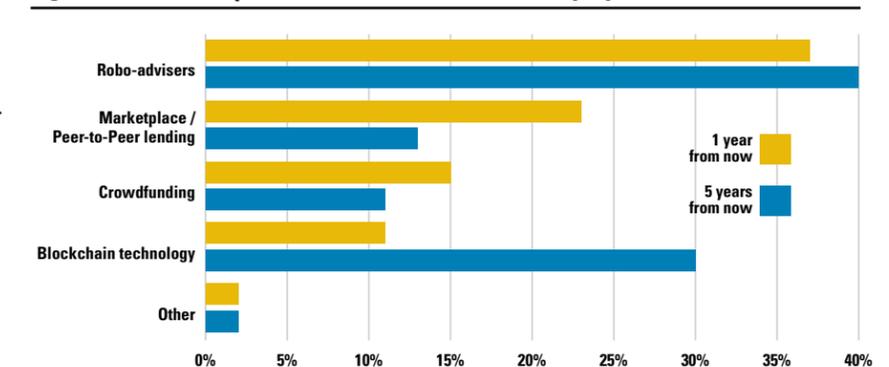
Start-up companies have broken new ground in a number of specialties within the financial services industry, including digital investment management, digital lending, mobile payments, and digital ledger (blockchain) technology, among others. A March 2016 CFA Institute Fintech Survey of more than 3800 institute members demonstrates industry participants’ expected impact of fintech innovation on the financial services industry by timeline.² (See Figure 1)

In the interest of brevity, we limit our discussion to three areas of fintech: digital investment management, digital lending, and mobile payments. We leave digital ledger (blockchain) out of this discussion because of its inherent depth and complexity with one cursory observation. The recent massive Equifax data breach, which affected 140 million individuals in the US, is certain to hasten the adoption of more secure methods of storing data. Blockchain may well be a major beneficiary. Regulators and law enforcement embrace blockchain technology for its ability to make financial transactions fully traceable to the source, aiding anti-terrorism efforts and potentially rendering money laundering through the banking system a thing of the past. For further information about blockchain technology, please refer to the resource references at the end of this article.

Digital Investment Management

Digital investment management is often referred to as robo-advising. While there is no standard definition, the Financial Industry Regulatory Authority (FINRA) defines robo-advisors as digital investment advice tools that “support one or more of the following core activities in managing an investor’s portfolio: customer profiling, asset allocation, portfolio selection, trade execution, portfolio rebalancing, tax-loss harvesting, and portfolio analysis.”³

Figure 1: Greatest Impact on Financial Services Industry, by Timeline



Two of the most prominent start-up robo-advisors are Wealthfront and Betterment. Both were founded in 2008 and are considered the earliest movers in the digital investment advice space. In addition, virtually all major brokers have launched some sort of automated brokerage advice platform to individuals, including Vanguard’s “Personal Advisor Services” and Charles Schwab’s “Intelligent Portfolios.” Even some of the major pension fund managers like TIAA-CREF extend automated advice as part of their suite of employer-sponsored retirement account offerings. Finally, other behemoths have acquired robo-advising technology, such as Blackrock’s acquisition of FutureAdvisor.⁴

These digital investment management platforms offer financial advice at a considerably reduced cost compared to a traditional investment advisor. Both Wealthfront and Betterment, for example, charge a fee of 0.25% for portfolios larger than \$10,000. Betterment goes one step further to offer the first year of service free with a \$10,000 deposit, while Wealthfront gives free service to any account smaller than \$10,000. Both allow investors to open accounts with minimal to no deposit. Meanwhile, larger platforms such as Schwab charge slightly higher fees of 0.28% with a \$25,000 minimum.

These fintech platforms mainly invest in low-cost passive investment vehicles like exchange-traded funds (ETFs). Portfolio construction is limited to asset class allocation, rather than individual security or instrument selection. Additionally, most robo-advisors offer automated portfolio rebalancing and tax-loss harvesting strategies, so clients do not have to implement these investment services themselves, or pay excessive fees to individual financial advisors (FAs) for such services.

Table 1: Asset Allocation Model Comparison

Asset Class	Digital Adviser A	Digital Adviser B	Digital Adviser C	Digital Adviser A	Digital Adviser D	Digital Adviser E	Digital Adviser F
Equity	90.1%	72.0%	51.0%	84.0%	60.0%	69.0%	72.2%
Domestic	42.1%	37.0%	26.0%	34.0%	30.0%	47.0%	28.9%
U.S. total stocks	16.2%	22.0%		34.0%		47.0%	13.0%
U.S. large-cap	16.2%		8.0%		19.0%		13.0%
U.S. mid-cap	5.2%						
U.S. small-cap	4.5%		18.0%		11.0%		2.9%
Dividend stocks		15.0%					
Foreign	48.0%	35.0%	25.0%	50.0%	30.0%	22.0%	43.3%
Emerging markets	10.5%	16.0%	13.0%	25.0%	9.0%	9.0%	17.0%
Developed markets	37.5%	19.0%	12.0%	25.0%	21.0%	13.0%	26.3%
Fixed income	10.1%	13.0%	40.0%	10.0%	21.5%	11.0%	15.0%
Developed markets bonds			15.0%		2.5%		4.1%
U.S. bonds	4.9%	6.0%	25.0%	10.0%	12.0%		10.9%
International bonds	3.6%						
Emerging markets bonds	1.6%	7.0%			7.0%		
Other	0.0%	15.0%	9.0%	6.0%	10.0%	16.0%	12.8%
Real estate		15.0%	9.0%	6.0%	5.0%		12.8%
Currencies						2.0%	
Gold & precious metals					5.0%		
Commodities						14.0%	
Cash					8.5%	4.0%	

Asset Allocation Models for a 27-Year-Old Investing for Retirement, September 2015
 Source: Cerulli Associates
 Note: Columns may not total to 100% due to rounding.

Robo-advisors also help to minimize conflicts of interest between clients and individual FAs. These conflicts of interest formed the basis of the Department of Labor Fiduciary Rule changes proposed last year. Briefly, the current law requires FAs to select “suitable” investments for their clients and the DOL proposed changing this to a stricter “fiduciary” standard that would require FAs to consider their clients’ interests ahead of their own.⁵ Therefore, computer-driven robo-advisors are designed to protect unsuspecting clients from such conflicts of interest.

However, conflicts of interest may still arise at the level of the firm vis-à-vis the client. For example, algorithms may favor allocation of assets toward funds in which the digital advisor has a financial interest. Some financial services firms seek to avoid potential conflicts of interest by not offering proprietary or affiliated funds, or funds that provide revenue-sharing payments. Other firms offer affiliated funds, but disclose the relationship to the client.

In addition to lower costs, proponents of robo-advisors argue that their algorithm-driven investment advice is objectively measurable. Retail investors obtain investment advice by answering a series of questions about their financial

profile and their risk tolerance. These inputs are fed into an algorithm, which generates asset allocation and portfolio selection recommendations. Indeed, the use of algorithms reduces investors’ emotional temptation to, for instance, “buy high and sell low” that often comes in circumstances of uncertainty and extreme market volatility.

Algorithms can also perform standard portfolio rebalancing tasks more efficiently and accurately than humans can. On the margin, this activity can contribute to outperformance relative to the average investor.

