Treasury Management
Concepts for Colleges and Universities

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Jon K. Speare

Jon is an Executive Director of The Treasury Institute for Higher Education, an independent not for profit organization that promotes excellence in treasury and financial management through developing educational programs. Since the Institute’s founding in 2000, Jon has overseen the facilitation of over sixty programs developed for senior managers of the largest universities in the country. In addition to his work with the Institute, Jon was a Managing Director and Group Head for Commonfund, an investment service provider to schools, universities and other not for profit organizations. He had been with Commonfund for over twenty years in various investment and client service roles, including Head of Treasury/Short Term Investments, the Investor Resource Client Service Group, the Strategic Treasury Solutions Team and the Treasury Access Program.

Jon has been a faculty member with the National Association of College and University Business Officers (NACUBO), the Professional Development Group, the College Business Management Institute and has written articles for Robert Morris Associates, NACUBO, The Association for Financial Professionals’ Journal of Cash Management and Commonfund Institute. He has a B.A. from The Colorado College and an M.B.A. from Villanova University. Jon was a trustee of the Crozer Keystone Health System and a Finance Committee member of the Chester Community Improvement Project.
Treasury Management Defined

How you define Treasury Management

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Treasury Management Defined

The process of administering to the financial assets and holdings of a business.

The goal of most treasury management departments is to optimize the organization’s liquidity, make sound financial investments, mitigate financial risks, and provide useful reporting.

Source: Businessdictionary.com
Treasury Management Defined

“Our team manages the University’s checkbook, savings, short-term investments, and borrowings, along with related systems and information.

And we work on a lot of special projects.”
Treasury Management

“…the discipline of effectively managing cash from the moment a claim for cash is established until an application for disbursement is satisfied.”

• OR

“…having the right amount of money in the right place at the right time.”
# Basics of Treasury Management

## The Fundamentals

### Short-term
- Daily liquidity management
- Cash resources and availability
- For operations

### Long-term
- Finance functions
- Funds and information/data availability
- For initiatives to support financial objectives

Source: AFP 2018 CBMI
Basics of Treasury Management

The Daily Details

- Complete cash position worksheet
- Monitor cash/liquidity balances
- Collect, concentrate and disburse
- Short-term investing and borrowing
- Research and reconcile exceptions
- Coordinate with A/R, A/P, tax, accounting

Source: AFP

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Treasury Management Responsibilities

- Oversee daily liquidity and cash management
- Collection & Disbursement
- Concentration
- Information Gathering & Analysis
- Forecasting
- Investments
- Negotiate External Financing
- Risk Management & Compliance
- Manage Relationships with Banks & Providers
- Internal Consulting

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Where Treasury Fits in a University

- BOARD OF TRUSTEES
- PUBLIC/DONORS
- INTERNAL AUDITOR
- PRESIDENT
- EXTERNAL AUDITORS
- VP FINANCE/CFO
- ENDOWMENT/CIO
- TREASURER
- CONTROLLER
- TAX AND REPORTING
- CASH MANAGEMENT
- RISK MANAGEMENT
- INVESTMENT MANAGEMENT
- VENDOR (BANK) RELATIONS MANAGEMENT
- EXTERNAL FINANCING
- ACCOUNTING
- FP&A
- MANAGEMENT INFORMATION SYSTEMS
- CREDIT & A/R
- A/P

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Treasury Collaboration - INTERNAL

Source: AFP 2018 CBMI
Treasury Collaboration - EXTERNAL

Source: AFP

2018 CBMI
Role of Board of Directors in Treasury

- General authority for operations
- Policies, major initiatives and contracts

Treasury

- Open, close and modify bank accounts
- Establish credit facilities
- Oversee investments
- Issue debt and equity securities
- Devise, implement and execute risk management

Source: AFP 2018 CBMI
A former University of Miami finance director embezzled $2.3 million from the college by falsifying bills for a bogus vendor and depositing the ill-gotten payments into the bank account of a fabricated business she had set up to hide the income, authorities said.

Kimberly Jean Miller, 58, who worked as the finance director of the UM Rosenstiel School of Marine and Atmospheric Science, pleaded guilty to four counts of tax evasion on Tuesday in Miami federal court.

Miller, who was charged in late March, faces between three and four years in prison at her sentencing before U.S. District Judge Robert Scola on Aug. 16.
Essex College Administrator Is Placed on Leave Amid Investigation

By JEFFERY C. MAYS  SEPT. 21, 2017

The Essex County College administrator accused of causing problems at the troubled two-year school was placed on paid administrative leave on Tuesday by the trustees while an investigation is conducted into allegations of financial abuse.

The administrator, Joyce Harley, the vice president for administration and finance, was accused by the school’s president of buying a half-million-dollar copier without prior approval, taking improper leaves and paying her personal cellphone bill with school money. Anthony Munroe, the college president, made the accusations against Ms. Harley in a Sept. 6 letter to the board of trustees. She has denied any wrongdoing and last week countered, accusing Mr. Munroe of misusing relocation funds.
Treasury Management Strategy

80% of survey respondents believe that treasury is currently playing a more strategic role at their organizations than in the past three years.

80% of finance professionals agree that the treasury function will be playing a greater strategic role three years from now.

73% of treasury professionals report that the close attention paid by senior management and the Board to the companies’ liquidity and risk exposure is a primary reason for treasury playing a greater strategic role at companies.

Source: 2017 AFP Strategic Role of Treasury Survey
THE U.S. FINANCIAL SYSTEM
U.S. Regulatory Environment

- History of Bank Regulations
- Banking in the 1920’s
- Impact of 1929 stock market crash
- Glass-Steagall Act (1933)
- Banking Deregulation (Gramm-Leach-Bliley Act – 1999)
- Financial Crisis of 2007-2010
- Banking Re-regulation (Dodd-Frank Wall Street Reform and Consumer Protection Act – 2010)
U.S. Financial Regulations

Financial Stability Oversight Council (FSOC)
Chair by Secretary of Treasury
Members from Other Regulators

Federal Deposit Insurance Corp. (FDIC)
National Credit Union Administration (NCUA)
Commodity Futures Trading Commission (CFTC)
Office of Foreign Assets Control (OFAC)
Financial Crimes Enforcement Network (FinCEN)
Office of Financial Research (OFR)
Federal Insurance Office (FIO)
Office of the Comptroller of the Currency (OCC)
Department of Justice (DOJ)

Regulation of Depository Institutions
(Banks, Thrifts and Credit Unions)

Federal Reserve
Board of Governors
Reserve Banks
Securities and Exchange Commission (SEC)

State Banking, Insurance and Securities Boards and Commissions

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U.S. Financial Regulations

Changes under Dodd-Frank

• Financial Stability Oversight Council (FSOC) -
  – Secretary of The Treasury serves as chair

Bureau changes under The Treasury

• Office of Financial Research (OFR) added
• Financial Insurance Office (FIO) added
• Office of Thrift Supervision (OTS) eliminated – responsibilities taken over by OCC
U.S. Financial Regulations

Emerging Regulations

• Cryptocurrency Regulations
  – Made illegal for IPOs in China in 2017

• De-merging regulations – Dodd-Frank Repeal?
U.S. Financial Regulators

U.S. Dual Banking System
FSOC, OCC, Fed, FDIC
OFAC, FinCEN, NCUA, State boards, DOJ
Consumer Financial Protection Bureau (CFPB)
Commodity Futures Trading Commission (CFTC)
Financial Industry Regulatory Authority (FINRA)
Securities and Exchange Commission (SEC)
FIO, Office of Credit Ratings, Office of Financial Information
Securities and Exchange Commission

• Registers public offerings of debt and equity
• Sets financial disclosure standards for corporations that sell securities to the public
• Requires companies with publicly owned securities to file quarterly and annual financial statements

• Regulates mutual funds and investment advisors
• Monitors insider trading

Source: AFP 2018 CBMI
Dodd-Frank Act (2010)

- Derivatives transparency and accountability:
- Closes regulatory gaps
- Requires central clearing and exchange trading
- Requires market transparency
- Adds financial safeguards
- Sets higher standards of conduct

