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*Financial Services***



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## FINANCIAL SERVICES INDUSTRY (FSI) 2018

**ABSTRACT:** The Financial Services Industry (FSI) is healthier today than before the 2008 financial crisis. Post-crisis reforms built resiliency into an industry that proved fragile to financial shocks. The largest institutions continue to consolidate market share and performance is returning to historic levels while smaller institutions struggle with rising regulatory demands. Increased US government reliance on economic sanctions intensifies the FSI's role as an instrument of national power. Emerging Financial Technologies are changing the FSI landscape creating opportunities and consolidating risks. London and Singapore—key Global Financial Centers—bring uncertainty and opportunity the US can leverage to further its economic security.

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## INDUSTRY STUDY OUTREACH & FIELD STUDIES 2018

### **On-Campus Guest Presenters:**

Americans for Financial Reform, Washington, DC  
 US Department of Treasury Office of Critical Infrastructure Protection and Compliance Policy, Washington, DC  
 Center for Responsible Lending, Washington, DC  
 Chain Bridge Bank, N.A., McLean, VA  
 Department of State, Office of Sanctions Policy and Implementation, Washington, DC  
 Financial Services-Information Sharing and Analysis Center (FS-ISAC), Reston, VA  
 Goldman Sachs, New York City, NY  
 INNOVATI<sup>ON</sup> 360, McLean, VA  
 Hughes Financial Services, Herndon, VA  
 US Congress, House Committee on Financial Services, Washington, DC

### **Field Studies—Domestic:**

Academy Securities Inc., New York, NY  
 Bank of America, Charlotte, NC  
 Consumer Bankers Association, Washington, DC  
 Depository Trust and Clearing Corporation (DTCC), New York, NY  
 Federal Deposit Insurance Corporation (FDIC), Washington, DC  
 Federal Reserve Bank of New York, New York, NY  
 Federal Reserve Board, Washington, DC  
 Financial Crimes Enforcement Network (FinCEN), US Treasury, Vienna, VA  
 Financial Industry Regulatory Authority (FINRA), Washington, DC  
 Former Treasury Secretary Timothy F. Geithner, New York, NY  
 Ironshore Insurance, New York, NY  
 Investors Exchange (IEX), New York, NY  
 J.P. Morgan Chase and Company, New York, NY  
 Moody's Investor Service, New York, NY  
 New York Stock Exchange, New York, NY  
 Pentagon Federal Credit Union (PenFed), McLean, VA  
 Securities and Exchange Commission, Washington, DC  
 Wells Fargo Securities, Charlotte, NC

### **Field Studies—International:**

ABN-AMRO Group, APAC HQ, Singapore  
 Barclays Bank, London, UK  
 Citi Bank, Singapore  
 Embassy of the United States of America, Singapore  
 Embassy of the United States of America, London, UK  
 European Bank for Reconstruction and Development, London, UK  
 FS-ISAC, Singapore and Asia, Singapore  
 House of Commons, London, UK  
 HSBC, London, UK  
 INTERPOL, Cybersecurity Directorate, Singapore  
 Mr. Martin Wolf, CBE, Financial Times, London, UK  
 Monetary Authority of Singapore, Singapore  
 The Bank of England, London, UK  
 TheCityUK (trade association), London, UK

## **EXECUTIVE SUMMARY**

“Economic security is national security.”

PRESIDENT DONALD J. TRUMP | NOVEMBER 2017

### **Introduction**

The preamble to the US Constitution enumerates the purpose of our government: to “establish Justice, insure [sic] domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity.”<sup>1</sup> The Eisenhower School Industry Study program explores the US industrial base’s ability to provide resources for the common defense. As one of twenty studied industry sectors, the Financial Services Industry (FSI) not only contributes directly to the health of the US economy, it also provides credit and liquidity to finance the defense industrial base.

Three views capture why the FSI remains critical to the United States’ national security. First, as the 2017 National Security Strategy (NSS) establishes, “Economic security is national security.”<sup>2</sup> A safe and resilient FSI underpins a secure and prosperous economy. Accordingly, the FSI is designated vital critical infrastructure key to US economic security.<sup>3</sup> Thomas Jefferson articulated a second, competing point of view, “banking establishments are more dangerous than standing armies; and that the principle of spending money to be paid by posterity, under the name of funding, is but swindling futurity on a large scale.”<sup>4</sup> Or more simply, the FSI poses a fundamental danger to the nation. The third point of view, that of Alexander Hamilton, highlights the FSI’s value to a nation’s future greatness: “And thus by contributing to enlarge the mass of industrious and commercial enterprise, banks become nurseries of national wealth...”<sup>5</sup> Although seemingly divergent, these views all share a common theme, the criticality of the FSI to national security. Not only is FSI directly linked to today’s national security, it both poses an inherent danger while also being fundamental and essential to the nation’s growth, development and prosperity. *The purpose of this study is to develop policy recommendations through which the financial services industry can more securely support and make a greater contribution to national security.*

Nearly 10 years after the 2008 global financial crisis, several significant contextual events occurred and influenced the FSI. Shortly after his inauguration, President Trump issued a Presidential Executive Order (PEO) on Core Principles for Regulating the United States Financial System to examine the post Dodd-Frank regulatory architecture. Subsequently, an additional PEO followed on Assessing and Strengthening Manufacturing and Defense Industrial Base (DIB) and Supply Chain Resiliency of the United States, including assessing the FSI’s ability to provide the credit and liquidity necessary for a vibrant and responsive US DIB. The next action was to identify the key priority actions—reduce regulatory burden and promote tax reform—in the 2017 NSS.<sup>6</sup>

These events spurred several key actions affecting the US FSI. Congress passed the most significant US tax reform in 30 years. Additionally, both chambers of Congress moved forward to reform the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act (“Dodd-Frank”). In addition to these actions, low unemployment and increasing consumer prices encouraged the Federal Reserve Board (FED) to target three federal funds rate increases in 2017 signifying an increasing confidence in the economy. The FED also began balance sheet normalization in October 2017 by starting to unwind quantitative easing, in use since 2008. These and other contextual factors contributed to this period being an inflection point for the FSI.

Given these events, the 2018 Financial Services Industry Study (FSIS) team filtered its analysis through three lenses: industry support for national security, how the regulatory framework identifies dangers and builds safeguards against them, and how the industry is postured to nurture

the nation's future wealth and economic prosperity. The team performed this analysis through an examination of selected firms, regulatory agencies, industry organizations, advocacy groups, and law enforcement, which included discussions with key government and industry leaders. The FSIS study included visits to the top ranked Global Financial Centers (GFC) including: #1 London, #2 New York, and #4 Singapore.<sup>7</sup> (Appendix A) For the past ten years, Singapore and Hong Kong have alternated between third and fourth on the GFC index.

This report consolidates analytical findings through an executive summary and collection of several essays. The executive summary provides an overview and analysis of the industry's current condition. Essay I evaluates the industry as a foundation of national power and examines Brexit impacts. Essay II reviews the FSI's ability to further support national security policy and evaluates how government has postured the industry for use as both hard and soft instruments of power. It also considers how the US can better leverage London and Singapore relationships to improve the effectiveness of US instruments of power. Essay III explores emerging threats and opportunities by examining the industry's innovative environment and evaluating how the industry is postured to ensure security and prosperity in the future. It also analyzes Singapore's role as a growing global center of financial innovation excellence. The report includes recommendations to improve security against systemic risks and ensure a prosperous American economic environment.

This report argues that the financial services industry is in a much stronger position today than before the 2008 financial crisis, but this came at a cost. The post-crisis regulatory framework addressed much of the financial risk. The largest commercial and investment banks continue to consolidate market share with performance returning to historic levels. However, rising and inefficient regulatory compliance demands pressure smaller institutions. While regulations enhanced financial resilience to system shocks, less has been done to address operational risk and cybersecurity particularly from emerging Financial Technology (fintech). Consolidation of operational functions increases the impacts of possible internal and external system failures. Positive systemic health, however, has bolstered the FSI's ability to support national security as an instrument of power. Increasing reliance on sanctions and the power of the dollar as a reserve currency are key considerations as is competition from other financial hubs.

Moreover, the FSI's international landscape is changing. Brexit transition begins in 2019 with unanswered questions on how it will affect the health of the US FSI and impact US-European sanctions partnerships (see Essays I & II). Furthermore, Singapore is a burgeoning financial powerhouse actively seeking to increase its influence and innovative posture in the Asia-Pacific region and globally. As the study found, it is likely that Singapore will continue to enjoy success in this effort particularly in Asia, but also across the globe. As a result, the US must ensure it leverages that influence and remains an irreplaceable partner to Singapore (see Essays II & III). The study also found that access to capital in underserved areas offers an opportunity to extend American influence. This is an important aspect of US national power that should be pursued.

Looking forward, several emerging threats and opportunities will radically shape the industry and require regulators to keep pace. Nurturing a healthy innovative environment and adoption of the resulting innovations and technologies such as artificial intelligence and other cyber-related tools will be important to consider. The rising cyber threat will also will require greater interagency and government-commercial integration.

### **Definition of the Financial Services Industry**

Thousands of depository institutions, insurance companies, and firms providing financial advisory services, mortgage lending, market making, and many other related services comprise the

FSI.<sup>8</sup> The FSI is crucial to American prosperity and gross domestic product (GDP) growth by providing capital for industry expansion and job creation, connecting investors and borrowers, providing credit to firms and individuals, and facilitating the sale and export of American goods. In 2017, the US financial sector added 21 percent, more than \$4T, to GDP.<sup>9</sup> The FSI's real value is at post-2008 highs and demonstrates that, although profits may not be at pre-2008 levels, it is once again supporting economic growth.<sup>10</sup>

The health of the overall financial sector is a factor of two key industry components, investment banking and commercial banking, due to each component's central roles in providing liquidity for the economy, generating new jobs, and boosting GDP. Moreover, commercial and investment banks are subject to the bulk of post-crisis regulation aimed at ensuring industry resilience, thus making these industry components critical considerations in an assessment of industry health. The US government must strike a difficult balance between protecting its health, keeping it stable and resilient, and allowing market forces the space required to fuel economic growth and create wealth.

IBISWorld defines the commercial banking industry as "banks that provide financial services to retail and business clients in the form of commercial, industrial, and consumer loans. Banks accept deposits from customers, which are used as sources of funding for loans."<sup>11</sup> The largest US commercial banks include JP Morgan, Bank of America, Wells Fargo, and Citibank.<sup>12</sup> The Office of the Comptroller of the Currency (OCC), the FED, and the Federal Deposit Insurance Corporation (FDIC) are principle federal regulators.<sup>13</sup>

Investment banking provides "underwriting, originating, [and] market-making services for a range of financial instruments including, but not limited to, bonds, stocks, and derivatives."<sup>14</sup> The largest American investment banks are JP Morgan, Morgan Stanley, Bank of America, Citigroup, and Goldman Sachs.<sup>15</sup> The Securities Exchange Commission (SEC) and Commodity Futures Trading Commission (CFTC) principally regulate securities market activities including investment banks.<sup>16</sup> Following the 2008 financial crisis, the remaining investment banks converted into bank holding companies, which are chiefly regulated by the FED.<sup>17</sup> Commercial banking is largely domestic, whereas investment banking is highly globalized. (Appendix B)

### **Current Condition of the Financial Services Industry**

The fundamental question is whether FSI firms achieve adequate profit and create value at acceptable risk. If industry conditions prevent firms from doing so, the government should consider policy interventions to ensure a healthy, resilient, and sustainable industry. This section follows the Structure – Conduct – Performance methodology to evaluate commercial banking and investment banking health as indicators for the broader financial sector.

Understanding which of the market forces described in the Porter's Five Forces model<sup>18</sup> are dominant in financial services is useful in analyzing the overall industry structure and profit potential. One can further analyze structure by plotting and examining the sector's position and trend on the competition spectrum. Conduct considers the strategies that firms use to compete within the industry, the ways firms differentiate their products, and the sustainability of their business strategies. Performance evaluates the effectiveness of the firm's strategy by measuring firm value including profit margins, return on equity (ROE), and profit-earnings (P/E) ratios, as well as measures of resilience to financial shocks. Analysis of these performance and resilience metrics determines whether firms achieve adequate profit and create value at acceptable risk.

### *Structure – The Shape of the Industry*

Analyzing the financial industry using Porter's Five Forces<sup>19</sup> reveals that both commercial and investment banking firms face similar dominant forces that shape firm structure and influence strategy. Complex regulations and high compliance costs, coupled with mandatory capital and liquidity ratios, make it difficult for new firms to enter the market. These barriers make the banks' chief competitors established firms and drive business strategy towards winning customers from these firms and overall cost reduction. Firms also vigorously compete in hiring scarce talent with the necessary technology skills and cybersecurity experience required by the modern FSI.<sup>20</sup> Industry insiders report that their firms increasingly resemble technology companies that happen to work in finance rather than the banks of yesteryear.<sup>21</sup> At the same time, banks face an intensifying threat of substitutes to some banking products. Current innovations help non-bank providers, called shadow banks, to offer traditional banking services, like consumer loans, mortgage underwriting, and advising (see Essay I).<sup>22</sup>

Despite the increasing number of threats from new substitutes, both commercial and investment banking are trending towards greater concentration albeit at different degrees and speeds. Investment banking consolidated rapidly after the 2008 financial crisis. Today the four largest investment banking firms hold 43.9 percent of market share, giving the industry a medium level of concentration and defining its structure as an oligopoly.<sup>23</sup> Competition among major commercial banks is also intense. The four largest commercial banking firms hold 32.4 percent of market share defining the industry structure as a monopolistic competition trending towards oligopoly as it continues to consolidate.<sup>24</sup> Outside the four largest banks, regional commercial banks hold a considerable portion of the remaining market share and are facing new challenges. The biggest commercial banks are growing at the expense of major regional banks whose annual deposit numbers are shrinking. This is, in part, due to an improving economy which encourages clients to move money out of deposits and into money market funds and other investment vehicles offering higher interest rates.<sup>25</sup> Due to costly regulatory compliance, the trend for smaller community banks is further consolidation. Many small banks have not survived. According to historical banking statistics, 2,370 banks closed between the end of 2007 and the end of 2017.<sup>26</sup>

Shaped by these forces and trends, there are concerns with the FSI's ability to effectively serve consumer and national security needs. The rise of shadow banks and the speed of financial innovation which drives risk to financial products and firms beyond regulatory oversight is concerning (see Essay I). Also, the loss of many community banks with assets under \$10B impedes credit available to small, innovative business start-ups.<sup>27</sup> These trends may directly harm the DIB as these start-ups may not have access to necessary capital to launch new innovations (see Essay III).<sup>28</sup> Congress is currently considering updates to Dodd-Frank including scalable regulatory compliance schemes that differentiate among banks based on asset size. Scalable regulations would provide relief for local banks that are "too small to succeed" and reduce industry concentration (see Essay III).<sup>29</sup>

### *Conduct – Bank Strategy Evolves*

Commercial and investment banking firms share similarities in their competition and profit maximization strategies. Applying the Strategic Game Board model reveals that most banks position themselves to compete across the board, doing more business better while seeking to cut costs using innovation and technology.<sup>30</sup> Mergers and acquisitions play a large role in both banking industries as firms seek the resources and economies of scale required to offer lower prices.

Fintech developments increasingly shape commercial bank strategies. Banks are now closing physical branches, relying on technology in lieu of human capital due to the ubiquitous access consumers now have through mobile banking.<sup>31</sup> One firm reports banks target those with technology and user experience credentials for 30 to 40 percent of new hires.<sup>32</sup> Another industry veteran predicted that fintech or artificial intelligence (AI) use will replace 30 percent of current FSI jobs; a trend producing both opportunities and threats (see Essay III).<sup>33</sup>

Investment banking is highly cyclical with profitable periods and lean times tracking the broader business cycle. No longer restricted by Glass-Steagall, previously stand-alone investment banks before the crisis changed strategies. They are now bank holding companies adopting the universal banking model offering investment and commercial banking services.<sup>34</sup> Meanwhile, they seek to do more business better, using new commercial business lines to maximize profits and bring in new customers. For those that advocate a return of Glass-Steagall, it remains unclear how a modern version would prevent commercial banks from providing investment banking services. If it does, investment banking strategies would drastically change as firms would need to divest their existing businesses, shrinking the largest US banks and impeding their current ability to ride the business cycle.<sup>35</sup>

#### *Performance – The Balance Between Adequate Profit, Creating Value, and Acceptable Risk*

Dodd-Frank regulations added considerable compliance costs to the banks' bottom line while years of low interest rates and slower economic activity put additional pressure on financial sector profits. From November 2016 through the 2018 first quarter bank earnings reports, performance trends are positive. Increasing economic growth, lower corporate tax rates, low loan default rates, and rising interest rates buttress these trends.<sup>36</sup>

In 2017, FSI firms increased profits by \$15.7B total, significantly reversing the trend from 2016 when firms posted \$2B losses.<sup>37</sup> More recently, banks reported positive 2018 first-quarter results, adding to expectation-beating earnings by large US banks.<sup>38</sup> In investment banking, JP Morgan posted 30 percent higher first-quarter profits and Goldman Sachs reported 26 percent higher profits compared to one year ago.<sup>39</sup> (Appendix C) In commercial banking, Bank of America reported that profits were up 30 percent compared with the previous year.<sup>40</sup> (Appendix D) Recent tax reform was a major contributor to these higher profits by cutting statutory corporate tax rates. Higher market trading volume also added to increased investment bank profits.<sup>41</sup>

Banks use return on equity (ROE) to measure value and inform strategy. For Q1 2018 firms posted significantly higher ROE demonstrating improved equity use.<sup>42</sup> Average ROE for banks during the first half of 2017 was 9.75 percent while in April 2018 Goldman Sachs, Citigroup, Bank of America, JP Morgan, and Wells Fargo posted ROEs of 23.62 percent, 17.63 percent, 16.7 percent, 15.54 percent, and 11.94 percent respectively, a major gain over the past year.<sup>43,44</sup>

A third key performance measure is the price/earnings (P/E) ratio—market value of stock share against its per share earnings.<sup>45</sup> In 2017, bank stocks outperformed the market, adding 42 percent.<sup>46</sup> Recent market turbulence, however, hit bank stocks hard slashing recent gains. High profits and improved ROE may not contribute to better P/E ratios in the near-term given investor concerns over likely short-term rate increases and investor expectations for further yield curve flattening.<sup>47</sup> Large banks with diverse business lines, however, can leverage other stable revenue streams (i.e., commercial vs. investment banking) to mitigate such risk. (Appendix E)

Financial system risk is an equal consideration when analyzing bank profit and value creation. Dodd-Frank regulatory requirements build industry resilience and lessen systemic risk. Dodd-Frank requires minimum bank capital and liquidity ratios to bolster resiliency to major

financial shocks. Firms must retain enough capital to meet their commitments and sustain public confidence.<sup>48</sup> A central part of the FED's oversight of the largest US banks is its annual Comprehensive Capital Analysis and Review (CCAR) program that assesses banks' forward-looking capital planning based on each firm's particular risk profiles.<sup>49</sup> The FED also oversees annual Dodd-Frank Act Stress Tests (DFAST) to measure bank performance based on firm planning and forecasts during a simulated crisis.<sup>50</sup> In 2017, the CCAR program covered firms that held over 75 percent of banking assets.<sup>51</sup>

Banks continue to hold capital cushions beyond Dodd-Frank mandates. Stagnant capital on balance sheets means forgoing potential returns by investing that capital. Transparency from regulators on what circumstances banks can dip into mandatory buffers and under what processes would assuage this caution. It is unclear whether banks can make that choice or regulators must approve and uncertainty may impede profitability.<sup>52</sup>

While Dodd-Frank regulations led to increased compliance costs, they have not unduly impaired large firm competitiveness as banks are able to make adequate profit and create value at acceptable risk following sound strategies. Smaller firms, regardless of the strength of their strategies, have found it increasingly difficult to remain competitive due to increased compliance costs. Based on small bank and small DIB firm connections, and the 2017 NSS's call for a "healthy defense industrial base,"<sup>53</sup> scalable regulatory changes are warranted now (see Essay III).

