Spring 2014
Industry Study

Final Report
Financial Services

The Dwight D. Eisenhower School for National Security and Resource Strategy
National Defense University
Fort McNair, Washington, D.C. 20319-5062

FINANCIAL SERVICES 2014

ABSTRACT: The Commercial and Investment Banking industries played a pivotal role in the 2008-2009 financial crisis, and they form the core of the banking and investment capital markets, an economic engine of capital flows that underpins US prosperity and national security. Risk flows, regulatory pressures, globalization, and accelerating technology trends are reshaping the face of this industry, emphasizing the need to balance tensions between safety and soundness in the financial markets. Recommendations focus on risk flows, leading indicators, resolution capacity, regulatory arbitrage, and cybersecurity vulnerabilities in the Commercial and Investment Banking sectors. These two industries are robust to financial shocks, but systemic risk may be growing in less regulated adjacent markets.

Col Lars Aamodt, Norwegian Air Force
Mr. Eric Barboriak, Dept of State
CDR Jeffrey Bernhard, US Navy
LtCol Rollin Brewster, US Marine Corps
Lt Col Luke Cropsey, US Air Force
Dr. Robert Czincila, Dept of Energy
COL Robyn Ferguson, US Army
COL David Gibson, US Army
COL Mark Gorak, US Army
Lt Col Robert Hanovich, US Air Force
Col Gary Jenkins, US Air Force
Ms. Jessica Johnson, Dept of Defense
CDR David Kunselman, US Navy
LtCol Adam Musoff, US Marine Corps
Mr. David Nobles, Dept of State
LTC Thomas O'Connor, US Army
Mr. Michael Willis, Georgia Institute of Technology

Colonel Douglas McCarthy, Canadian Forces, Faculty Lead
Mr. Kurt Savoie, National Geospatial-Intelligence Agency, Faculty
Lt Col Thomas Geiser, US Air Force, Faculty

PLACES VISITED

Domestic:

American Securities Capital Partners, New York City, NY
Bank of America, Charlotte, NC
British Embassy to the United States, Washington, DC
Brookings Institute, Washington, DC
Canadian Embassy to the United States, Washington, DC
The Carlyle Group, Washington, DC
CITIC Securities International USA, New York City, NY
Federal Bureau of Investigation, Washington, DC
Federal Deposit Insurance Corporation (FDIC), Washington, DC
Federal Reserve Bank of New York, New York City, NY
Federal Reserve Board, Washington, DC
Financial Industry Regulatory Authority (FINRA), Rockville, MD
The Financial Times, New York City, NY
Goldman Sachs, New York City, NY
Investors Exchange (IEX), New York City, NY
J.P. Morgan Chase and Co., New York City, NY
Moody's Investor Service, New York City, NY
New York Stock Exchange (NYSE) Euronext, New York City, NY
Pentagon Federal Credit Union, Alexandria, VA
United States Commodity Futures Trading Commission (CFTC), Washington, DC
United States Department of the Treasury, Washington, DC
United States Securities and Exchange Commission (SEC), Washington, DC
United States Senate Committee on Banking, Housing, and Urban Affairs, Washington, DC
Wells Fargo, Charlotte, NC

International:

Bank of England, London, UK
Barclays Bank, London, UK
The CityUK Trade Association, London, UK
Her Majesty's Treasury, London, UK
The Said School of Business, Oxford University, Oxford, UK
United States Embassy, London, UK

There is no difference between national security and economic security—
they are one and the same.[1]

Brad Botwin, Director of Industry Studies,
US Dept of Commerce, March 26, 2014

The US national interests of security and prosperity are inextricably linked to the health of the financial services industry (FSI), the network of banks, insurance companies, brokerages, and financial exchanges that serves to channel funds to productive investments. The 2010 National Security Strategy declares, "Our prosperity serves as a wellspring for our power. It pays for our military, underwrites our diplomacy and development efforts, and serves as a leading source of our influence in the world."[2] Economic prosperity, in turn, depends on the strength and stability of the FSI to efficiently move capital to where it is most needed, fueling innovation and enabling economic growth. The United States must lead the development of a financial services regulatory framework that fosters economic strength and stability both domestically and globally or risk abdicating that role to other burgeoning economic powers looking to curb or surpass the United States in terms of economic influence.

The financial system's importance to national security, however, extends beyond the provision of capital and trading of risk—it serves as a powerful financial weapon in-and-of itself. The United States wields its central position in the international finance system as a strategic weapon with far-reaching effects. For example, the United States used the strength of its financial markets to unilaterally cut off capital flows to Japan in World War II, and again in 1956 to force Britain's position in the Suez Canal crisis to align with US interests.[3] After the 9/11 attacks, agents in the government, working with banks, clearing houses, and banking data repositories were able to shut down terrorist networks, defund terrorist sponsored social programs, and even track high-value targets by their money trails.[4] Most recently, the FSI played a direct role in the actions the United States took in concert with the European Union (EU) against Russia's annexation of Crimea. In an effort to "use a scalpel rather than a hammer", US sanctions targeted Russian President Vladimir Putin's inner circle by freezing US assets held by these individuals and preventing them from conducting any financial transactions using dollars.[5] Although the overall impact of these measures is still developing, Russia's net US Treasury security holdings fell from $126 billion to $100 billion between February and March 2014, representing a 20 percent tumble in assets due to investors pulling capital out of Russia in anticipation of further US financial sanctions.[6] In these cases, the US FSI derived its effectiveness from the relative depth of US financial markets, the perceived strength and stability of US financial firms and the American economy, effective partnership with other major global financial centers, and the acceptance of the dollar as the global reserve currency. In the face of declining defense budgets, the US FSI becomes all the more significant as a means of projecting national power.

Given this industry's strategic importance to US national security interests, *the purpose of this paper is to provide specific recommendations to create a stronger and more stable FSI for the purpose of ensuring a strong national security posture*. The report includes: an explanation of the methodology used in this analysis; a summary of the industry's current economic health

and associated implications; and an in-depth analysis of four specific factors within the industry that will likely impact the economic health of the industry in the future. The report concludes with an essay on chip cards to illustrate several of the points described in the analysis.

Assessment Approach: A Method Behind the Madness

The methodology employed in this analysis integrates the strengths of rigorous academic and theoretical models with the insights and real-world observations of regulators, firms, and other industry experts in order to synthesize the observations and recommendations of this report. The value and relevancy of the methodology lies in the extent to which it provides insight into market or industry behavior and the subsequent implications for recommendations on making the industry stronger and more stable. This portion of the analysis briefly outlines the models used to assess the FSI, describes the specific investigation into research and site visits conducted across the industry, and concludes with an approach for categorizing the health of individual firms within the industry. (An extended discussion of the methodology can be found in Appendix A.)

The analytical model employed the Structure-Conduct-Performance (SCP) framework to assess the overall financial services market. The "Structure" component of the analysis examined the degree of industry market concentration and the type and impact of market failures. The analysis uses Porter's Five Forces as a model to detail market forces at work across the financial services value chain and the extent to which new entrants and barriers to entry influence the behavior of industry firms.[7] The "Conduct" component examined firm- and business-level strategies currently employed throughout the industry. Finally, the "Performance" component of the framework investigated firm-specific financial data such as balance sheets, income statements, statements of cash flow, price-to-earnings ratios, liquidity, and return on equity to evaluate the extent to which firms in the industry generate business value.

In conjunction with the market analysis described above, numerous visits were conducted domestically and internationally with a wide range of government organizations, firms across multiple financial industry sectors, and various experts from advocacy groups and newspapers. The international portion of the analysis focused on the United Kingdom (the world's second largest financial center), Canada (which survived the 2008-2009 financial crisis largely unscathed), and China (whose financial system reforms are key to its own and global economic growth and prosperity). These visits were further augmented with in-depth research on a subset of financial firms within the industry along with specific "deep dive" topics that ranged from cybersecurity challenges to the impact of regulation on innovation. To bound this investigation, the Commercial and Investment Banking sectors were selected from within the FSI due to their causal role in the 2008-2009 financial crisis, and their key position within the broader industry as the core of the banking and investment capital markets.

Figure 1 below provides a graphical depiction of the FSI, key stakeholders visited as part of this analysis, and associated relationships sustained between stakeholders across the broader Financial Services Enterprise (FSE), which differentiates the FSI from the broader FSE network of stakeholders that comprise the customers, adjacent markets, and regulators impacting the

market. This model also highlights stakeholder dynamics across a range of topics, such as regulatory arbitrage and globalization, which will be addressed in detail later in this report.

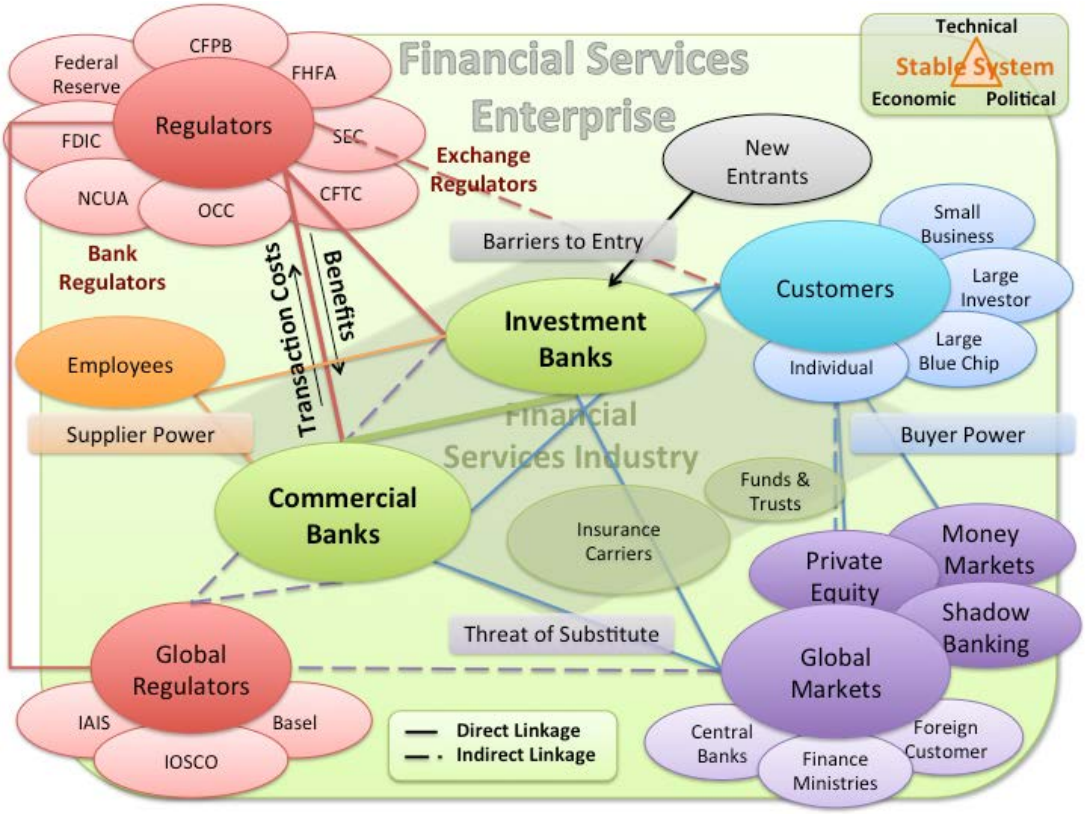

Figure 1. Financial Services Enterprise Model.

Setting the Stage: SCP Analysis and Its Impact on Industry Dynamics

The methodology described above provides insight into market and industry dynamics and their subsequent implications for recommendations to make the industry stronger and more stable. This section of the report details important SCP analysis findings, the impact of consolidation within the industry, the import of the performance metrics, and key market failures driving FSI dynamics.

The SCP analysis revealed an industry best characterized as an oligopoly with a small number of very large firms controlling a major share of the total market, but also containing a significant number of smaller banks that play a critical role in the US economy.[8] While oligopolies are typically characterized by high profit levels for the few firms controlling the market, this is not the case in the FSI, either in the US domestic or global markets. The high degree of competition among firms in the industry puts significant downward pressure on profit levels, causing the industry to exhibit the dynamics of a monopolistically competitive market. The deadweight loss due to regulatory compliance costs, the impact of cybersecurity measures and remediation, and the ever-accelerating rate of technological innovation required to remain competitive squeeze profit margins even further. (These factors will be examined in more detail

later in this report.) For example, the ability of firms in the Commercial and Investment Banking industries to generate returns equivalent to the pre-financial crisis have been hampered by regulatory requirements limiting firms' leverage and the types of activities in which they are permitted to engage, such as proprietary trading, that were highly profitable in the past. *Costs continue to climb and the ability to generate profits continues to erode. This suggests the need for an ongoing assessment of market health* as the industry continues to recover from the financial crisis due to potentially negative second-order effects from ongoing regulation implementation intended to make the overall industry more resilient.