Response to near failure of US banking system in 2009 recession

Source: AFP 2018 CBMI
Payment Systems & Instruments Legislation

**EFTA (1978)**
- Customer rights, responsibilities and liability limits for non-wire EFTs

**DIDMCA (1980)**
- Deposit-taking Fed reserves
- Discount window
- Reduce/price float

- Digital signatures legal status

**Check 21 (2003)**
- Substitute of image in clearing process
- Payment system efficiency

Source: AFP 2018 CBMI
Bank Secrecy/Money Laundering Control

BSA (1970), MLCA (1986)

• Must report suspicious financial transactions
• Financial Institution defined broadly
• Now a crime to structure transactions to avoid reporting
• KYC, parties to large-value transfers, referrals

Source: AFP
USA Patriot Act (2001)

- Non-bank Financial Institution obligations
- Foreign banks in US subject to US jurisdiction
- US banks: no foreign shell bank correspondent accounts
- US credit card operators cannot authorize foreign banks to issue or accept US credit cards without steps to prevent terrorist use
- Requires due diligence

Source: AFP
Central Banks

Currency Issuance

Monetary Policy

Supervision and Regulation

Government Services

Depository Institution Services

Fed

ECB

Peoples Bank of China

Bank of England

Source: AFP 2018 CBMI
U.S. Federal Reserve Bank

Background

• Federal Reserve Act of 1913
• Foundation for the current banking system
• All banks with national charter from OCC to become Reserve banks
• National check collection and settlement system

Source: AFP 2018 CBMI
U.S. Federal Reserve Bank

Composition

- Board of Governors
- Federal Open Market Committee (FOMC)
- Federal Reserve Banks
  - 12 banks and 24 branches

Principal Roles

- Monetary Policy
- Supervision and Regulation
- Government Services
- Depository Institution Services

Source: The Treasury Academy
U.S. Federal Reserve Bank

Policy making exercise
Monetary Policy at the Fed

• The Fed should conduct monetary policy in a way that:
  – Maximizes employment, promotes price stability and maintains moderate long-term interest rates

• Fed monetary policies influence the demand for, and supply of, credit at banks and other depository institutions
  – Discount rate
  – Reserve requirement
  – FOMC open market operations
  – Fed Funds target rate
Cash Management – Managing the Financial System

Financial Institution Offerings

- Depository accts & transaction services
- Short-term lending & investments
- Foreign exchange (FX)
- Information reporting
- Investment banking
- Trade services
- Agent & fiduciary services
- Risk management
- Consulting

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Cash Management & Banking

Financial Institution Capabilities

• Retail
• Commercial
• Institutional/Investment
Institutional/Investment Banks

• Underwriting/intermediary
• Facilitate mergers, acquisitions and divestitures
• Broker/financial advisor
• Issue stocks and bonds:
  – Origination
  – Underwriting
  – Distribution

Source: AFP 2018 CBMI
Other Financial Institutions

Savings & Loan Institutions
Credit Unions
Mutual Funds (MMFs)

Other Non-Bank FIs
  Industrial credit/capital companies
  Industrial banks
  Captive finance companies
  Factoring firms
  Insurance companies
  Pension funds
  Consumer finance companies

Source: AFP 2018 CBMI
Cash Management & Banking

Your favorite banking organization – why?
Selecting a Bank (RFP)

**Historic Priorities**
- Paper processing – Lockbox, deposits, etc.
- Controlled disbursement products
- Branches
- Transaction volume

**Commodity based**

**New Priorities**
- Non bank providers
- Card processing – First Data, Vantif...
- Technology
- ...Cloud
- Cyber security
- Non traditional incentives...beware

State of art based
Selecting The Right Provider

Historic Priorities

- Paper processing –Lockbox, deposits, etc.
- Controlled disbursement products
- Branches
- Transaction volume
- Commodity based

New Priorities

- Non bank providers
- Card processing –First Data, Vantiv…
- Technology …Cloud
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- State of art based
Cash Management & Banking

Receipts

- Currency and coin
- Check processing
- Electronic Receipts
  - Automated Clearing House (ACH)
  - Wire transfer
- Payment, clearing and settlement systems

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How Universities Collect

What are different ways you accept payments on Campus?

• Self-Service via Web payments
• Phone via IVR
• Cashier Back-Office
• Mail via Lockbox or Drop Box
• In Person via Cashier’s Window or Point-of-Sale

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Collecting Funds Owed

Goals

• Collect receivables in a cost-effective manner
• Update receivables quickly and accurately
• Convert collections into available funds as rapidly as possible

“Do we accept PayPal? We accept any method that pays, pal.”

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Sample US Business Check

PAY TO THE ORDER OF: ____________________________$ ___________ DOLLARS

ANYCOMPANY
1430 ANY STREET
ANYTOWN CA 90000

ANYTOWN BANK
1000 BANKING WAY
ANYTOWN CA 90000

Fed Office
Availability
Bank Location
Check Digit

AUXILLARY
ON-US
EPC
ROUTING/
TRANSIT
ON-US/ACCOUNT
#/CHECK SERIAL
# AMOUNT

e.g., 01-12 = Fed Reserve District

Source: AFP 2018 CBMI
Lockbox Advantages vs. Internal Processing

- Reduced mail and processing float time
- Improved access to remittance information
- Reduced risk and improved security
- Improved control and record keeping
- Uninterrupted service
- Scalability
- Proper segregation of duties

Source: AFP 2018 CBMI
Lockbox Paper Check Collection

1. Mail sent to P.O. box
2. Courier picks up mail; delivers to lockbox facility
3. Mail sorted by bank staff
   - Remittance data captured using OCR scanners
     - Remittance data transferred to government
     - Posting to internal financial system (government process)
   - Data on checks captured using MICR scanners
     - Checks deposited at bank (non-matching or exception items processed separately)
     - Check clearing begins (bank process)

Source: GFOA 2018 CBMI
Local Paper Check Processing

Check Image Capture

Remote Deposit Capture

All positives on this service?

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Local Paper Check Processing

Check Image Capture
Remote Deposit Capture

Issues
  Retention
  Image Quality
  Device Connection
  Data Security
  Cross-Currency Checks

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Electronic Receipts

Electronic Collections

- Wire Transfer
- ACH
- Check Conversion
- Credit Card
- Debit Card
- Campus Card

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Large-Value EFT/Wire Transfer

Sender/Payer

Beneficiary/Payee

Central Bank

Sender’s/Payer's Bank

Beneficiary’s/Payee’s Bank

Source: AFP
Large-Value EFT/Wire Transfer

- **RTGS**: individual, continual settlement
  - Fedwire
  - **CHAPS** (Clearing House Automated Payment System)
  - **LVTS** (Large Value Transfer System – Canada)
  - **CNAPS** (China National Advanced Payments System)

- **CHIPS**: Fed settled
  - Financial Institutions must have U.S. presence

- **TARGET2** and **SEPA**

Source: AFP
Account Identification: Bank ID Code (BIC)

**SWIFT Code**

- **Alphabetic Only**
  - Bank Code
  - ISO 3166-1 alpha-2 country code
  - Location Code
  - Branch Code (XXX for primary office)

- **Alphanumeric**

- **RTN**
  - 9-digit US routing
  - 8-digit Canadian routing similar

- **IBAN**
  - EBCS, now ISO
  - SWIFT managed
  - 34-digit alphanumeric
    - 2-digit country code
    - 2 check digits
    - Country’s BBAN

Source: AFP

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ACH

• Batch-process, store-and-forward system used for high-volume, low-value transactions

• Funds generally settled one or two business days after the file is released

• Same day ACH transactions were only on-us transactions until September 2016

• Multiple formats: ARC, POP, BOC, TEL, WEB
Small-Value Transfer Systems

Originator (Payer)  
ODFI

ACH Network

Receiver (Payee)  
RDFI

Credit Transaction Example

Source: AFP 2018 CBMI
Small-Value or ACH Systems

- Bacs, ECG or ACH
- Batch processed
- Value dated
- Credits or debits
- More payment information

- Giro now ACH
- Transactions
  - Payroll credits
  - Pre-authorized debits
  - Debit filters and blocks
- Cross-border ACH