## **Industry Outlook**

Dodd-Frank implementation substantially reduced systemic financial risk. Other forms of risk, however, remain and new risks are emerging. Risk is increasingly migrating from the formal banking sector to the shadow banking sector which offers innovative products outside regulatory oversight (see Essay I). Existing regulation and DFAST requirements do not adequately address new areas of operational and technological risk driven by fintech innovation that is also transforming the industry landscape and offering banks new avenues to compete. Fintech also opens new cybersecurity vulnerabilities. Bank officials routinely cite cybersecurity as a chief concern due to unpredictability and the unrelenting level of attacks they face daily (see Essay III).

Unfortunately, a necessary feature for success in the current FSI regulatory environment is a large firm. The one-size-fits-all nature of the Dodd-Frank regulation puts smaller banks at risk of extinction by being "too small to succeed" and contributes to the further industry concentration. Regulators should consider scalable regulation based on bank assets to minimize the small bank damage—not all banks are Wall Street behemoths. These small banks do not pose a systemic risk and reducing regulatory burden should release capital for small business, generating jobs and innovation (see Essay III).

## **ESSAY I: A FOUNDATION OF NATIONAL POWER**

The 2017 NSS gives primacy to the notion that the economy is a foundational element of national security. As a critical economic component, the FSI is vital to national power. There are significant risks, however, with this role. The 2008 financial crisis reminded us of those risks. Since the crisis, Dodd-Frank forced industry rehabilitation through regulation and accountability. In response, banks appreciably improved both capital and liquidity improving industry resilience and reducing systemic risk.

Over the past few years, the regulatory landscape shifted toward pro-growth sentiment, causing policy makers to reevaluate elements of Dodd-Frank. Moreover, President Trump's

election brought an emphasis to downsize regulation. Shortly after his inauguration, President Trump signed an executive order that directed a review of regulations that inhibit economic growth or American competitiveness.<sup>54</sup> On the whole, this new regulatory landscape gave policy makers an opportunity to revise Dodd-Frank eight years after its inception. This section will analyze and evaluate the resiliency of US financial system as a foundation of national security.

### **Dodd-Frank 2.0**

Dodd-Frank succeeded in its primary aim of decreasing systemic FSI risk. However, there is a prevailing sentiment that Dodd-Frank went too far in some cases. The law may inhibit the competitiveness of US banks, particularly abroad due to the regulatory burdens. Banks argued from the outset, the \$50B systemically important financial institution (SIFI) designation threshold was too low while regulators and industry criticized the compliance burdens borne by smaller, non-systemically important banks. Congress is responding to these concerns.

In March 2018, the Senate passed the bipartisan Economic Growth, Regulatory Relief, and Consumer Protection Act. Also known as Dodd-Frank 2.0, it included modest reforms to address Dodd-Frank excesses. The bill aided all but the largest banks by raising the threshold for SIFI designation to \$250B and reducing supplementary leverage ratios to lower bank holding companies' burdens. The legislation also assisted smaller community banks, by, for example, granting regulatory relief from the Volcker Rule for banks with under \$10B in assets.

As of this paper's publication, the Senate bill faces an uncertain future in the House of Representatives. Ultimately, experts believe that a final bill will pass this Congress, featuring only slight deviations from the Senate version. Bipartisan political support for the Senate bill occurred because both parties wanted to help small banks. While small banks welcome the prospect of a marginally improved regulatory environment following likely passage, they would still face existential challenges into the future.

### **Financial Regulatory Structure**

While the US financial system may be the envy of the world, its regulatory structure is not. Arguably, the greatest failure of post-financial crisis reforms involved failing to significantly reform our nation's regulatory structure. Dodd-Frank did make some changes to the regulatory structure. It established the Financial Stability Oversight Council (FSOC) and made changes to the regulatory structure regarding derivatives. Yet it left the inefficient, pre-reform regulatory structure largely unchanged. This regulatory environment includes a mix of 15 state, federal, and industry self-regulating agencies. One major bank indicated their biggest challenge is unharmonized US regulations, leading to confusion and contradictory guidance.

In addition to private sector frustration, regulators concede a significant amount of burdensome inter-regulatory coordination must occur during oversight. This lack of coherent regulatory structure is a major systemic vulnerability. According to David Wessel, a senior fellow at the Brookings Institution, "Each regulator had responsibility for one set of institutions; no one had responsibility for the whole. And that proved nearly fatal to the system. It was part of the cause of the crisis, and it made responding to the crisis much more difficult and complex."<sup>55</sup> The incoherent structure is not the only issue. Resourcing among the regulatory agencies is also disproportionate. For example, the SEC and CFTC both perform vital and related securities markets regulatory roles, but the SEC budget for Fiscal Year (FY) 18 was \$1.652B compared to the CFTC which received \$250M.<sup>56</sup> Compared to FY17, the SEC increased while the CFTC

decreased. This leaves the CFTC, which is responsible for regulating derivatives (a fundamental cause of the 2008 financial crisis), struggling to keep up with its critical regulatory role.

Current political will to reform the regulatory structure is low. Dodd-Frank 2.0 is not likely to address it. When the political will improves to reform the US FSI regulatory structure, regulatory bodies such as the Bank of England and Monetary Authority of Singapore are models to consider. They each have further harmonized regulatory agencies that provide clearer guidance and focus limited resources on compliance and competitive advantage. FSI firms preferred each countries' coherent regulations over the balkanized and contradictory US requirements.

*Recommendation:* The US should begin an incremental path to meaningful FSI regulatory reform by merging the SEC and CFTC into a single agency. The undersized CFTC is ill-equipped to regulate complex derivatives and futures trading. The SEC has resources to draw from, such as FINRA, that could help the CFTC manage one of the most complex aspects of the FSI. This would increase efficiency and reduce uncertainty over jurisdictions.

### **Credit Rating Agencies**

While there are numerous credit rating agencies in the industry, the “Big Three Agencies” (Moody’s, S&P, and Fitch) dominate. They also absorbed partial blame for the 2008 financial crisis. According to the report submitted by the Financial Crisis Inquiry Commission in January 2011, “Mortgage-related securities at the heart of the crisis could not have been marketed and sold without the Big Three’s seal of approval.”<sup>57</sup> The agencies were accused of forfeiting quality ratings to win a bigger share of profits.<sup>58</sup> Mortgage backed securities subsequently suffered large losses during the 2008 crisis and the agencies were bluntly criticized for failing to warn investors of the dangers of investing in these products.<sup>59</sup> Dodd-Frank regulatory updates for CRAs were weak. For example, Congress expanded regulation of credit rating agencies within the SEC to strengthen the oversight of the industry; however, they made no substantive changes. The conflict of interest between the CRAs and their paying customers, the rated agencies, lingers as a systemic weakness.

*Recommendation:* Policy makers should consider moving to an investor-paid credit rating model aligning incentives of rating agencies and investors. The current issuer-paid model allows rated agencies to pay for credit rating services to sell their bonds to regulated financial institutions.<sup>60</sup> This conflict of interest allows for the possibility that a rated agency could pay for a better rating. Investor-paid models may reduce conflicts of interest.

### **Shadow Banks**

Shadow banks are “financial intermediaries involved in facilitating the creation of credit across the global financial system but whose members are not subject to regulatory oversight.”<sup>61</sup> Although, shadow banks provide similar products and services as traditional FSI firms, they are for the most part unregulated. This allows them to collect risk pushed out of the industry’s regulated sectors. Shadow banks are also vulnerable to panics and systemic failures.<sup>62</sup>

In 2010, the US government exacerbated the problem by failing to address potential risk associated with shadow banking, un-insured deposits, and securitized loans. Making matters worse, Dodd-Frank prescribed strict regulatory guidelines for financial institutions which further pushed lenders into the shadows of banking. As an example, banks have started to pull out of mortgage lending due to onerous regulatory requirements and post-crisis belief that mortgage lending was inherently risky. Shadow banks, such as Quicken Loans and Freedom Mortgage account for more than half of the mortgage market in the US. Today, the FSI faces increasing risk,

vulnerabilities, and challenges based on the rising demand, market share, and potential impact of shadow bank provided mortgage loans.

*Recommendation:* US regulators should categorize and regulate large non-banking intermediaries that reach a \$250B capital threshold as traditional banks and require appropriate charters. Such actions would require US regulators to increase efforts to prioritize, include, and monitor all vulnerable non-banking intermediaries as SIFIs.

### **Central Counterparty Clearing Houses (CCP)**

Following the financial crisis, regulators and institutions sought to increase safety and reduce risk through CCP transactions. Clearing houses were a mitigation tool to leverage more effectively. Therefore, Dodd-Frank required that more trades flow through clearing houses, expanding their role as a guard of financial stability.<sup>63</sup> The value of CCPs has grown to around \$278T in derivatives.<sup>64</sup> This staggering amount demonstrates the potential widespread impacts of CCP failures. In November 2017, the National Economic Council singled out clearing houses as "the next problem."<sup>65</sup>

The growth and increasing interconnectedness of CCPs requires attention. (Appendix F) Amplifying this concern, one prominent Wall Street expert suggested that two firms, ICE and CME, have a near monopoly on clearing services.<sup>66</sup> As an added concern, the Bank of New York (BNY) Mellon will soon become the sole US provider of tri-party repurchase (repo) clearing.<sup>67</sup> In this role, BNY Mellon clears \$1.6T tri-party repo daily.<sup>68</sup> The tri-party repo market was a key source of instability leading to the 2008 financial crisis and remains so today.<sup>69</sup>

High concentration correlates with increased systemic risk. Problems in the major CCPs will affect almost all major global banks and a multitude of products. Failures could cascade into central banks, insurance, pensions, hedge funds, etc. (Appendix G) Dodd-Frank concentrated the risk for clearing houses but failed to ensure resiliency in this new systemic feature.

*Recommendation:* The SEC and CFTC should intensely monitor CCP operational risk and consider mitigation options. Transparency for regulators is the most important regulatory need. As transparency enhances confidence, the number and difficulty of DFASTs should decrease and focus on system resiliency and redundancy. Finally, regulators must ensure all CCP users, traditional and non-traditional, maintain adequate capital.

### **Areas of Emergent Risk**

In an unpredictable world, we cannot predict the next crisis. Other emergent risks stemming from areas such as interest rate and operational resilience could, perhaps, trigger the next financial crisis. This section will evaluate the risk emerging from areas not related to the financial crisis of 2008 in the context of the resiliency of US financial system.

*Interest Rate Risk:* The FED used extreme measures when it cut the federal funds rate (FFR) to zero percent, the lowest in history, during the financial crisis. From 2008-2015, interest rates stayed at historically low levels; however, in 2015 as the economy improved, the FED started slowly raising rates. By early 2018, the FED increased the FFR six times. Citing improving economic conditions, FED Chairman Jerome Powell, signaled that rates may rise quicker than current forecasts of three additional increases in both 2018 and 2019.<sup>70</sup>

A rapid increase in rates is a threat to financial stability and exposes banks to interest rate risk.<sup>71</sup> According to the CEO of a major credit union, banks monitor "interest rate risk by managing the volume of the fixed and variable rate loan portfolios and the lengths to maturity of these

portfolios.”<sup>72</sup> Flat and inverted yield curves generate significant interest rate risk. When short-term interest rates rise faster than long-term rates, the yield curve flattens. A flat yield curve limits bank profitability by reducing the benefit “from borrowing short and lending long.”<sup>73</sup> When short-term interest rates actually rise above long-term rates, the yield curve inverts. An inverted yield curve is an indicator of future recession. It is also a risk proven to cause bank duress and systemic failure in the past—such as during the S&L crisis, when more than 4,000 institutions closed.

Current stress test scenarios primarily focus on preparing for recessions accompanied by a downturn in the housing industry. In 2018, the FED included a flat yield curve scenario for the first time. Upon a more in-depth analysis, however, the yield curve scenario lacks rigor. Today’s yield curve is essentially flatter than two-thirds of the time periods covered in the scenario.

US regulators may be less concerned about interest rate risk than what is prudent. The Basel Committee on Banking Supervision leads the US in terms of addressing interest rate risk. With annual federal deficits increasing, higher interest rates on treasuries will likely fund future deficits. This increases the likelihood of future interest rate risk stemming from climbing interest rates.

*Recommendation:* Bank stress tests should elevate the importance of interest rate risk. According to a Federal Reserve Bank of New York (FRBNY) official, the “coherence of scenario” is a major factor when determining stress tests.<sup>74</sup> Aptly, FED economists do not find a flat or inverted yield curve to be necessarily coherent with the macroeconomic duress in the severely adverse scenario. Therefore, as a remedy, the 2019 DFAST and CCAR should include a standalone, *market shock*, yield curve scenario derived from the Basel Committee’s latest Interest-Rate Risk in the Banking Book “common shock and stress scenarios”.<sup>75</sup>

*Operational Resilience:* As discussed above, Dodd Frank reforms bolstered systemic resilience. This resilience, however, focused narrowly on weathering market-based shocks (i.e., loss of value, capital, etc.) and did little to address operational resilience, or the ability to weather shocks to daily business functions. Operational resilience ensures continuity of the daily business.

Federal Financial Institutions Examination Council (FFIEC) guidelines push business continuity centered on the awareness, tracking, and mitigation of operational risk.<sup>76</sup> Yet these guidelines largely focus on internal operational resilience to shocks such as malicious or natural threats. Regulators also demand that primary institutions demonstrate adequate understanding of third party risk.<sup>77</sup> However, it is difficult for Bank of America, for example, to assess the BNY Mellon’s operational resilience for tri-party repo. Likewise, Jack Henry Associates, an FSI systems provider, supports over 10,000 FSI clients with a vast range of services including payment and enterprise management.<sup>78</sup> Internal failures could cause a systemic contagion across the industry, yet clients have little deep insight into Jack Henry daily operations.

What the CCPs, BNY and Jack Henry examples illustrate is that consolidation increases interconnectedness as singular players become critical central nodes. And, because consumer confidence is fundamental in FSI, nodal interruptions could be crippling. Some SIFI banks employ a technology sandbox approach when incorporating third party systems, allowing a safe space to mitigate operational risk. Others leverage distributed approaches (e.g., multiple data centers, cloud technologies, etc.) to improve overall operational resilience.<sup>79</sup>

The Basel Committee includes interconnectedness as a factor in assessing Global Systemically Important Banks (GSIB), but only financial interconnectedness.<sup>80</sup> Regulators appear to have a passing awareness of this rising interconnectivity challenge. Former Treasury Secretary Timothy Geithner reminds us that it is difficult to imagine where the next financial crisis will

originate.<sup>81</sup> Thus, we must consider the necessary actions now to posture the industry to handle operational risk-related failures.

*Recommendation:* Although FFIEC guidelines focus on traditional malicious and natural threats, they can serve as a foundation to build interconnectivity focused operational risk guidelines. Additionally, the FSOC should direct a review of individual firm risk analysis to determine if firms, systems, or markets have interdependent operational risk.

### **Impacts of Brexit Uncertainty on US FSI**

The UK's decision to leave the European Union (EU), also referred to as Brexit, could generate immense uncertainty for US regulators. A transition period begins on March 29, 2019 that gives businesses time to finalize actions for post-Brexit rules coming into full-force on January 1, 2021. Already, UK banks indicate they are spending 25-40 percent of their time on the Brexit transition. Although significant coordination is underway, most industry representatives believe the transition will run past its stated deadline. Brexit will also impact UK FSI profitability with the loss of passporting (free access to EU financial markets). Roughly a quarter of UK FSI business is within the EU, and according to one UK expert, they expect to lose roughly half of that.

Brexit coincides with another significant structural change, ring-fencing, a separation of investment and commercial banking operations. Regulators approved Barclays' ring fencing plan and HSBC expects approval in May. Splitting operations reduces efficiency and consumes capital. Considering the regulatory impact of Brexit and ongoing implementation of post-financial crisis changes, the political momentum for tighter regulation has abated in the UK. British regulators emphasized, however, that Brexit will not lead to deregulation.

This Brexit uncertainty drives US FSI uncertainty. US banks with exposure to London will likely see negative earnings and uncertain regulatory environments to the degree determined by ongoing Brexit negotiations. Regardless, London will likely remain a leading global financial hub with limited opportunities probably for US firms to fill voids within the EU. Overall, Brexit is largely negative for the UK FSI and US firms in the UK will experience an uncertain transition period as regulatory guidelines are established.

*Recommendation:* The US should designate a single, authoritative regulatory voice to speak in forums dealing with Brexit. According to feedback from regulators, the fragmented nature of US FSI oversight can lead to divergent US perspectives at the international level. Given its regulatory role, the Federal Reserve Board should be the single US voice during this transition.