Trends toward further consolidation underscore the challenge of resolving larger banks in the event of a bank failure and the imperative to prevent bank failures from causing contagion in the market. Regulation has capped mergers and acquisitions by large banks, which Dodd-Frank legislation categorizes as Systemically Important Financial Institutions (SIFIs). Industry historical trends reveal that an average of 150 small banks fail annually and there have been virtually no new starts or charters in recent years.[9] These factors have pushed market consolidation to intermediate-size banks, which are absorbing failing small banks. Small banks, especially in the Commercial Banking industry, fill a critical market niche by providing small businesses operating capital. While small banks only own only 14 percent of the industry's assets, they issue 46 percent of all small business loans.[10] Given declining DoD budgets, the implications of the continuing failure of small banks is particularly troubling for the Defense Industrial Base (DIB) as 60-70 percent of all defense procurement spending is executed by subcontractors who rely on smaller banks for their capital requirements.[11] *As a result of the role small banks play in the capitalization of small businesses, including second and third tier vendors in the DIB, the cost of compliance and its impact on competition within the industry has a direct impact on maintaining national security.*

The financial health of firms in the industry is based on their ability to generate business value. Business value is a measure of a firm's ability to make a reasonable profit over-and-above a given level of risk.[i] Over the long-term, a firm's level of profitability influences its desire to remain in the industry, as well as its capacity to withstand challenging business downturns and innovate to maintain competitiveness. Reflecting positive business value trends in the industry, overall commercial bank lending surpassed its 2008 levels in March 2014, reaching a new all-time high of $1.6 trillion.[12] Additionally, several key performance metrics such as Tier 1 capital, liquidity coverage ratio (LCR), and government capital stress tests suggests bank financial positions are highly resilient.

Unfortunately, the same Dodd-Frank Act and Basel III regulations that have made the industry safer have also contributed to anemic overall performance of firms as measured by return on equity. (ROE is the business value indicator most commonly used in this industry.) ROE has been further undermined, at least in the near-term, by the burden of civil penalties and fines resulting from bank activities related to the 2008-2009 financial crisis. The cumulative

[i] Reasonable profit is often defined as profits that exceed the weighted average cost of capital (WACC). For various reasons, this paper uses ROE instead of ROI. In addition, it is important to distinguish between the market risk a firm can take on to generate profits and the systemic or macro-prudential risk that potentially undermines the safety of the market.

effect of these regulations suggests that *many banks are well positioned to absorb future financial shocks, but their long-term health merits monitoring to ensure that their business value continues to recover*. This balance between safety and soundness in the market is a fundamental tension examined in this paper, and underscores the need for sound policy and regulation that considers the competitiveness of firms within the industry as well as their resilience to market shocks. This dynamic is typically understood as the tension between business value, discussed above, and economic value.

Essentially, economic value indicates how efficiently firms within an industry are using their resources, and therefore their potential to contribute to the Gross Domestic Product (GDP). It also indicates the extent to which market power is equitably divided between firms and consumers. In the case of the FSI, economic value is significantly affected by market failures that disrupt market efficiency, specifically information asymmetry, moral hazards, and principal-agent problems. Information asymmetry results when one party in a transaction has an information advantage over the other parties in a transaction, and it is characteristic of many activities in financial markets such as market making, timeliness of pricing information, and determining the risk level of assets. Significant portions of the analysis that follow are devoted to combating this problem through better transparency mechanisms. Moral hazards from information asymmetry result when one party's actions come at the expense of another. Credit ratings and lobbying activities that influence regulation are prominent examples of moral hazards in the industry. Principal-agent market failures are the result of misaligned incentives between stakeholders when one stakeholder (the agent) is acting on behalf of another (the principal). Manipulation of the market through high frequency trading (HFT) and the misleading marketing of complex financial instruments such as synthetic securities serve as examples of principal-agent induced market failures.

In summary, the health of the FSI is correlated directly to the size of the firm. While the largest banks are demonstrating a steadily improving ability to generate business value (as measured by ROE), small banks are struggling to achieve profitability in the market. The high degree of interdependencies, domestically, globally, and among adjacent financial markets, creates a wicked set of problems where solutions addressing one element described above exacerbate issues in other areas. In an effort to manage this complexity and drive out ambiguity in the analysis, four industry-wide factors were identified as key contributors to a safer and more stable FSI. Each will be examined in detail throughout the remainder of this analysis.

A Complex Balance: Risk, Regulation, Globalization, and Technology

The clearest, most oft-repeated truism in the FSI is *no one knows where, when or how the next financial crisis will occur—only that it will occur.* Four key systemic factors—risk, regulation, globalization, and technology—have significant interdependencies among them that must be balanced to maintain the resiliency and competitiveness of the US FSI (see Figure 2). The recommendations that follow are based on identifying and understanding these interactions within and among these four factors; isolating competing stakeholder incentives; and assessing the alignment of these incentives within the financial system as depicted in the Financial

Services Enterprise model (Figure 1). (See Appendix A of this report for the methodology used to select the four key factors and how these factors were assessed in the FSI.)

Transparency, confidence, and complexity also play a central role in the evaluation of stakeholder incentives, and have a significant impact on the four key factors identified above. Transparency is a major force for maintaining and improving confidence in the financial system. *Policy actions improving transparency and enabling the market to rapidly assess and price risk offer the greatest opportunities for reducing market instabilities*.[ii] Confidence that the FSI can

Figure 2. Key Factors in the Financial Services Industry.

appropriately price and channel market risk, for example, is essential to keeping highly leveraged industries operational. In fact, the US FSI and global financial system are constantly impacted by the degree of confidence market participants have in the system. Should consumer confidence disappear in an individual banking institution, a bank run would ensue and that institution would ultimately fail, no matter the size of its balance sheet.[iii,13] Complex financial

[ii] The principal concept is that better visibility of information enables faster, more accurate asset pricing and overall market efficiency. Opaque securities trading practices, such as dark pool and high frequency trading (HFT), reduce transparency by hiding information or disadvantaging market participants. Dark pool trading enables select investors to have trades matched off exchanges. HFT provides institutional traders a technological advantage over others by using high-speed computer technology for the execution of trades, milliseconds in front of others. These types of practices reduce transparency, price discovery, and equal access to markets. They can also cause high volatility in the market as evidenced by the HFT flash crash of 2010.

[iii] When Goldman Sachs lost confidence in Bear Stearns' ability to repay short-term working capital loans known as repurchase agreements, or "repos", the news went viral and began the rapid death spiral of Bear Stearns overnight. Goldman Sachs denied Bear Stearns a trade on Tuesday, March 11, 2008. By Wednesday night, Bear Stearns lost access to the repo market. Within 48 hours, a number of hedge funds pulled their brokerage accounts "*and then started shorting the stock like mad.*" (See Blinder, *When the Music Stopped* reference in the bibliography.) This bank failure spread, marking the beginning of a financial crisis unparalleled in American history in terms of job loss and GDP decline. Waning confidence was a key symptom of the precipitous system collapse in the financial markets and the speed at which the global contagion spread. Restoration and sustainment of confidence is critical to the cure.

instruments, such as derivatives contracts or other synthetic securities, which increase opportunities for asymmetric information and represent opacity in the system, erode market confidence. The opacity in the market during the 2008-2009 financial crisis spurred the advent of regulation that pushed derivatives from Over-The-Counter (OTC) trading to central clearinghouses in order to increase transaction transparency and price discovery. Other types of complexity, such as regulatory, technological, or market structure complexity, also contribute to market opacity and increase transaction costs. In general, the greater the complexity, the lower transparency and confidence is in the system. Consequently, *recommendations in this report seek to increase transparency and confidence while reducing complexity across the financial system.*

Risk: You can't live with it… and you can't live without it

As one banking executive put it, "Risk is at the core of the entire industry. It isn't a collateral duty."[14] *The objective of the FSI is not to remove risk from the system, but rather to transparently identify where the risk is going and whether the subsequent level of risk exposure is appropriate.* This section of the report provides a brief taxonomy for discussing risk, examines the impact regulation is having on where risk is moving in the system, and investigates the tensions involved between safety and soundness of the market. The section concludes by discussing the unique challenges of resolving failing SIFIs and the risk of contagion these institutions create due to high levels of industry firm interdependencies.

The US Department of Treasury's Office of Financial Research framework bins risk in several categories.[15] This analysis aggregates the OFR risk framework into two primary types of risk, market-based risk and macro-prudential risk. *Market-based risks are those that arise from the marketplace itself* and may include the following: economic downturns due to the business cycle; political risk caused by unstable regimes lacking adequate rule-of-law; and operational risks such as those related to reputation, credit worthiness, or asset valuation. When multiple market-based risks coalesce, a synergistic effect results amplifying asset price shocks and their impact on the financial system. Consequences can include bank failures, investor losses, insufficient consumer protection and—as occurred in the 2008-2009 financial crisis—tremendous burdens on taxpayers who must bail out financial institutions in order to keep the broader financial system solvent. *Macro-prudential risks are those that affect the safety of the financial system as a whole* and may include contagion and interdependence risks as well as insufficient liquidity and capital in the markets. The Dodd-Frank legislation and the international Basel agreements addressed a variety of systemic risks by requiring greater Tier 1 capital and liquidity ratios and prohibiting some forms of proprietary trading. These efforts focused on increasing system safety at the systemic or structural level. The Federal Reserve stress tests conducted earlier this year on large financial institutions demonstrate *current US macro-prudential requirements and associated bank performance are the most robust in the world.*

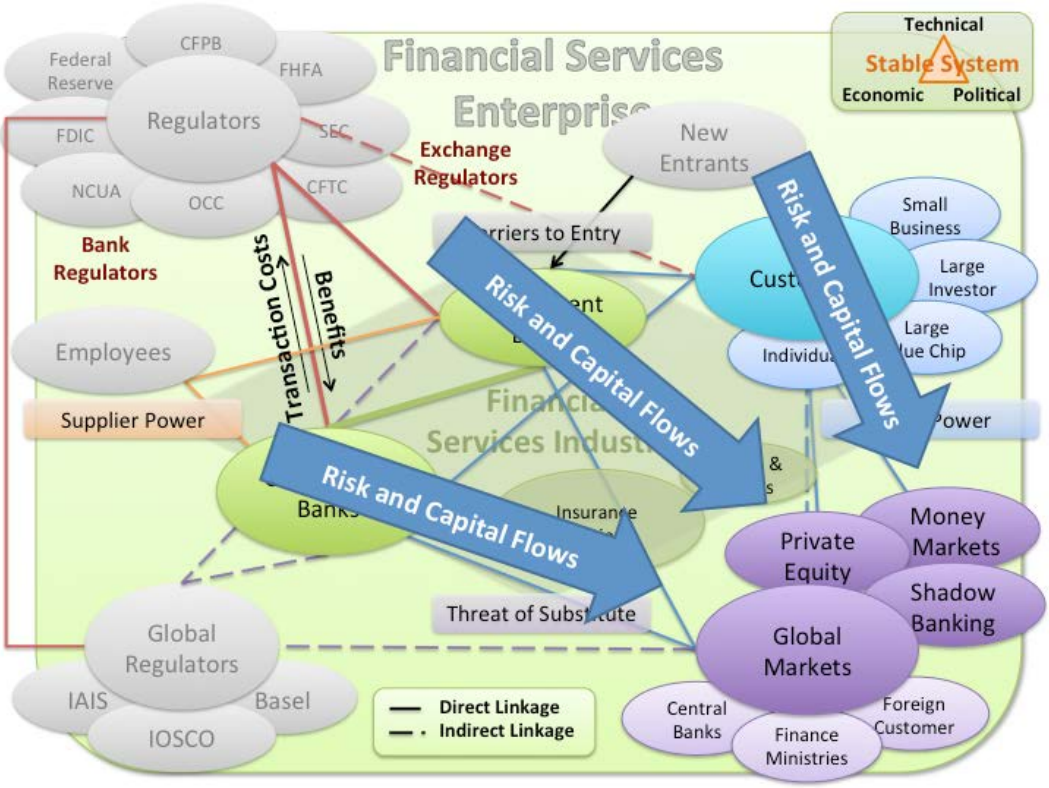

Figure 3. Risk and Capital Flows in the Financial System.

Increased regulatory oversight is pushing systemic market risk from the core of the commercial and investment banking industry into adjacent markets. For example shadow banking now "accounts for a quarter of the global financial system, with assets of $71trillion at the beginning of last year, up from $26 trillion a decade earlier."[16] Figure 3 depicts *significant capital flows out of the commercial and investment banking sectors into adjacent markets (such as shadow banking or private equity markets) that are a result of investors seeking higher rates of return on their capital*. Private equity fund investments by large pension fund managers have increased nearly five-fold, and there are notable increases in the purchases of collateralized debt obligations (CDOs), zero-down loans, and swap financial instruments as investors seek increased rates of return. The money market sector alone accounts for over $2.5 trillion in assets and comprised 40 percent of the commercial paper market when the 2008-2009 financial crisis struck.[17] These observed trends in risk and capital flows, coupled with the lack of transparency in these adjacent markets, are causing an accumulation of risk in the insurance, student loan, and shadow banking sectors such as money market accounts.

