

How Do Speed and Security Influence Consumers' Payment Behavior?

Scott Schuh and Joanna Stavins
Federal Reserve Bank of Boston

Presented at the ECB/Suomen Pankki
Conference

Helsinki, June 4, 2015

Disclaimer

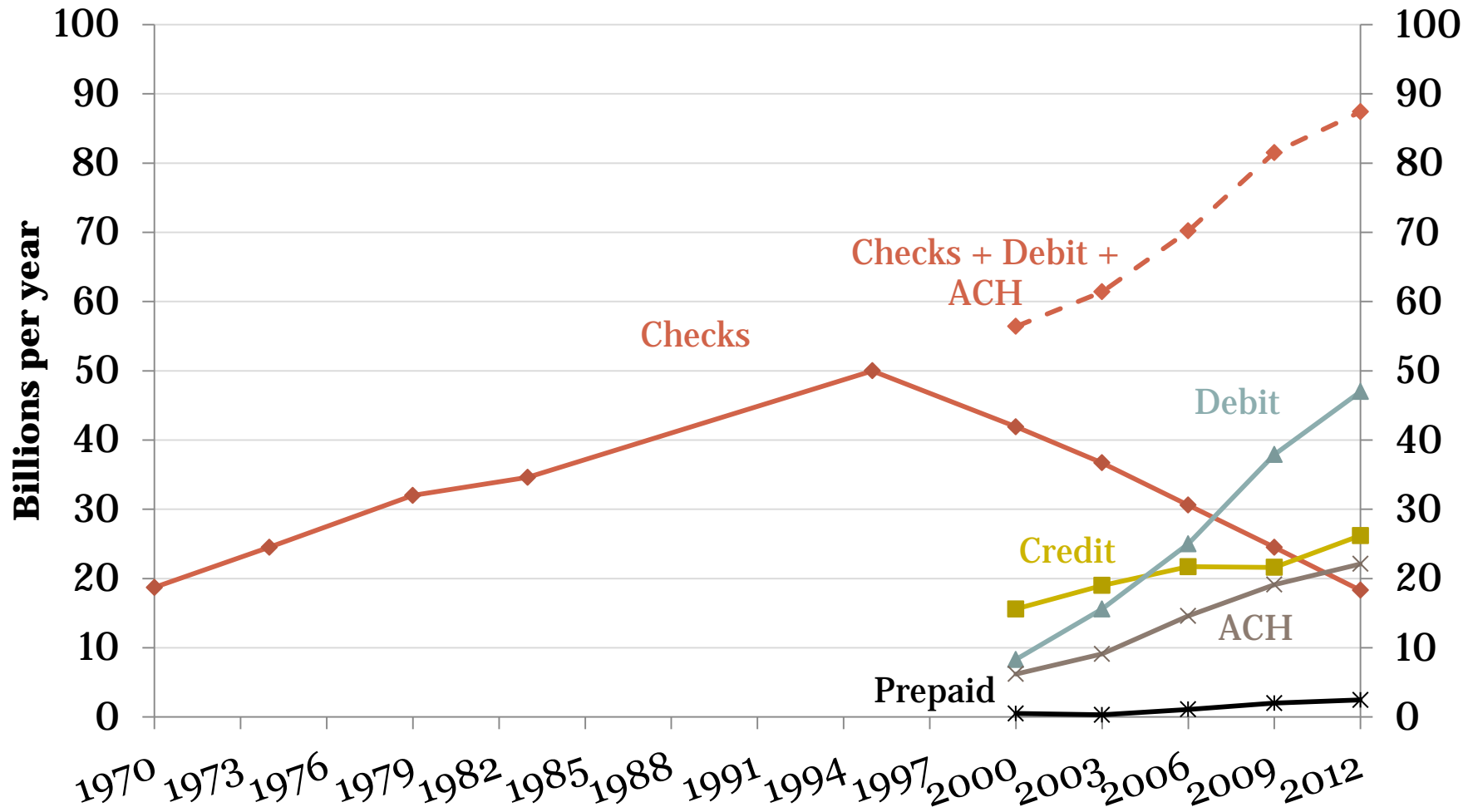
- Views expressed here do not necessarily represent the views of the Federal Reserve Bank of Boston or the Federal Reserve System
- 2013 and 2014 SCPC survey results are preliminary and subject to revisions