## **ESSAY II: INSTRUMENT OF NATIONAL POWER**

With its strong economy, large domestic market, global reserve currency, and central role within the global banking system, the US possesses immense economic power. The 2017 NSS deems economic tools "important parts of broader strategies to deter, coerce, and constrain adversaries."<sup>82</sup> Access to capital is a hugely powerful tool and, consequently, financial sanctions are valuable coercive instruments of statecraft.<sup>83</sup> Former US Treasury Secretary Jacob Lew called economic sanctions "a powerful force in service of clear and coordinated foreign policy objectives—smart power for situations where diplomacy alone is insufficient, but military force is not the right response."<sup>84</sup> Present Treasury Secretary Mnuchin goes further indicating he spends "probably over 50 percent" of his time on national security issues and sanctions.<sup>85</sup>

Wielding American economic power, however, is neither simple nor assured. Effective application of US economic power requires "like-minded partners to build support for tools of

economic diplomacy against shared threats.”<sup>86</sup> Moreover, fluid US foreign policy and a changing international landscape, means the US FSI must remain agile to support national security while maneuvering complex and sometimes burdensome, if necessary, anti-money laundering (AML) and counter-terror financing (CTF) regulations. Yet hard prohibitions on capital access such as sanctions are not the only instrument available. With these matters in mind, this essay further explores the issues and implications regarding the applications of American economic might.

### **Sanctions and the Financial Services Sector**

Sanctions as an instrument of US national power are an appealing alternative to military force. Inherently flexible, they can target nations broadly or industries or individuals specifically to cause sufficient hardship to influence actions or positions. Past sanction regimes address wide ranging policy ends, including responses to human rights violations, the proliferation of nuclear weapons, undermining democracy, terrorist financing, Ukrainian intervention and cybercrimes. Tariffs and other restrictions on imported goods, trade embargoes, and the seizure of assets are some examples of effective sanction approaches.<sup>87</sup>

Nations must consider several factors to effectively apply economic sanctions. Namely, foreign policy objectives must be properly focused and scoped and used against nations that are dependent on the country(s) sanctioning them. The definition of compliance must be reasonable, and the sanctions should be proportional to the offense. And, finally, those applying sanctions must allow sufficient time to reach desired effects.<sup>88</sup>

Moreover, in today’s globalized financial system, nations will be more successful when sanctions are multilateral versus unilateral. The US benefits both from its relationship with close Allies and by leveraging the dollar as a primary global reserve currency. However, Brexit may add complexity in coordinating and enforcing sanction within the EU, as the UK is a valuable partner and sounding board in European matters and in supporting sanction implementation.

### **International Regulation and Relevance**

While the Trump administration has pushed FSI deregulation, it remains focused on AML/CTF and sanction activities. Commensurately, federal and state regulators continue tightening AML/CTF and sanction compliance through increased enforcement and fines. In 2017, these agencies levied \$2.5B in non-compliance penalties, continuing a trend to levy heavy fines on companies *and* company compliance officers not meeting compliance standards.<sup>89</sup> These fines have the attention of the FSI leadership in ensuring AML/CTF compliance both here and abroad.

Beyond fines, an important tool in ensuring the success of AML/CTF is the Financial Action Task Force (FATF). The FATF is an inter-governmental body established in 1989 to assist in “setting standards and promoting effective implementation of legal, regulatory and operational measures for combating money laundering [and] terrorist financing.”<sup>90</sup> Through its 37 members (including the US), FATF has established 40 financial standard recommendations to date and continues to update and strengthen these recommendations to promote financial transparency and protect the financial system through improved information sharing standards between both public and private organizations.<sup>91</sup>

The strength of FATF is its quarterly assessments and individual country reports. Over the last two years, FATF has reviewed over “80 countries and publicly identified 65 of them as having major AML/CTF regulatory and enforcement weaknesses.”<sup>92</sup> Since February 2018, FATF removed “53 of the designated 65 countries” from its blacklist.<sup>93</sup> Of the remaining twelve, the two worst offenders are the Democratic People’s Republic of Korea (DPRK) and Iran. FATF warned

its members to protect themselves against these two countries and to be aware of the substantial AML/CTF risks they pose. Although FATF has taken significant steps to help standardize laws and regulations with widespread support, they are still a policy-making body with no regulatory authority. An effective system needs its members to individually accept, pass, and enforce their own legislation within their sovereign borders and is only as strong as its weakest link.<sup>94</sup>

### **Weakness & Concerns**

*Special Designated Nationals (SDN) Detection:* Significant limitations exist within the Office of Foreign Asset Control (OFAC) SDN name recognition technology. The SDN application assists firms by allowing them to identify questionable transactions for further processing, and if needed, the ability to take preventive actions. The system is effective, but not perfect. It requires significant processing and adjudication and may still fail to identify all concerned individuals. Moreover, financial institutions attempt to circumvent this process by using non-roman based characters (e.g., Russian, Arabic, or Chinese).

Failures during the identification process may reduce the system's effectiveness and lead to penalties after properly identifying rule breakers. OFAC and the EU have begun to expand their name search capability beyond non-roman characters, but this capability is still limited, and notification is lagging.<sup>95</sup> The US government and FSI lead in leveraging technology to assist in regulation enforcement. But, while the technology is advancing and reducing false positives, it still requires further efficiencies.

*Recommendation:* The Department of Treasury should expand SDN ability beyond non-roman characters. Further, the Department of Treasury, with the assistance of the Department of Justice, should provide FSI firms with bi-annual updates on promising SDN adjudication solutions. Treasury, in partnership with US firms, should also pursue improved automated technologies that comprehensively address sanctions application and reduce the costs of compliance. New technologies, for example, can reduce monitoring burden by consolidating multiple sanctions lists or enhancing data filtering for target or name identification.

*Compliance Cost:* While AML/CTF regulations are critical to ensuring sanction effectiveness, compliance generates growing costs for financial institutions. They must manage conflicting international regulatory policy and investigate numerous suspected rule breakers while navigating the threat of accidentally doing business with the wrong parties missed by automated tracking systems. As an example, the US requires compliance with its sanctions on Cuba, while Canada restricts compliance with boycotts leading to obvious conflicts for US firms wanting to do business in both Canada and the US.<sup>96</sup> Naturally, firms faced with regulatory disconnects may elect to avoid the market altogether. The associated compliance costs are high, and compliance programs must be robust. Failure means financial and possibly reputational consequences while further degrading the interconnected strength of the US FSI to support AML/CTF sanction practices.

*Recommendation:* The US should lead in synthesizing international regulatory and enforcement standards. Both the US State and Treasury Departments in conjunction with the US FSI should establish a working group with trusted "Five Eyes" nations (Australia, Canada, New Zealand, the United Kingdom and the United States) to review top financial AML/CTF/sanctions regulation and compliance. This group should standardize policies, enforcement tactics, and resolution practices and then share these best practices with FATF for global adoption.

*De-risking:* Sanction compliance costs have a significant downside. US financial institutions, worried about compliance-related penalties and reputational risk, may be hesitant to enter developing markets or may reduce business relationships with companies and financial institutions in certain geographical locations—a practice called “de-risking.” Avoiding these emerging, high-risk markets means less capital within smaller developing countries or to humanitarian organizations conducting operations within these countries and ultimately could weaken US economic influence.

De-risking also counters AML and sanction efforts by pushing developing countries away from the regulated banking system into informal, or shadow, systems in which tracking is more difficult.<sup>97</sup> Keeping these underbanked individuals, companies, and humanitarian organizations operating within these emerging nations is vital to improving internal conditions, maintaining transparency within the financial system, and keeping these operations within the regulatory system. The European Bank for Reconstruction and Development (EBRD) is an excellent example of leveraging opportunities to help the underbanked. By providing development loans to developing nations in Eastern Europe, Central Asia, Middle-East, and Northern Africa, EBRD promotes transition of market economies, private ownership and spreads democratic values. Currently, they operate in 38 countries and expect to expand into Africa to provided needed capital, while promoting good governance and ensuring economic stability.<sup>98</sup> Such examples are important tools in national policy toolboxes to leverage soft power through financial services.

*Recommendation:* The US should counter institutional de-risking by improving financing opportunities for developing nations and humanitarian organizations in high risk areas through two lines of effort. First, the Treasury Department should institute a coordinated review process for FSI risk management documentation and then approve or provide exemptions. Such a controlled process supports financial institution investment in developing nations and aid organizations aligned with US interests without fear of compliance penalties. Second, the US should increase support to international development banks such as the EBRD and Asian Development Bank.

### **Partnering for Effective Application of the Economic Instrument**

The 2017 NSS aptly enumerates the value and importance of economic power in support of US interests. Efficient sanctions application and improving emerging nation investments are important to the overall effectiveness of the economic instrument of power. As leading GFCs London and Singapore are key partners enhancing the effectiveness of the US economic instrument of power. Each bring unique advantages which the US should foster and leverage.

*Brexit/United Kingdom:* The previously discussed foundational implications of Brexit provide important context to Brexit’s effect on sanction implementation. The UK has been a long-time strategic sanctions partner and US proxy within the EU. Together, the two nations invoked powerful sanctions combining the force of US and European markets. At present, UK experts suggest the UK is responsible for approximately 85 percent of sanctions activity within the EU. The combined US-UK influence over the EU will logically wane after Brexit.

*Recommendation:* Continue close monitoring of Brexit implications to FSI. London is already taking appropriate steps to set up its own banking processes to handle sanction activities after Brexit. The expectation is that while banking functions are changing, London will retain its financial influence.<sup>99</sup> US officials must monitor Brexit negotiations closely.

*Singapore:* A valuable industry study team visit to Singapore revealed a nation quickly and purposefully positioning itself as a strategically important banking center and financial hub. The pragmatic Singaporean government and its equally practical central bank, The Monetary Authority of Singapore (MAS), are implementing several efforts to increase its appeal as a financial center. Singapore recently adjusted its tax rates to compete with regional competitor Hong Kong and is actively working to produce cyber and tech savvy human capital, or “new collar” workers necessary for the financial industry. Further, many view Singapore as preferable to Hong Kong in employee standard of living, and, due to its free market and rule of law, it will remain a safer option to move capital. Finally, Singapore has invested significantly in establishing itself as a technology and cyber leader within the financial sector. It enticed Interpol Cyber Security Fusion Center and the Financial Services Information Sharing and Analysis Center (FSISAC) to locate operating locations in Singapore while establishing fintech labs to help lead in FSI technology development.

It appears these efforts are succeeding. Banking executives predicted Hong Kong competing for the next two to five years; however, they expect Singapore to pass Hong Kong as the leading Asian financial center. Consequently, many banks are also establishing headquarters in Singapore. This prediction is strategically significant to US influence in the region as Singapore may become an even stronger strategic financial sanctions partner. US officials echoed these predictions but cautioned that Singapore seeks partners for international political actions as it prefers to act on sanctions only when United Nations Security Council resolutions apply.

Singapore’s reluctance to act alone may be due to their vulnerability in size and immature but growing cyber protection capabilities. Singapore recently passed robust cybersecurity and infrastructure laws and their judicial system’s foundation in common law adds reassurance it can ably prosecute crimes. Moreover, Singapore recently signed agreements with China on its belt and road initiatives to avoid missed opportunities, a pragmatic position given regional balances of power. Singapore values the US and its presence in the region. And, significant for sanctions and US economic power, two-thirds of regional infrastructure funding flows through Singapore.

*Recommendation:* The US should seek to remain an irreplaceable partner for Singapore through strengthened relationships as it rises in importance as a global financial hub. Several avenues offer potential payoff. First, the US should work to help Singapore as a partner of choice to further its cyber threat recognition and response capabilities, and partner with them in developing pertinent cyber laws within the region and the United Nations. Next, the US should recapture good trade relations with Singapore through tariff relief. Despite a \$20B trade surplus with the US, tariffs on steel and other items impact Singapore. Although currently the US enjoys a strong economic relationship with Singapore, further supporting Singapore’s rise as a global financial hub and partnering in key FSI development initiatives would deliver a firm message about US interests in Asia. In doing so, the US will clarify its intentions following the Trans-Pacific Partnership withdrawal and bolster support from a key partner in Asian and global forums.

### **Soft Power—Access to Capital**

Most of the proceeding discussion focused on prohibiting access to capital by direct means (sanctions, etc.). Yet there are other avenues worth reviewing that allow the US to apply soft power through the financial industry. The first of these is controlling firms’ access to capital through principled or targeted investing. The FSIS discovered the value of principle-based investing in meetings with ABN-AMRO, whose corporate pillar of sustainability (i.e., environmentally sound practices) guides decisions. Given this pillar, the bank limits lending to firms for programs that are

unsustainable. Initially, and with an American perspective, such restrictions seemed contrary to sound profit-seeking business. After discussions, however, the merits were apparent.

For example, ABN AMRO, would likely not lend to firms producing energy through coal-fired power plants unless the firm had a long-term strategy to move to more renewable energy sources. What became obvious to the study team is the potential power of this principle-based lending approach. ABN-AMRO, as an avenue for capital, can impart its values upon other firms.

A second, similar situation arose in discussions with US-based firms in Singapore. Local bank officials explained how Chinese customers do not want to leave mainstream social media platforms to access firm-specific apps. For example, most Chinese consumers prefer the WeChat platform. Thus, US-based banks are exploring how to integrate their applications with WeChat.<sup>100</sup> As WeChat is wholly accessible by the Chinese government, the potential integration of US bank systems is both informative as to a likely industry trend and concerning as a large US financial institution will have direct links into a system with close ties to the Chinese government.<sup>101</sup>

*Recommendation:* Three of the top five GSIBs are US financial institutions. Such status is the source of much of US economic might. As demonstrated by the previous ABN-AMRO and Chinese examples, controlling access to capital beyond traditional hard prohibitions has promise. The US government should consider working closely with US financial institutions, within the bounds of American values, to employ soft power through capital access.

We recognize the Chinese model is antithetical to American values. It is important, however, to also consider the implications should US financial institutions merge open architectures within Chinese social media platforms. The US Treasury Department should ensure it clearly understands the connectivity associated with these new applications.

### **ESSAY III: EMERGING THREATS AND OPPORTUNITIES**

#### **The Innovation Environment**

The 2017 NSS identifies the DIB as a critical element of US power.<sup>102</sup> A healthy and innovative FSI is a direct indicator of the potential for growth of a nation's economy writ large and also its defense industry.<sup>103</sup> This highlights the need for industry and government leaders to assess the FSI Innovative Environment (IE) to ensure that it promotes a healthy approach to innovation within US banking industries and ensures safe, secure, and stable access to credit and liquidity through the digital financial commons for the US economy and DIB.

*Government policy effect on innovation:* Two recent regulatory and oversight actions drove FSI innovation. The first was a 1998 change in patent law interpretation, updated in 2010. The second was Dodd-Frank in 2010. Patent law changes improved IP protections, eliciting a 50 percent increase in fintech related patent submissions. Dodd-Frank, on the other hand, increased the cost of compliance, driving banks to seek innovative cost reduction solutions.<sup>104</sup> Policy makers must consider how laws and regulations impact FSI innovation, while industry needs to harness competitive forces to push innovation, if not for the betterment of the defense industrial base, then for competitive advantage.

*Human Capital:* US cyber security professionals and fintech developers are in high demand. Many industry leaders have indicated that there are not enough available for the required need. As an example, more than 30 percent of JPMorgan Chase's (JPM) 252K personnel are technologists. While the industry aggressively seeks to retain technical personnel, domestic FSI regulators struggle to keep pace.<sup>105</sup> Singaporean industry and government representatives also

commented on international competition for human capital. Consequently, global human capital does not meet demand.

*Capital for Innovation:* As the industry focuses on technical personnel, it also devotes more capital to technical innovation. Total global fintech investments grew from 2010 to 2015 peaking at \$105B, then declined slightly to \$94B by 2017, the majority investment from North America.<sup>106</sup> As privately owned entities funded by the government to work on long-term R&D needs, Federally Funded R&D Centers (FFRDC) also fill a special role in the innovative environment.<sup>107</sup> Although the DTCC worked with the MITRE Corporation (an FFRDC) on a Cyber Security Threat Messaging System, other financial firms seem to be relatively unaware of FFRDC roles. FFRDCs seem to be underutilized in financial services due to the traditional oversight role of government and industry firms' limited awareness of their contributions including technology licensing, cooperative R&D agreements, open source participation, and developing industry standards.<sup>108</sup>

*Recommendation:* The American FSI IE would benefit from regulators and lawmakers recognizing the joint industry and government approach required to sustain the innovative environment. US FSI regulators maintain a hands-off approach with an enforcement culture, but this approach reduces the IE's ability to shape innovations in ways that prioritize the macroprudential security of the industry over corporate profitability.

*Recommendation:* Industry associations and government agencies should increase focus on building knowledge assets. Current trends require more focus on developing the workforce with the right skills to support industry innovation and regulation. With a deficit of skilled resources, emphasis should be put into increasing awareness in high-schools and colleges for the type of technical skills needed to support innovation in financial services.

## **Operational Risk**

As discussed in Essay II, systemic operational risk from interconnected institutions is concerning, and largely lacks regulator focus. Rapid evolutions in technology, however, further threaten to increase operational risk. Emerging technologies both internal to firms and external threats from the cyber domain will likely exacerbate current operational risk concerns. Fintech and AI are the most significant internal threats and the FSOC highlights the primary external threat to the system vis-à-vis technology will come from the cyber domain.<sup>109</sup>

Key to understanding fintech risk is the build/buy decision. Generally, large firms have the resources to develop technology internally while small firms, who see such technology as a viability imperative, must look to third party providers. Both groups face risk when employing fintech, but the small bank ecosystem's short list of providers presents a more concentrated pool of risk. Several small banks interviewed by the FSIS highlight technological relevancy and associated cyber security challenges as top business concerns.<sup>110</sup> Few forecast a decline in this trend—therefore it is crucial to address the threats of increasing fintech reliance in FSI.

AI presents different challenges to the FSI. Traditional programs perform only the functions directed via specific code. Programmers give AI machine learning systems, on the other hand, broad rule sets and the systems learn independently to meet programmed goals. This learning is internal and largely opaque to the human programmer who may not fully understand how the machine learning evolved. AI has a critical potential malignant failure mode: perverse instantiation.<sup>111</sup> A perverse instantiation is when an intelligent system uses unexpected methods to meet programmed goals. The US equity market shed over \$1T of value in minutes in 2010's flash crash when high-speed, algorithmic traders responded automatically to market fluctuations causing a massive sell off.<sup>112</sup> Most telling is that the crash was likely caused by unintelligent

algorithms. Years later only minimal clarity exists as to what caused the crash, leading some to argue it was the interaction of algorithms coupled with a nervous market.<sup>113</sup>

Due to the significant amount of fintech developed in-house by the banking institutions, it falls to firm Chief Technology Officers (CTO) to ensure fintech development complies with the NIST Framework and is deployed with minimal vulnerabilities. The Chief Information Security Officer (CISO) additionally supports regular testing, assessment, and update of company information technology products to enhance their cyber resiliency throughout their life cycle. This symbiotic relationship between the CTO and CISO was evident in our various bank visits.