Source: AFP

2018 CBMI
<table>
<thead>
<tr>
<th>Year</th>
<th>Checks Collected (MM’s)</th>
<th>ACH Transactions (MM’s)</th>
<th>FedWire Volume (MM’s)</th>
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<tbody>
<tr>
<td>2015</td>
<td>5,452</td>
<td>12,298</td>
<td>143</td>
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<tr>
<td></td>
<td></td>
<td>$20.0B</td>
<td>$835B</td>
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<td>2014</td>
<td>5,742</td>
<td>11,620</td>
<td>135</td>
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<td>$19.9B</td>
<td>$884B</td>
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<td>2013</td>
<td>5,988</td>
<td>11,143</td>
<td>134</td>
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<tr>
<td></td>
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<td>$19.6B</td>
<td>$713B</td>
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<td>2007</td>
<td>10,001</td>
<td>9,363</td>
<td>134</td>
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<td>$14.5B</td>
<td>$671B</td>
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<td>2000</td>
<td>16,994</td>
<td>3,812</td>
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<td>$11.6B</td>
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<td>1990</td>
<td>18,595</td>
<td>915</td>
<td>62</td>
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<tr>
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<td>$4.1B</td>
<td>$199B</td>
</tr>
</tbody>
</table>

Federal Reserve 2016
Card Payment Solutions

• Types
  – Visa
  – MasterCard
  – Discover
  – American Express
  – China UnionPay
  – Japan JCB

• Where accepted
  – Open-loop
  – Closed-loop

• Participants
  – Cardholder
  – Card issuer
  – Merchant
  – Merchant acquirer
  – Acquiring processor
  – Issuer processor
  – Network operator

Source: AFP 2018 CBMI
Credit Card Processing

1. Authorization
2. Clearing
3. Settlement

Merchant

Issuing Bank

Merchant Acquirer

Charge

Hold

Cardholder Account

Issuing Bank

Credit Card Network

Source: AFP 2018 CBMI
Debit and Other Card Varieties

- Signature vs. PIN-based debit
- Purchasing
- T&E
- Fleet
- Ghost/Virtual
- Departmental

- Single-use
- SVCs
- Chip/smart

Source: AFP 2018 CBMI
Merchant Card Processing Fees

- Components
  - Interchange fees
  - Assessments
  - Processor fees or markups

- Bundled or “interchange-plus”

- Merchant discount

- Smaller merchants/low volumes = higher fees

- Fee & process audit can be fruitful

Source: AFP 2018 CBMI
Payment Card Industry Data Security Standards: PCI DSS

Build and Maintain a Secure Network

- **Requirement 1:**
  - Install & maintain firewall configurations to protect data

- **Requirement 2:**
  - Do not use vendor-supplied defaults for system passwords and other security parameters
  - Protect Cardholder Data

- **Requirement 3:**
  - Protect stored cardholder data

Source: PCI Security Standards Council
Payment Card Industry Data Security Standards: PCI DSS

• **Requirement 4:**
  – Encrypt transmission of cardholder data across open, public networks
  – Maintain a Vulnerability Management Program

• **Requirement 5:**
  – Use and regularly update anti-virus software

• **Requirement 6:**
  – Develop and maintain secure systems and applications
Payment Card Industry Data Security Standards: PCI DSS

- **Requirement 7:**
  - Restrict access to cardholder data by business need-to-know

- **Requirement 8:**
  - Assign a unique ID to each person with computer access

- **Requirement 9:**
  - Restrict physical access to cardholder data
  - Regularly Monitor and Test Networks

Source: PCI Security Standards Council
Payment Card Industry Data Security Standards: PCI DSS

- **Requirement 10:**
  - Track and monitor all access to network resources and cardholder data

- **Requirement 11:**
  - Regularly test security systems and processes
  - Maintain an Information Security Policy

- **Requirement 12:**
  - Maintain a policy that addresses information security

For additional information regarding PCI DSS go to www.treasuryinstitute.org

Source: PCI Security Standards Council
Payment Card Industry Data Security Standards: PCI DSS

Welcome to PCI DSS 3.2

Source: PCI Security Standards Council

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What is new in PCI DSS 3.2?

• Within the 12 core requirements of the PCI DSS, there are five new sub-requirements for service providers affecting requirements 3, 10, 11 and 12.

• New sub-requirements have been added to requirement 8 to ensure multi-factor authentication is used for all non-console administrative access and all remote access in the cardholder data environment.

• There are also two new appendices. Appendix A2 incorporates new migration deadlines for removal of Secure Sockets Layer (SSL) /early Transport Layer Security (TLS) in line with the December 2015 bulletin. Appendix A3 incorporates the “Designated Entities Supplemental Validation” (DESV), which was previously a separate document.
LET’S TAKE A BREAK
Disbursements

Control

Disbursement, clearing and settlement information

Payment initiation

Reconciliation

Source: AFP

2018 CBMI
Disbursements

Priorities

• Time cash disbursements to maximize discount benefits and avoid early payments
• Minimize the cost of issuing and processing disbursements
• Know when large-dollar disbursements are going to clear and have cleared
• Maintain satisfactory controls
Disbursement Structures

- Standard Disbursement Account
- Controlled Disbursement
- Zero Balance Account
- Imprest Account (petty cash account, other)
- Outsourced Payables
- Outsourced Check Printing
Focus on Controlled Disbursement

- Service providing same-day notification - early and mid-morning, of checks and ACH totals that will clear against the account later the same day
- Utilizes segregated routing number
- Provides timely and accurate clearing information for daily cash position determination
- Facilitates ability to minimize idle balances
- Cash position of University can be optimized
Best Disbursement Controls

Check Payments

– Reconciliation
– Segregation of Duties
– Positive Pay
– Issue No Checks
Best Disbursement Controls

Automated Clearing House

– Reconciliation
– Segregation of Duties
– ACH Debit Filter
– ACH Positive Pay
– ACH Debit Block
PAYMENT FRAUD

Is it a problem at YOUR school?
Fraud = 7% of Revenue Losses

Gross U.S. Losses
$994 Billion

Source: Association of Certified Fraud Examiners
Some Fraud Statistics

• Nilson Report estimates check fraud to amount to over $20 billion annually

• ABA study of total cases:
  - Growing 25 percent per year

• FBI predicts identity theft to cost financial institutions in excess of $5 billion and banks and businesses $48 billion (it is the fastest growing white-collar crime)
Payments fraud is a growing problem...

- Almost three-quarters of organizations were victims of payments fraud in 2009.

- Further, 30% of organizations experienced increased fraud activity during 2009, as economic conditions worsened in the U.S.

- 81% of organizations with revenues over $1 billion were victims of payments fraud in 2009 while 63% with revenues under $1 billion experienced fraud.

- 9 out of 10 organizations that experienced attempted or actual payments fraud in 2009 were victims of check fraud.

- ACH debit fraud (25%) is the second leading type of fraud committed, followed by credit/debit card (20%) and corporate/commercial cards (17%).

- Organizations that suffered financial averaged $17,100.
Check Fraud

- Check “kiting”
- Counterfeiting
- Forgery (endorsement or signature)
- Paperhanging
- 3rd party billing service
- Alterations
- “Washing”
- Organized groups (gangs)
Who is Liable for Check Fraud?

**UCC 3-103**

- “Ordinary care” – the observance of “reasonable commercial standards” that prevail in the area in which the person is located with respect to business in which the person is engaged.
- Does not require the financial institution to examine each item if failure to examine does not violate the institution’s prescribed procedures and those procedures are commonly followed by other institutions in the area.
Who is Liable for Check Fraud?

**UCC 3-405**

- “Comparative negligence” – the risk would remain with the company (employer) if the bank exercised “ordinary care” in processing the check.
- In brief, employers are responsible for the integrity of their employees.
Who is Liable for Check Fraud?

**UCC 3-406**

- “Contributory negligence” – the risk would remain with the company if it fails to safeguard checks from forgery or alteration (by a “reasonable commercial standard”) and that failure to safeguard contributes to the forgery or alteration.
- In brief, the company could be responsible for the loss along with the financial institution.
Who is Liable for Check Fraud?