Nevertheless, the questionnaires that feed the algorithms are ultimately human constructs, as are the answers provided by the end-user. Data inputs and assumptions can yield vastly different investment recommendations. In the CFA Institute Fintech survey of members cited earlier, 46% identified flaws in advice algorithms as one of the biggest risks to consumers. The members’ concerns are borne out by empirical evidence. FINRA’s digital investment report cites a study of seven different automated investment platforms. In the study, information about the same theoretical 27-year-old saving for retirement was inputted into each platform. The seven platforms each yielded radically different investment

recommendations for the same individual. For example, the equity asset allocation for the identical 27-year-old individual ranged from a low of 51% to a high of 90%. Obviously, the long-term investment outcomes for such variant portfolio allocations would be diverge markedly.

Thus, as with all products in the financial services, consumers are wise to exercise caution in selecting providers and to become informed of the underlying assumptions that drive the outputs of automated advice.

Without a doubt, democratized access to investment advice for younger and lower-income individuals with smaller savings pools is good for both savers and providers of financial services. Anecdotally, brokers say that individuals are willing to use automated investment advice up until they have accumulated \$100,000 in savings. After that, investors will seek financial counsel that is augmented by an experienced professional. Intuitively, such a threshold makes sense given that wealth management increases in complexity as the portfolio size grows. Issues such as more nuanced tax management; allocation towards different types of savings, including both college 529 and retirement accounts, and estate planning become increasingly more relevant as an investor’s portfolio grows and their circumstances evolve.

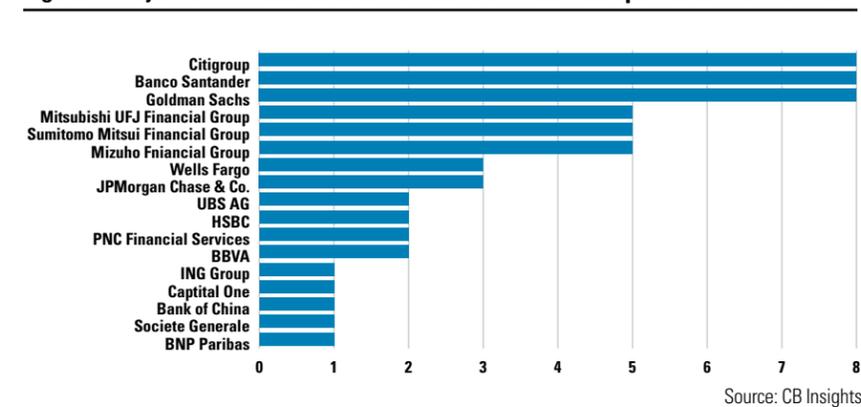
Digital Lending

A second major fintech innovation has been through digital lending. Digital lending is primarily lending that takes place outside of the traditional banking system through Web-based or mobile phone platforms. S&P’s Global Market Intelligence estimates that the 13 largest digital lenders originated approximately \$28 billion in loans in 2016. That is a tiny slice of the total \$3.7 trillion in consumer debt held by Americans in August 2017.⁶

As with digital wealth management, digital lending offers the beneficial feature of convenience and broadens access to otherwise under-served communities. While Congress in the past has sought to mandate some modicum of lending to underbanked communities, barriers to entry such as geographical location and prohibitive cost of acquiring customers have proven intractable. The arrival of digital lending has marked a transformational change in the market structure of lending to individuals and small businesses by reducing the cost of acquisition, and thus has naturally started to fill in the lending gap in underbanked regions.

Quick access to liquidity has proven particularly valuable to small businesses in need of working capital. Whereas banks often take weeks to transfers funds to users, digital lenders can often fund accounts within the same day. This

Figure 2: Major Bank Investments to VC-Backed Fintech Companies Q4 '15 – Q4 '16



Source: CB Insights

makes digital lenders especially attractive partners for small businesses seeking to manage payroll and inventory cash flow requirements.

Digital lenders differ from traditional banks not just in their rapid delivery mechanisms, but in their credit scoring systems. They do not rely exclusively on credit scores supplied by the major credit agencies, which means they can target groups that often lack sufficient credit history for them to qualify for loans through conventional avenues.

In the place of standard credit scores, digital lenders have developed their own sophisticated scoring methods based on “alternative data.” Much of this involves the use of big data and artificial intelligence. Indeed, at a recent fintech conference at Yale University, Goldman Sachs partner Paolo Zannoni posited that with the huge amounts of public information available about individuals, it is entirely feasible to establish credit profiles based solely on data available in the public domain.⁷

Behemoth banking incumbents like JP Morgan and HSBC are increasingly looking to fintechs not as competitors but as partners to help improve operations and reach new consumers. Indeed, significant regulatory barriers may require some fintechs to join forces with larger entities in order to prevail in the tough competitive environment. Investments by major banks in fintechs have been steady over the past several years. Figure 3 from CB Insights Global Fintech Report 2016 shows the numbers of investments by major banks over the five quarters through December 2016.

Digital Lending & Regulatory Frameworks

Digital lending is a new service and there is still no clear regulatory framework to manage service providers' activities. Marketplace lenders are a subgroup of digital lenders that essentially act as brokers. They generate revenue from origination and servicing fees. Such marketplace lenders sell loans immediately to banks and investors, and therefore do not retain credit risk on their balance sheets.

Direct lenders, on the other hand, behave more like banks, although they are not subject to the same bank supervision by regulators, nor do they have the same state-level licensing. Like banks, they hold loans to maturity and earn a profit on the spread between their borrowing cost and their lending income. They rely on lines of credit at commercial banks or their own balance sheet for capital. Indeed, many lenders rely on regulated banks to issue loans on their behalf.

Digital lenders face considerable challenges from state regulators and industry groups who question their methods and practices. Many digital lenders have actively been calling for more regulatory oversight of their business, so that the boundaries in which they can do business are clear. Data privacy and security, compliance, and fair lending violations are but a few of the issues around which digital lenders seek guidance.

Until now, non-bank lending has been primarily regulated at the state level. However, given the inherently interstate nature of online lending, federal preemption of state regulations may be justified to provide a consistent regulatory environment. Moreover, the rapid pace of innovation and complexity of the technology almost certainly prevents regulators from creating adequate rules-based regulations to keep up with the speed of change. This may imply a move away from rules-based governance toward a more controversial principles-based regulatory structure. At times, rules created to benefit consumers can in fact generate negative externalities if they prevent innovation by startups who may lack the resources to meet significant compliance burdens. The move away from rules-based to principles-based regulation may alleviate the downside of negative unintended consequences brought on by such a structure.

Whatever the case, as the fintech space continues to grow, the role and need for a sound regulatory environment will continue to be of paramount importance to the overall health of the U.S. banking system. Most observers of fintech agree that regulators in Asia and Europe are ahead of the U.S. in understanding the nuanced interface of technology and financial services. Regulators in the U.K. have been particularly successful in regulating in such a way that encourages innovation. The good news is that U.S. regulators do not have to reinvent the wheel, as they have the U.K. and other models to learn from and adapt to our own markets.

Mobile Payments

As it is in the regulatory regime of digital lending, the U.S. is also behind the rest of the world in the usage of mobile payments. Mobile payment services accelerate the pace of payments relative to traditional services and allow transactions to take place at a negligible cost. Such payments are also referred to as mobile money, mobile money transfer or mobile wallet, and are used as an alternative to cash, check or credit card payments.