Third-party providers offer a wide variety of technology for financial institutions. If industry widely uses the provider (i.e., Jack Henry Associates), any introduced vulnerability from its exploitation can be systemic. The financial services sector developed TruSight to reduce third-party risks. TruSight gathers and validates third-party information, including cyber resiliency protocols and capabilities. TruSight stores these assessments on a secure platform that firms can utilize to assess and manage relationships with third-party providers.

Finally, there is appropriate and rising attention across industry, regulators and government agencies to minimizing systemic external cyber risk.<sup>114</sup> As a part of the New York State Department of Financial Services (DFS) 2017 Cybersecurity Requirements for Financial Services Companies, banking institutions must have a CISO overseeing and implementing the companies' cybersecurity program and enforcing its cybersecurity policy. Institutions may be aware such risks exist and have internal methods to minimize problems, but current regulatory focus and requirements may not be adequate to ensure the individual firm and system security. New York's cybersecurity requirements may be useful in developing Federal guidelines for in-house development of cyber resilient technologies in the banking industry.

Recommendation: US regulators must be more proactive in assessing systemic, interdependent operational risk. DFAST and CCARs should include operational risk and cyber scenarios. The FED's cyber assessment efforts are a step in this direction.<sup>115</sup> Similar technology failure modes and effects analyses would provide the FED insight into systemic operational risk. The Bank of England models this recommendation by deeming operational failures planning certainties rather than chance possibilities.<sup>116</sup>

Recommendation: AI must be clearly understood. Peeling away AI's opaqueness is crucial to solving associated challenges.<sup>117</sup> Defense Advanced Research Projects Agency's Explainable Artificial Intelligence program warrants review for use beyond DoD. At present, limited skills and tools for auditing and maintaining awareness of AI fintech applications exist.<sup>118</sup> The FSOC should also support establishing AI safety rules and associated monitoring systems.

Recommendation: Create a cybersecurity standards certification authority to set the conditions for improved fintech cybersecurity. As a critical infrastructure sector, FSI security is foundational to our national economy and the defense industrial base. The creation of cybersecurity standards should not be left for industry to define. Combining industry efforts and government oversight will ensure a comprehensive approach to ensuring the IE for critical financial infrastructure is safe and secure.

### **Opportunities to Encourage Innovation**

While innovation *within* the FSI warrants discussion, also worthy of discussion is the *external* innovation enabled by the FSI. Specifically, the FSI ensures credit availability to transition DIB concepts to capabilities. But, not all defense industry companies have the same ready access to that crucial funding, especially small defense firms. The post-2008 aftermath

affected small banks, and consequently small defense firms, uniquely. A 2018 report from the US Small Business Administration (SBA) shows the growth rate for small business loans post-crisis remain depressed.<sup>119</sup> Loan volume since 2008 is down 13 percent with the actual number of loans down 41 percent.<sup>120</sup> Dodd-Frank regulations did little to assist low volumes, “uniquely discourag[ing] loans to small business” by imposing higher capital requirements on banks larger than just \$10B.<sup>121</sup>

Most small community banks also offer something the big banks cannot—an aptitude for connecting with small businesses on multiple levels. They can make better qualitative assessments through their proximity to the borrower, their ability to learn about the business, and their knowledge of the local market.<sup>122</sup> Small business loans “remain the core of the community banking business, with 98 percent of banks with under \$10B in assets offering small business loans.”<sup>123</sup>

Unfortunately, post-crisis, one-size-fits-all regulation has hurt small banks significantly and severely impacted small banks’ ability to serve small businesses.<sup>124</sup> As shown by the FDIC chart (Appendix H) there are 1700 fewer banks in the US than in 2010. The smallest community banks, with assets below \$100M, fell by 32 percent over this period and banks with assets between \$100M and \$1B fell by 11 percent.<sup>125</sup> This suggests that smaller banks are more susceptible to consolidation due to high compliance costs. Not only have small banks themselves declined, the remaining have decreased their overall approval of bank loans to small business.<sup>126</sup> Compliance costs due to regulation impact small banks disproportionately, accounting for a “greater share of personnel, data processing, legal, accounting, and consulting costs.”<sup>127</sup>

*Recommendation:* Policy should create a regulatory environment that fosters innovation by encouraging lending to small innovative businesses. Because of the high risk regarding emerging technology, the DoD and SBA need to formulate a small defense technology (SDT) caveat increasing safeguards and incentives for banks that lend to designated SDT businesses.

*Recommendation:* Regulatory policy should encourage de novo community bank formation in emerging innovation centers. Favorable small bank regulatory conditions translate to more small business loans and would support defense innovation, especially in emerging US innovation corridors.<sup>128</sup> Setting such conditions will help both the banks and the start-up companies grow together<sup>129</sup> and supports the 2017 NSS call to renew DIB capabilities.<sup>130</sup>

*Recommendation:* Compliance cost are disproportionately burdensome for small banks thus the US needs a scalable and coordinated regulatory system. Scalable reform efforts should focus on effective cost-benefit analysis associated with enacting regulation. Standardized compliance cost collection without additional regulatory burden will be key.

### **Singapore’s Innovation Push**

Thus far, the role of FSI innovation and associated fintech and cyber security implications are key themes in this study. In that vein, the study found that Singapore’s government and FSI industry are pushing for leadership in global research, development, and application of innovative fintech. The MAS wants to accelerate fintech development, commercialization and operationalization. Following a deliberate strategy, the MAS works through a network of public-private and private-private partnerships to create a business and innovation friendly regulatory environment. But, the MAS itself also innovates.

In 2015 the MAS launched the Looking Glass fintech innovation lab to mix “talent, funding, and mentorship together to create the right ecosystem.”<sup>131</sup> It promotes fintech experimentation and facilitates collaboration between the innovators, regulators, and investors. CitiBank Asia responded to this permissive environment by developing AI bots connected to social

media platforms allowing customers to access all banking operations through a single app.<sup>132</sup> This is part of Citi's overall effort to digitize all aspects of banking life for a better customer experience.<sup>133</sup> Other banks in Singapore are looking to similar fintech and cyber focused initiatives. These digitization efforts bring with them greater efficiency, but, as discussed earlier, greater operational risk and is why Singapore courted the aforementioned Interpol and FSISAC regional centers to provide closer access to cyber threat information.

*Recommendation:* The US government is lagging in the deliberative, carefully-orchestrated, and government-sponsored fintech innovation similar in Singapore. Although Singapore benefits from a relatively small and well-controlled society, its efforts demonstrate the technological and regulatory value of strategic planning for innovation. The US government should partner with Singapore to gain insight into the creative nexus growing in that nation.

## **CONCLUSION**

The Financial Services Industry is critical to the United States' economic and national security. Paradoxically, however, financial services present both a systemic danger and nurturing force for America's prosperity and its industrial base. Fortunately, the financial services industry is in a much stronger position today than before the 2008 financial crisis. Post-crisis reforms built needed resiliency into an industry that proved fragile to the financial shocks of 2008. No regulatory regime is perfect and Dodd-Frank reforms certainly were not free from costs. Compliance costs rose, regulatory regimes expanded, and firms generally experienced a hit to their bottom lines. That said, Dodd-Frank was necessary to ensure the long-term viability of the US financial system as an instrument of power.

The 2017 NSS is clear; America's economic might is vital to its achieving national security goals and this industry is a critical component. Not only is it instrumental in applying coercive sanctions, it underpins a significant portion of global business. The US must deliberately leverage its financial system as a tool—if not the primary tool—to achieve strategic ends despite a dynamic global financial system.

Although generally more resilient, the financial system is not free from threats and this study found several key areas the US government and US FSI firms must consider. First is operational risk. While post-crisis reforms built financial resiliency into the system, they did little address the risk of a highly interconnected network of institutions with various single points of failure, especially given the rise of fintech. Second, international partners will remain critical in the future. Brexit results must be followed closely, and Singapore is a burgeoning financial hub attractive for deeper partnerships. At home, rising interest rates will dictate the pace of growth and shadow banking remains a concern. Finally, access to capital remains the crux of economic power. Risks, innovations and opportunities abound in this space and the US government must encourage innovative approaches in the industry writ large and to support the defense industrial base.

In the end, the US remains the world's most vibrant financial power. Whether through principle-based lending or controlling access to financial accounts, governments can wield significant sway over individuals and nations. Moving forward, the US must continue to focus on increasing the overall resiliency of its financial services industry. Smart regulation coupled with strong public-private partnerships will be critical to future success.

## Appendix A<sup>134</sup>

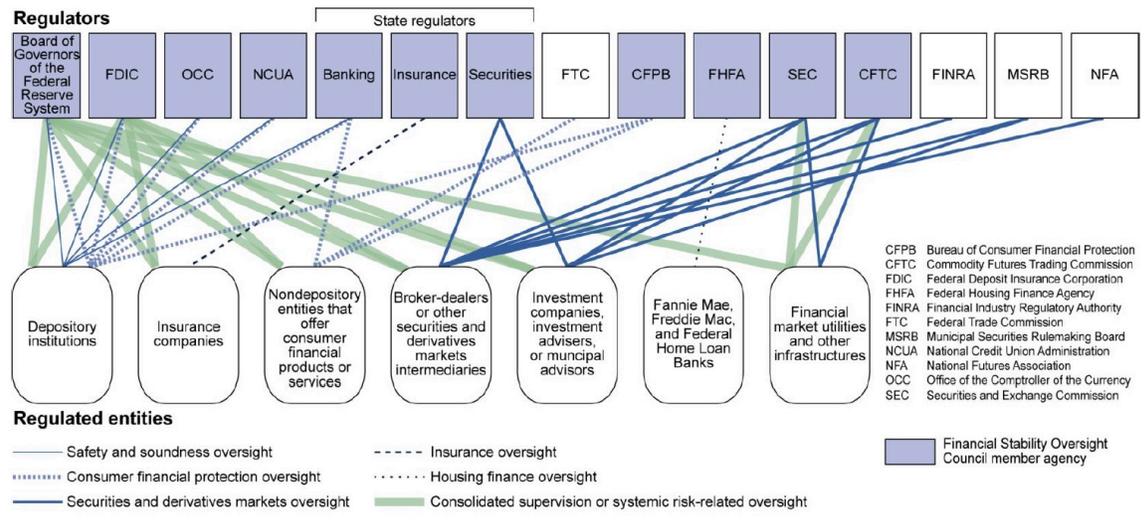
### ZYen Global Financial Center Index 23

Table 1 | GFCI 23 Ranks and Ratings

Centre	GFCI 23		GFCI 22		Change in	
	Rank	Rating	Rank	Rating	Rank	Rating
London	1	794	1	780	0	▲14
New York	2	793	2	756	0	▲37
Hong Kong	3	781	3	744	0	▲37
Singapore	4	765	4	742	0	▲23
Tokyo	5	749	5	725	0	▲24
Shanghai	6	741	6	711	0	▲30
Toronto	7	728	7	710	0	▲18
San Francisco	8	726	17	693	▲9	▲33
Sydney	9	724	8	707	▼1	▲17
Boston	10	722	19	690	▲9	▲32
Beijing	11	721	10	703	▼1	▲18
Melbourne	12	720	13	696	▼1	▲24
Montreal	13	719	12	697	▼1	▲22
Chicago	14	718	24	683	▲10	▲35
Vancouver	15	717	18	692	▲3	▲25
Zurich	16	713	9	704	▼7	▲9
Los Angeles	17	712	23	683	▲6	▲29
Shenzhen	18	710	20	689	▲2	▲21
Dubai	19	709	18	691	▼1	▲18
Frankfurt	20	708	11	701	▼9	▲7
Luxembourg	21	701	14	695	▼7	▲6
Cayman Islands	22	700	31	671	▲9	▲29
Osaka	23	692	21	688	▼2	▲4
Paris	24	687	26	680	▲2	▲7
Abu Dhabi	25	683	25	682	0	▲1
Geneva	26	682	16	694	▼10	▼12
Seoul	27	679	22	686	▼5	▼7
Guangzhou	28	678	32	668	▲4	▲10
Hamburg	29	676	67	628	▲38	▲48
Taipei	30	673	27	677	▼3	▼4
Dublin	31	666	30	672	▼1	▼6
Casablanca	32	664	35	665	▲3	▼1
Qingdao	33	662	47	649	▲14	▲31
Tel Aviv	34	661	34	666	0	▼5
Munich	35	660	50	646	▲15	▲14
Bermuda	36	656	29	673	▼7	▼17
Bangkok	37	643	61	634	▲24	▲9
Calgary	38	642	71	624	▲33	▲18
Jersey	39	637	40	658	▲1	▼21
Kuala Lumpur	40	632	55	640	▲15	▼8
Madrid	41	631	59	636	▲18	▼5
Stockholm	42	629	39	660	▼3	▼31
Edinburgh	43	628	52	643	▲9	▼15
Wellington	44	621	38	661	▼6	▼40
Warsaw	45	620	36	664	▼9	▼44
Busan	46	618	70	625	▲24	▼7
Doha	47	617	45	651	▼2	▼34
Washington DC	48	616	28	676	▼20	▼60

### Appendix B<sup>135</sup>

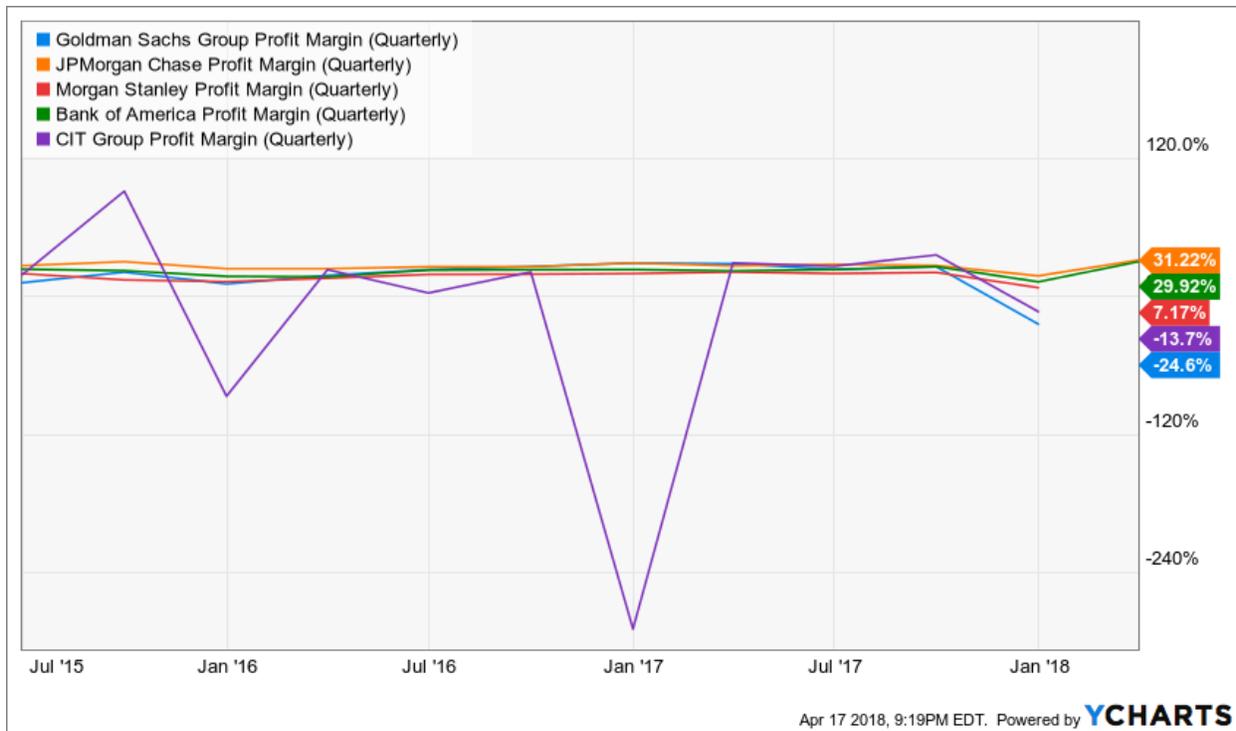
Figure 1. Regulatory Jurisdiction by Agency and Type of Regulation



Source: Government Accountability Office (GAO), *Financial Regulation*, GAO-16-175, February 2016, Figure 2.