To the extent risk is mitigated in the Commercial and Investment Banking industries for deposit accounts and invested capital with government guarantees (and associated taxpayer liabilities), this movement of capital to adjacent markets may not pose a macro-prudential risk to the system. If investors seeking higher rates of return understand their market risk exposure, then *these more volatile markets may be entirely appropriate for riskier investment activity*. Within the Commercial and Investment Banking industries, the additional regulatory pressure from Dodd-Frank is working effectively to bring down the systemic risk, decreasing the

likelihood of another taxpayer bailout and increasing the overall stability of the core segments of the industry. However, the accelerated capital flows resulting from the regulatory differences between adjacent financial markets, called regulatory arbitrage, could become a source of potential instability in the system if regulatory imperatives for market stability and institutional resilience increasingly diverge from economic incentives for profit.

Additionally, if firms in these industries seek higher returns through significantly riskier investments in those portions of their portfolios that are not subject to Dodd-Frank restrictions, unacceptably high systemic risk in the Commercial and Investment Banking sectors could result. *The systemic risks generated by this "internal" regulatory arbitrage are a function of the level of exposure Commercial and Investment Banking firms have in these less regulated adjacent markets*. This analysis finds that these two industries are resilient to macro-prudential shocks, but risk and capital flows through the financial enterprise beyond the Commercial and Financial Banking sectors are creating systemic risk in adjacent markets that have received little-to-no attention from regulatory agencies. The extent to which the Commercial and Investment Banking industries are exposed to these cross-market risks is a very complex problem with largely unknown boundaries, leaving the assessment of systemic risk across markets open question.

Ultimately, capital flows to opportunities for profit. A completely stable system has no risk and, correspondingly, no profits. Since risk in the financial system is tied directly to the rate of return on an investment, participants seek advantages via information asymmetry, often achieved by increasing complexity or system opacity i.e., lack of transparency. *The objective of good policy is to strike a productive balance between the risks needed for a profitable FSI (soundness) and the stability needed to survive future shocks (safety).* Fast moving capital flows create the opportunity for profits, but they also generate boom-and-bust cycles that can cause significant disruption across the industry and potentially the economy as a whole. This tension between safety and soundness is the defining tension within the industry. On the one hand, firms seek profit through leverage and asymmetric information, and on the other, regulators seek stability through higher capital ratios and better transparency. Achieving balance between safety and soundness in the midst of this complexity is a key risk management function and a public good.

One of the most effective means for simultaneously achieving both safety and soundness is the financial system's capacity to successfully unwind a SIFI that does not manage its risk appropriately and fails. One of the most unique aspects of the FSI is its high degree of interconnectedness and interdependence among firms, not only domestically, but also globally. The ability to resolve a failed SIFI with the rest of the financial system prevents contagion from spreading across the industry and significantly mitigates the worst of the consequences from systemic risk. Effective resolution processes enable conventional market forces, instead of the government and taxpayers, to dictate which firms survive. Such a resolution capacity could mitigate the need for the extensive regulatory oversight in place today, and a significant amount of deadweight loss could be eliminated. However, while large financial institutions are successfully passing stress tests, *intermediate-sized community banks may be difficult to unwind*

should they fail due to Dodd-Frank caps on mergers and acquisitions by larger banks might have otherwise absorbed the assets of these failing mid-sized banks.[iv,18]

Recommendation: *Identify the extent to which domestic and global risk is flowing through the financial services enterprise to better understand macro-prudential risk exposure across markets.* This can be facilitated by monitoring the effectiveness of LCR and stress tests while developing additional leading indicators designed to evaluate systemic resiliency to macro-prudential shocks, market opacity, and growing complexity. Specific areas of concern include the money market, shadow banking, student loan and insurance sectors of the industry, which are particularly opaque, complex, or have incentive misalignments among stakeholders. A Federal agency with responsibilities across the entire market, such as the Financial Stability Oversight Council (FSOC) with possible delegation to the Office of Financial Research (OFR) should address this task.

Recommendation: Focus on improving and testing the resolution plans for SIFIs through more comprehensive stress tests engaging the full spectrum of government and business entities while also expanding the scope of stress tests to include not only the firm's ability to execute to plan, but also the role of government regulators. *Creating credible resolution capacity in the financial system will do more to minimize the macro-prudential risk in the system than any other single activity*. The Federal Deposit Insurance Corporation (FDIC) and the Federal Reserve should co-lead the effort to expand the organizational scope and depth of stress tests.

Recommendation: Reduce the risk of bank failures through better alignment of industry stakeholder incentives by utilizing broader market-based approaches rather than additional regulatory guidance. For instance, a "bail-in" construct that converts bank bondholders to equity owners in the event of a bank failure would reduce the need for government bank guarantees and mitigate moral hazards inherent in "bail-out" systems by keeping bondholder capital at risk for poor investment decisions. To deter ethically or legally questionable behavior, introduce a criminal standard of "recklessness" similar to that found in the United Kingdom. These recommendations should be championed by the Treasury Department with follow-on implementation through the appropriate department and agency offices.

Regulation: A Sword that Cuts both Ways

Failures in risk management have historically led to regulatory responses, reflecting government efforts to re-align the balance between economic profit incentives in the industry and the responsibility of securing the public good. As previously noted, the financial crisis of 2008-2009 served as the impetus for an unprecedented surge in legislative and regulatory control of the industry. Regulation should protect investors and consumers by increasing market transparency, maintaining orderly and efficient markets, promoting financial stability, and reducing systemic risk, while minimizing the economic deadweight loss associated with the

[iv] The statute exempts three types of acquisitions from the concentration limit, including the acquisition of a bank in default or in danger of default. In all cases, prior written consent of the Federal Reserve Board is required.

implementation and enforcement of the regulations. This section of the analysis assesses the impact of regulation on the resiliency of the financial services enterprise, examines the costs and culture of regulatory compliance in the industry, and concludes with a discussion on information asymmetry problems still extant in the financial system.

The Dodd-Frank Act bolstered the overall resiliency of the financial services enterprise within the United States. US banks have never had stronger balance sheets or better liquidity than they do today. The stringent regulatory requirements in Dodd-Frank has contributed directly to the industry's ability to absorb future financial shocks and maintain a functioning financial services system under duress. These regulations have also limited the amount of market-based risk firms in the industry can assume, and remedied a number of issues associated with counterparty risks, derivative transactions, and insider trading on market making activities.

The overall "safety" of the industry has increased remarkably considering where the industry was prior to the 2008-2009 financial crisis; however, these gains in industry resilience have come at a significant cost to financial firms in terms of compliance costs and regulatory complexity. One banking vice-president summed it up by saying, "Compliance is the hottest growing sector in the bank's costs. These are going to be long-term additions, not temporary surges."[19] For example, the Dodd-Frank Act is over 2,300 pages long and has spawned over 14,000 pages of regulatory guidance. While the full impact of Dodd-Frank is uncertain, current estimated costs are around $15.4 billion and 58.3 million work hours of paperwork burden.[20,21] The complexity of the regulatory environment and the magnitude of reporting requirements dictated the establishment of comprehensive compliance programs at banks and other financial institutions. Regardless of a firm's size and despite tiered compliance requirements based on activities and assets, fixed costs associated with establishing compliance programs to address new levels of regulatory complexity are unavoidable. Smaller firms, in comparison to large banks, are challenged to mitigate these fixed compliance costs, putting smaller banks at a competitive disadvantage compared to larger institutions. This regulatory induced advantage to institutions possessing economy of scale creates a significant barrier to entry for new entrants into the market, a dynamic perhaps reflected in the fact that virtually no new banks have been started in the past few years.[22] The net effect of the additional regulatory complexity creates the potential for more "too big to fail" banks due to increasing market concentration—exactly what the regulation was trying to prevent in the first place.

The emphasis on regulatory compliance in the aftermath of the 2008-2009 financial crisis has led to additional strain between regulatory agencies and the firms in the industry. There is a perception by some that industry's primary motivation is its own profit incentive, or alternatively, that regulators may not have the experience needed to develop effective regulations. This cultural tension between two of the most significant stakeholder groups in the industry creates an unhealthy adversarial relationship. There is a need for the regulators and the compliance division of firms to reach a more collaborative, though still fully independent, relationship to better address the remaining issues at large in the industry.

Two of these remaining challenges are information asymmetry problems. The first is the ongoing arrangement between firms and the rating agencies conducting risk ratings on various financial instruments. There is an inherent conflict of interest when rating agencies receive

direct compensation from the firms for which they are providing the ratings. The only effective way to eliminate this moral hazard is to change the structure of compensation to eliminate the economic market incentive for firms to "shop around" among rating agencies for better ratings. A second challenge is the lack of transparency in the information lobbying organizations provide to lawmakers with respect to legislation or enforcement of financial industry regulations. These efforts directly affect the content, coherency, and implementation of industry standards. Transparency in legislative deliberations, including interest group influence leading to the promulgation of these banking standards, is needed for public accountability of the industry.

Recommendation: *Pursue alternative funding streams for regulatory agencies* currently relying exclusively on public funding (e.g., the Commodity Futures Trading Commission) and provide them with the tools to attract the talent and experience needed for more effective rule development and regulatory action. Self-funding for regulatory agencies provides a greater degree of flexibility in hiring needed talent, adapting to changing markets, and building information technology to become more effective and efficient. This would require a joint effort on the part of Congress, the Treasury Department, and Industry.

Recommendation: *Encourage further collaboration and cooperation between regulatory agencies to help reduce overlap and eliminate gaps in regulatory oversight functions*. Specific actions include further refinement of missions or charters, more liaison or exchange of personnel between organizations, and better operational-level integration between agencies focused on a more effective and efficient government-wide regulator environment. The Financial Stability Oversight Council should spearhead this effort.

Recommendation: *Change the economic incentives for rating agencies and firms to reduce moral hazards.* Potential courses of action include funding rating agencies through transaction fees or industry tax, directly funding a third-party rating agency provider using taxpayer dollars or industry fees, or creating a Self-Regulating Organization funded by industry. The Securities and Exchange Commission (SEC) should be tasked with the development and implementation of a revised structure.

Recommendation: *Increase transparency and accountability by requiring financial lobbying organizations to publicly disclose the context and content of information* they provide to lawmakers or other government officials. Legislation such as the Lobbyist Disclosure Enhancement Act introduced by Representatives Quigley and Polis in 2011 would make significant strides in improving transparency in the system.[23] Near real-time reporting and disclosure regulation would go even further in helping the public understand the stakeholders and factors influencing the decision-making process. The Senate Committee on Banking, Housing, and Urban Affairs or the House Committee on Financial Services should consider efforts to return this bill to the floor for a vote.

Globalization: It's a Small World after All

Nearly every major type of financial instrument is now traded in a robust global market, and firms must have the capacity to compete in this environment or they risk losing profit opportunity and market share. Despite specific imperatives to factor competitiveness into the

creation of regulatory frameworks, legislative and regulatory efforts to date have focused almost exclusively on the safety and soundness of domestic markets, not on the impacts these changes may have to the global competitiveness of affected sectors in the FSI and the firms operating in those sectors. This section of the report will examine the issue of regulatory arbitrage among global markets; how the differing structures in financial services across countries impacts regulatory coherence; and the need for a global systemic risk perspective with corresponding international standards for specific performance metrics.

Much like the capital flows out of the core-banking sector to unregulated markets described in the risk discussion, international regulatory arbitrage also creates capital flows in markets from one country to another. Dodd-Frank regulations that push derivatives trading into formal clearinghouses erode the near-term US FSI's global comparative advantage vis-à-vis the OTC derivatives market. Conversely, US regulations mandating higher capital and liquidity levels create barriers-to-entry for new firms, thereby limiting competition from foreign firms in the US market. *It is possible that some markets, such as derivatives and swaps, may shift from the United States to the European Union or Asia if regulatory and economic incentives in the United States continue to diverge*, reminiscent of the 1960s bond market migration from New York to London. Offsetting this near-term market incentive due to regulatory arbitrage is the longer-term impact created by more highly regulated markets that create "safe havens" for capital. Indeed, most firms stated *the industry has a significant reputational incentive to meet new regulatory requirements as quickly as possible in order to demonstrate a firm's superior strength and stability as a differentiator to attract more customers*. It is unclear at this point how these opposing incentives between safety and profits will play out. To date, the dynamic coming out of the crisis appears to favor longer-term safety over near-term profits, but that trend may be changing.