Not surprisingly, mobile payments have been especially successful in markets where previously underbanked consumers have been able to take advantage of new mobile infrastructures to improve their financial standing. The world's most popular integrated mobile application is WeChat. WeChat originates from China, and originally began as an instant messaging platform similar to WhatsApp. Within a matter of a few years, WeChat is the app on which consumers can place phone calls, send money, shop, order food for delivery, pay bills, and many other transactions.

In the U.S., the largest number of users of mobile payments are not surprisingly in the under-35 demographic, the Millennials. PayPal is the most popular mobile payment platform in the U.S., and it is currently accepted by 35% of U.S. retailers. PayPal's annual mobile payment volume was \$102 billion in 2016.

Older demographics largely prefer credit cards and other methods of payments, citing concerns over security and complexity of using the apps. Ironically, mobile wallets are especially helpful in curtailing credit card fraud through card-skimming. Nevertheless, security concerns are not entirely unwarranted.

Peer-to-peer payment apps have weaknesses unique to their format. For example, fraud or identity theft on peer-to-peer payment apps can lead to irrevocable spending in client accounts, as these are not protected by fraud insurance. Despite their convenient interface, peer-to-peer payments

Table 2: Maryland/DC-area Fintech Start-Ups

Firm Name	Service/Specialization	City	Total VC Funding
Blispay Inc.	Consumer Credit	Baltimore	\$25M
eOriginal, Inc.	Financial Document Management	Baltimore	\$35M
EverSafe	Identity Theft & Account Monitoring	Columbia	\$250k
iControl Systems USA, LLC	Payment Management	Bethesda	\$20M
FS Card Inc.	Consumer Credit	Washington D.C.	\$30M
MPower Financing	Student Loans	Washington D.C.	\$10.5M
Fundrise	Private Real Estate Investing	Washington D.C.	\$55.5M

Source: Crunchbase¹⁰

still rely on the traditional banking infrastructure that ungirds the ATM system. In addition to security concerns, merchants still pay processing fees for retail purchases, which they absorb. So, in this sense there are no cost advantages created.

Maryland's Entrepreneurs

Maryland's Fintech Entrepreneurs operate across a variety of spaces. Table 2 shows some of the largest start-ups that have recently received VC funding.

Conclusions

The fintech space is vast and ever-growing. This brief overview has considered some of the major innovations in fintech that have had a significant effect on how consumers operate at a global scale. Other aspects of innovation not considered in this article are those technologies that target business efficiencies. Blockchain is one mentioned earlier. Another is how artificial intelligence may be used to aid financial analysts and portfolio managers to deliver investment management services more effectively and at a lower cost in ways that may ultimately offer far more value than robo-advising. In closing, we share data on Maryland's entrepreneurs in the fintech space.

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Disasters Strike — Ready or Not?

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Each new natural disaster rekindles businesses' interest in taking measures to prevent the next one from hurting their operations. But talk has so far led to little action, even after the big disasters of 2017, Hurricane Maria's devastating effect on Puerto Rico and the U.S. Virgin Islands, three hurricanes making landfall on the U.S. mainland, multiple earthquakes hitting Mexico and Japan, and a 4.1-magnitude earthquake centered near Dover, Delaware, rocking parts of Maryland. With the frequency and cost of storms rising, business owners should be developing plans, building on the existing efforts to protect and preserve life and property in Maryland.

The devastation of natural disasters is not that surprising – but the economic impact to those regions is shocking. Hurricane Katrina (2005) caused \$150 billion in economic damage, Superstorm Sandy (2012) caused \$30 billion in economic damage, Hurricane Irma (2017) is still racking up bills but is expected to hit \$100 billion, and as the waters recede in Texas and surrounding states, Hurricane Harvey is on track to set a new record of nearly \$190 billion and impact 450,000 people.¹ Not only households, but also local businesses are severely impacted.

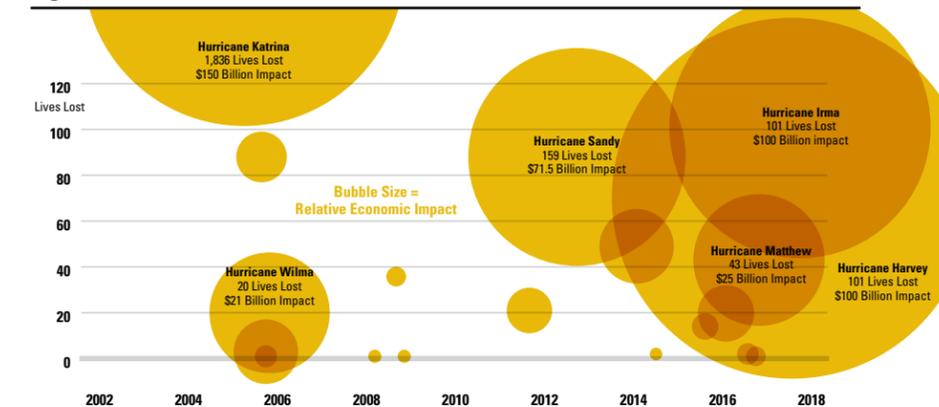
Closer to Home

Maryland is not immune to natural disasters, its coastal location and the extremes of hot humid summers, and low winter temperatures bring hurricanes, tornadoes, floods, snowstorms and ice storms to the region. In July 2016, flooding in Ellicott City impacted 65,000 people and closed the downtown business district for more than two months. The reported economic impact to Ellicott City was \$42 million to both households and businesses.²

Figure 1 shows the 20 largest mainland U.S. natural disasters from 2005–2017. Each bubble represents one event with the cost in human lives identified on the vertical axis and the relative economic impact represented by the size of the bubble. The frequency of natural disasters increased over the period. However, the number of lives lost has decreased dramatically.

We are getting better at moving people out of harm's way and moving supplies in to aid in recovery. Since Hurricane Katrina, we have witnessed FEMA stepping-up with improved information on family storm preparedness and enhanced procedures for storm response. As individuals, we are regularly reminded to have our home emergency kits stocked with flashlights, batteries, water, and other essentials.

Figure 1: Natural Disasters 2005 - 2017



Primary Source Polsson, www.worldtimeline.info³

The coordination between private and state agencies has a positive effect on how quickly a region returns to a state of normalcy. The coordination of product flow between the right people at the right time has made a difference in the number of lives lost during a natural disaster and the time it takes to recover. Additionally, as technology advances, the ability to track a storm and detect when and where it will hit has improved. When Hurricane Katrina made landfall near New Orleans, there were 1,836 direct and indirect deaths.⁴ When Hurricane Harvey hit the South and Southeast coast in September 2017, though the economic damage was the highest in history, the number of lives lost was significantly lower (70 deaths).⁵

All Businesses Need to Be Prepared

Businesses of all sizes must also improve their preparedness for natural disasters and learn from the past. Business continuity planning is often part of a large corporation's risk mitigation strategy. But our economy is driven by small business, are our small to medium-sized firms ready to weather the next storm? Preparedness is a costly endeavor but so is a business failure. For small and medium-sized firms, being ready starts with identifying key relationships and leveraging networks of organizations outside of the region. This includes full documentation and contact information for employees, suppliers, banking, insurance, and legal support.