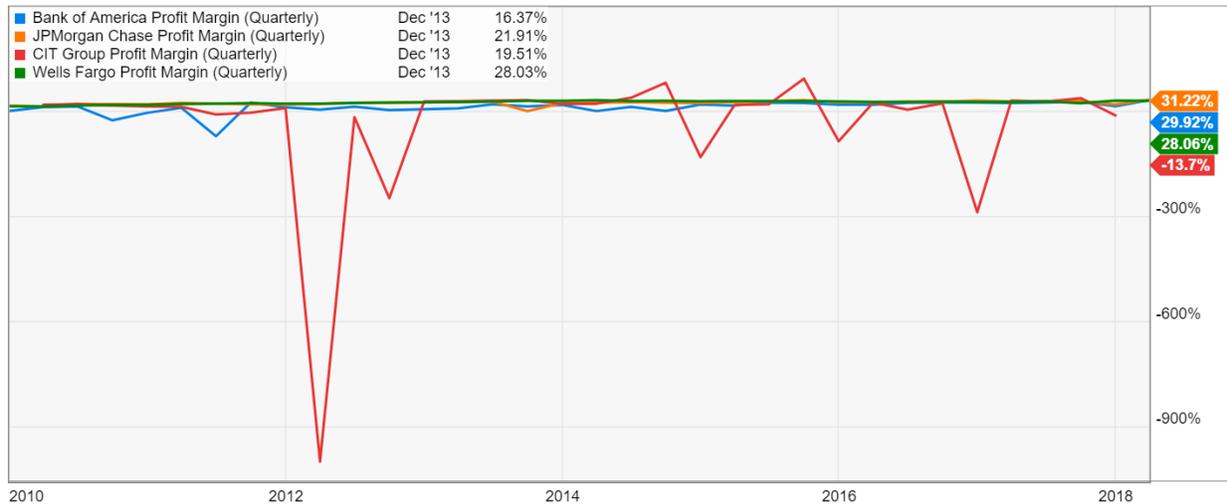
Appendix C

**Profit Margins Among Five Largest Investment Banks (ycharts.com)**



**Appendix D**

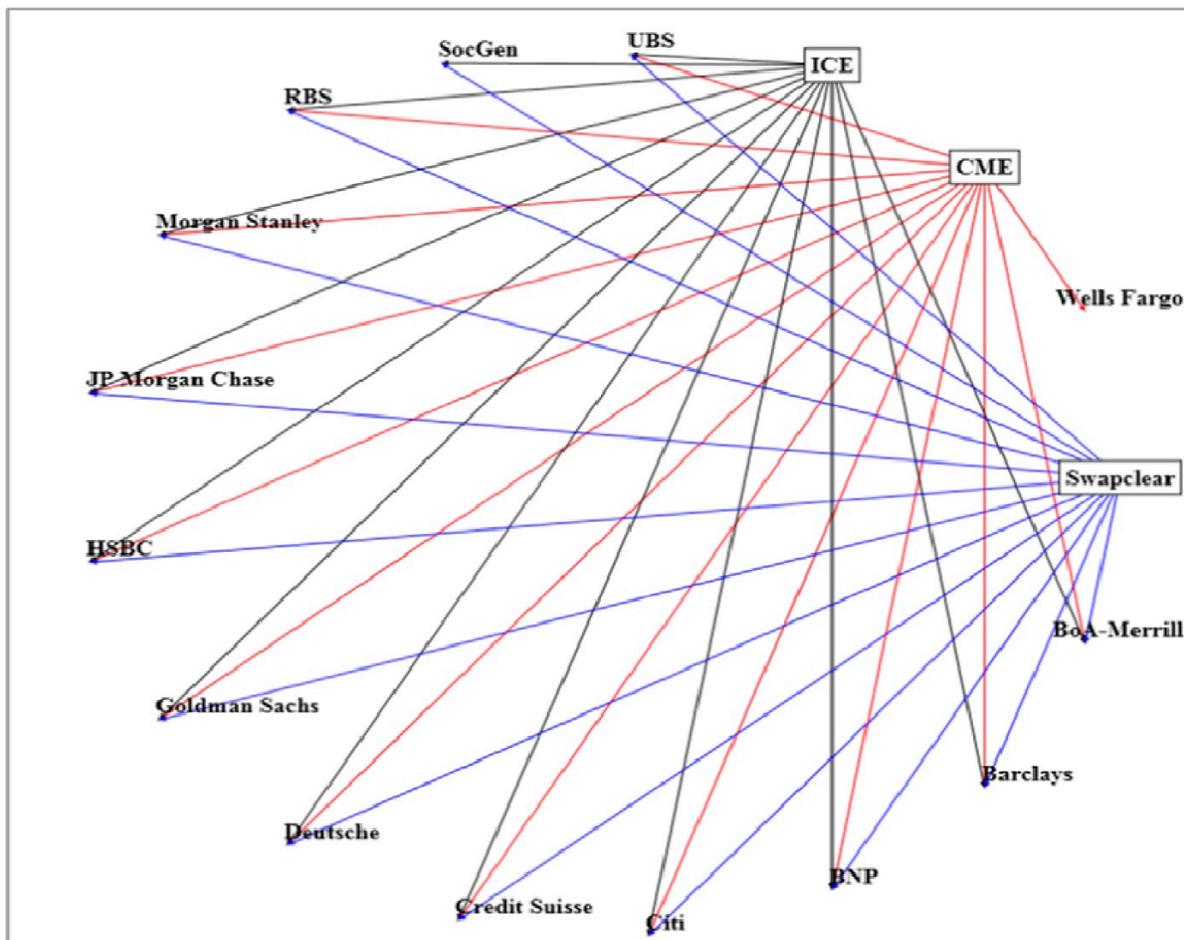
**Profit Margins Among Four Largest Commercial Banks (ycharts.com)**



**Appendix E**

**P/E ratios of top banks (ycharts.com)**

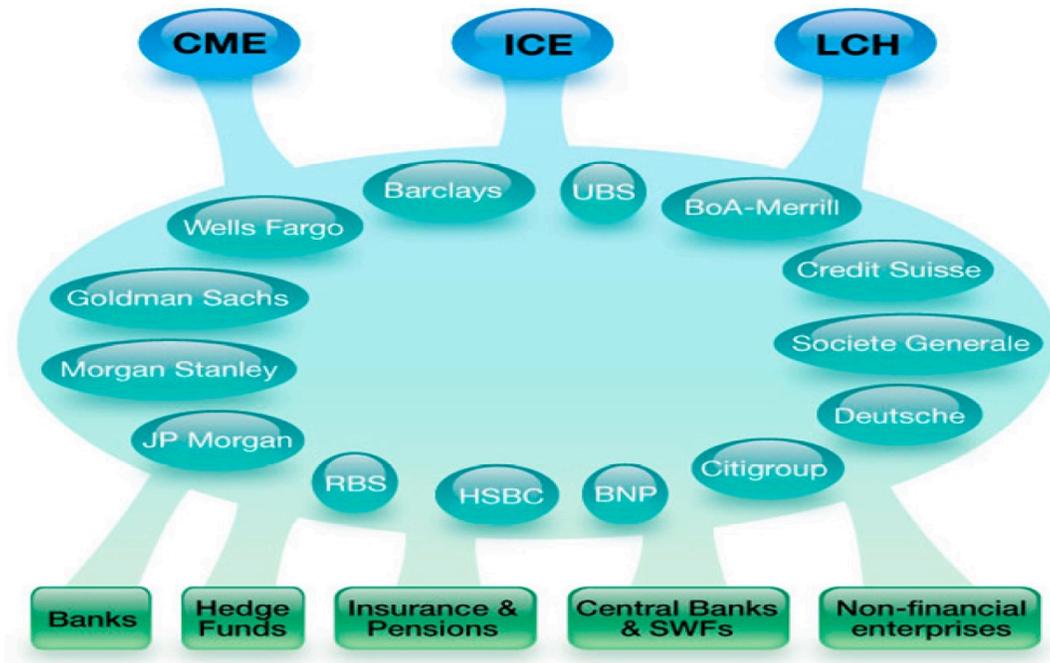


**Appendix F**<sup>136</sup>**Central Counterparty Clearing House Interconnectedness**

Sources: Chicago Mercantile Exchange, LCH.Clearnet and the InterContinental Exchange.

Appendix G<sup>137</sup>

Figure 4. CCPs in the Global Financial Network

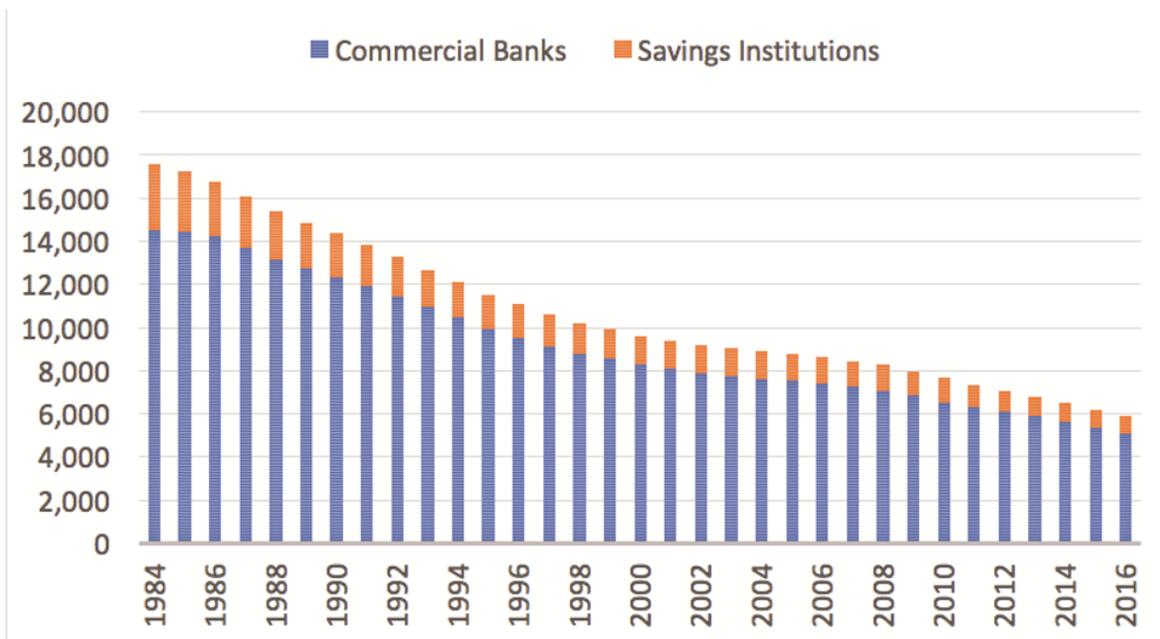


Note: SWF = Sovereign Wealth Fund.

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**Appendix H<sup>138</sup>**

## Consolidation Trends 1984-2016



Source: FDIC

## Appendix I

### Consolidated Recommendations

#### Essay I: A Foundation of National Power

*Recommendation:* The US should begin an incremental path to meaningful FSI regulatory reform by merging the SEC and CFTC into a single agency. The undersized CFTC is ill-equipped to regulate complex derivatives and futures trading. The SEC has resources to draw from, such as FINRA, that could help the CFTC manage one of the most complex aspects of the FSI. This would increase efficiency and reduce uncertainty over jurisdictions.

*Recommendation:* Policy makers should consider moving to an investor-paid credit rating model aligning incentives of rating agencies and investors. The current issuer-paid model allows rated agencies to pay for credit rating services to sell their bonds to regulated financial institutions.<sup>60</sup> This conflict of interest allows for the possibility that a rated agency could pay for a better rating. Investor-paid models may reduce conflicts of interest.

*Recommendation:* US regulators should categorize and regulate large non-banking intermediaries that reach a \$250B capital threshold as traditional banks and require appropriate charters. Such actions would require US regulators to increase efforts to prioritize, include, and monitor all vulnerable non-banking intermediaries as SIFIs.

*Recommendation:* The SEC and CFTC should intensely monitor CCP operational risk and consider mitigation options. Transparency for regulators is the most important regulatory need. As transparency enhances confidence, the number and difficulty of DFASTs should decrease and focus on system resiliency and redundancy. Finally, regulators must ensure all CCP users, traditional and non-traditional, maintain adequate capital.

*Recommendation:* Bank stress tests should elevate the importance of interest rate risk. According to a Federal Reserve Bank of New York (FRBNY) official, the “coherence of scenario” is a major factor when determining stress tests.<sup>74</sup> Aptly, FED economists do not find a flat or inverted yield curve to be necessarily coherent with the macroeconomic duress in the severely adverse scenario. Therefore, as a remedy, the 2019 DFAST and CCAR should include a standalone, *market shock*, yield curve scenario derived from the Basel Committee’s latest Interest-Rate Risk in the Banking Book “common shock and stress scenarios”.<sup>75</sup>

*Recommendation:* Although FFIEC guidelines focus on traditional malicious and natural threats, they can serve as a foundation to build interconnectivity focused operational risk guidelines. Additionally, the FSOC should direct a review of individual firm risk analysis to determine if firms, systems, or markets have interdependent operational risk.

*Recommendation:* The US should designate a single, authoritative regulatory voice to speak in forums dealing with Brexit. According to feedback from regulators, the fragmented nature of US FSI oversight can lead to divergent US perspectives at the international level. Given its regulatory role, the Federal Reserve Board should be the single US voice during this transition.

## **Essay II: Instrument of National Power**

*Recommendation:* The Department of Treasury should expand SDN ability beyond non-roman characters. Further, the Department of Treasury, with the assistance of the Department of Justice, should provide FSI firms with bi-annual updates on promising SDN adjudication solutions. Treasury, in partnership with US firms, should also pursue improved automated technologies that comprehensively address sanctions application and reduce the costs of compliance. New technologies, for example, can reduce monitoring burden by consolidating multiple sanctions lists or enhancing data filtering for target or name identification.

*Recommendation:* The US should lead in synthesizing international regulatory and enforcement standards. Both the US State and Treasury Departments in conjunction with the US FSI should establish a working group with trusted “Five Eyes” nations (Australia, Canada, New Zealand, the United Kingdom and the United States) to review top financial AML/CTF/sanctions regulation and compliance. This group should standardize policies, enforcement tactics, and resolution practices and then share these best practices with FATF for global adoption.

*Recommendation:* The US should counter institutional de-risking by improving financing opportunities for developing nations and humanitarian organizations in high risk areas through two lines of effort. First, the Treasury Department should institute a coordinated review process for FSI risk management documentation and then approve or provide exemptions. Such a controlled process supports financial institution investment in developing nations and aid organizations aligned with US interests without fear of compliance penalties. Second, the US should increase support to international development banks such as the EBRD and Asian Development Bank.

*Recommendation:* Continue Close Monitoring of Brexit Implications to FSI. London is already taking appropriate steps to set up its own banking processes to handle sanction activities after Brexit. The expectation is that while banking functions are changing, London will retain its financial influence.<sup>99</sup> US officials must monitor Brexit negotiations closely.

*Recommendation:* The US should seek to remain an irreplaceable partner for Singapore through strengthened relationships as it rises in importance as a global financial hub. Several avenues offer potential payoff. First, the US should work to help Singapore as a partner of choice to further its cyber threat recognition and response capabilities, and partner with them in developing pertinent cyber laws within the region and the United Nations. Next, the US should recapture good trade relations with Singapore through tariff relief. Despite a \$20B trade surplus with the US, tariffs on steel and other items impact Singapore. Although currently the US enjoys a strong economic relationship with Singapore, further supporting Singapore’s rise as a global financial hub and partnering in key FSI development initiatives would deliver a firm message about US interests in Asia. In doing so, the US will clarify its intentions following the Trans-Pacific Partnership withdrawal and bolster support from a key partner in Asian and global forums.

*Recommendation:* Three of the top five GSIBs are US financial institutions. Such status is the source of much of US economic might. As demonstrated by the previous ABN-AMRO and Chinese examples, controlling access to capital beyond traditional hard prohibitions has promise.

The US government should consider working closely with US financial institutions, within the bounds of American values, to employ soft power through capital access.

We recognize the Chinese model is antithetical to American values. It is important, however, to also consider the implications should US financial institutions merge open architectures within Chinese social media platforms. The US Treasury Department should ensure it clearly understands the connectivity associated with these new applications.

### **Essay III: Emerging Threats and Opportunities**

*Recommendation:* The American FSI IE would benefit from regulators and lawmakers recognizing the joint industry and government approach required to sustain the innovative environment. US FSI regulators maintain a hands-off approach with an enforcement culture, but this approach reduces the IE's ability to shape innovations in ways that prioritize the macroprudential security of the industry over corporate profitability.

*Recommendation:* Industry associations and government agencies should increase focus on building knowledge assets. Current trends require more focus on developing the workforce with the right skills to support industry innovation and regulation. With a deficit of skilled resources, emphasis should be put into increasing awareness in high-schools and colleges for the type of technical skills needed to support innovation in financial services.

*Recommendation:* US regulators must be more proactive in assessing systemic, interdependent operational risk. DFAST and CCARs should include operational risk and cyber scenarios. The FED's cyber assessment efforts are a step in this direction.<sup>115</sup> Similar technology failure modes and effects analyses would provide the FED insight into systemic operational risk. The Bank of England models this recommendation by deeming operational failures planning certainties rather than chance possibilities.<sup>116</sup>

*Recommendation:* AI must be clearly understood. Peeling away AI's opaqueness is crucial to solving associated challenges.<sup>117</sup> Defense Advanced Research Projects Agency's Explainable Artificial Intelligence program warrants review for use beyond DoD. At present, limited skills and tools for auditing and maintaining awareness of AI fintech applications exist.<sup>118</sup> The FSOC should also support establishing AI safety rules and associated monitoring systems.

*Recommendation:* Create a cybersecurity standards certification authority to set the conditions for improved fintech cybersecurity. As a critical infrastructure sector, FSI security is foundational to our national economy and the defense industrial base. The creation of cybersecurity standards should not be left for industry to define. Combining industry efforts and government oversight will ensure a comprehensive approach to ensuring the IE for critical financial infrastructure is safe and secure.

*Recommendation:* Policy should create a regulatory environment that fosters innovation by encouraging lending to small innovative businesses. Because of the high risk regarding emerging technology, the DoD and SBA need to formulate a small defense technology (SDT) caveat increasing safeguards and incentives for banks that lend to designated SDT businesses.

*Recommendation:* Regulatory policy should encourage de novo community bank formation in emerging innovation centers. Favorable small bank regulatory conditions translate to more small business loans and would support defense innovation, especially in emerging US innovation corridors.<sup>128</sup> Setting such conditions will help both the banks and the start-up companies grow together<sup>129</sup> and supports the 2017 NSS call to renew DIB capabilities.<sup>130</sup>

*Recommendation:* Compliance cost are disproportionately burdensome for small banks thus the US needs a scalable and coordinated regulatory system. Scalable reform efforts should focus on effective cost-benefit analysis associated with enacting regulation. Standardized compliance cost collection without additional regulatory burden will be key.

*Recommendation:* The US government is lagging in the deliberative, carefully-orchestrated, and government-sponsored fintech innovation similar in Singapore. Although Singapore benefits from a relatively small and well-controlled society, its efforts demonstrate the technological and regulatory value of strategic planning for innovation. The US government should partner with Singapore to gain insight into the creative nexus growing in that nation.

## End Notes

<sup>1</sup> US Constitution. preamble.

<sup>2</sup> The White House, Office of the President. 2017. “National Security Strategy of the United States of America (NSS).” December 18. pg 17. Accessed March 28, 2018, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>.

<sup>3</sup> US Department of Homeland Security. 2014. *NIPP (National Infrastructure Protection Plan) 2013: Partnering for Critical Infrastructure Security and Resilience*. Homeland Security Digital Library. January 8. pgs 7 and 11. Accessed May 8, 2018. [https://www.dhs.gov/sites/default/files/publications/NIPP%202013\\_Partnering%20for%20Critical%20Infrastructure%20Security%20and%20Resilience\\_508\\_0.pdf](https://www.dhs.gov/sites/default/files/publications/NIPP%202013_Partnering%20for%20Critical%20Infrastructure%20Security%20and%20Resilience_508_0.pdf).

<sup>4</sup> Jefferson, Thomas. 1816. “Thomas Jefferson to John Taylor, 28 May 1816,” *Founders Online*, National Archives, last modified April 12, 2018. Accessed April 23, 2018. [https://founders.archives.gov/documents/Jefferson/03-10-02-0053#print\\_view](https://founders.archives.gov/documents/Jefferson/03-10-02-0053#print_view). [Original source: *The Papers of Thomas Jefferson*, Retirement Series, vol. 10, *May 1816 to 18 January 1817*, ed. J. Jefferson Looney. Princeton: Princeton University Press, 2013, pp. 86–90.]

<sup>5</sup> Hamilton, Alexander. 1790. “Final Version of the Second Report on the Further Provision Necessary for Establishing Public Credit (Report on a National Bank), 13 December 1790.” *Founders Online*, National Archives, last modified April 12, 2018, accessed April 23, 2018, [https://founders.archives.gov/documents/Hamilton/01-07-02-0229-0003#print\\_view](https://founders.archives.gov/documents/Hamilton/01-07-02-0229-0003#print_view). [Original source: *The Papers of Alexander Hamilton*, vol. 7, *September 1790–January 1791*, ed. Harold C. Syrett. New York: Columbia University Press, 1963, pp. 305–342.]