**UCC 4-406**

- "reasonable promptness" – a period of time in which the customer has the duty to discover and notify the bank of unauthorized signatures and/or alterations of checks on the account.
- 30 days is the maximum limit.
- Bank can establish a shorter time limit.
- There is controversy over a shorter time limit.
Obligations Under UCC

- **Issuer** - Examine bank statements with reasonable promptness
- **Payee** – Employers responsible for fraudulent endorsements by employees
- **Depository bank** – Warranty of endorsement, signature authentication, information has not been altered, MICR encoding liability
- **Paying bank** – Return disputed items by the deadline
Commercial Check Fraud Defenses

- Positive pay
- Restrictive endorsements
- Secure check stock
- Utilize ACH whenever possible
- Prompt reconciliation of accounts
- Payroll/purchase cards
- Information verification software
- Deposit only accounts
Electronic Fraud (PC’s and ATMs)

- Remote PC access
- Wireless hacking
- Keystroke logging/memory programs
Who is Liable for Electronic Fraud?

- Reg “E” – Carries out the purposes of the Electronic Funds Transfer Act establishing the basic rights, liabilities and responsibilities of *consumers* using electronic funds transfer services
- UCC 4A – Governs the payment method referred to as a “wholesale wire transfer” in the “commercial community”
Electronic Fraud Defenses

- Personal firewalls
- Intrusion detection
- E-mail encryption
- Up-to-date anti-virus software
- Convert paper payments to electronic delivery
- ACH debit block
Electronic Fraud Defenses (cont.)

- Protect your equipment
- Protect your work area
- Protect your password
- Protect your files
- Lock up storage media containing sensitive data
- Back up data regularly
- Report security violations religiously
Credit Card Fraud

- Your trash is searched for discarded statements.
- Dishonest clerk copies your credit card number and makes personal charges.
- Call a long distance number in response to a free trip or bargain of some sort and provide your account number so you can be billed. You don’t get a trip or a bargain and charges appear on your account you did not authorize.
- Database hacking
- Carding
Credit Card Fraud Defenses –
Personal/Consumer

• Carry cards separate from your wallet
• Keep a record of all your cards
• Watch your card during in-person transactions
• Save receipts to compare to billing statements
• Report questionable charges promptly
• Notify card companies in advance of a change in address
• Biometric technology
  – “Out of wallet” questions
  – Fingerprint identification
  – Voice recognition
Credit Card Fraud
Defenses – Corporate/Merchant

- Use of Address Verification Service (AVS)
- PCI/DSS
- "SecureCode"
- Proper acceptance procedure at point of sale
- Visual inspection of card
Other Disbursement Methods

- Cash
- Purchasing/Procurement Cards
- Payroll Cards
- ePayables
Strategic Planning to Move Paper Payments to Electronic

• The right thing to do?
• E-payable conversion solutions
• Getting to 100% direct deposit of payroll
• Later issue dates for paper checks
• Reevaluate in higher rate environments
A Touch on Foreign Exchange

- Spot FX trades
- Daily Rates
- Forward Rates
Cash Flow and Forecasting

• Your Processes

• Daily Cash Positioning

• Extended Cash Forecasts
Cash Flow Trends

Corporate cash as a % of current assets
S&P 500 companies – cash and cash equivalents, quarterly

Source: JPMorgan Guide To The Markets 9-30-2017
Account Analysis Billing

A record of bank services including

– Account structures
– Transaction volumes
– Balances maintained
– Charges assessed
– Earnings credit allowances

2018 CBMI
Earnings Credit

\[ EC = CB \times (1 - RR) \times ECR \left( \frac{D}{365} \right) \]

\[ = AB \times ECR \left( \frac{D}{365} \right) \]

Where:
EC = Earnings credit
CB = Average collected balances
AB = Average available balances
RR = Reserve requirement
ECR = Earnings credit rate
D = Number of days in the month
Earnings Credit

Assume the following scenario:
- Average ledger balance $250,000
- Deposit float $30,000
- Reserve requirement 10%
- Earnings credit rate 5%
- Service charges for the month $1,000
- Days in month 30

Average Balance Calculations:
- Average ledger balance $250,000
- Less: Deposit float ($30,000)
- Equals: Average collected balance $220,000
- Less: Reserve Requirement ($22,000)
- Equals: Average available balance $198,000

\[
EC = CB \times (1 - RR) \times ECR \times \frac{D}{365}
\]

\[
= $220,000 \times (1 - 0.10) \times 0.05 \times \frac{30}{365}
\]

\[
= $814
\]
Iowa State University
Banking and Investments -2016

Deposits (electronic)
E-check, Credit Cards

 Deposits (non electronic)
Treasurer’s Office, Athletics, Book Store, Residence Halls

Bankers Trust
Deposits/Disbursements

Disbursements: Electronic
Direct Deposits: Payroll, Bursar, Travel, Accounts Payable,
Univ. Benefits
WIRE/ACH
Disbursements: Checks
Payroll, Accounts Payable

Bank of America
Merchant Credit Card

US Bank
ISU Card/Confidential Research Projects/Athletics/P-Card

Wells Fargo Custodian
Short Term Fund
Endowments
Bond Funds

Endowment
Alternative Investments

Diversified Fund
Vanguard Funds
Great Western
Western Asset
ING

Concentration Account
Depository Account
Investment Account
Trust Account
Treasury Trends

What to expect

• Cryptocurrency Expansion
• Real-time Payments
• Increased Tokenization
• Are checks going away yet?
• Blockchain Revolution

2018 CBMI
Short-Term Investment Concepts
Role of Operating Fund Portfolios

- Maintain liquidity
- Optimize cash resources
- Maximize returns
- Manage risk
- Remain University mission-minded
Operating Fund Investing 2017

- Different risks and characteristics
- Rapid investment changes
- Flexibility and monitoring required
Operating Funds & Higher Education

- Short-term pool of assets
- Primary segment duration < 1 year
- Typical maximum duration 5 years
- Needs integration with daily cash
- Maintain proper liquidity
- Principal Preservation
Traditional Treasury Model

- **Receipts**
- **Operating Checking**
- **Short-Term Investments**
  - Typical max duration: 1 to 5 years
- **Credit Facilities**
- **Disbursements**
  - Typically 30 or 60 or 90 days expenses

2018 CBMI
Emerging Treasury Model

- Money Market Funds
- Receipts
- Operating Checking
- Short-Term Investments
- Disbursements
- Credit Facilities

Structure allows for minimal cash in checking
Will bank deposit rates keep up with rising short-term market rates?

How might short-term bond funds be impacted?
Operating Fund Investment Options

- Checking – ECR and/or interest-bearing
- Savings
- CD / CDAR / ICS
- Money Market
- Mutual Fund
- Separately Managed
## Money Market Fund Makeup

<table>
<thead>
<tr>
<th></th>
<th>Commercial Paper</th>
<th>Asset Backed Commercial Paper</th>
<th>Bank Obligations</th>
<th>Government Paper</th>
<th>Floating Rate Notes</th>
<th>Repurchase Agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maturity</strong></td>
<td>Overnight–270 days</td>
<td>Overnight–270 days</td>
<td>1 day–2 years</td>
<td>4–52 weeks</td>
<td>Variable</td>
<td>Wholly negotiable</td>
</tr>
<tr>
<td><strong>Issued by</strong></td>
<td>Companies</td>
<td>Companies</td>
<td>Banks</td>
<td>Government/public</td>
<td>Companies/FIs</td>
<td>Companies/FIs</td>
</tr>
<tr>
<td><strong>Interest rate</strong></td>
<td>Fixed</td>
<td>Fixed</td>
<td>Fixed</td>
<td>Fixed</td>
<td>Variable</td>
<td>Negotiable</td>
</tr>
<tr>
<td><strong>Interest paid</strong></td>
<td>On maturity</td>
<td>On maturity</td>
<td>During or maturity</td>
<td>On maturity</td>
<td>During or maturity</td>
<td>On maturity</td>
</tr>
<tr>
<td><strong>Issued</strong></td>
<td>Discount</td>
<td>Discount</td>
<td>Interest</td>
<td>Discount</td>
<td>Interest</td>
<td>Discount</td>
</tr>
<tr>
<td><strong>Secured</strong></td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes/no</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Access to capital before maturity</strong></td>
<td>Sell on secondary market</td>
<td>Sell on secondary market</td>
<td>Negotiable CDs sell on secondary market</td>
<td>Sell on secondary market</td>
<td>Sell on secondary; periodic reset dates</td>
<td>Negotiable</td>
</tr>
<tr>
<td><strong>Risks</strong></td>
<td>Credit, price</td>
<td>Credit, liquidity, price</td>
<td>Credit, liquidity</td>
<td>Price</td>
<td>Credit, liquidity</td>
<td>Credit, liquidity</td>
</tr>
</tbody>
</table>