Structural differences among national jurisdictions also complicate efforts at financial services regulatory coherence. Two countries, for example, could conceivably use completely divergent approaches to implement an international standard, such as Basel III,[v] yet achieve comparable outcomes. A further obstacle is that regulatory bodies in different jurisdictions may disagree over the equivalency of their counterpart's approach. This in turn complicates the ability of international banking firms to conduct business in multiple global markets since they must comply with regulatory-mandated structural approaches depending on the countries in which they operate. Possible negative consequences of the lack of global regulatory coherence are the geographical and sectorial balkanization (trapping of liquidity in specific market segments) of capital flows. This occurs in countries that are compliant with higher global standards or within a market sector through holding companies in a single country. Countries may also employ "ring-fencing" approaches that wall off capital flows in one part of the market from other parts. These structural differences translate into additional overhead costs, lower

[v] Basel III implementation started in 2013 and should be fully phased in by 2019. Basel III redefined capital ratio requirements, narrowing the regulatory capital and enlarging the risk coverage. This new definition on average decreases large banks Tier 1 Common Equity ratio from 11.1 percent to 5.7 percent, requiring banks to increase their capital to meet the standards. As a result, banks may decrease lending, providing less liquidity access for firms and consumers resulting in reduced spending and ultimately lowering GDP.

global liquidity, and additional arbitrage opportunities. A regulatory equivalency approach mitigates some of this by focusing on the ends (better liquidity and capital ratios) instead of the means (specific structure of a country's FSI). *If an outcome-based equivalency approach prevails between US and EU regulators, the structural differences among global markets would have less of an impact on international regulatory coherence*. If US and EU regulators can arrive at an agreed upon solution in the near-term, that is, while New York and London dominate the global financial markets, the Asia-based financial markets will likely follow their lead. If these disparities are not resolved soon, the United States and European Union risk leaving Asian markets to design their own regulatory schemes resulting in the West further ceding control and influence over global economic norms.

To date, the international community has made little headway in establishing a framework to identify, assess, and remediate global systemic risk in the system. Discussions with the leaders of the banking community both domestically in the United States and overseas provided mutually reinforcing perspectives that locally originating financial crises will impact the global health of the industry. The Basel III standards are an effort to address some of these global macro-prudential risks in the system, but even with the great progress in risk mitigation the global FSI has achieved in the past several years, significant issues remain to be resolved. *Perhaps the one international regulatory measure with the potential for the most impact is the articulation of a clear set of global metrics establishing comparable stress tests*. A globally shared, specific and well-regulated stress test would provide a clear standard to drive better transparency in the safety and soundness of individual firms and between industries across national financial jurisdictions. A global stress test would help ameliorate information asymmetry and international regulatory arbitrage due to market opacity caused by differing financial system structures and laws. It would also facilitate the movement to an outcomes-based regulatory oversight approach advocated above.

Recommendation: *Aggressively pursue macro-prudential regulatory equivalency standards between US and EU regulatory regimes* to help mitigate regulatory arbitrage in a timely fashion. Near-term activity should focus on achieving outcome-based results to mitigate the present challenges of differing financial system structures between countries, and to secure global standards that are consistent with US and EU financial principles. The long-term objective should be a harmonization of not only regulatory outcomes but also full financial system structural congruence. This should be a collective effort between the Financial Stability Oversight Council (FSOC) and Financial Stability Board (FSB). This could be further delegated to the Commodity Futures Trading Commission (CFTC) and SEC to work with the International Organization of Security Commissions (IOSCO) on security-specific issues.

Recommendation: *Establish robust international standards for conducting, assessing, and reporting the results of stress tests and resolution plans* across differing regulatory regimes and financial system structures. In the mid-term, develop and promulgate similar standards for market opacity and overall system complexity commensurate with the leading indicator metrics recommended for the US FSI. This should be a collective effort between the Federal Reserve and FSOC in conjunction with the FSB.

Technology: Ride the Wave or Get Crushed

Technology underpins almost every facet of the FSI and provides critical functions in the US and global economies.[24] For instance, one firm's IT department oversees more than 1.5 billion lines of code; 59,000 databases; 118,000 servers; and 8,000 technology specialists consuming over one million daily computing hours for risk management calculations.[25] This section of the report addresses the impact of cybersecurity and cybercrime on the industry, the interaction between innovation and regulation, and how e-banking trends are changing customer service and firm business strategies.

The cyberspace domain has become the single most influential technological component of FSI activities and innovation. Cyber-related expenses, used to create venues for services and limit vulnerability to fraud or outright theft, represent an increasingly significant share of industry operating costs. The Federal Bureau of Investigation ranks cybercrime as its number three national priority, right after terrorism and counter espionage. General Keith Alexander, former director of the National Security Agency and head of Cyber Command, said *cybercrime represents "the greatest transfer of wealth in history."*[26] Statistics from Cisco and McAfee estimated US annual losses in the cyber domain at $250 billion from intellectual property theft, $388 billion from cybercrime, and over $1 trillion from global annual expenditures for remediation of breaches.[27] Ninety percent of senior executives and directors at the nation's largest banks affirmed that cybersecurity risk is their top concern.[28]

Cybercrime exploits the reality that a network is only as strong as its weakest link. As more transactions occur within the domain, and the information technology network continues to expand, the number of vulnerabilities increases—often in nonlinear ways. As the number of physical interfaces increase, the network becomes more complex and the number and types of applications proliferate, causing a rise in the statistical probability of finding poor security practices. *Efforts to strengthen the integrity of cyber systems leads to an "arms race" within the cybersecurity arena in which government and firms attempt to seal off attacks generated by hackers attempting to steal funds directly or by acquiring personally identifiable information for exploitation in other fraudulent activities*. As one type of attack is thwarted, hackers seek new vulnerabilities to exploit, stoking the ever-escalating frenzy of activity and cost. Although not currently a basis of market differentiation, a firm's relative abilities to secure its information technology networks against data breaches and theft will become a differentiator for consumers in the future. Cybersecurity strategies also will become more intrusive to the customer as firms seek to raise the bar on cybersecurity "hygiene" practices, not just for customers, but also for vendors and other firms connecting to their networks.

The cyberspace domain remains largely unregulated, even within the financial services sector. The current approach relies largely on voluntary compliance with a newly created set of broad-based National Institute of Standards and Technology (NIST) standards. The unregulated nature of cyberspace has several direct implications for the FSI, both positive and negative. On the positive side, *industry participants have the ability to act quickly and unilaterally within their own networks to counter threats on a real-time basis* with little to no overhead associated with compliance or reporting requirements. This enables more efficient use of resources and generates an environment in which rapid innovation is the norm rather than the exception.

Economic incentives are also clearly aligned with technological enhancements to prevent theft and fraud of customer and firm assets through cyber-related crime. On the negative side, *firms are often less than transparent in divulging cybersecurity risks* (i.e., firms are reluctant to report breaches due to reputational risk and loss of customer confidence), and financial institutions may not be fully incentivized to protect the full range of customer or investor personally identifiable information, leaving them vulnerable to risks beyond the simple loss of assets or profits. The inability to evaluate and compare cybersecurity risks across a common set of criteria among financial firms severely limits the potential to create system-wide standards. An active and balanced regulatory and technical approach is needed to shore up cybersecurity shortfalls across the industry.

Much like cyber, innovation fuels a firm's competitive positioning within the market and the growth and expansion of the global FSI. This analysis focuses on the interactions between regulation and innovation, recognizing that different results occur depending on which factor is "good" or "bad. Good regulation should produce innovation that facilitates orderly and efficient markets, provides better transparency, and reduces complexity while harmonizing incentives through natural market forces. (See Appendix A for more details on this model). Unfortunately, discussions with industry participants suggest the majority of their innovation efforts are actually oriented towards muting the impact of the new regulatory environment and the additional complexity it has injected into the market, rather than focusing those resources on advancing the positive functioning of the industry. This amounts to an opportunity cost imposed on industry from the Dodd-Frank regulatory framework. These factors reveal *a long-term threat to the industry if the regulatory and economic incentives cannot be better aligned with respect to innovation in the industry.*

The other technologically induced dynamic in the financial system is the stunning rate at which consumers are moving to e-banking platforms. These innovative venues are experiencing annual growth rates of over 30 percent, and *online and mobile banking activity is fundamentally changing the way commercial and investment banks are structuring their business strategies.*[29] Firms that fail to leverage these new banking channels will soon find themselves closing their doors. The full impact of this shift away from traditional brick-and-mortar bank branches, in combination with the other factors highlighted previously, is already impacting service provisioning in the industry. US banks and thrifts closed 2,267 branches in 2012 and this trend is expected to continue with 13,000 additional branches projected to close over the next decade.[30] A challenge for financial institutions is whether they possess the technical architecture to scale their online and mobile services to the number of customers attempting to use those channels. A separate market effect of this technology trend is the cost of entry for existing firms and new entrants into the market. If e-banking services are merely "add-ons" to existing brick-and-mortar banking facilities, then the e-banking trend is raising the barrier to entry. In contrast, using the "e-bank" model as a substitute for brick-and-mortar facilities would diminish barriers to entry. Individual firm decisions to implement e-banking and the enabling technology that makes this channel possible have to be integrated with the broader strategic capabilities of the firm and be responsive to customer service demands.

Recommendation: *Establish a public-private partnership to spearhead a joint government-industry effort to rapidly advance the US financial services' cybersecurity posture*. Use this organizational entity as the development and implementation arm for other cyber-related best practices and as the interface to other industries and government organizations working similar issues. This could be tasked to the Information Systems Security Association (or similar body) for implementation.

Recommendation: *Accelerate implementation of existing cybersecurity standards* through a phased program to increase information flow, transparency, and accountability while preserving industry's speed and flexibility to adapt to rapidly changing threat vectors. The Treasury Department should lead this effort as the organization responsible for coordinating the FSI as an identified critical infrastructure component.

Recommendation: *Establish a venue for providing focus and incentives for accelerating good innovation within the industry* by sponsoring challenges, making seed money available for exploring new concepts, and creating a forum in which to pool industry resources to solve common, industry-wide problems. A major thrust of this effort would be innovative approaches for reducing overhead costs and complexity of regulatory compliance or developing alternative frameworks to assist firms in reconciling structural differences between global markets. The best analogy would be comparable efforts in the DoD using Cooperative Research and Development Agreements between industry and government for mutually beneficial research and development activities.

The next section of this report reproduces an individual essay on the topic of chip cards. This essay is of particular significance in the discussion of this report due to the number of competing incentives and technological issues associated with the adoption of chip cards in the US market. As such, it provides a real-world example of many of the dynamics identified in the previous sections on risk, regulation, globalization, and technology.

Chip Cards: An Essay on Real-World Financial Services Dynamics

This essay addresses the use of chip card technology through the lens of innovation and technology to illustrate the financial system's failure to adapt technical improvements because of misplaced economic and political incentives. A brief overview of the technology itself is presented, followed by an examination of implementation successes in other global markets. An analysis of the incentives structure in the US domestic market provides insights into the reasons why an otherwise sophisticated financial market did not adopt the technology sooner. The case study concludes with a brief look at the way forward with this technology in the US market.

The magnetic strip (mag strip) on the back of most Americans' credit cards is 1960s technology, easily counterfeited with minimal equipment and little technical expertise. In contrast, a chip card contains a small integrated circuit that securely contains cardholder information using a cryptoprocessor, sophisticated protocols, randomly generated shared encryption keys, and a secure file system.[31] The hardware and software on the chip card provides a high-level of security for the consumer, the merchant, and the issuing bank. Furthermore, the Europay, MasterCard and Visa (EMV) standard that governs the manufacturing

and operational interface for chip cards is so effective it garners widespread global acceptance. Outside of the United States there are 1.6 billion EMV cards and 24 million EMV terminals in use.[32] In Europe over 80 percent of the cards and nearly 95 percent of terminals are EMV capable. Figure 4 graphically depicts the relative degree of EMV market penetration achieved on a region-by-region basis.