<sup>6</sup> Office of the President. “NSS.” Pgs 17-18.

<sup>7</sup> Yeandle, Mark. 2018. “The Global Financial Centres Index 23,” *ZYen and China Development Institute*. March. 4. Accessed May 5, 2018. <http://www.longfinance.net/Publications/GFCI23.pdf>.

<sup>8</sup> D’Costa, Viraj. 2017. “IBISWorld Industry Report 52211, Commercial Banking in the U.S., About this Industry.” IBISWorld. October. Accessed on March 31, 2018, <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/default.aspx?entid=1288>.

<sup>9</sup> US Department of Commerce. 2018. *Overview: Finance, insurance, real estate, rental, and leasing value added, 2017:Q4*. BEA (Bureau of Economic Analysis) Industry Facts. April 19. Accessed May 8, 2018. <https://www.bea.gov/industry/factsheet/factsheet.cfm?IndustryId=FIRE>.

<sup>10</sup> US Department of Commerce. 2017. *Gross Domestic Product by Industry: Fourth Quarter and Annual 2017, Real Value Added by Industry, 2017:Q3*. BEA (Bureau of Economic Analysis) News Release, BEA 18-18. April 19. Accessed May 8, 2018. <https://www.bea.gov/newsreleases/industry/gdpindustry/gdpindnewsrelease.htm>.

<sup>11</sup> D’Costa, Viraj. 2017. “IBISWorld Industry Report 52211, Commercial Banking in the US, Industry at a Glance.” IBISWorld. October. Accessed on March 31, 2018, <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/default.aspx?entid=1288>.

<sup>12</sup> Viraj D’Costa. 2017. “IBISWorld Industry Report 52211, Commercial Banking in the U.S., Major Companies.” IBISWorld. October. Accessed on April 1, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/majorcompanies.aspx?entid=1288>.

<sup>13</sup> D’Costa. “IBISWorld Industry Report 52211, Commercial Banking in the US, Industry at a Glance.”

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<sup>14</sup> Gambardella, Anthony. 2017. "IBISWorld Industry Report 52311, Investment Banking and Securities Dealing in the U.S., Industry at a Glance." IBISWorld. December. Accessed March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/ataglance.aspx?entid=1307>.

<sup>15</sup> D'Costa. "IBISWorld Industry Report 52211, Commercial Banking in the U.S., Major Companies."

<sup>16</sup> Labonte, Marc. 2017. "Who Regulates Whom? An Overview of the U.S. Financial Regulatory Network." *Congressional Research Service*, August 17. pg 8. Accessed on May 8, 2018. <https://fas.org/sgp/crs/misc/R44918.pdf>

<sup>17</sup> Gambardella, Anthony. 2017 "IBISWorld Industry Report 52311, Investment Banking and Securities Dealing in the U.S., Operating Conditions." IBISWorld. December. Accessed March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/operatingconditions.aspx?entid=1307>.

<sup>18</sup> Porter, Michael E. 2008. "The Five Competitive Forces that Shape Strategy." *Harvard Business Review* 86, no. 1. January. Accessed May 8, 2018. <http://eds.b.ebscohost.com.nduezproxy.idm.oclc.org/eds/pdfviewer/pdfviewer?vid=1&sid=a06e55ff-2c30-4393-ae74-a17dde144af9%40sessionmgr102>.

<sup>19</sup> Ibid.

<sup>20</sup> Interview with bank official on April 5, 2018.

<sup>21</sup> Interview with bank official on April 5, 2018; and Robinson, Edward. 2017. "Fintech." *Bloomberg, Quicktake*. September 13. Accessed April 15, 2018. <https://www.bloomberg.com/quicktake/financial-technology-companies-disrupt-comfy-banks-quicktake>.

<sup>22</sup> Ibid.

<sup>23</sup> Gambardella. 2017. "IBISWorld Industry Report 52311, Investment Banking and Securities Dealing in the U.S., Operating Conditions."

<sup>24</sup> D'Costa, Viraj. 2017. "IBISWorld Industry Report 52211, Commercial Banking in the U.S., Competitive Landscape." IBISWorld. October. Accessed March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/competitivelandscape.aspx?entid=1288>.

<sup>25</sup> Rexrode, Christina and Rachel Louise Ensign. 2017. "The Biggest Banks are Gobbling up Deposits. Here's Who's Not." *Wall Street Journal*. April 29. Accessed April 30, 2018. <https://www.wsj.com/articles/the-biggest-banks-are-gobbling-up-deposits-heres-whos-not-1524999612?mod=searchresults&page=1&pos=2>.

<sup>26</sup> Federal Deposit Insurance Company. "Commercial Banks – Historical Statistics on Banking, Table CB02, Changes in Number of Institutions." Accessed on May 8, 2018. <https://www5.fdic.gov/hsob/HSOBRpt.asp>.

<sup>27</sup> Ricketts, Joe. 2017. "Some Banks are too Small to Succeed." *Wall Street Journal*. October 29. Accessed April 15, 2018. <https://www.wsj.com/articles/some-banks-are-too-small-to-succeed-1509302051>.

<sup>28</sup> Interview with Member of Congress on April 18, 2018.

<sup>29</sup> Ricketts. "Some Banks are too Small to Succeed."

<sup>30</sup> Buaron, Roberto. 1981. "New-game strategies." *McKinsey Quarterly* (Spring). pgs 24-40. [Reprinted by special permission from the January 1981 issue of *Management Review*, where it appeared under the title "How to win the

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market-share game? Try changing the rules.” Pgs 8-17. Accessed May 8, 2018.  
<http://www.firstatlanticcapital.com/news/How%20to%20win%20the%20market%20share%20game.pdf>

<sup>31</sup> Interview with bank official on April 5, 2018.

<sup>32</sup> Ibid.

<sup>33</sup> Interview with bank official on March 16, 2018.

<sup>34</sup> Gambardella. “IBISWorld Industry Report 52311, Investment Banking and Securities Dealing in the U.S., Operating Conditions.”

<sup>35</sup> Otani, Akane and Ryan Tracy. 2017. “President Trump Says He’s Looking Into Breaking Up Wall Street Banks.” *Wall Street Journal*. May 1. Accessed April 14, 2018. <https://www.wsj.com/articles/president-trump-says-hes-looking-into-breaking-up-wall-street-banks-1493660319>.

<sup>36</sup> Back, Aaron. 2018. “Is This As Good As It Gets for the Big Banks?” *Wall Street Journal*. April 16. <https://www.wsj.com/articles/is-this-as-good-as-it-gets-for-the-big-banks-1523889853>.

<sup>37</sup> US Department of Commerce. 2018. “National Income and Product Accounts, Corporate Profits: Fourth Quarter and Annual 2017.” Bureau of Economic Analysis, BEA 18-14, Corporate Profits (table 12), released March 28, 2018. Accessed April 10, 2018. [https://www.bea.gov/newsreleases/national/gdp/2018/gdp4q17\\_3rd.htm](https://www.bea.gov/newsreleases/national/gdp/2018/gdp4q17_3rd.htm).

<sup>38</sup> Ensign, Rachel Louis. 2018. “Bank of America’s Profits Lifted by Tax Law, Rising Interest Rates.” *Wall Street Journal*. April 16. Accessed April 16. <https://www.wsj.com/articles/bank-of-america-reports-higher-earnings-1523875943>.

<sup>39</sup> Hoffman, Liz. 2018. “Goldman Profit Surges but Investors Lament Buyback Pause.” *Wall Street Journal*. April 17. <https://www.wsj.com/articles/goldman-sachs-reports-higher-earnings-1523965357>.

<sup>40</sup> Back. “Is This As Good As It Gets for the Big Banks?”

<sup>41</sup> Hoffman, Liz. 2018. “Morgan Stanley Posts Record Profits, Revenue.” *Wall Street Journal*. April 18. Accessed May 10, 2018. <https://www.wsj.com/articles/morgan-stanley-reports-higher-revenue-earnings-1524049224?mod=searchresults&page=1&pos=5>.

<sup>42</sup> 2018. “JP Morgan, Citigroup, and Wells Fargo Report First-Quarter Results.” *Wall Street Journal*. April 13. Accessed April 14, 2018. <https://www.wsj.com/livecoverage/jpmorgan-citigroup-wells-fargo-1q18-earnings/card/1523617903>.

<sup>43</sup> Maverick, J.B. 2017. “What level of Return on Equity is Common for Bank?” Investopedia.com. September 15. Accessed April 15, 2018. <https://www.investopedia.com/ask/answers/040815/what-level-return-equity-common-company-banking-sector.asp>.

<sup>44</sup> YCharts, The Modern Financial Data Research Platform. Accessed April 15, 2018. <https://ycharts.com/>.

<sup>45</sup> Investopedia. 2018. “Price-Earnings Ratio – P/E Ratio.” Investopedia.com. Accessed April 15, 2018. <https://www.investopedia.com/terms/p/price-earningsratio.asp>.

<sup>46</sup> Ensign, Rachel Louise and Peter Rudegeair. 2018. “Bank Stocks Limp into Earnings Season.” *Wall Street Journal*. April 11, 2018. Accessed April 12, 2018. <https://www.wsj.com/articles/bank-stocks-limp-into-earnings-season-1523468090?mod=searchresults&page=1&pos=16>.

---

<sup>47</sup> Ibid.

<sup>48</sup> Board of Governors of the Federal Reserve System. 2017. “Comprehensive Capital Analysis and Review [(CCAR)] 2017: Assessment Framework and Results.” Federal Reserve. June. pg 1. Accessed April 15, 2018. <https://www.federalreserve.gov/publications/files/2017-ccar-assessment-framework-results-20170628.pdf>.

<sup>49</sup> Board of Governors of the Federal Reserve System. 2017. “Stress Tests and Capital Planning.” Federal Reserve. Last updated March 7, 2017. Accessed April 15, 2018. <https://www.federalreserve.gov/supervisionreg/stress-tests-capital-planning.htm>.

<sup>50</sup> Board of Governors of the Federal Reserve System. “CCAR 2017” pg 1.

<sup>51</sup> Ibid. pg 2.

<sup>52</sup> Interview with regulators on April 3, 2018.

<sup>53</sup> Office of the President. “NSS.” pg 29.

<sup>54</sup> Donald J. Trump. Executive Order 13772 (February 3, 2017). “Core Principles for Regulating the United States Financial System.” *Federal Register* 82, no. 25 (February 8, 2017). Accessed May 8, 2018. <https://www.whitehouse.gov/presidential-actions/presidential-executive-order-core-principles-regulating-united-states-financial-system/>.

<sup>55</sup> Kasperkevic, Jana. 2018. “Does the U.S. have too many financial regulators?” Marketplace.org. March 19. Accessed May 8, 2018. <https://www.marketplace.org/2018/03/19/economy/divided-decade/what-balkanization-fragmented-financial-regulatory-system>.

<sup>56</sup> Ramonas, Andres. 2018. “Spending Bill Would Boost SEC Budget, Trim CFTC Funding.” *Bloomberg Law*. March 22. Accessed May 7, 2018. <https://www.bna.com/spending-bill-boost-n57982090237/>.

<sup>57</sup> Financial Crisis Inquiry Commission. 2011. “The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States.” U.S. Government Printing Office. January. pg xvi. Accessed May 8, 2018. <https://www.gpo.gov/fdsys/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf>.

<sup>58</sup> Council on Foreign Relations Staff. 2015. “The Credit Rating Controversy.” *Council on Foreign Relations*. February 19. Accessed May 8, 2018. <https://www.cfr.org/backgrounder/credit-rating-controversy>.

<sup>59</sup> Krantz, Matt. 2013. “2008 crisis still hangs over credit-rating firms.” *USA Today*. September 13. Accessed May 8, 2018. <https://www.usatoday.com/story/money/business/2013/09/13/credit-rating-agencies-2008-financial-crisis-lehman/2759025/>.

<sup>60</sup> Competition Committee. 2010. “Competition and Credit Rating Agencies 2010.” Organisation for Economic Co-operation and Development. October 5. Accessed May 8, 2018. <https://www.oecd.org/competition/sectors/46825342.pdf>.

<sup>61</sup> Investopedia. 2018. “Shadow Banking System.” Investopedia.com. Accessed April 30, 2018. <https://www.investopedia.com/terms/s/shadow-banking-system.asp>.

<sup>62</sup> Sanches, Daniel. 2014. “Shadow Banking and the Crisis of 2007-08” *Business Review* (2nd Quarter). Accessed February 24, 2018. [https://philadelphiafed.org/-/media/research-and-data/publications/business-review/2014/q2/brQ214\\_shadow\\_banking.pdf](https://philadelphiafed.org/-/media/research-and-data/publications/business-review/2014/q2/brQ214_shadow_banking.pdf).

---

<sup>63</sup> Miedema, Douwe. 2015. "Clearing houses are big risk, top U.S. federal researcher says." *Reuters*. May 15. Accessed February 23, 2018. <https://www.reuters.com/article/us-regulation-summit-berner/clearing-houses-are-big-risk-top-u-s-federal-researcher-says-idUSKBN0024O20150515>.

<sup>64</sup> Lancaster, Ross. 2017. "Cohn points finger at clearing houses as the 'next problem'." *Globalcapital*. October 19. Accessed March 31, 2018. <https://www.globalcapital.com/article/b157sc1k6b7kix/cohn-points-finger-at-clearing-houses-as-the-39next-problem39>.

<sup>65</sup> Ibid.

<sup>66</sup> Interview with exchange official on April 4, 2018.

<sup>67</sup> Spicer, Jonathan, Richard Leong, and Gertrude Chavez-Dreyfuss. 2016. "JPMorgan to stop settling government securities for dealers." *Reuters*. July 22. Accessed March 8, 2018. <https://www.reuters.com/article/us-jpmorgan-settlement/jpmorgan-to-stop-settling-government-securities-for-dealers-idUSKCN1021VK>.

<sup>68</sup> Rennison, Joe. 2016. "Treasury market plumbing in focus as JPMorgan pulls back." *Financial Times*. October 12. Accessed March 8, 2018. <https://www.ft.com/content/bf6bd6d8-81ed-11e6-bc52-0c7211ef3198>.

<sup>69</sup> Brickler, Lucinda, Adam Copeland, and Antoine Martin. "Everything You Wanted to Know about the Tri-Party Repo Market, but Didn't Know to Ask." *Liberty Street Economics*. Federal Reserve Bank of New York. April 11. Accessed March 8, 2018. <http://libertystreeteconomics.newyorkfed.org/2011/04/everything-you-wanted-to-know-about-the-tri-party-repo-market-but-didnt-know-to-ask.html>.

<sup>70</sup> Ydstie, John. 2017. "Fed Raises Interest Rates Again as Economy Rolls On." *National Public Radio*. December 13. Accessed December 17, 2017. <https://www.npr.org/sections/thetwo-way/2017/12/13/570484764/fed-raises-interest-rates-again-as-economy-rolls-on>.

<sup>71</sup> Abdymomunov, Azamat and Jeffrey Gerlach. 2014. "Stress testing interest rate exposure." *Sciencedirect.com*. September 10. Accessed December 17, 2017. <https://www.sciencedirect.com/science/article/pii/S0378426614002805>.

<sup>72</sup> Interview with bank official on April 5, 2018.

<sup>73</sup> Baker, Christopher. 2017. "Flattening Yield Curve Limiting Bank Profitability." *Morningstar.com*. July 10. Accessed March 30, 2018. <http://www.morningstar.com/videos/814927/flattening-yield-curve-limiting-bank-profitability.html>.

<sup>74</sup> Interview with regulator on April 3, 2018.

<sup>75</sup> Reuters. 2016. "Fitch: Basel Interest – Rate Risk Standards Aid Consistency." *Reuters*. April 28. Accessed May 8, 2018. <https://www.reuters.com/article/idUSFit957150>.

<sup>76</sup> Federal Financial Institutions Examination Council. 2015. *Business Continuity Planning, IT Examination Handbook*. FFIEC.gov. February. Accessed March 29, 2018. <https://ithandbook.ffeec.gov/it-booklets/business-continuity-planning.aspx>.

<sup>77</sup> Deloitte Risk Editor. 2013. "Managing Third-Party Vendor Compliance Under the CFPB." *Deloitte Risk and Compliance Journal* hosted in *Wall Street Journal*. December 2. Accessed March 29, 2018. <http://deloitte.wsj.com/riskandcompliance/2013/12/02/managing-third-party-vendor-compliance-under-the-cfpb/>.

<sup>78</sup> Williams, Kevin. 2017. Briefing. "2017 Analyst Day." Jack Henry Associates, Denver, CO. May 8. Pg. 21. Accessed April 1, 2018. <http://ir.jackhenry.com/static-files/dd69f607-b7ac-4460-923d-977baf3de701>.