2018 CBMI
## Cash Investing Options in 2018

<table>
<thead>
<tr>
<th></th>
<th>Bank Commercial Account</th>
<th>Bank Interest Bearing Account</th>
<th>Money Market Fund</th>
<th>Separate Account</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk</strong></td>
<td>Fully insured FDIC until end of 2012</td>
<td>No FDIC insurance over $250,000 balance</td>
<td>No insurance</td>
<td>Risk dependent on securities and duration</td>
</tr>
<tr>
<td><strong>Transparency</strong></td>
<td>Low – assets used for bank programs</td>
<td>Low – assets used for bank programs</td>
<td>Some – fund holdings available monthly</td>
<td>High – fully transparent</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td>Low – fee and FDIC insurance pass through</td>
<td>Netted from yield</td>
<td>Netted from yield – range between 10 and 30 basis points for institutional offerings</td>
<td>High – primarily limited to large investors</td>
</tr>
<tr>
<td><strong>Issues</strong></td>
<td>Full insurance scheduled to end December 2012</td>
<td>Banks reluctant to take additional deposits</td>
<td>Additional reforms coming – Provider consolidation</td>
<td>Costs and oversight – internal or outsourced resources needed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2011</td>
<td>&lt; $500 Billion</td>
</tr>
<tr>
<td>January 2013</td>
<td>&gt; $700 Billion</td>
</tr>
</tbody>
</table>
Money Market Reform

- **Money Market Reform Amendment Structural Changes include:**
  - **Floating NAV** – Institutional Prime and Municipal money market funds will be required to maintain a floating net asset value (NAV) for purchases and redemptions based on the current market value of the securities in their portfolios.
  - **Withdrawal Restrictions** – Money market fund boards will now have the ability to impose liquidity fees and suspend redemptions temporarily if levels of weekly liquid assets fall below 30% of total assets of the fund. If the weekly liquid assets fall below 10% of total assets of the fund, liquidity fees will be required.
  - **Government Fund exemption** – Government funds will continue to maintain stable NAVs and will continue to calculate NAVs using amortized cost accounting. A government money market fund will be defined as any money market fund that invests 99.5 percent (formerly 80 percent) or more of its total assets in cash, government securities and repurchase agreements backed solely by such securities.
  - **Retail Fund exemption** – A retail money market fund will be defined as any money market fund (prime or municipal) designed and used by “natural persons”.

2018 CBMI
# Cash Investing Options in 2018

<table>
<thead>
<tr>
<th></th>
<th>Bank Commercial Account</th>
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<td>No insurance</td>
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</tr>
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<td>Some – fund holdings available monthly</td>
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<tr>
<td><strong>Costs</strong></td>
<td>Low – fee and FDIC insurance pass through</td>
<td>Netted from yield</td>
<td>Netted from yield – range between 10 and 30 basis points for institutional offerings</td>
<td>High – primarily limited to large investors</td>
</tr>
<tr>
<td><strong>Issues</strong></td>
<td>Not fully insured</td>
<td>Banks reluctant to take additional deposits</td>
<td>Provider consolidation – <strong>Floating NAV</strong></td>
<td>Costs and oversight – internal or outsourced resources needed</td>
</tr>
</tbody>
</table>
Four Re-Emerging Risks—Now and Going Forward

**Regulatory Risk**
- SEC Rule 2a-7 revised with new liquidity, maturity and disclosure requirements
- Outstanding 2a-7 changes for further mitigation of systemic risks
- FDIC expected change

**Opportunity Risk**
- Money Market yields are at all time lows, and there is no relief in sight over the short term.
- Identify pockets of cash with no medium-term needs, return on cash may be maximized by adding incremental interest rate and credit duration

**Liquidity Risk**
- Create an accurate picture of your cash position
- Liquidity review
- Determining your Limited Term Assets
- Diversify cash assets & holdings
- Utilize providers with strong capital bases

**Concentration Risk**
- Diversify cash assets & holdings
Short-Duration Mutual Funds

• Longer maturities
  – Average maturity 1 to 3 years

• Instruments
  – Government issues
  – CDs
  – Commercial Paper

• Higher average returns

• Higher risk of fluctuating NAV
  – No fixed unit NAV

• For matching strategy
Separately Managed Account

- Customized investment allocations
- Lower net investment fees than funds
- Direct interaction with managers
- Minimum investment ~ $100 million
- Normally used with custodial service
Investment Fund Oversight & Controls

• **Fund Sponsor**
  - Capital
  - Commitment to the business

• **Investment Teams & Process**
  - Experienced cash investment team (separate from Fixed Income team)
  - Fund objectives are safety, liquidity and return (in that order of priority)
  - Team meetings for reviews

• **Continuous Oversight**
  - Access to Portfolio Managers

• **Annual on-site due diligence meetings**

---

2018 CBMI
Operating Fund Investment Considerations

- Do you have a robust and accurate cash flow forecasting process – or does this need to be reviewed?
- How much surplus cash do you have across the organization outside of working capital needs?
- Are forthcoming events likely to alter your cash position significantly and what notification and lead times will you have for these?
Operating Fund Investment Considerations

- Establish a repeatable process
- Determine surplus cash
- Determine working capital
- Consistent cash forecasting

2018 CBMI
Liquidity Review

- Define Allocations
- Liquidity program - daily needs
- Ultrashort program - annual needs
- Intermediate program - longer funds
- Reserves & Endowment – overflow
### Determine Monthly Cash Flows

<table>
<thead>
<tr>
<th>Date</th>
<th>DDA &amp; Cash Sweep Opening Available Balance</th>
<th>Control Disbursement</th>
<th>ACH/Wire Expected Activity</th>
<th>Actual Custody - Op (Buy) Sell</th>
<th>Expected Ending Cash Sweep &amp; DDA Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/1/2017</td>
<td>19,127,376.65</td>
<td>(1,945,523.81)</td>
<td>(33,027,132)</td>
<td>26,000,000</td>
<td>10,154,721</td>
</tr>
<tr>
<td>9/4/2017</td>
<td>Bank Holiday - Labor Day</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>9/5/2017</td>
<td>15,351,666.15</td>
<td>(8,219,937.51)</td>
<td>(6,291,015)</td>
<td>9,000,000</td>
<td>9,840,713</td>
</tr>
<tr>
<td>9/6/2017</td>
<td>14,251,302.86</td>
<td>(3,488,378.18)</td>
<td>(8,259,519)</td>
<td>8,000,000</td>
<td>10,503,406</td>
</tr>
<tr>
<td>9/7/2017</td>
<td>19,787,338.64</td>
<td>(2,148,853.39)</td>
<td>-</td>
<td>(7,000,000)</td>
<td>10,638,485</td>
</tr>
<tr>
<td>9/8/2017</td>
<td>14,657,517.20</td>
<td>(1,634,560.30)</td>
<td>232,295</td>
<td>-</td>
<td>13,255,252</td>
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<tr>
<td>9/11/2017</td>
<td>19,211,002.71</td>
<td>(5,545,316.02)</td>
<td>(1,041,131)</td>
<td>-</td>
<td>12,624,556</td>
</tr>
<tr>
<td>9/12/2017</td>
<td>20,559,140.01</td>
<td>(1,686,296.35)</td>
<td>(3,148,943)</td>
<td>(5,000,000)</td>
<td>10,723,900</td>
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<tr>
<td>9/13/2017</td>
<td>22,998,464.83</td>
<td>(653,301.54)</td>
<td>-</td>
<td>-</td>
<td>22,345,163</td>
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<tr>
<td>9/14/2017</td>
<td>34,422,090.91</td>
<td>(1,195,836.54)</td>
<td>(3,245,182)</td>
<td>-</td>
<td>29,981,073</td>
</tr>
<tr>
<td>9/15/2017</td>
<td>32,225,226.34</td>
<td>(932,384.85)</td>
<td>(9,300,000)</td>
<td>-</td>
<td>21,992,841</td>
</tr>
<tr>
<td>9/18/2017</td>
<td>26,188,504.05</td>
<td>(4,123,638.96)</td>
<td>(5,311,752)</td>
<td>-</td>
<td>16,753,113</td>
</tr>
<tr>
<td>9/19/2017</td>
<td>20,430,899.66</td>
<td>(2,626,040.21)</td>
<td>(7,769,058)</td>
<td>-</td>
<td>10,035,801</td>
</tr>
<tr>
<td>9/20/2017</td>
<td>14,599,683.72</td>
<td>(1,188,240.94)</td>
<td>(2,968,047)</td>
<td>-</td>
<td>10,443,396</td>
</tr>
<tr>
<td>9/21/2017</td>
<td>13,828,444.05</td>
<td>(1,603,475.29)</td>
<td>(6,234,394)</td>
<td>6,000,000</td>
<td>11,990,575</td>
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<tr>
<td>9/22/2017</td>
<td>15,514,288.81</td>
<td>(2,161,463.00)</td>
<td>(7,062,090)</td>
<td>6,000,000</td>
<td>12,290,736</td>
</tr>
<tr>
<td>9/25/2017</td>
<td>19,081,149.65</td>
<td>(4,505,904.52)</td>
<td>(6,094,174)</td>
<td>-</td>
<td>8,481,071</td>
</tr>
<tr>
<td>9/26/2017</td>
<td>18,056,522.55</td>
<td>(3,539,861.10)</td>
<td>(2,388,133)</td>
<td>-</td>
<td>12,128,529</td>
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<tr>
<td>9/27/2017</td>
<td>12,965,024.88</td>
<td>(1,763,655.28)</td>
<td>(4,348,530)</td>
<td>-</td>
<td>6,852,840</td>
</tr>
<tr>
<td>9/28/2017</td>
<td>20,646,496.77</td>
<td>(2,026,825.33)</td>
<td>(5,822,284)</td>
<td>-</td>
<td>12,797,388</td>
</tr>
<tr>
<td>9/29/2017</td>
<td>16,587,674.16</td>
<td>(2,501,630.17)</td>
<td>(81,216,339)</td>
<td>77,000,000</td>
<td>9,869,705</td>
</tr>
</tbody>
</table>