Industry groups and US policymakers can learn valuable lessons from these mature

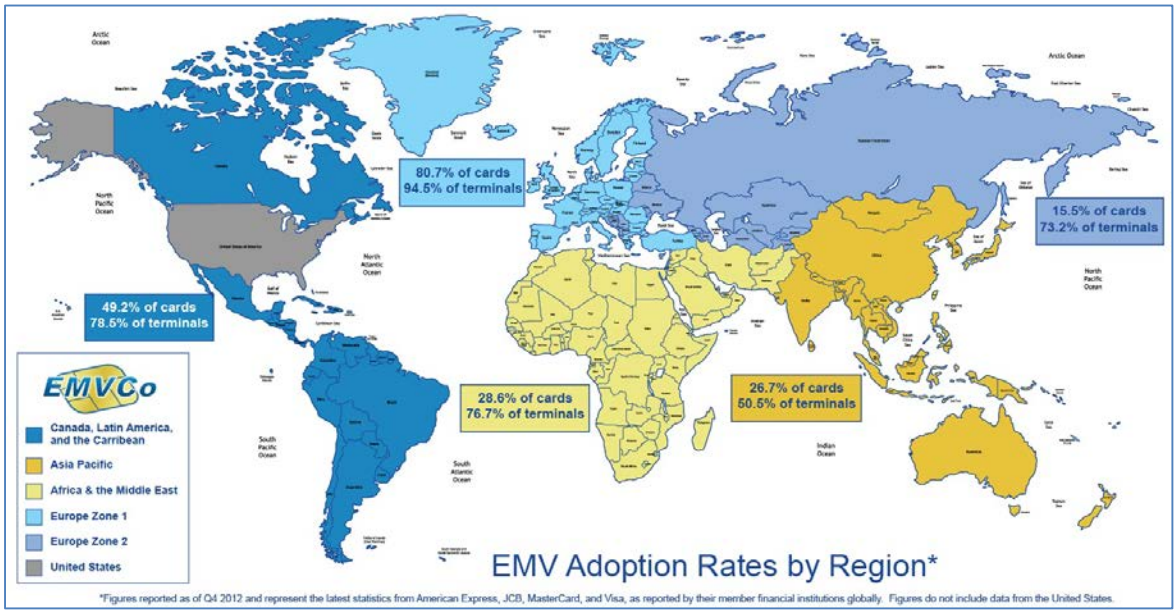

Figure 4. EMV Global Adoption Rates.

European markets with respect to EMV implementation lessons and adoption dynamics. The United Kingdom, France and Canada each experienced similar outcomes following their transition to EMV technology. The new technology reduced the fraud from counterfeit, lost or stolen cards by more than 50 percent, pushing fraud to Card-Not-Present (CNP) transactions, such as e-commerce, and to countries where the mag strip was still used to complete purchases. EUROPOL reports "the majority of illegal face-to-face card transactions (skimming-related) affecting the European Union take [sic] place overseas, mainly in the United States."[33] This places United States in the dubious position of being the number one country for foreign fraud for EU merchants and cross-border fraud using EU-issued cards.[34] Given the clear success of the chip card and the EMV standards to reduce lost, stolen and counterfeit card fraud in the United Kingdom, France and Canada, failure on the part of the United States to implement the technology is disconcerting.

The sheer size of the US credit card market and conflicting stakeholder interests (merchants, consumers, employees, retail managers, and banks) allowed the US financial system to coalesce around a suboptimal technological architecture. There are an estimated 1.2 billion credit cards in use in the United States and the consumer market includes 177 million cardholders.[35] The cost of producing a chip card is more expensive than a corresponding mag strip card ($1.25-$2.50 versus $0.25). Switching costs alone, estimated at $1.4B, represented a sizable expense for issuing banks and economically discouraged transition to EMV cards.

Additionally, required Automated Teller Machine (ATM) upgrade costs approach $500M.[36] Given few EMV terminals exist in the United States, there is little motivation for banks to issue EMV capable cards, especially as US banks became more sophisticated in applying counter-fraud algorithms to flag fraudulent activity. These counter-fraud measures effectively reduced the financial losses from fraud without the overhead associated with implementing the chip card technology.

Merchants also face significant cost hurdles. Of the 1.2 billion credit cards in the United States, only two percent are EMV chip card enabled.[37] These extremely small numbers provided little incentive for merchants to purchase and upgrade to EMV compliant point of sale (POS) terminals. Merchant costs for switching to the new terminals are expected to exceed $6.75B.[38] The US credit card industry (issuers, merchants, and payment networks) found itself with a "chicken-and-egg" problem; banks did not issue EMV cards since merchants did not have EMV POS terminals, and merchants did not upgrade to EMV POS terminals since so few chip cards were issued. Industry needed an external stimulus to push past economic disincentives long enough to grow network externalities to the point where switching makes economic sense.

The current liability arrangement creates a moral hazard where the consumer may be more apt to engage in risky behavior since the industry, not the consumer, bears the cost of compromised transactions. For example, strong US consumer protection laws coupled with the fact that fraudulent card use carries a maximum liability to the consumer of only $50, which the issuing bank typically waives, provides little incentive for consumers to practice sound cyber-hygiene.[39] Additionally, failing to install or update antivirus software, clicking on malicious email links, unencrypted or weakly encrypted wireless settings, and weak passwords demonstrates that without real economic incentives, consumers lack motivation to implement proper internet banking security practices.

Merchants and employees also encounter a moral hazard when accepting mag strip credit cards. The economic cost of failure to verify identification when accepting a credit card, and the fraud that may result, does not accrue to the cashier and rarely to the merchant. According to one industry report, "card *issuer* losses occur mainly at the point of sale from the counterfeit cards while *merchant* losses occur mainly on CNP transactions on the Web, at a call center or through mail order."[40] The cashier that takes the time to dutifully check identification during a credit card transaction only harms their personal performance metrics of speed and customers-per-hour. Moreover, even if a particular vendor had established rules for cashiers to check identification, those rules would be in direct conflict with the speed of the transaction.

Retail managers experience a principal-agent problem because managers are recognized and promoted on metrics that have more to do with same-store sales growth, inventory turns, and customer satisfaction rather than fraud rates.[41] Even if their customers experience better credit card security when identification is always verified, the manager is incentivized to lower the level of security since additional checkout time to inspect the credit card slows throughput, requires additional cashiers, and negatively impacts the metrics against which store employees are measured. An additional incentive working against forces to protect customer's data and reduce fraudulent transactions is that customers frequently feel inconvenienced when forced to produce identification if historically they have not been required to do so.

Finally, issuing banks faced several disincentives to implementing EMV technology. First, each mag strip card represented an opportunity to reduce up-front costs and increase profits.[42] Additionally, banks received interchange fees from merchants that are more profitable for signature vice PIN transactions. Finally, according to industry watchers, since online transactions are sent to issuers in real-time for approval, issuing banks are able to successfully apply analytics that overcome the majority of credit card fraud without having to invest in EMV technology. This approach, however, fails to recognize that the United States "accounted for 47.3 percent of global card fraud despite only accounting for 23.5 percent of the total transactions."[43]

Collectively the high transaction costs, the misaligned incentives, the moral hazards, and principal-agent problems identified above created and sustained a market failure to adopt more rigorous security standards. After a delay of over 20 years, however, the incentive structure in the industry appears to be on the brink of a significant transition. The US FSI recently took steps to align incentives to force adoption of the EMV chip card standards. Beginning in October 2015, merchants without EMV compliant devices will be liable for face-to-face fraudulent transactions from counterfeit credit card transfers.[44] By October of 2017, even gasoline pumps and ATMs must be upgraded to protect the industry and consumer from counterfeit cards.

Moving forward, the US FSI must quickly pursue and develop the technologies, standards, and agreements to validate and certify CNP transactions. Technologies for performing CNP certifications are promising, but they are not routinely or consistently implemented. Secure authentication protocols, such as 3D Secure, have been developed by the card networks to add an additional authentication layer for CNP transactions. The drawbacks are expensive merchant fees, clumsy technology, and consumers who are legitimately wary of typing a secure password into a pop-up window. The card networks, the merchant organizations, and the banks must collectively develop and implement an easy-to-use, secure and common interface to reduce customer confusion and enforce strong authentication.

Criminal elements also will migrate and redouble their efforts on targeting consumers who are typically vulnerable to computer exploitation. The individual consumer remains an easy, though certainly less lucrative, target to exploit than the bank or merchant's POS technology. The lack of proper Internet safety education and the on-going moral hazards for the consumer are areas where regulation is needed to correct the market failure to pursue the public good. Who enforces the regulation or, better yet, who creates the economic incentives (CFPB, FTC, FCC, or industry groups) is beyond the scope of this paper. Just as regulators implemented standards for workplace safety, seatbelts, and food production, the need for basic Internet security standards and education is a public good and badly needed in a hyper-connected society.

The United Kingdom, France, Canada and 77 other countries have successfully transitioned, or are transitioning, to chip card technology with a proven track record to reduce credit card fraud more effectively than the mag strip technology the United States still uses today. Misaligned incentives and moral hazards, including principal-agent problems, have prevented the US FSI from adopting and deploying new standards. The transition from mag strip transactions to chip-enabled transactions in the United States will take place almost 30 years after countries like France, Canada, and Venezuela that are not traditionally known as financial innovators or early adaptors have implemented the technology. (Author: LtCol Rollin Brewster)

In Conclusion…

The interactions of risk, regulation, globalization, and technology determine the fundamental dynamics of the FSI. The trends in each of these areas indicate positive improvements in the overall position of the industry, but there are significant issues within each that have the potential to undermine the strength and stability of the industry and the economy. Often diverging stakeholder incentives within the industry reveal the fundamental tension between the "safety" and the "soundness" of the market. Identifying predictive leading indicators and creating truly robust resolution plans are examples of high impact efforts that would increase transparency, bolster consumer confidence, and reduce the overall complexity in the system. Regulators should make the establishment of global, comprehensive stress test standards a top priority in order to mitigate the effects of regulatory arbitrage, and expand the scope of stress test activities to include not just industry firms, but also government responses to bank failures. Technology and innovation trends are reshaping the face of the competitive environment, but cybercrime has created a virtual "arms race" for securing networks from exploitation. The United States needs a focused government-industry effort to deal with these threats more effectively and limit the future damage from cybersecurity breaches.

In the final assessment, there is cause for optimism with regard to the strength and stability of the financial services industry and its ability to support current and future national security demands. The resiliency of the Commercial and Financial Banking industries are at all-time highs, and total lending has now surpassed pre-financial crisis levels. Recovering ROE metrics and the failure rate of small banks constitute specific areas that bear ongoing scrutiny, as do risk and capital flows through segments of the financial enterprise system beyond the Commercial and Financial Banking sectors that create systemic risk in less regulated markets. The recommendations in this report build on the impressive progress the collective efforts of industry and government have made in restoring the confidence of the American public and the global community in US banking institutions. However, the financial system needs to stay resilient because the next financial crisis is already brewing—it is just a matter of time before the next shock hits the system.

Acknowledgments

This report would not have been possible without the tremendous level of support received from a virtual army of supporters across industry, academia, and government. The access to senior leadership in every field of inquiry was truly unparalleled, and if there are any worthwhile observations or recommendations in this report, it is due almost entirely to those who spent time discussing and explaining the nuances of the industry with candor and passion.

Endnotes

[1] Brad Botwin, "Defense Industrial Base to Drawdowns," Class Lecture, Dwight D. Eisenhower School for National Security and Resource Strategy, National Defense University, Washington, D.C., March 26, 2014. Permission granted March 28, 2014.

[2] The White House, *National Security Strategy*. (Washington, DC: White House, 2010), 9. http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf (accessed May 16, 2014)

[3] Paul Bracken, "Financial Warfare," *Foreign Policy Research Institute E-Note*, September 2007, https://www.fpri.org/enotes/200709.bracken.financialwarfare.html (accessed March 26, 2014)

[4] Juan Zarate, "Treasury's War," *Public Affairs* (2013): New York.

[5] Data taken from The Washington Post, "Further sanctions against Russia are outlined, tied to Ukraine's presidential election", May 8, 2014 http://www.washingtonpost.com/world/national-security/further-sanctions-against-russia-are-outlined-tied-to-ukraines-presidential-election/2014/05/08/c1841320-d6de-11e3-95d3-3bcd77cd4e11_story.html (accessed May 12, 2014)

[6] Data taken from the US Department of the Treasury, "Major Foreign Holders of Treasury Securities," April 2014, http://www.treasury.gov/ticdata/Publish/mfh.txt (accessed May 16, 2014)

[7]Michael E. Porter, "The Five Competitive Forces that Shape Strategy," *Harvard Business Review* (January 2008): 78-93.

[8] Zesshan Haider, Zesshan"Industry Report 52211: Commercial Banking in the US," *IBISWorld*, March 2014; Stephen Hoopes, "Industry Report 52311: Investment Banking and Securities Dealings in the US," *IBISWorld*, February 2014.

[9] Federal Deposit Insurance Corporation, "Statistics at a Glance," Last modified February 16, 2014, http://www.fdic.gov/bank/statistical/stats/2013dec/fdic.html (accessed May 16, 2014)

[10] Federal Deposit Insurance Corporation, "Community Banking Study," (Dec 2012): 1. http://fdic.gov/regulations/resources/cbi/report/cbi-full.pdf (accessed March 13, 2014)

[11] Under Secretary of Defense for Acquisition, Technology, and Logistics, "Annual Industrial Capabilities Report to Congress," (Washington DC: October 20130), 2.

[12] Federal Reserve, *H8 report, Economic Research*, "Assets and Data, Liabilities of Commercial and Industrial Loans in the United States Weekly -H.8," http://www.federalreserve.gov/releases/h8/current/#fn1 (accessed April 10, 2014)

[13]Adam Blinder, "From Bear to Lehman: Inconsistency was the Hobgoblin," in *After the Music Stopped*, (New York: Penguin Books, 2013).

[14] Interview with confidential source. All interviews granted to students were with the agreement of confidentiality. Names are withheld by mutual agreement between source and the Dwight D. Eisenhower School for National Security and Resourcing Strategy.