Background

- **Speed and security: main strategic goals**
 - **Federal Reserve's Financial Services Strategic Plan**
 - **Focus groups, market research**
 - ***Strategies for Improving the U.S. Payment System* released January 26, 2015**

- **We estimate effects on consumers**
 - **What is most important to consumers?**
 - **How do speed and security affect payment behavior?**
 - **Merchants and banks might get additional benefits**

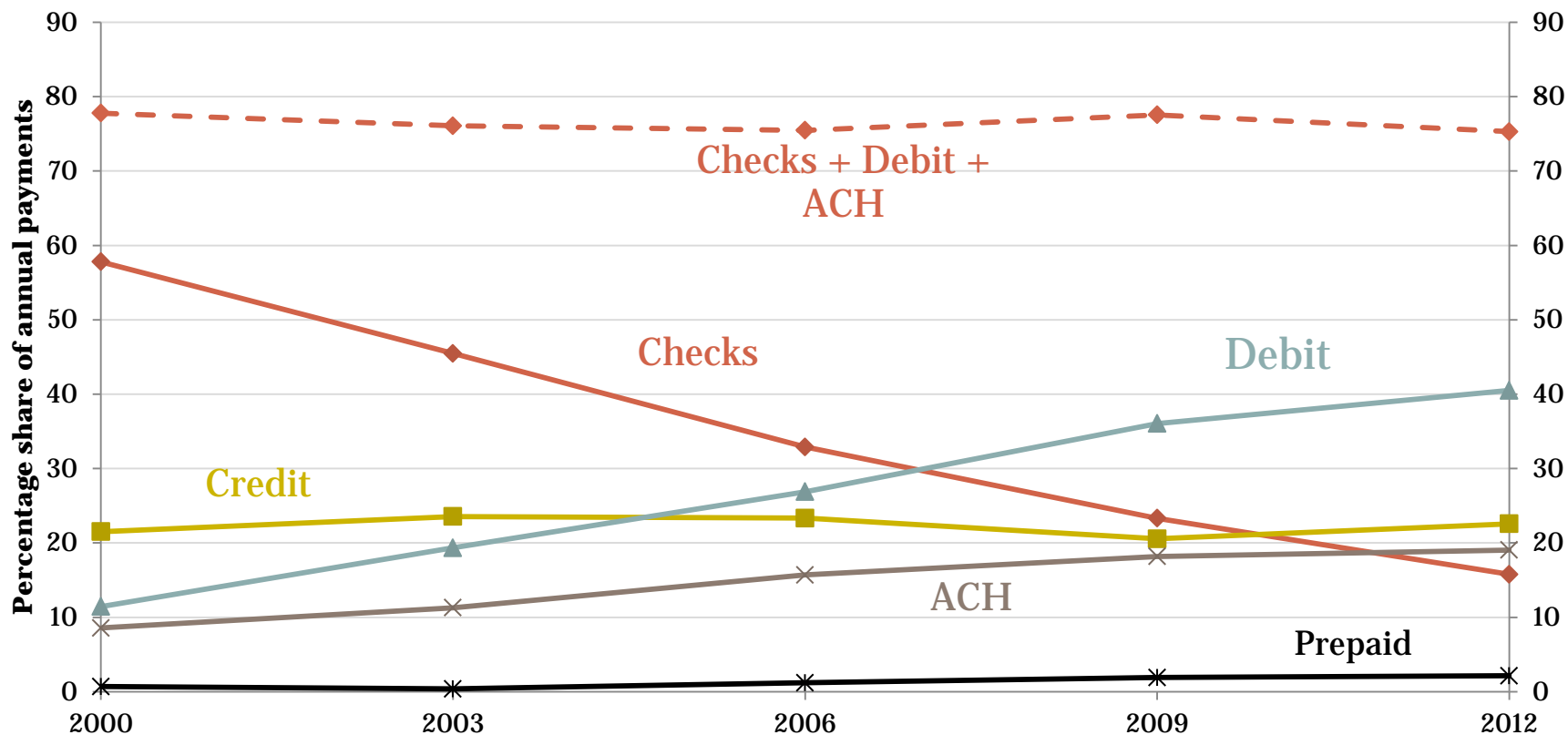
Number of noncash payments, U.S. total *substitution among ways of accessing bank accounts*