Table 1 – Emergency Response Plan Elements Comparison

Element/State	FL	NC	MD
Understanding of Planning Phases and its Components	■	■	■
Local and State Government Responsibility	■	■	■
Major Stakeholder Responsibilities	■	■	■
Mutual Aid Management and Logistics	■		■
Maintenance and Development of Emergency Plan	■	■	■
Laws and Guidelines	■	■	
Reference Points and Authorities	■		
Acronyms	■	■	■
Transportation - Responsibilities and Stakeholders	■	■	
Communication - Responsibilities and Stakeholders	■	■	
Firefighting - Responsibilities and Stakeholders	■	■	
Planning - Responsibilities and Stakeholders	■	■	■
Mass Care - Responsibilities and Stakeholders	■	■	
Resource Management - Responsibilities and Stakeholders	■	■	
Public Health and Medical Services - Responsibilities and Stakeholders	■	■	
Search and Rescue – Responsibilities and Stakeholders	■	■	
Environmental Protection – Responsibilities and Stakeholders	■		
Food and Water – Responsibilities and Stakeholders	■	■	
Energy – Responsibilities and Stakeholders	■	■	
Military Support – Responsibilities and Stakeholders	■	■	
External Affairs – Responsibilities and Stakeholders	■		
Volunteers and Donations – Responsibilities and Stakeholders	■	■	
Law Enforcement and Security – Responsibilities and Stakeholders	■	■	
Animal and Agricultural Issues – Responsibilities and Stakeholders	■	■	
Business, Industry and Economic Stabilization – Responsibilities and Stakeholders	■		
Disaster Airlift		■	
Public Works and Engineering		■	
Hazardous Materials		■	
SERT		■	
Event Specific Plans	■	■	

Customers often do not understand that business operations cannot be conducted the same way following a natural disaster. In the wake of a natural disaster, employees, supplies, computer equipment, refrigeration, and heating and air conditioning may not be fully available. Initial lost sales and longer-term customer loyalty can be at risk. How quickly can your business recover from a natural disaster?

Lesson from Electric Utilities

Even when a storm does not damage a business’s physical location, regional utility outages can keep the business closed. Having power and water not only affects the business location but also the ability of its employees to maintain their family responsibilities and be available to come into work.

In Central Maryland, BGE is responsible for restoring electric power to help the region return to normal. BGE has learned from the past and not only has its workforce prepared for natural disasters, they have a network of utilities outside the region that are ready to lend a hand.

Throughout the year, preparation for the worst is in full swing at BGE’s operations center in Windsor Mill, Maryland. Drills are conducted twice a year where various scenarios are played out, in order to ensure that all procedures and processes work effectively and efficiently based on a several hundred page playbook. More experienced employees train newer employees so that everyone knows their role in storm restoration.

In the background, mutual aid agreements are in place to ensure that local resources are augmented by trained crews from regions not affected by the storm. BGE’s parent company, Exelon, coordinates with their subsidiaries to create a strong network stretching from the eastern seaboard to Chicago. If Exelon’s resources are not sufficient, mutual assistance groups, such as SEE – Southeastern Electric Exchange, NAMAG – North Atlantic Mutual Assistance Group, and MUGMA – Maryland Utilities Group for Mutual Assistance are ready to step in. And these relationships are reciprocal as we saw BGE crews head to Florida in the wake of Hurricane Harvey.

Businesses Can Prepare and Build Support Networks

We often see companies help in recovery efforts, usually through cash donations or making supplies and material available to start the recovery process. Waffle House restaurants have policies in place that no matter how much damage is incurred, they do anything possible to be open, offer a limited menu and serve the ones affected by the disaster and the first responders.⁶ Walmart donates water and household

products after a storm hits. And Home Depot donated \$1 million to help those affected by Hurricane Harvey. “Our hearts and full support go out to our communities, customers, and associates that are being impacted by Hurricane Harvey,” said Shannon Gerber, executive director of the Home Depot Foundation.⁷

In an era of virtual networks, we can build assistance networks that will help businesses of any size get back to work in the aftermath of a natural disaster. Suppliers, customers, and even competitors can be part of a solution that speeds recovery.

Preparation is Key to Minimizing Business Disruption

The preparation to expect the worst is critical, to minimize damage to the operations of a business. MEMA – Maryland Emergency Management Agency, the state government agency responsible for providing support whenever local governments are not able to provide the necessary resources, have preparedness plans in places, to make sure organizations, agencies and individuals know what to do and how to prepare for a natural disaster. State emergency response plans are designed for use in a variety of man-made and natural disaster scenarios.

Every state develops its own plan based on their needs, risk, and experience. A comparison of the plans provides some insights on the comprehensiveness of the plans.

Table 1 compares the plan elements for Maryland and two other southeastern states.

The list of thirty plan elements comes from aggregating across all three state’s plans. Florida’s plan addresses 26 of the elements (87%), North Carolina’s plan addresses 25 of the elements (83%), Maryland’s plan addresses seven of the element (23%). It is not surprising that Florida has the most extensive plan given its large geographic footprint, thousands of miles of shoreline and a long history of devastating hurricanes. Plans are scalable for the needs of the organization but we can all learn from the experiences of others.

Forewarned is Forearmed

Planning reduces recovery times and the negative impact of disruptions.⁸ Experience with prior disasters and the likelihood of future disasters may affect the comprehensiveness of planning, but the nature of disasters is that their level of destruction and when they will strike cannot be precisely predicted.

Every company should have a playbook in place with employees and suppliers trained to know how to respond when disaster strikes. An external support network beyond the region can provide access to critical supplies and services. A plan on the shelf is of no use, ongoing training and practice are necessary to keep the plan current and actionable.

When it comes to natural disasters, Mother Nature always wins the battle but with preparation businesses can recover to stand and fight another day.

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Importance of Knowing the Value of Your Trade Secret

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Businesses in the United States have a trade secret problem. Four out of five senior executives say their business' trade secrets are an important and/or essential part of their business.¹ The majority of businesses in the U.S. do not know if their trade secrets have been stolen and do not have action plans in responding to thefts of trade secrets.² According to the U.S. Department of Commerce, trade secret theft costs U.S. businesses approximately \$300 billion annually which is a significant.³

Knowing and understanding your business' trade secret is important but it is equally important to know the value of your trade secret. This knowledge is helpful for business planning and also in case the trade secret is stolen.

According to 18 U.S.C. §1839(3), a trade secret is defined as all forms and types of financial, business, scientific, technical, economic or engineering information. Trade secrets are typically owned by a company and information about the trade secret is not usually known outside that particular company. In many instances, the trade secret provides a company with a competitive advantage and provides some sort of economic value to a company. Some additional characteristics of trade secrets are as follows:

- Trade secrets are not known outside of the particular company
- They are valuable to the owner and possible competitors
- It costs time, effort and money to develop trade secrets
- These are known only by employees and others involved in the company
- It is difficult for others to acquire or independently duplicate these secrets
- They are subject to reasonable measures to guard the secrecy of the information

Almost every business has some form of trade secrets. Trade secrets take the form of manufacturing processes, inventions, software source code, and business knowledge of a particular industry. For example, many investment management firms have financial models that they use to value particular businesses and assets. The financial models created by these firms have the potential to be a trade secret. In the event a competitor obtains these financial models, the competitor could stand to gain economic value through their use.