2018 CBMI
Multiple Levels of Liquidity

Market value of cash and investments (millions)

- LRP + LP minimum target 60 days of operating cash (range 60-90)
- LP minimum target 30 days of operating cash (range 30-60)
Role of the Vice President for Finance and Treasurer

The Vice President for Finance and Treasurer:
Shall advise the President and CIO on investment policies relating to the CIF and Pooled Cash Fund;

Shall develop and recommend to the President, through consultation with the Investment Advisory Subcommittee, investment policies relating to the administration of the Board's Pooled Cash Fund;

Shall consult with the CIO with respect to private equity and long-term illiquid strategy and asset commitments and shall approve, in conjunction with the CIO, new private equity and long-term illiquid investment managers and make follow-on investments with existing managers;

Shall have the authority to appoint the investment custodians for the CIF and Pooled Cash Fund;

Shall have the authority to appoint, or may act in the role of, an investment manager for the Pooled Cash Fund and shall report any such appointments to the Finance Committee, the Investment Advisory Subcommittee, and the Board;

Shall consult with the IAS and have the discretion and authority to terminate Pooled Cash Fund investment managers for reasons including, but not limited to, performance concerns, organizational changes, deviation from investment mandate, investment mandate is inconsistent with the current market environment, or restructuring of the relevant investment portfolio;

Shall provide a monitoring and measurement program that will permit evaluation of the performance of the Liquidity Reserve Pool and investment managers in comparison with applicable investment market benchmarks and with other managers; and

Shall provide a monitoring and measurement program that will permit evaluation of the performance of the Liquidity Pool and investment managers in comparison with applicable investment market benchmarks and with other managers.
Operating Fund Investment Plan

• Risks:
  – Liquidity
  – Duration
  – Credit
  – Market

• Cash flow

• Oversight
Opportunity Risk
Treasury Yield Curves

- Normal
- Inverted
- Flat Curve
- Flat with Slight Inversion

Time/Yield Curve spacing

- 3 month
- 2 years
- 5 years
- 10 years
- 30 years
Oversight Needed in Cash Investing

• Fund Sponsor
  – Capital
  – Commitment to the business

• Investment Teams & Process
  – Experienced cash investment team (separate from Fixed Income team)
  – Fund objectives are safety, liquidity and return (in that order of priority)

• Continuous Oversight
  – Access to Portfolio Managers
  – Annual on-site due diligence meeting
Operating Fund Investment Risks

Volatility
Standard Deviation 5-Year

- Cash: 1%
- US Treasuries (2-year): 3%
- Core Bonds: 6%
- High Yield: 10%
- Equity Market Neutral: 5%
- Low-Volatility Equity: 12%
- Large Cap Stock: 15%

Risk Buckets

- Duration
- Illiquidity
- Credit
- Market (equity)

2018 CBMI
## Operating Fund Investments

### Fixed income sector returns

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EMD LCL.</td>
<td>18.1%</td>
<td>13.7%</td>
<td>58.2%</td>
<td>15.7%</td>
<td>13.6%</td>
<td>17.4%</td>
<td>7.4%</td>
<td>8.7%</td>
<td>3.8%</td>
<td>17.1%</td>
<td>14.3%</td>
</tr>
<tr>
<td>TIPS</td>
<td>11.6%</td>
<td>8.3%</td>
<td>29.8%</td>
<td>15.1%</td>
<td>12.3%</td>
<td>16.8%</td>
<td>-1.4%</td>
<td>7.5%</td>
<td>1.5%</td>
<td>10.2%</td>
<td>9.0%</td>
</tr>
<tr>
<td>MBS</td>
<td>9.0%</td>
<td>18.7%</td>
<td>9.0%</td>
<td>8.1%</td>
<td>9.8%</td>
<td>15.8%</td>
<td>-1.5%</td>
<td>7.4%</td>
<td>1.2%</td>
<td>7.0%</td>
<td>9.9%</td>
</tr>
<tr>
<td>MBS Allo.</td>
<td>6.9%</td>
<td>6.7%</td>
<td>11.4%</td>
<td>7.9%</td>
<td>8.1%</td>
<td>7.4%</td>
<td>-2.2%</td>
<td>5.5%</td>
<td>-0.3%</td>
<td>4.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>TIPS</td>
<td>-2.4%</td>
<td>11.4%</td>
<td>6.5%</td>
<td>7.8%</td>
<td>7.0%</td>
<td>-2.2%</td>
<td>5.5%</td>
<td>4.7%</td>
<td>4.4%</td>
<td>53.3%</td>
<td>4.7%</td>
</tr>
<tr>
<td>EMD USD</td>
<td>6.2%</td>
<td>-2.4%</td>
<td>6.5%</td>
<td>7.8%</td>
<td>7.0%</td>
<td>-2.2%</td>
<td>5.5%</td>
<td>53.3%</td>
<td>55.0%</td>
<td>53.3%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Corp.</td>
<td>4.6%</td>
<td>5.9%</td>
<td>6.2%</td>
<td>5.8%</td>
<td>6.2%</td>
<td>5.8%</td>
<td>3.6%</td>
<td>1.7%</td>
<td>2.3%</td>
<td>3.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>MBS</td>
<td>4.3%</td>
<td>5.9%</td>
<td>5.4%</td>
<td>5.4%</td>
<td>5.0%</td>
<td>2.6%</td>
<td>8.6%</td>
<td>1.7%</td>
<td>2.3%</td>
<td>1.0%</td>
<td>2.3%</td>
</tr>
<tr>
<td>High Yield</td>
<td>1.9%</td>
<td>-12.0%</td>
<td>5.9%</td>
<td>5.9%</td>
<td>5.0%</td>
<td>2.6%</td>
<td>-8.6%</td>
<td>1.7%</td>
<td>2.3%</td>
<td>3.0%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

**Source:** Barclays, Bloomberg, FactSet, J.P. Morgan Global Investment Research, J.P. Morgan Asset Management.
### Asset Allocation Detail