[15] Office of Financial Research, "2013 Annual Report," (Washington DC, December 2013), 11.

[16] "Shadow Banking: The Lure of Shadow Banking," *The Economist*, May 10, 2014, http://www.economist.com/news/leaders/21601826-shadow-banks-helped-cause-financial-crisis-better-regulated-they-could-help-avert-next (accessed May 15, 2014)

[17] Mary L Schapiro, Chairman, U.S. Security and Exchange Commission, Testimony on "Perspectives on Money Market Mutual Fund Reforms," June 21, 2012.

[18] Financial Stability Oversight Council, "Study and Recommendations Regarding Concentration Limits on Large Financial Companies," (January 2011), 5 - 7, http://www.treasury.gov/initiatives/Documents/Study%20on%20Concentration%20Limits%20on%20Large%20Firms%2001-17-11.pdf (accessed May 16, 2014)

[19] Interview with a confidential source. All interviews granted to students were with the agreement of confidentiality. Names are withheld by mutual agreement between source and the Dwight D. Eisenhower School for National Security and Resourcing Strategy.

[20] Sam Batkins and Ike Brannon, "The Unknown Costs of Dodd-Frank," *Regulation*. Vo1 36 no. 3: 405, (The Cato Institute, 2013), http://object.cato.org/sites/cato.org/files/serials/files/regulation/2013/9/regv36n3-8n.pdf (accessed March 26, 2014)

[21] Susannah Hammond and Jane Walshe, "Cost of Compliance Survey 2013," (Thomas Reuters, 2013), http://accelus.thomsonreuters.com/sites/default/files/GRC00186.pdf (accessed May 16, 2014).

[22] Federal Deposit Insurance Corporation. "Statistics at a Glance." Last modified February 16, 2014. http://www.fdic.gov/bank/statistical/stats/2013dec/fdic.html (accessed May 16, 2014).

[23] Lisa Rosenberg, "Lobbyist Disclosure Enhancement Act Introduced," Sunlight Foundation: June 23, 2011, http://sunlightfoundation.com/blog/2011/06/23/lobbyist-disclosure-enhancement-act-introduced/. (accessed May 13, 2014).

[24] White House. *Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure*. (2009): ii. http://www.whitehouse.gov/assets/documents/Cyberspace_Policy_Review_final.pdf (accessed May 16, 2014).

[25] Interview with a confidential source. All interviews granted to students were with the agreement of confidentiality. Names are withheld by mutual agreement between source and the Dwight D. Eisenhower School for National Security and Resourcing Strategy.

[26] Gen Keith Alexander address to the American Enterprise Institute, as quoted by Pierluigi Paganini, "Ponemon Statistics 2012," *Security Affairs, (*October 10th, 2012), http://securityaffairs.co/wordpress/9319/cyber-crime/ponemon-statistics-2012-on-cost-of-cybercrime.html (accessed December 9, 2014).

[27] Ibid.

[28] Nichole Jordan, W. Graham Tasman, Mark Springer and Jack Katz. "New Cybersecurity Framework Can Help Financial Services Firms Manage Risk." *Grant Thornton*, (October14, 2013), http://www.grantthornton.com/~/media/content-page-files/financial-services/pdfs/2013/BIS/102013_Cybersecurity_framework_financial_firms_FIN.ashx, (accessed May 13, 2014).

[29] Bank of America Corporation, *2012 Annual Report*. March 15, 2013, 4.

[30] Robin Sidel. "After Years of Growth, Banks Are Pruning Their Branches." *The Wall Street Journal*, March 31, 2013, http://online.wsj.com/news/articles/sp10001424127887323699704578326894146325274. (accessed May 13, 2014).

[31] Dinoj Surendran, University of Chicago, "Smart Card Technology and Security," Last modified 2000, http://people.cs.uchicago.edu/~dinoj/smartcard/security.html. (accessed March 17, 2014).

[32] Randy Vanderhoof, Testimony before the Committee on Science, Space and Technology, Subcommittees on Oversight and Research & Technology, March 4, 2014, http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-RVanderhoof-20140306.pdf (accessed May 16, 2014).

[33] EUROPOL, "Situation Report: Payment Card Fraud in the European Union," last modified September 20, 2012, https://www.europol.europa.eu/sites/default/files/publications/1public_full_20_sept.pdf. (accessed March 17, 2014).

[34] Randy Vanderfhoof, Testimony before the Committee on Science, Space and Technology, Subcommittees on Oversight and Research & Technology, March 4, 2014. http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-RVanderhoof-20140306.pdf. (accessed May 16, 2014).

[35] Statistic Brain, "Credit Card Ownership Statistics," last modified July 24, 2012, www.statisticbrain.com/credit-card-ownership-statistics/ (accessed March 22, 2014).

[36] FirstData, "EMV in the U.S.: Putting It into Perspective for Merchants and Financial Institutions," White Paper, www.firstdata.com/downloads.thought-leadership/EMV_US.pdf. (accessed March 22, 2014).

[37] Randy Vanderhoof, Testimony before the Committee on Science, Space and Technology, Subcommittees on Oversight and Research & Technology, March 4, 2014. http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-RVanderhoof-20140306.pdf (accessed May 16, 2014).

[38] FirstData, "EMV in the U.S.: Putting It into Perspective for Merchants and Financial Institutions," White Paper, http://www.firstdata.com/downloads/thought-leadership/EMV_US.pdf (accessed March 22, 2014).

[39] Federal Trade Commission, "Credit Card Loss Protection," www.consumer.ftc.gov/articles/0093-credit-card-loss-protection (accessed March 22, 2014).

[40] CardHub, "Credit Card and Debit Card Fraud Statistic," www.cardhub.com/edu/credit-debit-card-fraud-statistics (accessed March 19, 2014).

[41] A quick literature or web search for "retail store performance metrics" will bring up a multitude of industry-wide performance metrics, but steps to reduce credit card fraud is nowhere to be found.

[42] Tom Groenfeldt, "American Credit Cards Improving Security with EMV, At Last," *Forbes*, last modified January 28, 2014, http://www.forbes.com/sites/tomgroenfeldt/2014/01/28/american-credit-cards-improving-security-with-emv-at-last (accessed March 20, 2014).

[43] Randy Vanderhoof, Testimony before the Committee on Science, Space and Technology, Subcommittees on Oversight and Research & Technology. March 4, 2014.

http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-RVanderhoof-20140306.pdf (accessed May 16, 2014).

[44] TSYS White Paper, "U.S. EMV Adoption," last modified June 2012, http://www.tsys.com/acquiring/engage/white-papers/United-States-EMV-Adoption.cfm. (accessed March 17, 2014).

Bibliography

Alexander, Keith. Address to the American Enterprise Institute, as quoted by Pierluigi Paganini, "Ponemon Statistics 2012." Security Affairs, October 10th, 2012. Accessed December 9, 2013.http://securityaffairs.co/wordpress/9319/cyber-crime/ponemon-statistics-2012-on-cost-of-cybercrime.html.

Bank of America Corporation, 2012 Annual Report. March 15, 2013, 4.

Batkins, Sam and Ike Brannon, "The Unknown Costs of Dodd-Frank." Regulation. Vo1 36 no. 3: 405. The Cato Institute, 2013. http://object.cato.org/sites/cato.org/files/serials/files/regulation/2013/9/regv36n3-8n.pdf.

Blinder, Adam. "From Bear to Lehman: Inconsistency was the Hobgoblin." In After the Music Stopped. New York: Penguin Books, 2013.

Botwin, Brad. "Defense Industrial Base to Drawdowns." Class Lecture, Dwight D. Eisenhower School for National Security and Resource Strategy, National Defense University, Washington, D.C., March 26, 2014. Permission granted March 28, 2014.

Bracken, Paul. "Financial Warfare." Foreign Policy Research Institute E-Note, September 2007. Accessed March 26, 2014. https://www.fpri.org/enotes/200709.bracken.financialwarfare.html.

CardHub. "Credit Card and Debit Card Fraud Statistics." Accessed March 19, 2014. www.cardhub.com/edu/credit-debit-card-fraud-statistics.

Data taken from the US Department of the Treasury, "Major Foreign Holders of Treasury Securities," April 2014.Accessed May 16, 2014.http://www.treasury.gov/ticdata/Publish/mfh.txt

Data taken from The Washington Post, "Further sanctions against Russia are outlined, tied to Ukraine's presidential election", May 8, 2014. Accessed 12 May 2014. http://www.washingtonpost.com/world/national-security/further-sanctions-against-russia-are-outlined-tied-to-ukraines-presidential-election/2014/05/08/c1841320-d6de-11e3-95d3-3bcd77cd4e11_story.html.

EUROPOL, "Situation Report: Payment Card Fraud in the European Union." Last modified September 20, 2012. Accessed March 17, 2014. https://www.europol.europa.eu/sites/default/files/publications/1public_full_20_sept.pdf.

Federal Deposit Insurance Corporation. "Community Banking Study." (Dec 2012): 1. Accessed March 13, 2014.http://fdic.gov/regulations/resources/cbi/report/cbi-full.pdf.

Federal Deposit Insurance Corporation. "Statistics at a Glance." Last modified February 16, 2014. http://www.fdic.gov/bank/statistical/stats/2013dec/fdic.html.

Federal Deposit Insurance Corporation. “Statistics at a Glance.” Last modified February 16, 2014. http://www.fdic.gov/bank/statistical/stats/2013dec/fdic.html.

Federal Reserve.H8 report, Economic Research. “Assets and Data, Liabilities of Commercial and Industrial Loans in the United States Weekly -H.8.” Accessed April 10, 2014. http://www.federalreserve.gov/releases/h8/current/#fn1.

Federal Trade Commission. “Credit Card Loss Protection.” Accessed March 22, 2014.www.consumer.ftc.gov/articles/0093-credit-card-loss-protection.

Financial Stability Oversight Council. “Study and Recommendations Regarding Concentration Limits on Large Financial Companies.” January 2011, 5 - 7. http://www.treasury.gov/initiatives/Documents/Study%20on%20Concentration%20Limits%20on%20Large%20Firms%2001-17-11.pdf.

FirstData. “EMV in the U.S.: Putting It into Perspective for Merchants and Financial Institutions.” White Paper. Accessed March 22, 2014. www.firstdata.com/downloads.thought-leadership/EMV_US.pdf.

FirstData. “EMV in the U.S.: Putting It into Perspective for Merchants and Financial Institutions.” White Paper. Accessed March 22, 2014. http://www.firstdata.com/downloads/thought-leadership/EMV_US.pdf

Groenfeldt, Tom. Forbes. “American Credit Cards Improving Security with EMV, At Last.” Last modified January 28, 2014.Accessed March 20, 2014. http://www.forbes.com/sites/tomgroenfeldt/2014/01/28/american-credit-cards-improving-security-with-emv-at-last.

Haider, Zesshan, “Industry Report 52211: Commercial Banking in the US,” IBISWorld, March 2014; Stephen Hoopes, “Industry Report 52311: Investment Banking and Securities Dealings in the US,” IBISWorld, February 2014.

Hammond, Susannah and Jane Walshe. “Cost of Compliance Survey 2013.” Thomas Reuters, 2013.http://accelus.thomsonreuters.com/sites/default/files/GRC00186.pdf.

Jordan, Nichole W. Graham Tasman, Mark Springer and Jack Katz. “New Cybersecurity Framework Can Help Financial Services Firms Manage Risk.” Grant Thornton, October14, 2013. http://www.grantthornton.com/~/media/content-page-files/financial-services/pdfs/2013/BIS/102013_Cybersecurity_framework_financial_firms_FIN.ashx.

Office of Financial Research. “2013 Annual Report.” December 2013, 11.

Porter, Michael E. “The Five Competitive Forces that Shape Strategy.” Harvard Business Review (January 2008): 78-93.

Rosenberg, Lisa. “Lobbyist Disclosure Enhancement Act Introduced.” Sunlight Foundation: June 23, 2011. Accessed May 13, 2014. http://sunlightfoundation.com/blog/2011/06/23/lobbyist-disclosure-enhancement-act-introduced/.

Sidel, Robin. “After Years of Growth, Banks Are Pruning Their Branches.” The Wall Street Journal, March 31, 2013. Accessed on May 13, 2014 http://online.wsj.com/news/articles/sp10001424127887323699704578326894146325274.

“Shadow Banking: The Lure of Shadow Banking.” The Economist, May 10, 2014. Accessed May 15, 2014. http://www.economist.com/news/leaders/21601826-shadow-banks-helped-cause-financial-crisis-better-regulated-they-could-help-avert-next.

Statistic Brain.“Credit Card Ownership Statistics.” Last modified July 24, 2012.Accessed March 22, 2014. www.statisticbrain.com/credit-card-ownership-statistics/.