Another example of a trade secret could be a company's algorithm. Take Google for example. They developed a search algorithm and continue to refine it but this trade secret makes it the top search engine in the world. Without this algorithm, Google likely would not be

the company it is today. Another example of trade secrets are Coca Cola and Kentucky Fried Chicken. Each business has a recipe that has helped it develop sales and profits over the years. Each recipe is valuable to the business and is a direct driver of sales. In the event that a competitor of any of these companies steal their trade secrets, then this is an advantage and economic value to the competitor.

Many companies do not know the value of their trade secret even though their trade secret might be the driving factor in generating sales for the company. The trade secret might be synonymous with a company; however, management might not know the value of their trade secret. There are many reason for knowing the value of the Company's trade secret, including:

1. Transaction Purposes: A company might be able to sell its trade secret and/or license the trade secret for a royalty. In this instance, the value of the trade secret would affect the purchase price to the acquirer and/or the licensee fee paid by the licensor.
2. Financial Statement Reporting Purposes: The Accounting Standards Codification, Topic 805 (ASC) determines the accounting for business combinations, including the valuation of identifiable intangible assets. Trade secrets are considered identifiable intangible assets and thus need to be valued for financial statement purposes.
3. Strategic Planning Purposes: Knowing the value of a trade secret might help the company's management identify opportunities for the business and opportunities for growth in the industry.
4. Bankruptcy Purposes: If the company owns a trade secret and has filed for bankruptcy, the bankruptcy court might want to know the value of the company's trade secrets.
5. Litigation Purposes: A company might be in litigation for a variety of reasons, including the misappropriation of their trade secret. For example, a former employee might have stolen the company's trade secret prior to leaving the company. As a result, the court might need to determine the value of the trade secret in order to assess the damages.

As you can see, there are a variety of reasons for determining the value of trade secrets. There are three widely accepted approaches to value a trade secret: the market approach, the cost approach and the income approach. Each method is summarized below.

Market Approach

The market approach uses market data to derive the value of a trade secret. Market data can be in two forms. The first form is through historical, comparable acquisitions of trade secret from other companies. A company might sell its trade secrets to another company for a specific price and that price for the trade secrets can be used to value the subject company's trade secret. The other form of market data is using historical, comparable license agreements where a trade secret is licensed to



Both scenarios are present-valued back to the valuation date using a discount rate. The difference from owning the trade secret versus licensing the trade secret results in the value of the trade secret.

another company for a fixed or variable fee. The data from the comparable license agreements may indicate the value of the trade secret based on the terms of the license agreement.

The market approach is difficult to use in valuing trade secrets, as there is limited market data available on trade secrets. Trade secrets are specific to a company and an industry and finding market data is often difficult. In addition, available data is usually not complete and some of the detailed information may not have been disclosed. As a result, it can be difficult to find market data that discloses all the information necessary to value a trade secret.

Cost Approach

The cost approach considers the costs associated with creating the trade secret. Valuing trade secrets under the cost approach utilizes the costs (i.e. reproduction costs) that it would take for a competitor to recreate the trade secret. These costs should be adjusted for inflation, replacement cost, and obsolescence. Therefore, the total adjusted costs associated with reproducing the trade secret is the value of the trade secret.

The cost approach is often difficult to use in valuing trade secrets, as it is difficult to estimate the costs associated with reproducing the trade secret. It is also challenging to identify the costs for a competitor to recreate the trade secret. Many companies with trade secrets created them a long time ago and have most likely evolved them over the years. Identifying the cost and estimating the amount can be a difficult or impossible task.

Income Approach

The income approach uses the present value of cash flows generated by the company's trade secret to determine the value of the trade secret. This is the most common approach when valuing trade secrets. The two most common methods under the income approach for valuing trade secrets are the incremental value method and the relief from royalty method.

Under the incremental value method, also known as the "with and without" method, the timing and amount of future cash flows is determined under two scenarios: the "with" scenario and the "without" scenario. For the "with" scenario, the cash flows and timing of cash flows are determined under the assumption that the company owns the trade secret. For the "without" scenario, the cash flows and timing of cash flows are determined assuming the company does not have the trade secret or if the trade secret were public knowledge.

There are variations in income and expenses for each scenario which needs to be carefully analyzed. Typically, the "without" scenario will have less income and, as a result, cash flows since the company does not own the trade secret. In addition, certain costs such as security costs associated with protecting the trade secret might not be incurred in the "without" scenario. The cash flows in both scenarios are present valued back to the valuation date using a discount rate that is considered for each scenario.

The relief from royalty method is similar to the incremental method in that it utilizes two scenarios; however, the alternative scenario is derived differently. In the incremental method, the alternative scenario is the "without" scenario. In the relief from royalty method, the alternative scenario adjusts the cash flows to assume that the company licenses the trade secret versus owning it. In this scenario, a royalty expense is included in the analysis. Both scenarios are present-valued back to the valuation date using a discount rate. The difference from owning the trade secret versus licensing the trade secret results in the value of the trade secret.

To determine what the royalty rate would be in the relief from royalty method, various databases could be used to determine what the market average royalty rate is for the industry. The subject company's historical license agreements, to the extent they exist, can also be used as a proxy to determine what the royalty rate would be if the company were to hypothetically license the trade secret.

In conclusion, there are a variety of reasons to value trade secrets and there are a number of different methods to use in the valuation process. Each method has its advantages over others and the method used could be dependent on the purpose in which the trade secret is being valued. Knowing the value of the trade secret could be the critical piece that allows the business to recover its trade secret and not be one of the many firms in the U.S. to have their trade secrets stolen. More importantly, knowing the value might help prevent businesses from being one of the many companies that contribute to the \$300 billion annually in trade secret theft costs.⁴

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¹Baker McKenzie, "Companies Failing to Protect Their Trade Secrets", (<http://www.bakermckenzie.com/en/newsroom/2017/06/companies-failing-to-protect-their-trade-secrets/>). Accessed on October 26, 2017.

²Ibid.

³Statistic from U.S. Department of Commerce (www.commerce.gov); article titled: "Protecting America's Secret Sauce: Trade Secret Protection for American Innovators." Accessed on October 26, 2017.

⁴Statistic from U.S. Department of Commerce (www.commerce.gov); article titled: "Protecting America's Secret Sauce: Trade Secret Protection for American Innovators." Accessed on October 26, 2017.



Entrepreneurship Education: A Summary of Meta-Analytic Findings and Their Applications at Towson University

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Entrepreneurship Education and its Relationship with Entrepreneurial Intentions

Entrepreneurship education consists of “any pedagogical [program] or process of education for entrepreneurial attitudes and skills” (Fayolle, Gailly, & Lassas-Clerc, 2006, p. 702). The types of entrepreneurship education vary across specific target audience (Liñán, 2004). Nowadays, a majority of university-level programs are intended to increase entrepreneurial awareness and to prepare students for becoming aspiring entrepreneurs (Weber, 2011). It is noted that education for awareness focuses on the students who had no experience of starting a business so the purpose of this awareness-based entrepreneurship education is to enable students to develop entrepreneurial skills and to assist them in choosing a suitable career (Liñán, 2004). The objective of this paper is to offer suggestions and insights on entrepreneurship education and entrepreneurial intentions by building on this awareness-based entrepreneurship education that is designed for the students who had not already decided which career to pursue (e.g., employment versus entrepreneurship) or who had not experienced starting their own businesses prior to enrolling in entrepreneurship courses. Entrepreneurial intentions refer to one’s desire to own one’s own business (Crant, 1996) or to start a business (Krueger, Reilly, & Carsrud, 2000). Entrepreneurial intention is a robust predictor of entrepreneurial behaviors, which has been supported by a series of social-psychological studies that assume the intention is the single best predictor of actual behavior (Bagozzi, Baumgartner, & Yi, 1989).