- 
- <sup>79</sup> Interviews with bank officials on March 15-16 and April 3-6, 2018.
- <sup>80</sup> Basel Committee on Banking Supervision. 2014. "The G-SIB assessment methodology – score calculation." *Bank for International Settlements*. November. Pg. 2. Accessed April 9, 2018. <https://www.bis.org/bcbs/publ/d296.pdf>.
- <sup>81</sup> Timothy Geithner. 2014. *Stress Test*. New York: Penguin Random House. Pgs. 513-514.
- <sup>82</sup> Office of the President. "NSS." Pg. 34.
- <sup>83</sup> Early, Bryan R. and Amira Jadoon. 2016. "Do Sanctions Always Stigmatize? The Effects of Economic Sanctions on Foreign Aid." *International Interactions* 42, no. 2. Pgs 217–243. Accessed March 18, 2018. <http://dx.doi.org/10.1080/03050629.2016.1093477>.
- <sup>84</sup> Calmes, Jackie. 2016. "Lew Defends Sanctions, but Cautions on Overuse." *New York Times*. March 29. Accessed March 10, 2018. <https://www.nytimes.com/2016/03/30/us/politics/lew-defends-sanctions-but-cautions-on-overuse.html>.
- <sup>85</sup> Keane, Angela Greiling. 2017. "Pro Policy Summit: Live updates and highlights." *Politico*. September 14. Accessed March 20, 2018. <https://www.politico.com/story/2017/09/14/pro-policy-summit-highlights-242672>.
- <sup>86</sup> Ibid.
- <sup>87</sup> Radcliffe, Brent. 2016. "How Economic Sanctions Work." Investopedia.com. August 18. Accessed May 8, 2018. <https://www.investopedia.com/articles/economics/10/economic-sanctions.asp>.
- <sup>88</sup> Collins, Joseph J. and Gabrielle D. Bowdoin. 1999. *Beyond Unilateral Economics Sanctions: Better Alternatives for U.S. Foreign Policy, Crisis Report*. Center for Strategic and International Studies (CSIS) Press: Washington, DC. pg x.
- <sup>89</sup> Boehning, Christopher H., Jessica S. Carey, and Michael E. Gertzman, et. al. 2018. "Economic Sanctions and Anti-Money Laundering Developments: 2017 Year in Review." Lexology.com. January 23. pg 2. Accessed March 20, 2018. <https://www.lexology.com/library/detail.aspx?g=9e8a1e21-5d0d-4f14-b20a-5f27f41d4c1d>.
- <sup>90</sup> Financial Action Task Force (FATF). "Who We Are," FATF-GAFI.org. Accessed May 8, 2018. <http://www.fatf-gafi.org/about/>.
- <sup>91</sup> Interview with official working on sanctions on March 23, 2018; and Financial Action Task Force (FATF). 2017. "Outcomes Joint FATF/GAFILAT [(Financial Action Task Force/Financial Action Group of Latin America)] Plenary, 1-3 November 2017." FATF-GAFI.org. November 3. Accessed May 8, 2018. <http://www.fatf-gafi.org/publications/fatfgeneral/documents/outcomes-plenary-november-2017.html>.
- <sup>92</sup> Financial Action Task Force (FATF). 2018. "High Risk and Monitored Jurisdictions." FATF-GAFI.org. February. Accessed May 8, 2018. [http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/?hf=10&b=0&s=desc\(fatf\\_releasedate\)](http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/?hf=10&b=0&s=desc(fatf_releasedate)).
- <sup>93</sup> Ibid.
- <sup>94</sup> Ibid.
- <sup>95</sup> Tannebaum, Dan, Amber Stokes, Tracy Bruner, and Jason Rhoades. 2016. "Iran Sanctions and Beyond: Avoiding the Rising Fines." *Pricewaterhouse Coopers Financial Crimes Observer*, February. pg 4. Accessed May 8, 2018. <https://www.pwc.com/us/en/financial-services/financial-crimes/publications/assets/sanctions-and-beyond-2016.pdf>.

---

<sup>96</sup> Ibid., 3.

<sup>97</sup> Interview with official working on sanctions on March 23, 2018.

<sup>98</sup> European Bank for Reconstruction and Development. 2018. "About the EBRD - We invest in changing lives." European Bank for Reconstruction and Development (EBRD). January. Accessed May 8, 2018. <http://www.ebrd.com/home>.

<sup>99</sup> Interview with regulators on April 3, 2018.

<sup>100</sup> Staff Reporter. 2016. "Bricks and clicks: Citi plugs into WeChat and Alipay in China." Asian Banking and Finance.net. April 21. Accessed May 10, 2018. <https://asianbankingandfinance.net/banking-technology/news/bricks-and-clicks-citi-plugs-wechat-and-alipay-in-china>.

<sup>101</sup> Liao, Shannon. 2018. "How WeChat came to rule China." *The Verge*. February 1. Accessed May 8, 2018. <https://www.theverge.com/2018/2/1/16721230/wechat-china-app-mini-programs-messaging-electronic-id-system>.

<sup>102</sup> Office of the President. "NSS." Pg. 29.

<sup>103</sup> Beck, Thorsten, Tao Chen, Chen Lin, and Frank M. Song. 2016. "Financial Innovation: The Bright and the Dark Sides." *Journal of Banking & Finance* 72. November. Pg. 19. Accessed May 8, 2018. <https://www.sciencedirect.com/science/article/pii/S0378426616301133>.

<sup>104</sup> EY Global Banking & Capital Markets Sector. 2018. "Global banking outlook 2018: Pivoting toward an innovation-led strategy." EY (Ernst & Young). Pg 10. Accessed March 13, 2018. [http://www.ey.com/Publication/vwLUAssets/ey-global-banking-outlook-2018/\\$File/ey-global-banking-outlook-2018.pdf](http://www.ey.com/Publication/vwLUAssets/ey-global-banking-outlook-2018/$File/ey-global-banking-outlook-2018.pdf).

<sup>105</sup> Interview with regulators on February 12, 2018.

<sup>106</sup> Pollari, Ian, Murray Raisbeck, et al. 2018. "The Pulse of FinTech Q4 2017," *KPMG*, February 13. Pgs 10 and 27. Accessed May 8, 2018. [https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/02/pulse\\_of\\_fintech\\_q4\\_2017.pdf](https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/02/pulse_of_fintech_q4_2017.pdf).

<sup>107</sup> Mitre Corporation. 2014. "Federally Funded Research and Development Centers: Critical National Assets, Working in Public Interests." Mitre.org. Accessed April 13, 2018. [https://www.mitre.org/sites/default/files/publications/ffrdc-critical\\_0.pdf](https://www.mitre.org/sites/default/files/publications/ffrdc-critical_0.pdf).

<sup>108</sup> MITRE Corporation. 2015. "Understanding Federally Funded Research and Development Centers (FFRDCs)." Mitre.org. Accessed April 13, 2018. <https://www.mitre.org/sites/default/files/publications/ffrdcs.pdf>.

<sup>109</sup> Financial Stability Oversight Council (FSOC). 2017. "2017 Annual Report," December 14. Pg. 3. Accessed April 13, 2018. [https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/FSOC\\_2017\\_Annual\\_Report.pdf](https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/FSOC_2017_Annual_Report.pdf).

<sup>110</sup> Interview with banking officials on February 8, 2018 and February 22, 2018.

<sup>111</sup> Bostrom, Nick. 2014. *Superintelligence: Paths, Dangers, Strategies*. Oxford, UK: Oxford University Press. Pgs. 113 - 114.

<sup>112</sup> Levine, Matt. 2015. "Guy Trading at Home Caused the Flash Crash." *Bloomberg News*. April 2. Accessed March 31, 2018. <https://www.bloomberg.com/view/articles/2015-04-21/guy-trading-at-home-caused-the-flash-crash>.

<sup>113</sup> Bostrom. *Superintelligence: Paths, Dangers, Strategies*. Pg 17.

---

<sup>114</sup> FSOC. “2017 Annual Report.” Pg 17.

<sup>115</sup> Federal Financial Institutions Examination Council (FFIEC). 2015. “FFIEC Cybersecurity Assessment Tool, Overview for Chief Executive Officers and Boards of Directors.” FFIEC. June. Accessed May 8, 2018. [https://www.ffiec.gov/pdf/cybersecurity/FFIEC\\_CAT\\_CEO\\_Board\\_Overview\\_June\\_2015\\_PDF1.pdf](https://www.ffiec.gov/pdf/cybersecurity/FFIEC_CAT_CEO_Board_Overview_June_2015_PDF1.pdf).

<sup>116</sup> Gerken, Charlotte. Speech given at Operational Risk Europe 2017 Conference, London, June 13, 2017 “The Bank of England’s approach to operational resilience.” Pg 3. Accessed May 8, 2018. <https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/the-boes-approach-to-operational-resilience.pdf?la=en&hash=A9786F770B523D39BC714E79A221CA29806E4BF3>.

<sup>117</sup> Knight, Will. 2017. “The Dark Secret at the Heart of AI.” *MIT Technology Review* 120, no. 3. May/June. Pg 61. Accessed March 8, 2018. <https://www.technologyreview.com/s/604087/te-dark-secret-at-the-heart-of-ai/>.

<sup>118</sup> Financial Stability Board 2018. “Artificial Intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications.” Accessed March 30, 2018. Pg 18. <http://www.fsb.org/wp-content/uploads/P011117.pdf>.

<sup>119</sup> Cole, Rebel A. 2018. “How Did Bank Lending to Small Business in the United States Fare After the Financial Crisis?” Office of Advocacy, US Small Business Administration. January. Pg 2. Accessed May 8, 2018. <https://www.sba.gov/sites/default/files/439-How-Did-Bank-Lending-to-Small-Business-Fare.pdf>.

<sup>120</sup> Daner, Brian. 2018. “The Number of Small Business Loans Is Down 41% Since 2008. Here’s How Congress Can Help.” U.S. Chamber of Commerce. February 27. Accessed May 8, 2018. <https://www.uschamber.com/series/above-the-fold/the-number-small-business-loans-down-41-2008-here-s-how-congress-can-help>.

<sup>121</sup> Ibid.

<sup>122</sup> Mitchell, Stacy. 2010. “Why Small Banks Make More Small Business Loans.” Institute for Local Self-Reliance. February 10. Accessed May 8, 2018. <https://ilsr.org/banks-and-small-business-lending/>.

<sup>123</sup> Sparks, Evan. 2017. “Community Banks See Decline in Small Business Loan Volume.” *ABA Banking Journal*. October 9. Accessed May 8, 2018. <https://bankingjournal.aba.com/2017/10/community-banks-see-decline-in-small-business-loan-volume/>.

<sup>124</sup> Daner. “The Number of Small Business Loans is Down 41% Since 2008.”

<sup>125</sup> Independent Community Bankers of America (ICBA). 2017. “Community Bank Regulatory Relief: A Roadmap to Economic Growth and Prosperity.” Independent Community Bankers of America. May. Pg 4. <http://www.icba.org/docs/default-source/icba/advocacy-documents/priorities/icbawhitepaperonregulatoryrelief.pdf>.

<sup>126</sup> Mitchell. “Why Small Banks Make More Small Business Loans.”

<sup>127</sup> Sparks. “Community Banks See Decline in Small Business Loan Volume.”

<sup>128</sup> DoD Small Business Innovation Research, Small Business Technology Transfer (DoD SBIR/STTR). 2018. “Commercialization.” U.S. Department of Defense, Office of Small Business Programs. Accessed May 8, 2018. <https://www.acq.osd.mil/osbp/sbir/about/commercialization.shtml>.

---

<sup>129</sup> Katz, Bruce and Julie Wagner. 2014. “The Rise of Innovation Districts: A New Geography of Innovation in America.” Brookings, Metropolitan Policy Program. May. Accessed May 8, 2018. <https://www.brookings.edu/wp-content/uploads/2016/07/InnovationDistricts1.pdf>.

<sup>130</sup> Office of the President. “NSS.” Pgs 28-29.

<sup>131</sup> Yan Min, Chia. 2016. “Looking to boost local fintech sector.” *Straits Times*. August 25. Accessed May 8, 2018. <https://www.straitstimes.com/business/economy/looking-to-boost-local-fintech-sector>.

<sup>132</sup> Interview with banking officials on April 24, 2018.

<sup>133</sup> Ibid.

<sup>134</sup> Yeandle, Mark. 2018. “The Global Financial Centres Index 23.” Pg 4,

<sup>135</sup> Labonte. “Who Regulates Whom? An Overview of the U.S. Financial Regulatory Network.” Pg 10.

<sup>136</sup> Lin, Li and Jay Surti. 2013. “Capital Requirements for Over-the-Counter Derivatives Central Counterparties.” International Monetary Fund Working Paper. Pg 9. accessed May 8, 2018. <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Capital-Requirements-for-Over-the-Counter-Derivatives-Central-Counterparties-40220>.

<sup>137</sup> Ibid. Pg 10.

<sup>138</sup> ICBA. “Community Bank Regulatory Relief: A Roadmap to Economic Growth and Prosperity.” Pg. 5.

## Bibliography

- Abdymomunov, Azamat and Jeffrey Gerlach. "Stress testing interest rate exposure." Sciencedirect.com. September 10, 2014. Accessed December 17, 2017.  
<https://www.sciencedirect.com/science/article/pii/S0378426614002805>.
- Back, Aaron. "Is This As Good As It Gets for the Big Banks?" *Wall Street Journal*. April 16, 2018.  
<https://www.wsj.com/articles/is-this-as-good-as-it-gets-for-the-big-banks-1523889853>.
- Baker, Christopher. "Flattening Yield Curve Limiting Bank Profitability." Morningstar.com. July 10, 2017 Accessed March 30, 2018. <http://www.morningstar.com/videos/814927/flattening-yield-curve-limiting-bank-profitability.html>.
- Basel Committee on Banking Supervision. *The G-SIB assessment methodology – score calculation*. Bank for International Settlements. November 2014. Accessed April 9, 2018.  
<https://www.bis.org/bcbs/publ/d296.pdf>.
- Beck, Thorsten, Tao Chen, Chen Lin, and Frank M. Song. "Financial Innovation: The Bright and the Dark Sides." *Journal of Banking & Finance* 72 (November 2016): 28-51. Accessed May 8, 2018.  
<https://www.sciencedirect.com/science/article/pii/S0378426616301133>.
- Board of Governors of the Federal Reserve System. "Comprehensive Capital Analysis and Review 2017: Assessment Framework and Results." Federal Reserve. June 2017. Accessed April 15, 2018.  
<https://www.federalreserve.gov/publications/files/2017-ccar-assessment-framework-results-20170628.pdf>.
- Board of Governors of the Federal Reserve System. "Stress Tests and Capital Planning." Federal Reserve. Last updated March 7, 2017. Accessed April 15, 2018. <https://www.federalreserve.gov/supervisionreg/stress-tests-capital-planning.htm>.
- Boehning, H. Christopher, Jessica S. Carey, Michael E. Gertzman, Roberto J. Gonzalez, Brad S. Karp, Richard S. Elliott, Rachel Fiorill and Karen R. King. "Economic Sanctions and Anti-Money Laundering Developments: 2017 Year in Review." Lexology.com. January 23, 2018. Accessed March 20, 2018.  
<https://www.lexology.com/library/detail.aspx?g=9e8a1e21-5d0d-4f14-b20a-5f27f41d4c1d>.
- Bostrom, Nick. *Superintelligence: Paths, Dangers, Strategies*. Oxford, UK: Oxford University Press, 2014.
- Brickler, Lucinda, Adam Copeland, and Antoine Martin. "Everything You Wanted to Know about the Tri-Party Repo Market, but Didn't Know to Ask." Liberty Street Economics, Federal Reserve Bank of New York. April 11, 2011. Accessed March 8, 2018.  
<http://libertystreeteconomics.newyorkfed.org/2011/04/everything-you-wanted-to-know-about-the-tri-party-repo-market-but-didnt-know-to-ask.html>.
- Buaron, Roberto. "New-game strategies." *McKinsey Quarterly* (Spring 1981): 24-40. [Reprinted by special permission from the January 1981 issue of *Management Review*, where it appeared under the title "How to win the market-share game? Try changing the rules." 8-17. Accessed May 8, 2018.  
<http://www.firstatlanticcapital.com/news/How%20to%20win%20the%20market%20share%20game.pdf>.]
- Calmes, Jackie. "Lew Defends Sanctions, but Cautions on Overuse." *New York Times*. March 29, 2016. Accessed March 10, 2018. <https://www.nytimes.com/2016/03/30/us/politics/lew-defends-sanctions-but-cautions-on-overuse.html>.
- Cole, Rebel A. "How Did Bank Lending to Small Business in the United States Fare After the Financial Crisis?" Office of Advocacy, US Small Business Administration. January 2018. Accessed May 8, 2018.  
<https://www.sba.gov/sites/default/files/439-How-Did-Bank-Lending-to-Small-Business-Fare.pdf>.

- Collins, Joseph J. and Gabrielle D Bowdoin. *Beyond Unilateral Economics Sanctions: Better Alternatives for U.S. Foreign Policy, Crisis Report*, Washington, DC: Center for Strategic and International Studies (CSIS) Press, 1999.
- Competition Committee. "Competition and Credit Rating Agencies 2010." Organisation for Economic Co-operation and Development. October 5, 2010. Accessed May 8, 2018. <https://www.oecd.org/competition/sectors/46825342.pdf>.
- Council on Foreign Relations (CFR) Staff. "The Credit Rating Controversy – Backgrounder." Council on Foreign Relations. February 19, 2015. Accessed May 8, 2018. <https://www.cfr.org/backgrounder/credit-rating-controversy>.
- Daner, Brian. "The Number of Small Business Loans Is Down 41% Since 2008. Here's How Congress Can Help." U.S. Chamber of Commerce. February 27, 2018. Accessed May 8, 2018. <https://www.uschamber.com/series/above-the-fold/the-number-small-business-loans-down-41-2008-here-s-how-congress-can-help>.
- D'Costa, Viraj. "IBISWorld Industry Report 52211, Commercial Banking in the U.S., About this Industry." IBISWorld. October 2017. Accessed on March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/default.aspx?entid=1288>.
- D'Costa, Viraj. "IBISWorld Industry Report 52211, Commercial Banking in the U.S., Industry at a Glance." IBISWorld. October 2017. Accessed on March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/ataglance.aspx?entid=1288>.
- D'Costa, Viraj. "IBISWorld Industry Report 52211, Commercial Banking in the U.S., Major Companies." IBISWorld. October 2017. Accessed on April 1, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/majorcompanies.aspx?entid=1288>.
- D'Costa, Viraj. "IBISWorld Industry Report 52211, Commercial Banking in the U.S., Competitive Landscape." IBISWorld. October 2017. Accessed March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/competitivelandscape.aspx?entid=1288>.
- DoD Small Business Innovation Research, Small Business Technology Transfer (DoD SBIR/STTR). "Commercialization." U.S. Department of Defense, Office of Small Business Programs. 2018. Accessed May 8, 2018. <https://www.acq.osd.mil/osbp/sbir/about/commercialization.shtml>.
- Deloitte Risk Editor. "Managing Third-Party Vendor Compliance Under the CFPB." *Deloitte Risk and Compliance Journal*. Hosted in *Wall Street Journal*. December 2, 2013. Accessed March 29, 2018. <http://deloitte.wsj.com/riskandcompliance/2013/12/02/managing-third-party-vendor-compliance-under-the-cfpb/>.
- Early, Bryan R. and Amira Jadoon. "Do Sanctions Always Stigmatize? The Effects of Economic Sanctions on Foreign Aid." *International Interactions* 42, no. 2 (2016): 217–243. Accessed March 18, 2018. <http://dx.doi.org/10.1080/03050629.2016.1093477>.
- Ensign, Rachel Louis. "Bank of America's Profits Lifted by Tax Law, Rising Interest Rates." *Wall Street Journal*. April 16, 2018. Accessed April 16, 2018. <https://www.wsj.com/articles/bank-of-america-reports-higher-earnings-1523875943>.
- Ensign, Rachel Louise and Peter Rudegeair. "Bank Stocks Limp into Earnings Season." *Wall Street Journal*. April 11, 2018. Accessed April 12, 2018. <https://www.wsj.com/articles/bank-stocks-limp-into-earnings-season-1523468090?mod=searchresults&page=1&pos=16>.