Surendran, Dinoj. University of Chicago, "Smart Card Technology and Security." Last modified 2000. Accessed March 17, 2014.http://people.cs.uchicago.edu/~dinoj/smartcard/security.html.

The White House. National Security Strategy. Washington, DC: White House, 2010, 9. http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf.

TSYS White Paper. “U.S. EMV Adoption. Last modified June 2012.Accessed March 17, 2014.http://www.tsys.com/acquiring/engage/white-papers/United-States-EMV-Adoption.cfm.

U.S. Security and Exchange Commission, Testimony on “Perspectives on Money Market Mutual Fund Reforms.” Chairman Mary L. Schapiro U.S. Securities and Exchange Commission. June 21, 2012

Under Secretary of Defense for Acquisition, Technology, and Logistics, “Annual Industrial Capabilities Report to Congress.” October 2013. Pg. 2.

Vanderhoof, Randy. Testimony before the Committee on Science, Space and Technology, Subcommittees on Oversight and Research & Technology. March 4, 2014.http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-RVanderhoof-20140306.pdf.

White House. Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure. (2009): ii. http://www.whitehouse.gov/assets/documents/Cyberspace_Policy_Review_final.pdf

Zarate, Juan. “Treasury’s War.” Public Affairs (2013): New York.

Appendix A: Methodology and Model Development

This Appendix describes the overall methodology employed in the development of this report. It enumerates the theoretical basis, information collection and analysis approach, and several of the models created to generate better understanding of the underlying architecture and structure of the industry. The discussion begins with a macro-level depiction of the Eisenhower School framework used in conducting the industry study program as a whole, with attendant emphasis on the academic and theoretical basis this approach provides to the industry study seminar participants. This is followed with abbreviated descriptions of the analytical approach used to determine the four major thrusts in the report, the systems-level model used to identify industry-wide dynamics, and a regulation-innovation model used to assess the interactions between these two significant factors in the industry.

Methodology

The methodology employed by the Eisenhower School for the industry study course is depicted in Figure 5.

Figure 5. Industry Study Methodology Overview.

The theoretical underpinning was established through multiple courses conducted across the Fall and Spring semesters. These include macroeconomics, basic market theory, and a comprehensive country analysis course to establish a baseline for thinking through the dynamics between national security and economic elements of US national power. These courses are augmented by various electives and the diverse experience of mid-career professionals that come to the industry study from various branches of the Department of Defense, the US government interagency, industry, and international partners. Industry-specific domain knowledge is enhanced during the academic portion of the course by tailoring the readings, case studies, group projects, and individual research assignments to subject matter and firms that are central to

understanding the industry analyzed. As the academic schedule unfolds, visits to key government agencies, firms, think tanks, and industry advocate groups are integrated into the weekly schedule. The "on-the-ground" perspective of the professionals working the day-to-day challenges provides a potent venue to expand the industry study beyond the purely academic and into the real world. This concurrent academic-visit approach can be difficult at times with respect to building a logical flow of knowledge transfer, but the synergy achieved with the diversity in perspective and frank discussions of "how things really work" far outweigh the disadvantages.

Ultimately, the industry study takes the combined results of the academics and eyewitness visits to synthesize a position with respect to the health of the industry and its ability to contribute to the US's national security posture. The analysis is a combination of insights gleaned from discussions on visits, the use of frameworks introduced in course material, and the development of context-specific models to help further refine or explain the observations described earlier.

Determining Strategic Drivers in the Financial Services Industry

The approach for determining key strategic drivers within the FSI required an iterative approach between subjective inputs and observations collected over the course of three months of academics and visits, and a more rigorous process to organize and prioritize the issues using a meaningful taxonomy. Table 1 captures the intermediate-stage product that was ultimately used to converge the analysis to four basic dimensions: risk, regulation, globalization, and technology.

Problem Area	Considers multiple perspectives (stakeholders) - 10 pts	Impact or risk to National Security & Industry - 9 pts	Demonstrates central importance of financial services industry - 7 pts	Asseses backward or forward trajectory of policy outcomes - 6 pts	Has a regional/global perspective - 5 pts	Does it ID a new concept or add to the dialogue - 3 pts	Total
1. Risk	9	9	9	9	9	3	114
2. Regulation	9	9	9	9	9		111
3. Trends	9	9	3	9	9		97
4. Cyber	9	9	9		9	3	96
5. Innovation	3	3	9	9	9	3	76
6. Transparency	9	3	3	9	3		69
7. Mortgage	3	3	9	9	3		63
8. Structure	3	3	9	3		3	49
9. Defense Industrial Base	3	9				9	46
10. Education	3	3	3			9	35
11. Miscellaneous							0
Total	10	10	9	7	7	6	

Table 1. Strategic Driver Matrix.

The analysis started with a discussion about the characteristics or attributes the seminar team considered to be the most important given the unique perspective and access provided by

the industry study venue. These characteristics were listed across the top of the table as column headings and given a relative weighting between 1-10 points to capture the seminar's perspective on their relative importance to the analysis. A brainstorming session followed in which each member of the seminar listed what they considered to be the top drivers or issues in financial services resulting in 52 unique inputs. These in turn were sorted into groups of similar categories listed down the left side of Table 1. Each category was then scored against the characteristics using a quality functional deployment scoring scheme of 0 (no impact), 3 (some impact), and 9 (high impact) to assess the relative importance of that category to the analysis. Table 1 was then sorted with the highest weighted category at the top and the lowest weighted categories at the bottom.

Detailed analysis using these specific strategic drivers revealed the need to consolidate some of these areas and expand others. Risk and regulation remained as stand alone factors in the analysis, but it became apparent very quickly that globalization, which was not explicitly identified as a category, was a major undercurrent in many of the individual drivers. Likewise, transparency and innovation were determined to be ubiquitous across the industry, and the decision was made to treat these as integrating forces across all of the key factors where they exerted the most influence. The last area, technology, resulted from the realization that cyber issues, a key element within the technology category, did not have adequate scope to address other dynamics in the industry resulting from things like high frequency trading, dark pools, advanced algorithms for big data exploitation, or the explosive growth of mobile and online banking trends. To accommodate this expanded understanding of the industry, cyber was pulled under the broader banner of "technology" which allowed for a more robust discussion of several of these other factors in the industry. Finally, the decision to move "trends" into a separate section of the document was made based on the need to distinguish between the observations and facts surrounding the functioning of the industry in the current environment and the deeper analysis done for developing recommendations.

Financial Services as a System of Systems

A major challenge in any industry study is the sheer complexity of the interactions. This is especially true of the FSI that has such a high degree of interdependent relationships within the industry, across adjacent markets, into the US national economy as a whole, and ultimately across national borders to global financial markets. Due to this complexity, the ability to understand how the basic structure of the industry operated, what various stakeholder incentives and motivations were, and how the specifics of a given issue drove dynamics at an industry-wide level were difficult-to-impossible to discern at a surface level.

In an effort to control the complexity and reduce the ambiguity in the relationships, a system-of-systems approach was applied to the industry using Porter's Five Forces as the underlying basis for identifying key stakeholders and the primary market forces at work between them. An incentives-based filter was applied to each pair-wise interaction to determine how each stakeholder group was likely to respond to a given issue based on the technical, economic, and political architecture in place at the time. The approach also provided the means to assess the stability of the system by analyzing how well balanced the technical, economic, and political

architectures were in the system. If all three architectures were in relative alignment, the financial system would be expected to remain stable, much like a three-legged stool with equal length legs. The further these architectures diverged for an issue, the less stable the financial system could be expected to behave. Finally, the model could also be used to assess how well-matched the various stakeholder incentives were to the three architectures to predict where future activity is likely to occur to either exploit advantages or to attempt to re-establish better alignment. Figure 6 provides a graphical depiction of this model. The diamond in the middle represents the FSI itself, the colors represent major categories of the same type of stakeholders, and the weight of the lines indicate the type of relationship and the strength of the connection. Bolder lines represent higher levels of interaction, and dotted lines indicate indirect relationships through intermediate stakeholders not depicted in the model.

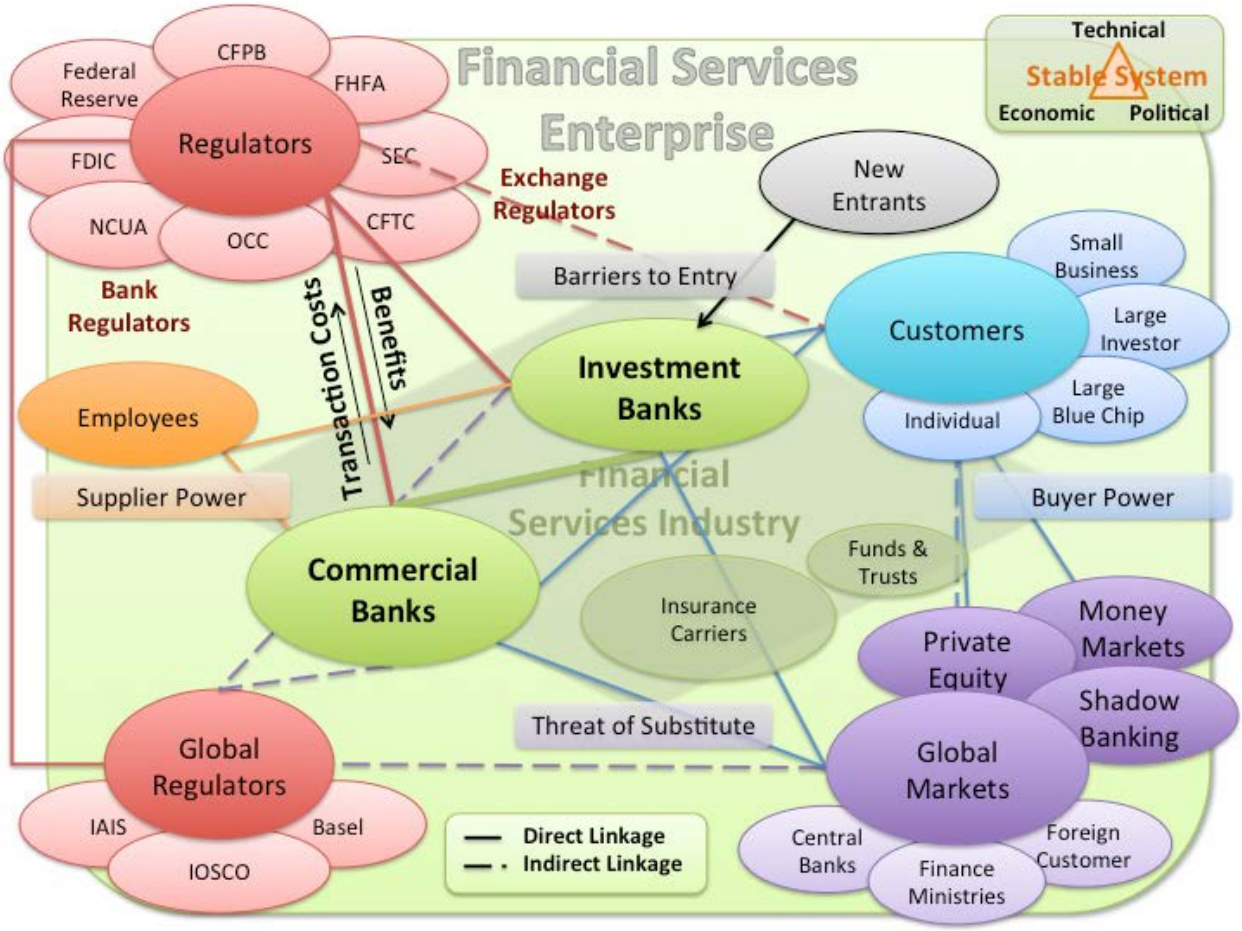

Figure 6. System-of-Systems Model of the Financial Services Enterprise.

Validating the model was beyond the scope of the industry study effort; however, to the extent the model was applied to issues under consideration such as cybersecurity and regulatory arbitrage, results were consistent with data collected from firms and other industry participants on those topics. It is provided here as a way to help the reader understand and think through the complexity of even the simplest issue in the FSI. Even relatively "straight forward" problems

like prohibiting insider trading turn into wicked challenges with second- and third-order implications and adverse knock-on effects across the industry.

Regulation and Innovation: A model for mixing oil and water

Some issues require a more detailed and nuanced deep dive to get to the bottom of how they impact the industry as a whole. The topic of how regulation and innovation interact in the financial system is one such subject. An early investigation into the topic revealed that an approach that modeled regulation in simple opposition to innovation failed to reflect reality. As a result, a more sophisticated approach was developed in an effort to accurately reflect the dynamics observed in the industry.

Figure 7 is a graphical depiction of the model. For this analysis, regulation and innovation create a two dimensional space in which to analyze a particular issue. The objective is to create mutually reinforcing regulation and innovation dynamics that will push activity into the upper right quadrant of the space. An example analysis for collateralized debt obligations is depicted on the right-hand side of the figure to help the reader visualize how the results of this analysis might be depicted.