Source: Federal Reserve Payment Study (FRPS); Benton, et al. (2007)

Share of U.S. noncash payments

All sectors (household, business, government)

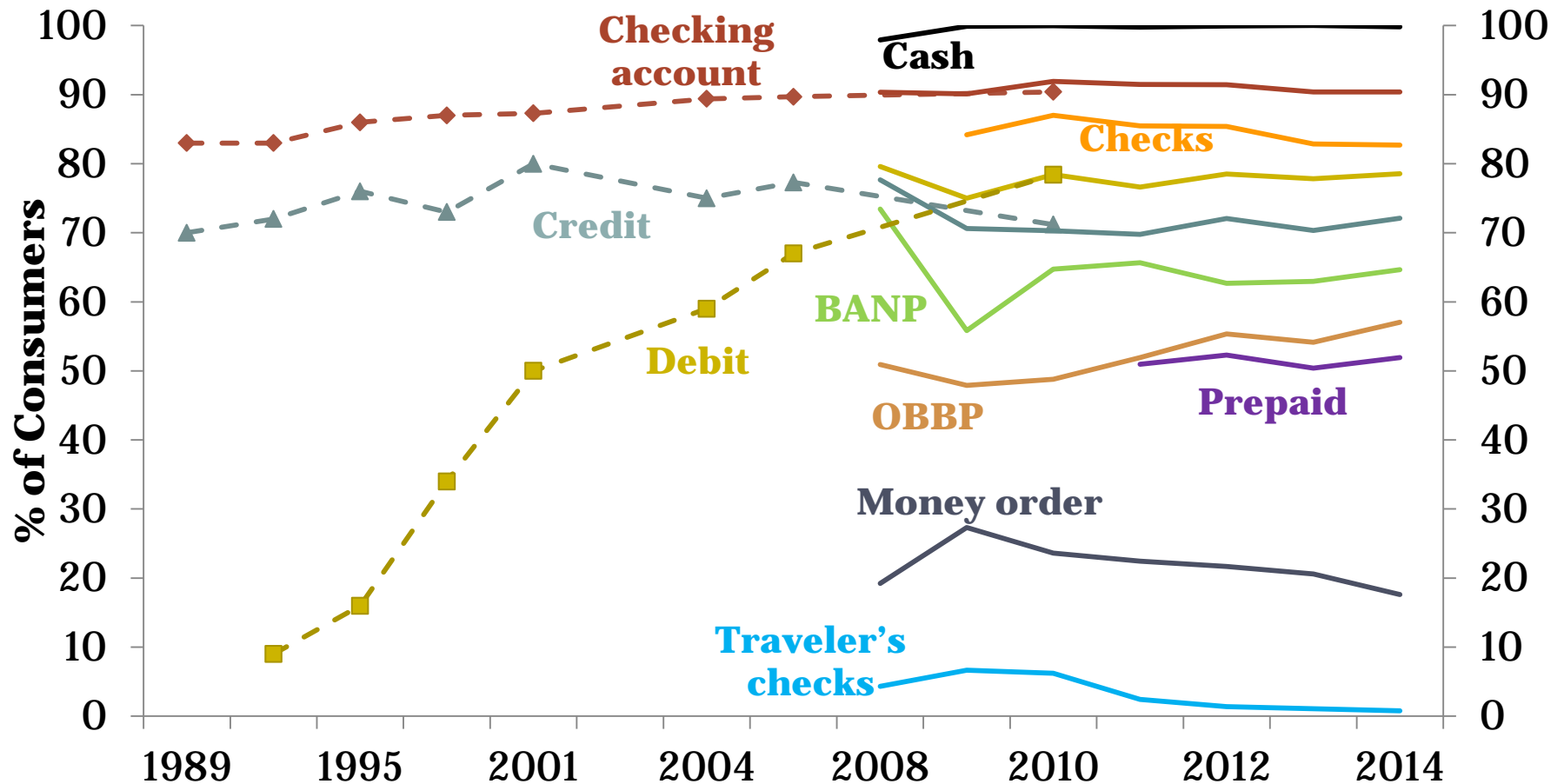


Source: Federal Reserve Payment Study (FRPS).