- European Bank for Reconstruction and Development Staff. "About the EBRD - We invest in changing lives." European Bank for Reconstruction and Development (EBRD). January 2018. Accessed May 8, 2018. <http://www.ebrd.com/home>.
- EY Global Banking & Capital Markets Sector. "Global banking outlook 2018: Pivoting toward an innovation-led strategy." EY (Ernst & Young). 2018. Accessed March 13, 2018. [http://www.ey.com/Publication/vwLUAssets/ey-global-banking-outlook-2018/\\$File/ey-global-banking-outlook-2018.pdf](http://www.ey.com/Publication/vwLUAssets/ey-global-banking-outlook-2018/$File/ey-global-banking-outlook-2018.pdf).
- Federal Deposit Insurance Company. "Commercial Banks – Historical Statistics on Banking, Table CB02, Changes in Number of Institutions." Accessed on March 31, 2018. <https://www5.fdic.gov/hsob/HSOBRpt.asp>
- Federal Financial Institutions Examination Council. *Business Continuity Planning, IT Examination Handbook*. FFIEC.gov. February 2015. Accessed March 29, 2018. <https://ithandbook.ffiec.gov/it-booklets/business-continuity-planning.aspx>.
- Federal Financial Institutions Examination Council (FFIEC). "FFIEC Cybersecurity Assessment Tool, Overview for Chief Executive Officers and Boards of Directors." FFIEC. June 2015. Accessed May 8, 2018. [https://www.ffiec.gov/pdf/cybersecurity/FFIEC\\_CAT\\_CEO\\_Board\\_Overview\\_June\\_2015\\_PDF1.pdf](https://www.ffiec.gov/pdf/cybersecurity/FFIEC_CAT_CEO_Board_Overview_June_2015_PDF1.pdf).
- Financial Action Task Force (FATF). "High Risk and Monitored Jurisdictions." FATF-GAFI.org. February 2018. Accessed May 8, 2018. [http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/?hf=10&b=0&s=desc\(fatf\\_releasedate\)](http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/?hf=10&b=0&s=desc(fatf_releasedate)).
- Financial Action Task Force (FATF). "Outcomes Joint FATF/GAFILAT [(Financial Action Task Force/Financial Action Group of Latin America)] Plenary, 1-3 November 2017." FATF-GAFI.org. November 3, 2017. Accessed May 8, 2018. <http://www.fatf-gafi.org/publications/fatfgeneral/documents/outcomes-plenary-november-2017.html>.
- Financial Action Task Force (FATF). "Who We Are." FATF-GAFI.org. Accessed May 8, 2018. <http://www.fatf-gafi.org/about/>.
- Financial Crisis Inquiry Commission. "The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States." U.S. Government Printing Office. January 2011. Accessed May 8, 2018. <https://www.gpo.gov/fdsys/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf>.
- Financial Stability Board Staff. "Artificial Intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications." Financial Stability Board. Accessed March 30, 2018. <http://www.fsb.org/wp-content/uploads/P011117.pdf>.
- Financial Stability Oversight Council (FSOC). "2017 Annual Report." December 14, 2017. Accessed April 13, 2018. [https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/FSOC\\_2017\\_Annual\\_Report.pdf](https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/FSOC_2017_Annual_Report.pdf).
- Gambardella, Anthony. "IBISWorld Industry Report 52311, Investment Banking and Securities Dealing in the U.S., Industry at a Glance." IBISWorld. December 2017. Accessed March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/ata glance.aspx?entid=1307>.
- Gambardella, Anthony. "IBISWorld Industry Report 52311, Investment Banking and Securities Dealing in the U.S., Operating Conditions." IBISWorld. Accessed March 31, 2018. <http://clients1.ibisworld.com.nduezproxy.idm.oclc.org/reports/us/industry/operatingconditions.aspx?entid=1307>.
- Geithner, Timothy. *Stress Test*. New York: Penguin Random House, 2014.

- Gerken, Charlotte. "The Bank of England's approach to operational resilience." Speech given at Operational Risk Europe 2017 Conference, London, June 13, 2017. Accessed May 8, 2018. <https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/the-boes-approach-to-operational-resilience.pdf?la=en&hash=A9786F770B523D39BC714E79A221CA29806E4BF3>.
- Greiling Keane Angela. "Pro Policy Summit: Live updates and highlights." *Politico*. September 14, 2017. Accessed March 20, 2018, <https://www.politico.com/story/2017/09/14/pro-policy-summit-highlights-242672>.
- Hamilton, Alexander. "Final Version of the Second Report on the Further Provision Necessary for Establishing Public Credit (Report on a National Bank), 13 December 1790." *Founders Online*. National Archives. Last modified April 12, 2018. Accessed April 23, 2018. [https://founders.archives.gov/documents/Hamilton/01-07-02-0229-0003#print\\_view](https://founders.archives.gov/documents/Hamilton/01-07-02-0229-0003#print_view). [Original source: *The Papers of Alexander Hamilton*, vol. 7, *September 1790–January 1791*, ed. Harold C. Syrett. New York: Columbia University Press, 1963, pp. 305–342.]
- Hoffman, Liz. "Goldman Profit Surges but Investors Lament Buyback Pause." *Wall Street Journal*. April 17, 2018. Accessed April 18, 2018. <https://www.wsj.com/articles/goldman-sachs-reports-higher-earnings-1523965357>.
- Hoffman, Liz. "Morgan Stanley Posts Record Profits, Revenue." *Wall Street Journal*. April 18, 2018. Accessed April 18, 2018. <https://www.wsj.com/articles/morgan-stanley-reports-higher-revenue-earnings-1524049224?mod=searchresults&page=1&pos=5>.
- Independent Community Bankers of America (ICBA). "Community Bank Regulatory Relief: A Roadmap to Economic Growth and Prosperity." Independent Community Bankers of America. May 2017. Accessed May 8, 2018. <http://www.icba.org/docs/default-source/icba/advocacy-documents/priorities/icbawhitepaperonregulatoryrelief.pdf>.
- Investopedia Staff. "Price-Earnings Ratio – P/E Ratio." Investopedia.com. Accessed April 15, 2018, <https://www.investopedia.com/terms/p/price-earningsratio.asp>.
- Investopedia Staff. "Shadow Banking System." Investopedia.com. Accessed April 30, 2018. <https://www.investopedia.com/terms/s/shadow-banking-system.asp>.
- Jefferson, Thomas. "Thomas Jefferson to John Taylor, 28 May 1816." *Founders Online*. National Archives. Last modified April 12, 2018. Accessed April 23, 2018. [https://founders.archives.gov/documents/Jefferson/03-10-02-0053#print\\_view](https://founders.archives.gov/documents/Jefferson/03-10-02-0053#print_view). [Original source: *The Papers of Thomas Jefferson*, Retirement Series, vol. 10, *May 1816 to 18 January 1817*, ed. J. Jefferson Looney. Princeton: Princeton University Press, 2013, pp. 86–90.]
- "JP Morgan, Citigroup, and Wells Fargo Report First-Quarter Results." *Wall Street Journal*. April 13, 2018, Accessed April 14, 2018. <https://www.wsj.com/livecoverage/jpmorgan-citigroup-wells-fargo-1q18-earnings/card/1523617903>.
- Kasperkevic, Jana. "Does the U.S. have too many financial regulators?" Marketplace.org. March 19, 2018. Accessed May 8, 2018, <https://www.marketplace.org/2018/03/19/economy/divided-decade/what-balkanization-fragmented-financial-regulatory-system>.
- Katz, Bruce and Julie Wagner. "The Rise of Innovation Districts: A New Geography of Innovation in America." Brookings, Metropolitan Policy Program. May 2014 Accessed May 8, 2018. <https://www.brookings.edu/wp-content/uploads/2016/07/InnovationDistricts1.pdf>.
- Knight, Will. "The Dark Secret at the Heart of AI." *MIT Technology Review* 120, no. 3 (May/June 2017): 61. Accessed March 8, 2018. <https://www.technologyreview.com/s/604087/te-dark-secret-at-the-heart-of-ai/>.
- Krantz, Matt. "2008 crisis still hangs over credit-rating firms." *USA Today*. September 13, 2013. Accessed May 8, 2018. <https://www.usatoday.com/story/money/business/2013/09/13/credit-rating-agencies-2008-financial-crisis-lehman/2759025/>.

- Labonte, Marc. "Who Regulates Whom? An Overview of the U.S. Financial Regulatory Network." *Congressional Research Service*. August 17, 2017. Accessed on May 8, 2018. <https://fas.org/sgp/crs/misc/R44918.pdf>.
- Lancaster, Ross. "Cohn points finger at clearing houses as the 'next problem'." *Globalcapital*. October 19, 2017. Accessed March 31, 2018. <https://www.globalcapital.com/article/b157sc1k6b7kix/cohn-points-finger-at-clearing-houses-as-the-39next-problem39>.
- Levine, Matt. "Guy Trading at Home Caused the Flash Crash." *Bloomberg News*. April 21, 2015. Accessed March 31, 2018. <https://www.bloomberg.com/view/articles/2015-04-21/guy-trading-at-home-caused-the-flash-crash>.
- Liao, Shannon. "How WeChat came to rule China." *The Verge*. February 1, 2018. Accessed May 8, 2018. <https://www.theverge.com/2018/2/1/16721230/wechat-china-app-mini-programs-messaging-electronic-id-system>.
- Lin, Li, and Jay Surti. "Capital Requirements for Over-the-Counter Derivatives Central Counterparties." International Monetary Fund Working Paper. 2013. Accessed May 8, 2018. <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Capital-Requirements-for-Over-the-Counter-Derivatives-Central-Counterparties-40220>.
- Maverick, J.B. "What level of Return on Equity is Common for Bank?" Investopedia.com. Updated September 15, 2017. Accessed April 15, 2018. <https://www.investopedia.com/ask/answers/040815/what-level-return-equity-common-company-banking-sector.asp>.
- Miedema, Douwe. "Clearing houses are big risk, top U.S. federal researcher says." *Reuters*. May 15, 2015. Accessed February 23, 2018. <https://www.reuters.com/article/us-regulation-summit-berner/clearing-houses-are-big-risk-top-u-s-federal-researcher-says-idUSKBN0024O20150515>.
- Min, Chia Yan. "Looking to boost local fintech sector." *Straits Times*. August 25, 2016. Accessed May 8, 2018. <https://www.straitstimes.com/business/economy/looking-to-boost-local-fintech-sector>.
- Mitchell, Stacy. "Why Small Banks Make More Small Business Loans." Institute for Local Self-Reliance. February 10, 2010. Accessed May 8, 2018. <https://ilsr.org/banks-and-small-business-lending/>.
- MITRE Corporation. "Federally Funded Research and Development Centers: Critical National Assets, Working in Public Interests." Mitre.org. 2014. Accessed April 13, 2018.
- MITRE Corporation. "Understanding Federally Funded Research and Development Centers (FFRDCs)." Mitre.org. 2015. Accessed April 13, 2018. <https://www.mitre.org/sites/default/files/publications/ffrdfs.pdf>.
- Otani, Akane and Ryan Tracy. "President Trump Says He's Looking Into Breaking Up Wall Street Banks." *Wall Street Journal*. May 1, 2017. Accessed April 14, 2018. <https://www.wsj.com/articles/president-trump-says-hes-looking-into-breaking-up-wall-street-banks-1493660319>.
- Pollari, Ian, Murray Raisbeck, et al. "The Pulse of FinTech Q4 2017." KPMG. February 13, 2018. Accessed May 8, 2018. [https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/02/pulse\\_of\\_fintech\\_q4\\_2017.pdf](https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2018/02/pulse_of_fintech_q4_2017.pdf).
- Porter, Michael E. "The Five Competitive Forces that Shape Strategy." *Harvard Business Review* 86, no. 1 (January 2008): 79-83. Accessed May 8, 2018. <http://eds.b.ebscohost.com.nduezproxy.idm.oclc.org/eds/pdfviewer/pdfviewer?vid=1&sid=a06e55ff-2c30-4393-ae74-a17dde144af9%40sessionmgr102>.
- Radcliffe, Brent. "How Economic Sanctions Work." Investopedia. August 18, 2016. Accessed May 8, 2018. <https://www.investopedia.com/articles/economics/10/economic-sanctions.asp>.

- Ramonas, Andres. "Spending Bill Would Boost SEC Budget, Trim CFTC Funding." *Bloomberg Law*. March 22, 2018. Accessed May 7, 2018. <https://www.bna.com/spending-bill-boost-n57982090237/>.
- Rennison, Joe. "Treasury market plumbing in focus as JPMorgan pulls back," *Financial Times*, October 12, 2016, accessed March 8, 2018, <https://www.ft.com/content/bf6bd6d8-81ed-11e6-bc52-0c7211ef3198>.
- Reuters Staff. "Fitch: Basel Interest – Rate Risk Standards Aid Consistency." *Reuters*. April 28, 2016. Accessed May 8, 2018. <https://www.reuters.com/article/idUSFit957150>.
- Rexrode, Christina and Rachel Louise Ensign. "The Biggest Banks are Gobbling up Deposits. Here's Who's Not." *Wall Street Journal*. April 29, 2017. Accessed April 30, 2018. <https://www.wsj.com/articles/the-biggest-banks-are-gobbling-up-deposits-heres-whos-not-152499612?mod=searchresults&page=1&pos=2>.
- Ricketts, Joe. "Some Banks are too Small to Succeed." *Wall Street Journal*. October 29, 2017. Accessed April 15, 2018. <https://www.wsj.com/articles/some-banks-are-too-small-to-succeed-1509302051>.
- Robinson, Edward. "Fintech." *Bloomberg, Quicktake*. September 13, 2017. Accessed April 15, 2018. <https://www.bloomberg.com/quicktake/financial-technology-companies-disrupt-comfy-banks-quicktake>.
- Sanches, Daniel. "Shadow Banking and the Crisis of 2007-08." *Business Review* (2nd Quarter 2014). Accessed February 24, 2018. [https://philadelphiafed.org/-/media/research-and-data/publications/business-review/2014/q2/brQ214\\_shadow\\_banking.pdf](https://philadelphiafed.org/-/media/research-and-data/publications/business-review/2014/q2/brQ214_shadow_banking.pdf).
- Sparks, Evans. "Community Banks See Decline in Small Business Loan Volume." *ABA Banking Journal*, October 9, 2017. Accessed May 8, 2018. <https://bankingjournal.aba.com/2017/10/community-banks-see-decline-in-small-business-loan-volume/>.
- Spicer, Jonathan, Richard Leong, and Gertrude Chavez-Dreyfuss. "JPMorgan to stop settling government securities for dealers." *Reuters*. July 22, 2016. Accessed March 8, 2018. <https://www.reuters.com/article/us-jpmorgan-settlement/jpmorgan-to-stop-settling-government-securities-for-dealers-idUSKCN1021VK>.
- Staff Reporter. "Bricks and clicks: Citi plugs into WeChat and Alipay in China." *Asian Banking and Finance.net*. April 21, 2016. Accessed May 10, 2018. <https://asianbankingandfinance.net/banking-technology/news/bricks-and-clicks-citi-plugs-wechat-and-alipay-in-china>.
- Tannebaum, Dan, Amber StokesTracy Bruner, and Joan Rhoades. "Iran Sanctions and Beyond: Avoiding the Rising Fines." *Financial Crimes Observer*. February 2016: 4. PricewaterhouseCoopers. Accessed May 8, 2018. <https://www.pwc.com/us/en/financial-services/financial-crimes/publications/assets/sanctions-and-beyond-2016.pdf>.
- Trump, Donald J. Executive Order 13772 (February 3, 2017), "Core Principles for Regulating the United States Financial System." *Federal Register* 82, no. 25 (February 8, 2017). Accessed May 8, 2018. <https://www.whitehouse.gov/presidential-actions/presidential-executive-order-core-principles-regulating-united-states-financial-system/>.
- Trump, Donald J. "National Security Strategy of the United States of America (NSS)." The White House, Office of the President. December 18, 2017: 17-18. Accessed March 28, 2018, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>.
- US Constitution, preamble.
- US Department of Commerce. *Gross Domestic Product by Industry: Fourth Quarter and Annual 2017, Real Value Added by Industry, 2017:Q3*. BEA (Bureau of Economic Analysis) News Release, BEA 18-18. Released April 19, 2018. Accessed May 8, 2018. <https://www.bea.gov/newsreleases/industry/gdpindustry/gdpindnewsrelease.htm>.

- US Department of Commerce. "National Income and Product Accounts, Corporate Profits: Fourth Quarter and Annual 2017." Bureau of Economic Analysis. BEA 18-14. Corporate Profits (table 12). Released March 28, 2018 Accessed April 10, 2018. [https://www.bea.gov/newsreleases/national/gdp/2018/gdp4q17\\_3rd.htm](https://www.bea.gov/newsreleases/national/gdp/2018/gdp4q17_3rd.htm).
- US Department of Commerce. *Overview: Finance, insurance, real estate, rental, and leasing value added, 2017:Q4*. BEA (Bureau of Economic Analysis) Industry Facts. Released on April 19, 2018. Accessed May 8, 2018. <https://www.bea.gov/industry/factsheet/factsheet.cfm?IndustryId=FIRE>.
- US Department of Homeland Security. *NIPP (National Infrastructure Protection Plan) 2013: Partnering for Critical Infrastructure Security and Resilience*. Homeland Security Digital Library. January 8, 2014: 7 and 11. Accessed May 8, 2018. [https://www.dhs.gov/sites/default/files/publications/NIPP%202013\\_Partnering%20for%20Critical%20Infrastructure%20Security%20and%20Resilience\\_508\\_0.pdf](https://www.dhs.gov/sites/default/files/publications/NIPP%202013_Partnering%20for%20Critical%20Infrastructure%20Security%20and%20Resilience_508_0.pdf).
- Williams, Kevin. "2017 Analyst Day." Briefing for analysts hosted by Jack Henry Associates, Denver, CO, May 8, 2017. Accessed April 1, 2018. <http://ir.jackhenry.com/static-files/dd69f607-b7ac-4460-923d-977baf3de701>.
- YCharts. The Modern Financial Data Research Platform. Accessed on April 15, 2018. <https://ycharts.com/>.
- Ydstie, John. "Fed Raises Interest Rates Again as Economy Rolls On." *National Public Radio*. December 13, 2017. Accessed December 17, 2017. <https://www.npr.org/sections/thetwo-way/2017/12/13/570484764/fed-raises-interest-rates-again-as-economy-rolls-on>.
- Yeandle, Mark. "The Global Financial Centres Index 23." *ZYen and China Development Institute*. March 2018. Accessed May 8, 2018. <http://www.longfinance.net/Publications/GFCI23.pdf>.