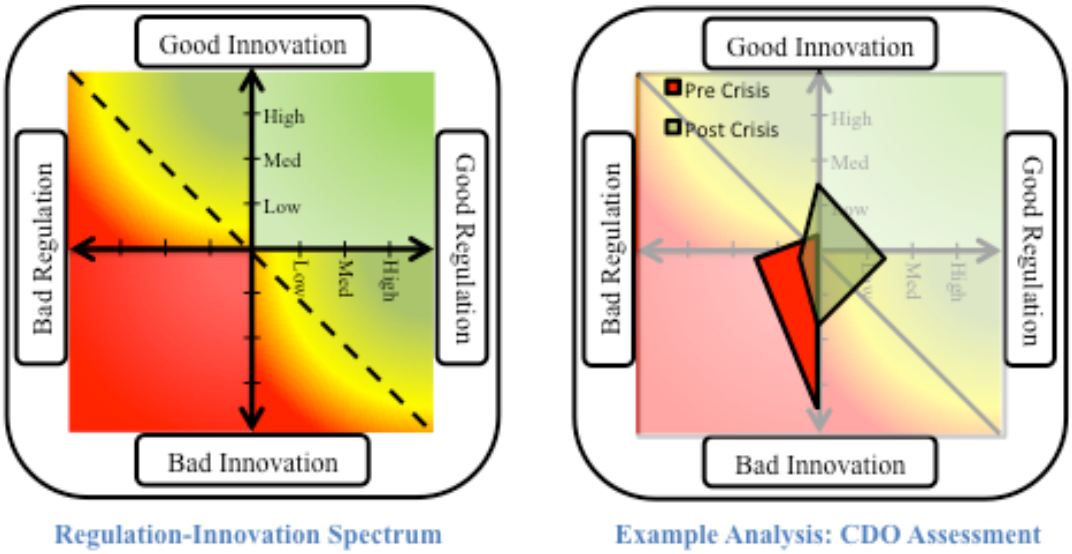

Figure 7. Regulation - Innovation Model.

The most desired quadrant is the good-innovation and good-regulation sector. This sector has positive outcomes for the industry and the economy like expanded GDP growth, increased real incomes, reduced risk, and decreased market concentration. The least desired quadrant is bad-innovation and bad-regulation where boom and bust cycles are exaggerated, markets are distorted and perverse incentives increase risk. The two remaining sectors indicate that, to some degree, good innovation or good regulation may provide mitigating effects as long as the associated bad innovation or bad regulation forces are not too strong. Finally, the dashed line bisecting the model from left to right indicates an overall system equilibrium line. To properly locate a particular regulation-innovation issue on the spectrum, a utility function was

developed to aggregate multiple characteristics into a single, nondimensionalized score for each axis. The below equation provides the structure for formulating this utility function for the innovation dimension.

$$f(\text{Good Innovation}) = \frac{\sum Good\ Attributes}{Number\ of\ Good\ Attributes}$$

The characteristics used in the utility function are listed in Table 2. By scoring each attribute for utility in both innovation and regulation, a rolled up score can be generated and plotted in the space depicted in Figure 7.

	Attribute
Good Innovation	Spread of products & services
	Increased economic efficiencies
	Proper allocation of risk
	Economic growth
Bad Innovation	Exaggerated boom-bust cycle
	Decreased market efficiencies
	Increased systemic risk
Good Regulation	Protects consumers & investors
	Orderly and efficient markets
	Market stability
	Reduces risk
Bad Regulation	Cost outweigh benefits
	Distorts markets
	Economic inefficiency
	Perverse Incentives

Table 2. Attribute Criteria for Assessing Regulation and Innovation Utility.

Enclosure 1: Glossary

Basel III: the Third Basel Accord is a global, voluntary regulatory standard on bank capital adequacy, stress testing and market liquidity risk.

Capital: wealth in the form of money or other assets owned by a person or organization or available or contributed for a particular purpose such as starting a company or investing.

CNP Transaction: Card not present transaction.

Collateralized Debt Obligations: is a type of structured asset-backed security (ABS). Originally developed for the corporate debt markets, over time CDOs evolved to encompass the mortgage and mortgage-backed security ("MBS") markets.

Dodd-Frank: Wall Street Reform and Consumer Protection Act, commonly referred to as simply "Dodd-Frank", is supposed to lower risk in various parts of the U.S. financial system.

EMV: stands for Europay, MasterCard and Visa, a global standard for inter-operation of integrated circuit cards (IC cards or "chip cards") and IC card capable point of sale (POS) terminals and automated teller machines (ATMs), for authenticating credit and debit card transactions.

High Frequency Trading: is a type of algorithmic trading, specifically the use of sophisticated technological tools and computer algorithms to rapidly trade securities. HFT uses proprietary trading strategies carried out by computers to move in and out of positions in millisecond timeframes.

Leverage: The amount of debt used to finance a firm's assets. A firm with significantly more debt than equity is considered to be highly leveraged.

Liquidity: The degree to which an asset or security can be bought or sold in the market-without affecting the asset's price. Liquidity is characterized by a high level of trading activity.

Liquidity Coverage Ratio (LCR): Highly liquid assets held by financial institutions in order to meet short-term obligations. The Liquidity Coverage Ratio is designed to ensure that financial institutions have the necessary assets on hand to ride out short-term liquidity disruptions.

Macro-Prudential Risk: A method of economic analysis that evaluates the health, soundness and vulnerabilities of a financial system.

Market Based Risk: The risk of losses in positions arising from movements in market prices.

Monopolistic Competition: A type of imperfect competition such that many producers sell products that are differentiated from one another (e.g. by branding or quality) and hence are not perfect substitutes.

Off Balance Sheet (OBS): An asset or debt that does not appear on a company's balance sheet.

Oligopoly: A situation in which a particular market is controlled by a small group of firms.

Over the Counter Derivatives: Also known as "unlisted stock", these securities are traded by broker-dealers who negotiate directly with one another over computer networks and by phone.

Porter's Five Forces: A framework for industry analysis and business strategy development. It draws upon industrial organization (IO) economics to derive five forces that determine the competitive intensity, and therefore attractiveness, of a market.

Regulatory Arbitrage: A practice whereby firms capitalize on loopholes in regulatory systems in order to circumvent unfavorable regulation.

Return on Equity (ROE): The amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested.

Risk: The chance that an investment's actual return will be different than expected. Risk includes the possibility of losing some or all of the original investment.

Systemically Important Financial Institution (SIFI): Is a bank, insurance company, or other financial institution whose failure might trigger a financial crisis.

Swap Financial Derivatives: A derivative transaction in which one party guarantees a fixed value for the total asset holdings of an entity over a certain period of time. Under a price swap derivative, if the value of the guaranteed assets declines, the counterparty is obligated to deliver stock or other collateral in order to offset any losses.

Tier One Capital: A term used to describe the capital adequacy of a bank. Tier I capital is core capital, this includes equity capital and disclosed reserves.

Enclosure 2: Consolidated List of Recommendations

Risk: You can't live with it… and you can't live without it

Recommendation: *Identify the extent to which domestic and global risk is flowing through the financial services enterprise to better understand macro-prudential risk exposure across markets.* This can be facilitated by monitoring the effectiveness of LCR and stress tests while developing additional leading indicators designed to evaluate systemic resiliency to macro-prudential shocks, market opacity, and growing complexity. Specific areas of concern include the money market, shadow banking, student loan and insurance sectors of the industry, which are particularly opaque, complex, or have incentive misalignments among stakeholders. A Federal agency with responsibilities across the entire market, such as the Financial Stability Oversight Council (FSOC) with possible delegation to the Office of Financial Research (OFR) should address this task. (Page 9)

Recommendation: Focus on improving and testing the resolution plans for SIFIs through more comprehensive stress tests engaging the full spectrum of government and business entities while also expanding the scope of stress tests to include not only the firm's ability to execute to plan, but also the role of government regulators. *Creating credible resolution capacity in the financial system will do more to minimize the macro-prudential risk in the system than any other single activity*. The Federal Deposit Insurance Corporation (FDIC) and the Federal Reserve should co-lead the effort to expand the organizational scope and depth of stress tests. (Page 9)

Recommendation: Reduce the risk of bank failures through better alignment of industry stakeholder incentives by utilizing broader market-based approaches rather than additional regulatory guidance. For instance, a "bail-in" construct that converts bank bondholders to equity owners in the event of a bank failure would reduce the need for government bank guarantees and mitigate moral hazards inherent in "bail-out" systems by keeping bondholder capital at risk for poor investment decisions. To deter ethically or legally questionable behavior, introduce a criminal standard of "recklessness" similar to that found in the United Kingdom. These recommendations should be championed by the Treasury Department with follow-on implementation through the appropriate department and agency offices. (Page 9)

Regulation: A Two-Edged Sword that Cuts both Ways

Recommendation: *Pursue alternative funding streams for regulatory agencies* currently relying exclusively on public funding (e.g., the Commodity Futures Trading Commission) and provide them with the tools to attract the talent and experience needed for more effective rule development and regulatory action. Self-funding for regulatory agencies provides a greater degree of flexibility in hiring needed talent, adapting to changing markets, and building information technology to become more effective and efficient. This would require a joint effort on the part of Congress, the Treasury Department, and Industry. (Page 11)

Recommendation: *Encourage further collaboration and cooperation between regulatory agencies to help reduce overlap and eliminate gaps in regulatory oversight functions.* Specific actions include further refinement of missions or charters, more liaison or exchange of

personnel between organizations, and better operational-level integration between agencies focused on a more effective and efficient government-wide regulator environment. The Financial Stability Oversight Council should spearhead this effort. (Page 11)

Recommendation: *Change the economic incentives for rating agencies and firms to reduce moral hazards.* Potential courses of action include funding rating agencies through transaction fees or an industry tax, directly funding a third-party rating agency provider using taxpayer dollars or industry fees, or creating a Self-Regulating Organization funded by industry. The Securities and Exchange Commission (SEC) should be tasked with the development and implementation of a revised structure. (Page 11)

Recommendation: *Increase transparency and accountability by requiring financial lobbying organizations to publicly disclose the context and content of information* they provide to lawmakers or other government officials. Legislation such as the Lobbyist Disclosure Enhancement Act introduced by Representatives Quigley and Polis in 2011 would make significant strides in improving transparency in the system. Near real-time reporting and disclosure regulation would go even further in helping the public understand the stakeholders and factors influencing the decision-making process. The Senate Committee on Banking, Housing, and Urban Affairs or the House Committee on Financial Services should consider efforts to return this bill to the floor for a vote. (Page 12)

Globalization: It's a Small World after All

Recommendation: *Aggressively pursue macro-prudential regulatory equivalency standards between US and EU regulatory regimes* to help mitigate regulatory arbitrage in a timely fashion. Near-term activity should focus on achieving outcome-based results to mitigate the present challenges of differing financial system structures between countries, and to secure global standards that are consistent with US and EU financial principles. The long-term objective should be a harmonization of not only regulatory outcomes but also full financial system structural congruence. This should be a collective effort between the Financial Stability Oversight Council (FSOC) and Financial Stability Board (FSB). This could be further delegated to the Commodity Futures Trading Commission (CFTC) and SEC to work with the International Organization of Security Commissions (IOSCO) on security-specific issues. (Page 13)

Recommendation: *Establish robust international standards for conducting, assessing, and reporting the results of stress tests and resolution plans* across differing regulatory regimes and financial system structures. In the mid-term, develop and promulgate similar standards for market opacity and overall system complexity commensurate with the leading indicator metrics recommended for the US FSI. This should be a collective effort between the Federal Reserve and FSOC in conjunction with the FSB. (Page 14)

Technology: Ride the Wave or Get Crushed

Recommendation: *Establish a public-private partnership to spearhead a joint government-industry effort to rapidly advance the US financial services' cybersecurity posture*. Use this organizational entity as the development and implementation arm for other cyber-related best practices and as the interface to other industries and government organizations working

similar issues. This could be tasked to the Information Systems Security Association (or similar body) for implementation. (Page 16)

Recommendation: *Accelerate implementation of existing cybersecurity standards* through a phased program to increase information flow, transparency, and accountability while preserving industry's speed and flexibility to adapt to rapidly changing threat vectors. The Treasury Department should lead this effort as the organization responsible for coordinating the FSI as an identified critical infrastructure component. (Page 16)

Recommendation: *Establish a venue for providing focus and incentives for accelerating good innovation within the industry* by sponsoring challenges, making seed money available for exploring new concepts, and creating a forum in which to pool industry resources to solve common, industry-wide problems. A major thrust of this effort would be innovative approaches for reducing overhead costs and complexity of regulatory compliance or developing alternative frameworks to assist firms in reconciling structural differences between global markets. The best analogue would be comparable efforts in the DoD using Cooperative Research and Development Agreements between industry and government for mutually beneficial research and development activities. (Page 16)