Regarding the relationship between entrepreneurship education and entrepreneurial intentions, human capital theory (Becker, 1975) and entrepreneurial self-efficacy (Miao, Qian, & Ma, 2017) are the two theories/lenses that suggest a positive relationship between them. Entrepreneurship education, as one category under human capital accumulation investments, should cultivate students’ attitudes and intentions toward entrepreneurship and thus prepare them for new venture creation (Liñán, 2008). Second, entrepreneurship education influences one’s entrepreneurial self-efficacy through which individuals’ entrepreneurial intentions may be enhanced (Wilson, Kickul, & Marlino, 2007).; hence, it is known as a factor that affects one’s entrepreneurial intentions (Segal, Schoenfeld, & Borgia, 2007).

Further, entrepreneurship education could augment entrepreneurial self-efficacy via exposing individuals to examples of successful business planning or proactive interaction with successful practitioners (Honig, 2004).

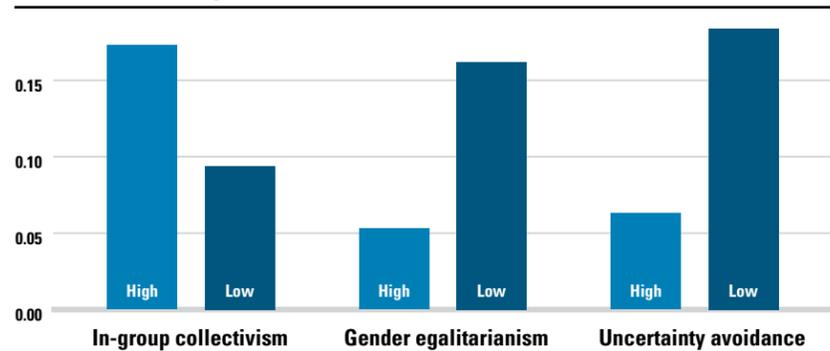
Major Findings in Bae, Qian, Miao, and Fiet’s (2014) Meta-Analytic Review

In my coauthored paper “The relationship between entrepreneurship education and entrepreneurial intentions: A meta-analytic review” published in *Entrepreneurship Theory and Practice*, we tested a series of important research hypotheses related to entrepreneurship education, such as the effect of duration and specificity of entrepreneurship education on entrepreneurial intention, and cross-cultural differences in entrepreneurship education – entrepreneurial intention relationship.

Specifically, my coauthors and I found that educational format of entrepreneurship education (e.g., semester format versus workshop format or business planning versus venture creation) did not condition the relationship between entrepreneurship education and entrepreneurial intention. Nor did students’ personal characteristics (e.g., entrepreneurial family background) condition the relationship between entrepreneurship education and entrepreneurial intention.

Regarding cultural contexts, the positive relationship between entrepreneurship education and entrepreneurial intentions is stronger in (1) high in-group collectivistic countries, (2) low gender egalitarianism countries, and (3) low uncertainty avoidance countries (Figure 1). In-group collectivism refers to “the degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families” (House et al., 2004, p.12). Gender egalitarianism is the “degree to which an organization or a society minimizes gender role differences while promoting gender equality” (House et al., 2004, p.12). Uncertainty avoidance is “the extent to which the members of an organization or a society strive to avoid uncertainty by relying on established social norms, rituals, and bureaucratic practices” (House et al., 2004, p.11).

Figure 1. A cross-cultural comparison of the relationship between entrepreneurship education and entrepreneurial intentions.



Note: the values on the vertical axis refer to corrected meta-analytic correlation coefficients for the relationship between entrepreneurship education and entrepreneurial intentions. National cultural dimensions were shown in the horizontal axis. The results presented here were based on Bae, Qian, Miao, and Fiet (2014).

Entrepreneurship Education in Towson University: An Example of Application of Research Findings

Department of Management in College of Business and Economics at Towson University sets a great example in preparing students for being future successful entrepreneurs. After receiving training in a variety of courses, students will obtain critical skills that allow them to successfully start their own businesses and will develop entrepreneurial spirits which help them effectively work in small businesses or family businesses.

With respect to course design, Department of Management offers entrepreneurship major (targeting toward business students) and entrepreneurship minor (targeting toward non-business major students). Entrepreneurship minor program was recently established and this program provides entrepreneurship skill development programs to students who are from non-business majors. This program offering coincides with my research findings that non-business students are very willing to take entrepreneurship education because they are keen on understanding the methods to integrate their major background and knowledge with entrepreneurship.

Schools nowadays offer entrepreneurship education in either semester or workshop format. The main difference between these two program offerings is the absorption time between class meetings. Programs of semester format can help students remember and retain new materials and positively influence students' learning (Cepeda et al., 2006). Entrepreneurship programs of

semester length are usually comprised of both theory training and practice training for students. For instance, these programs prepare students for learning foundational knowledge in entrepreneurship which covers idea development, entrepreneurship and society, family business and so forth. More importantly, students can learn real-world entrepreneurship cases, attend business plan competitions, and do internships from semester-length entrepreneurship programs. These programs are effective in developing students' knowledge and skills related to entrepreneurial tasks.

Relative to semester-length programs, workshops have also provided great benefits to students. In addition to semester-length courses, entrepreneurship minor program at Towson University launched a series of activities and events on campus opening to all students and the public. For example, innovation calisthenics which operate under workshop format have ten weeks long training sessions and last for 90 minutes once a week for each training session. These programs cover topics including sounding board, design thinking, business model, and pitch practices. Students participate in hands-on practices with mentors. They also learn about idea development from the initial stage. The schedule and training of innovation calisthenics are integrated with entrepreneurship competitions at Towson University. This way of training, named as learning-by-doing that was mentioned by Minniti and Bygrave (2001), consists of "repetition and experimentation that increases [an] entrepreneur's confidence in certain actions and improves the content of his stock of knowledge" (p. 7).

Entrepreneurship competition, an important feature of the entrepreneurship program at Towson University, allows students to present business ideas to the public and to gain awards according to judges' evaluation. The competitions include three sub-competitions, including Big Idea Poster Competition, Tiger Cage Pitch competition, and Business Model competition. Students take steps and compete to gain access to next stage and its corresponding awards. These entrepreneurial opportunities help students nurture their initial ideas into mature ideas and actionable plans and stimulate students' entrepreneurial intentions and behaviors.

Towson University sincerely cares about minority and entrepreneurship program in Towson University clearly reflects it. For example, entrepreneurship program in Towson University cares about female students and entrepreneurs and hosted Entrepreneurship Unplugged

by inviting both male and female entrepreneurs as speakers. It is noteworthy that in Fall 2017, entrepreneurship program hosted Women+Minority Entrepreneurship Conference by inviting Dr. Leola Henry who is from R&D at McCormick & Company.