<table>
<thead>
<tr>
<th></th>
<th>Cash</th>
<th>Duration</th>
<th>Risk Assets</th>
<th>Diversified</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>100.0%</td>
<td>30.0%</td>
<td>30.0%</td>
<td>30.0%</td>
</tr>
<tr>
<td><strong>Total Liquidity Strategies</strong></td>
<td>100.0%</td>
<td>30.0%</td>
<td>30.0%</td>
<td>30.0%</td>
</tr>
<tr>
<td><strong>Contingent Strategies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited Duration</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Contingent Asset Program</td>
<td>5.0%</td>
<td>5.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate Term Fund</td>
<td>15.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Total Contingent Strategies</strong></td>
<td>0.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td><strong>Core Strategies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Quality Bond Fund</td>
<td>45.0%</td>
<td></td>
<td>25.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td></td>
<td>10.0%</td>
<td></td>
<td>10.0%</td>
</tr>
<tr>
<td>MSCI ACWI</td>
<td></td>
<td>10.0%</td>
<td></td>
<td>10.0%</td>
</tr>
<tr>
<td>Equity Market Neutral</td>
<td></td>
<td></td>
<td>10.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Total Core Strategies</strong></td>
<td>0.0%</td>
<td>45.0%</td>
<td>45.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
### Risk & Return Summary

#### 5 Year Projections

<table>
<thead>
<tr>
<th>Projected Annualized Performance (5 years)²</th>
<th>Cash</th>
<th>Duration</th>
<th>Risk Assets</th>
<th>Diversified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Total Return <em>(Nominal)</em></td>
<td>1.5%</td>
<td>2.0%</td>
<td>3.1%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Median Total Return <em>(Real - CPI)</em></td>
<td>-0.5%</td>
<td>0.0%</td>
<td>1.0%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Standard Deviation <em>(Nominal)</em></td>
<td>1.0%</td>
<td>2.9%</td>
<td>3.8%</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

| Sharpe Ratio *(Nominal)*                  | 0.01 | 0.18    | 0.41        | 0.46        |

#### Risk Summary (5 years)

| VaR *(1 year, 97%)*                      | -0.1%| -3.3%   | -3.9%       | -3.8%       |
| CVaR *(1 year, 97%)*                     | -0.5%| -4.4%   | -5.3%       | -5.1%       |
| Maximum Drawdown                         | 0.0% | -3.4%   | -9.9%       | -10.5%      |
| Probability of 3% Loss *(within 5 years)*| 0.0% | 21.8%   | 26.4%       | 24.6%       |
| Probability of 3% Loss *(end of 5 years)*| 0.0% | 2.2%    | 1.6%        | 1.2%        |

*Sharpe Ratio = (Projected Return - Projected Cash Return) / Projected Standard Deviation; Projected Cash is 1.5% (5-yr)
Wealth Analyses Summary

5 Year Projections with a 2% distribution per annum

Projected Wealth Potential

- Wealth Analysis Summary is calculated in nominal terms.
- Projected Wealth Potential is based on tolerance level of 50% estimating number of occurrences above base amount.
- Projected Likelihood of Market Value Retention after Distribution measures the percentage of occurrences above base amount, distributions are simulated quarterly.
## Risk Scenarios

<table>
<thead>
<tr>
<th></th>
<th>Cash/3 mo T</th>
<th>ST Fixed Income</th>
<th>Div. Fixed</th>
<th>Div Equity</th>
<th>Div.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VaR</strong></td>
<td>(0.2%)</td>
<td>(1.8%)</td>
<td>(3.3%)</td>
<td>(6.0%)</td>
<td>(4.0%)</td>
</tr>
<tr>
<td><strong>CVaR</strong></td>
<td>(0.2%)</td>
<td>(2.2%)</td>
<td>(4.1%)</td>
<td>(7.7%)</td>
<td>(5.1%)</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.11%</td>
<td>1.1%</td>
<td>2.0%</td>
<td>3.8%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

### Historical Stress Tests

<table>
<thead>
<tr>
<th>Event</th>
<th>VaR</th>
<th>CVaR</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Seize of 2008 (Sep 2008 – Oct 2008)</td>
<td>0.5%</td>
<td>(1.4%)</td>
<td>0.11%</td>
</tr>
<tr>
<td>Equity Markets Correction (Feb 2001 – Mar 2001)</td>
<td>0.8%</td>
<td>0.7%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Equity Market Rally of 2001 (Apr 2001 – May 2001)</td>
<td>0.6%</td>
<td>(0.3%)</td>
<td>2.0%</td>
</tr>
<tr>
<td>Fed Tightening (Apr 1999 – Jun 1999)</td>
<td>(0.1%)</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>IR Steepening (Sep 1999 – Nov 1999)</td>
<td>(0.1%)</td>
<td>(1.3%)</td>
<td>0.1%</td>
</tr>
<tr>
<td>Emerging Markets Rally (Jan 1999 – May 1999)</td>
<td>(0.1%)</td>
<td>(1.0%)</td>
<td>2.6%</td>
</tr>
<tr>
<td>3Q 2011 (Jul 2011 – Sep 2011)</td>
<td>0.1%</td>
<td>1.1%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

### Hypothetical Factor Stress Tests

<table>
<thead>
<tr>
<th>Stress Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress Test 1: S&amp;P 500 down 10%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Stress Test 2: MSCI EM down 10%</td>
<td>(0.0%)</td>
</tr>
<tr>
<td>Stress Test 3: US Treasuries yield up 50 bps</td>
<td>(0.2%)</td>
</tr>
<tr>
<td>Stress Test 4: NA HY 5Y CDS Spread widen 10%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Stress Test 5: Breakeven Inflation up 50bp</td>
<td>(0.0%)</td>
</tr>
</tbody>
</table>

*All portfolios are hypothetical*
## Capital Market Return & Volatility Projections

<table>
<thead>
<tr>
<th>Asset Classes</th>
<th>Returns 5-year</th>
<th>Returns 20-year</th>
<th>Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global Equity</td>
<td>6.6%</td>
<td>7.7%</td>
<td>16.5%</td>
</tr>
<tr>
<td>Large Cap</td>
<td>7.5%</td>
<td>8.8%</td>
<td>15.5%</td>
</tr>
<tr>
<td>All Cap</td>
<td>7.6%</td>
<td>9.1%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Small Cap</td>
<td>6.8%</td>
<td>10.3%</td>
<td>20.8%</td>
</tr>
<tr>
<td>Developed International</td>
<td>4.8%</td>
<td>8.4%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Emerging Markets</td>
<td>9.8%</td>
<td>12.4%</td>
<td>25.1%</td>
</tr>
<tr>
<td>REITs</td>
<td>6.5%</td>
<td>8.6%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Low Volatility Equity</td>
<td>6.7%</td>
<td>7.9%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Portable Alpha Large Cap</td>
<td>8.3%</td>
<td>9.7%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Private Capital</td>
<td>9.4%</td>
<td>11.6%</td>
<td>23.4%</td>
</tr>
<tr>
<td><strong>Fixed Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3mo Tbills (Cash)</td>
<td>1.5%</td>
<td>2.9%</td>
<td>1.0%</td>
</tr>
<tr>
<td>US Treasuries - 10yr</td>
<td>1.5%</td>
<td>4.0%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Core Bonds</td>
<td>2.4%</td>
<td>4.5%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Global Bonds</td>
<td>0.8%</td>
<td>4.0%</td>
<td>8.1%</td>
</tr>
<tr>
<td>Short-Duration High Coupon Mortgages</td>
<td>3.9%</td>
<td>N/A</td>
<td>2.4%</td>
</tr>
<tr>
<td>Investment Grade</td>
<td>3.2%</td>
<td>5.2%</td>
<td>7.0%</td>
</tr>
<tr>
<td>High Yield</td>
<td>4.9%</td>
<td>6.4%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Short Duration High Yield</td>
<td>3.9%</td>
<td>N/A</td>
<td>10.0%</td>
</tr>
<tr>
<td><strong>Marketable Alternatives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global Hedged Equity</td>
<td>5.9%</td>
<td>7.8%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Equity Market Neutral</td>
<td>4.9%</td>
<td>6.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Relative Value / Event Driven</td>
<td>5.3%</td>
<td>6.8%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Diversifying</td>
<td>4.7%</td>
<td>6.1%</td>
<td>11.5%</td>
</tr>
<tr>
<td><strong>Real Assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commodities</td>
<td>5.1%</td>
<td>6.7%</td>
<td>15.0%</td>
</tr>
<tr>
<td>TIPS 10yr</td>
<td>2.1%</td>
<td>3.8%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Private Real Estate - Core</td>
<td>5.5%</td>
<td>6.2%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Private Real Estate - Non-Core</td>
<td>10.3%</td>
<td>11.6%</td>
<td>20.3%</td>
</tr>
<tr>
<td>Natural Resources - Public</td>
<td>8.1%</td>
<td>9.1%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Natural Resources - Private</td>
<td>10.3%</td>
<td>11.8%</td>
<td>18.9%</td>
</tr>
<tr>
<td><strong>Consumer Price Index (CPI)</strong></td>
<td>2.0%</td>
<td>2.4%</td>
<td></td>
</tr>
</tbody>
</table>