Suggestions for the Future Entrepreneurship Education

As Towson University is expanding and is home to nearly 500 international students from over 80 countries, I provide a few suggestions regarding entrepreneurship education in a culturally diverse academic environment in accordance with my research findings.

First, students who come from high in-group collectivistic cultures are more likely to exhibit consensus with their peers in their cohort because they are inclined to conform to social norms and to maintain harmony with others in their cohort (Singelis, 1994). If they work in teams, they are more likely to be followers due to their propensity to develop a high sense of team connectedness. As educators design team projects related to entrepreneurship, they may consider students' cultural backgrounds when assigning students into groups.

Second, individuals from countries where gender egalitarianism is low are prone to relate entrepreneurship with socially constructed gender differences. Hence, educators need to mitigate students' perception of gender inequality when delivering entrepreneurship education. Doing so should have profound beneficial effects on students who are from low gender egalitarianism countries.

Third, students may be less interested in entrepreneurship when they realize the uncertainties associated with entrepreneurship. This phenomenon may be more prevalent in high uncertainty avoidance countries. One of the proven effective approaches is to provide students with training, mentorship, and practice in order to mitigate students' fear of failure.

Finally, my research significantly contributed to the entrepreneurship education field with respect to the finding that pre-education entrepreneurial intentions explained a majority of variance in students' post-education entrepreneurial intentions. Therefore, if the goal is to enhance students' entrepreneurial intentions, educators should be advised to implement enrollment screening processes to select the students who already have had high entrepreneurial intentions.

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Can Towson Students Beat the Market? Evidence from a TU Survey Portfolio

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The Survey

During the Fall semester of 2016, the Towson University Investment Group (TUIG) surveyed 200 students on campus, posing the question “If you had \$100,000 to invest, and could choose five companies to invest in, which five would you choose?” We then created a \$100,000 hypothetical portfolio comprised of the top 30 responses, which amounted to a total of 986 votes. The weight of each holding was determined via the number of votes each holding received. For example, Twitter received 82 of the total 986 votes, consequently amounting to 8.32% of the total portfolio.

The goal of the survey is to collect sample data from the student body of Towson University to evaluate whether an average Towson student is able to beat the market. Once the data is consolidated, we are able to compare the TU Survey Portfolio to the performance of the S&P 500 Index.

The TU Survey Portfolio companies were purchased at their 10/31/2016 closing prices, which is also the portfolio’s inception date. In the Fall of 2017, the TUIG conducted another survey and reallocated the portfolio’s ending value on 10/31/2017 according to the new survey results. This method allows us to compare the performance of the TU Survey Portfolio to the market over several years.

Major Holdings

The top five most frequently selected companies in 2017 account for a staggering 44.4% of the portfolio’s allocation. The top five most allocated holdings are as follows: Amazon.com, Inc. (AMZN) 11.9%, Apple Inc. (APPL) 10.1%, Alphabet Inc. (GOOG) 8.8%, Microsoft Corp (MSFT) 7.7%, and Under Armour Inc. (UAA) 6.0%. Several of these holdings are currently leading performers in their respective sectors. Amazon is widely considered as one of the most powerful online retail giants in the consumer cyclical sector at the moment. The same can be said for technology vanguards Microsoft, Apple, and Alphabet. We believe that Under Armour was favored due to its relationship with Towson University as the sponsor for athletic wear on campus, in addition to the CEO’s nearby roots as an alumnus of the University of Maryland.

Only two major holdings from the 2016 survey results managed to make this year’s top five holdings. In the 2016 survey the top five holdings made up 33.9% of the portfolio, including Twitter Inc. (8.3%), Under Armour Inc. (6.7%), Apple Inc. (6.4%), Yahoo (6.3%), and Facebook, Inc. (6.2%).

Table 1. Sector Allocation

2016 ALLOCATIONS		
Sector	Count	%
Technology	504	51.1%
Consumer Cyclical	332	33.7%
Consumer Defensive	54	5.5%
Energy	4	0.4%
Utilities	0	0.0%
Communications	66	6.7%
Real Estate	0	0.0%
Financials	4	0.4%
Basic Materials	0	0.0%
Industrials	22	2.2%
Healthcare	0	0.0%
Total:	986	100.00%

2017 ALLOCATIONS		
Sector	Count	%
Technology	332	34.9%
Consumer Cyclical	395	41.5%
Consumer Defensive	118	12.4%
Energy	29	3.0%
Utilities	0	0.0%
Communications	0	0.0%
Real Estate	0	0.0%
Financials	33	3.5%
Basic Materials	0	0.0%
Industrials	33	3.5%
Healthcare	12	1.3%
Total:	952	100.00%

	TU Survey Portfolio	S&P 500
10/31/16	\$10,000.00	\$10,000.00
10/31/17	\$11,516.81	\$12,112.32
10/31/18	\$—	\$—
10/31/19	\$—	\$—
10/31/20	\$—	\$—

Sector Allocation

Table 1 presents the 2017 sector allocation and their respective weights: Consumer Cyclical (41.5%), Technology (34.9%), Consumer Defensive (12.4%), Financials (3.5%), Industrials (3.5%), Energy (3.0%), and Healthcare (1.3%). A remarkable 76.4% of the portfolio is allocated towards the Consumer Cyclical and Technology sectors.

Figure 1. 2016 Sector Allocation of TU Survey Portfolio

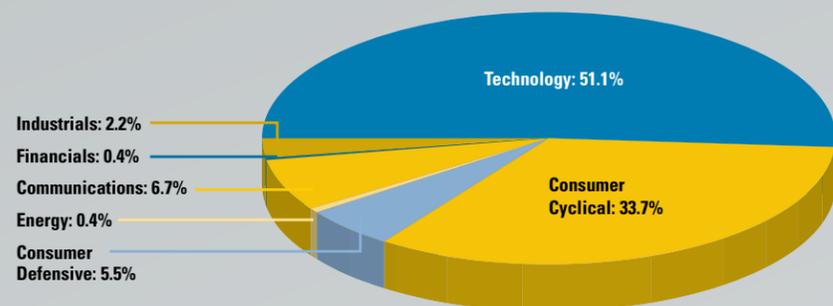


Figure 2. 2017 Sector Allocation of TU Survey Portfolio

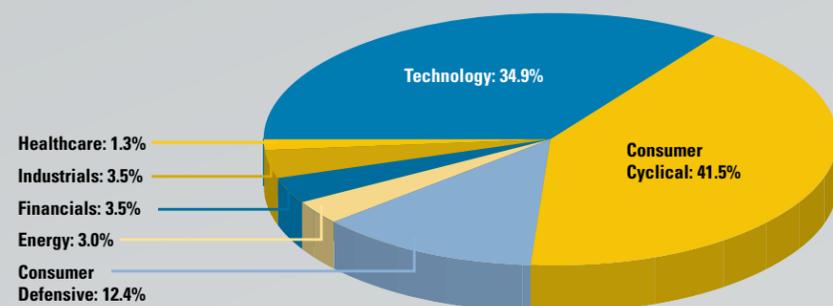


Figure 2 presents the 2016 sector allocation and their respective weights: Technology (51.1%), Consumer Cyclical (33.8%), Communications (6.7%), Consumer Defensive (5.5%), Industrials (2.2%), Financials (0.4%), and Energy (0.4%).