- Long-Term (20 Years) / Policy – estimates based upon historical returns, the academic literature, the expected future equilibrium macroeconomic environment and expected active management excess return. Medium-Term (5-Year) / Cyclical – estimates based upon historical returns, the academic literature, current valuations, the expected medium term macroeconomic environment and expected active management excess return. See “Explanatory Notes Regarding the Long-Medium Term Return/Risk Forecast” and “Important Notes – Market Commentary”.
- These forecasts represent Commonfund Asset Management Company’s long-term views with respect to the stated asset classes. There can be no assurance that these forecasts will be accurate. These forecasts do not represent the actual returns earned by any investor or investment fund or product, nor do they constitute a recommendation of any investment fund or product. Forecasts are as of February 2015 and runs through end of 2019.
Moving Forward

- Policy for Cash
  - Liquidity
  - Diversification

- Selection and oversight of providers
  - Capital
  - Process
  - Use Analytic tools available

- Access to your Cash
  - Same day access
  - “What if” scenarios
Endowment Concept
Intergenerational Equity

“The trustees of endowed institutions are the guardians of the future against the claims of the present. Their task is to preserve equity among generations.”

- James Tobin
Yale University
The Endowment Model

Over Time return CPI + spending

– Equity Bias
– Diversification
– Illiquidity Premium
### Asset Allocation | Asset Classes and Purpose in the Portfolio

#### Hypothetical Example

<table>
<thead>
<tr>
<th>LIQUIDITY SCALE</th>
<th>RISK ASSETS/GROWTH</th>
<th>DEFLATION HEDGES</th>
<th>INFLATION HEDGES</th>
<th>DIVERSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADITIONAL</td>
<td></td>
<td>Cash</td>
<td>Commodities</td>
<td>Currency (Non U.S. $ investments)</td>
</tr>
<tr>
<td>High</td>
<td>Public equities (large)</td>
<td>U.S. Treasuries</td>
<td>REITs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public equities (small)</td>
<td>High Quality Corporates and Mortgages</td>
<td>TIPs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Yield</td>
<td>Hedged Global Sovereign Debt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEDGE FUNDS</td>
<td>Long/short equities</td>
<td>Trend following hedge funds (CTAs*, Macro)</td>
<td>Trend following hedge funds (CTAs*, Macro)</td>
<td>Trend following hedge funds (CTAs*, Macro)</td>
</tr>
<tr>
<td>Moderate</td>
<td>Event-driven</td>
<td></td>
<td></td>
<td>Relative value strategies</td>
</tr>
<tr>
<td></td>
<td>Opportunistic credit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRIVATE PROGRAMS</td>
<td>Distressed Debt</td>
<td></td>
<td>Core Real Estate</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Venture capital</td>
<td></td>
<td>Natural Resources/ Timber</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private equity</td>
<td></td>
<td>Infrastructure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunistic Real Estate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value Add Real Estate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* CTA = Commodity Trading Advisor  
Note: For illustrative purposes only. Asset classes and investment strategies listed are representative and not intended to be all inclusive.
## Ten-Year Manager Returns by Asset Class

**March 31, 2016**

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Universe</th>
<th>Top Quartile</th>
<th>Median</th>
<th>Bottom Quartile</th>
<th>Median - Top Spread</th>
<th>Top - Bottom Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds</td>
<td>Domestic</td>
<td>7.0</td>
<td>6.8</td>
<td>6.4</td>
<td>0.3</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Global</td>
<td>7.6</td>
<td>6.9</td>
<td>6.5</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>U.S. Stocks</td>
<td>Large Cap</td>
<td>7.8</td>
<td>7.3</td>
<td>6.7</td>
<td>0.5</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Small Cap</td>
<td>8.0</td>
<td>6.7</td>
<td>5.6</td>
<td>1.3</td>
<td>2.3</td>
</tr>
<tr>
<td>International Stocks</td>
<td>Global Ex-U.S. Large Cap</td>
<td>4.4</td>
<td>3.2</td>
<td>2.5</td>
<td>1.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Hedge Funds³</td>
<td>Fund-of-Funds Universe</td>
<td>3.8</td>
<td>2.6</td>
<td>1.2</td>
<td>1.1</td>
<td>2.6</td>
</tr>
<tr>
<td>Private Capital²</td>
<td>U.S. Private Equity</td>
<td>17.2</td>
<td>9.4</td>
<td>1.6</td>
<td>7.8</td>
<td>15.6</td>
</tr>
<tr>
<td></td>
<td>Venture Capital</td>
<td>18.5</td>
<td>6.7</td>
<td>-3.1</td>
<td>11.8</td>
<td>21.6</td>
</tr>
</tbody>
</table>

**Spread = difference between top quartile managers and bottom quartile managers**

Universe Source: (c) Russell Investment Group unless otherwise noted. Data on individual universes available on request. Universes are calculated on the basis of total returns gross of fees and expenses.

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1. Hedge fund performance is from the HFRI – FOF Universe.
Portfolio versus Enterprise Liquidity Management Conclusions

- A premium exists for investing in illiquid markets
- This illiquidity premium has served long-term investors well
- The illiquidity premium is expanding
- Liquidity allocation should be viewed from a policy standpoint just like asset allocation
- Test liquidity under various scenarios
- Worst case scenario should not determine asset allocation
- Liquidity from operations should be viewed both independently and against the long term pool
- Review options for operating independently from the long term pool with debt capacity or committed credit line
Building Blocks of the Internal Bank

Assets

Liabilities

Limited Term Assets

Debt Portfolio

Cash Management
## Asset Liability Management

### Link between how assets are borrowed and invested:

<table>
<thead>
<tr>
<th></th>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Term</strong></td>
<td>Money Market Funds, Commercial Paper, Repos, t-bills</td>
<td>VRDB’s</td>
</tr>
<tr>
<td><strong>Medium Term</strong></td>
<td>MTN, Intermediate Fixed Income</td>
<td>Leases, Serial Bonds</td>
</tr>
<tr>
<td><strong>Long Term</strong></td>
<td>Endowment</td>
<td>Serial Bonds, Term Bonds</td>
</tr>
</tbody>
</table>
The School as a “Bank”

- Short-Term Investments
- Long-Term Investments
- Deposits
- Withdrawals
- Short-Term Borrowing
- Long-Term Borrowing
Financial Resources

Capital
- GIFTS
  - Annual Giving
  - Campaigns

Operations
- Tuition and Fee Rates
- State Support
- Financial Aid Policies
- Housing
- Academic Programs
- Enrollment
- Endowment Income
- Current Use Gifts
- Grants and Contracts
- Other Income
- State Support, Tuition & Fees, Room & Board

Facilities
- New
- Renewal
- State Support
- Debt
- DEBT POLICY
- Headcount
- Pay Scales
- Plan Design Cost Sharing
- Fixed/Variable

Spending
- Endowment
- Performance
- Spending POLICY

Revenue Expense
- Revenue
- Expense
- Net Assets
- PPE

Debt
- Interest
- Depreciation
- Space and Occupancy
- Supplies & Others

Compensation and Benefits
- Plan Design
- Cost Sharing

Asset Allocation
- Performance

Performance
- Endowment
- Allocation

Headcount
Resources

The Treasury Institute for Higher Education
www.treasuryinstitute.org

National Association of College and University Business Officers
www.nacubo.org

Association for Financial Professionals
www.AFPonline.org

National Automated Clearing House Association
www.nacha.org

2018 CBMI
Thank you!