Observations

There is no question that the survey results from this year do not reflect the same holdings from the survey results of 2016. For instance, in this year’s survey students chose several companies that did not receive a single vote last year, including Adobe Systems Inc. (ADBE), Tesla Inc. (TSLA), and Canopy Growth Corp. (WEED). These votes most likely resulted from increases in media presence.

Adobe recently partnered with Microsoft in order to exploit its cloud-based storage capabilities. As our society becomes increasingly more data-oriented, it comes as no surprise that students voted for one of the most suitable providers of data storage from emerging artists to global brands.

As for Tesla, CEO Elon Musk is known for his innovative nature, making headline news on a bi-weekly basis. The most recent of his endeavors was an announcement regarding the construction of hyperloop from Washington, D.C. to New York City. Musk claims that the one-way commute time is estimated under 30 minutes. Elon Musk’s Tesla received a total of 32 votes. Musk’s flamboyant reputation, know-how, and valuable mission aimed at building the future each day has clearly captured the attention of students at Towson University.

Last but certainly not least, Canopy Growth Corp., received five total votes. Canopy Growth Corp. is headquartered in Smiths Falls, Canada. Canopy has seen promising growth this year, as a result of the announcements from the Canadian government aimed at loosening regulations on the marijuana industry. With 11 marijuana dispensaries poised to open in nearby Baltimore City, it certainly is possible that Towson University students might be catching wind of a promising new industry on the horizon.

One of the most reputable investors of all time famously advised individuals “never to invest in a business you don’t fully understand.” Warren Buffet is seldom wrong, even to this day. On another note, Peter Lynch so eloquently said; “never invest in an idea you can’t illustrate with a crayon.” The survey results from this year suggest that students took-to this sort of advice. The top 10 companies from this year’s survey account for 66.70% of the portfolio. One thing that these companies all have in common, is that each produces a product or service commonly found on most college campuses. These products include Apple’s iPhone, Microsoft’s Xbox One or Office Program Package, or Under Armour’s apparel.

For most college students, the idea of risking a paycheck to make an investment in a market that they don’t truly understand just isn’t worth it. It comes as no surprise that companies which advertise specialty products and services to college campuses carry the most weight in the portfolio. The survey results suggest that students are more likely to invest in companies that provide the products and services they understand.

Figure 3: 2016 Growth of \$10,000



Performance

Figure 3 presents the one-year hypothetical growth of \$10,000 invested in the S&P 500 Index, and the 2016 TU Survey Portfolio from October 2016 to October 2017. As we can see, the TU Survey Portfolio underperformed the S&P 500 Index. The lagging performance of the portfolio can be attributed to a couple key factors. First, Under Armour -one of the top five holdings of the portfolio- declined 61%, attributing over \$4,000 in investment losses. In addition, Macy’s, Comcast, and Chipotle all declined 25%-48%, resulting in a combined \$3,100 investment loss. These heavily-allocated losers overshadowed stellar performances of lower-allocated holdings such as Bank of America (+67%), Netflix (+59%), and Southwest Airlines (+35%).

As we reallocate the portfolio to the 2017 survey results, there are a few important components to make note of. First, the diversification of the portfolio has slightly increased. The combined allocation of the Consumer Cyclical and Technology sectors decreased from 85% of the portfolio in 2016 to 76% in 2017. This money was reallocated into the Financials, Healthcare, Energy, and Consumer Defensive sectors. While the portfolio is still extremely overweight in the Consumer Cyclical and Technology sectors, the slight expansion into other

sectors will allow the portfolio to benefit more from different tides in the market. Second, the students are now most allocated into the Consumer Cyclical rather than Technology like the year before. It’s possible that we are seeing a change in millennial mindsets for investment strategies. Finally, Under Armour was the biggest loser for the 2016 portfolio, yet has an even higher allocation in 2017. Could the students have bought more into the company while it’s undervalued, or are they headed for another disappointing loss?



Towson University Investment Group

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 who 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 current TUI is composed of 50 publicly traded companies with 31 Maryland and 19 non-Maryland companies. In designing the index, we used a weighted approach where companies with larger market capitalizations hold a greater representation than their smaller counterparts.

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 29, 2015 market capitalizations were obtained by dividing recent company market capitalizations by recent company prices and multiplying this number by the share price on August 29, 2015. This calculation assumes the effects of changes due to share insurances to be minimal.

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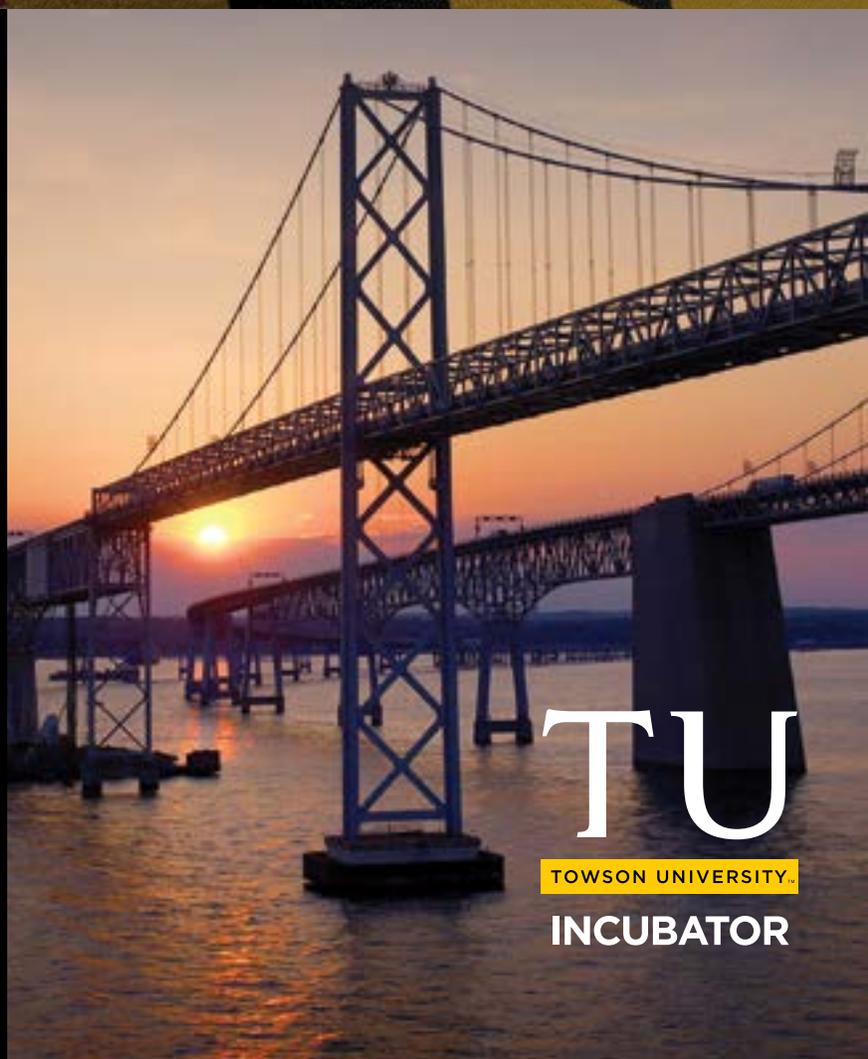
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