Survey of Consumer Payment Choice

- Annual survey of U.S. adult consumers, 2008-2014
- Adoption, use and assessments for 9 payment instruments
- Approximately 2,000 respondents every year

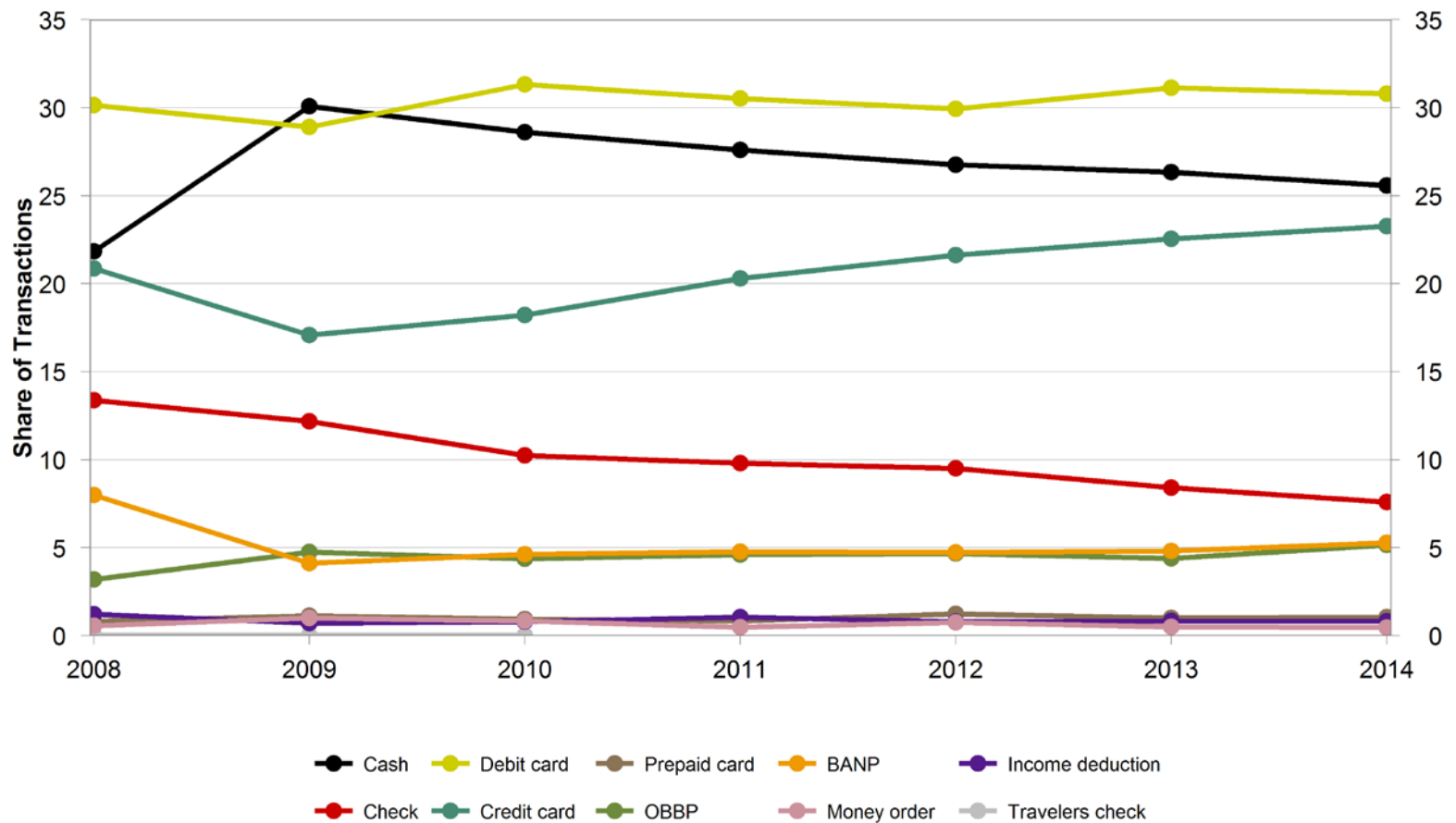
Consumer holding of payment instruments



Source: Survey of Consumer Payment Choice; Survey of Consumer Finance

Payment use fairly stable year to year

shares of all transactions by method, 2008–2014

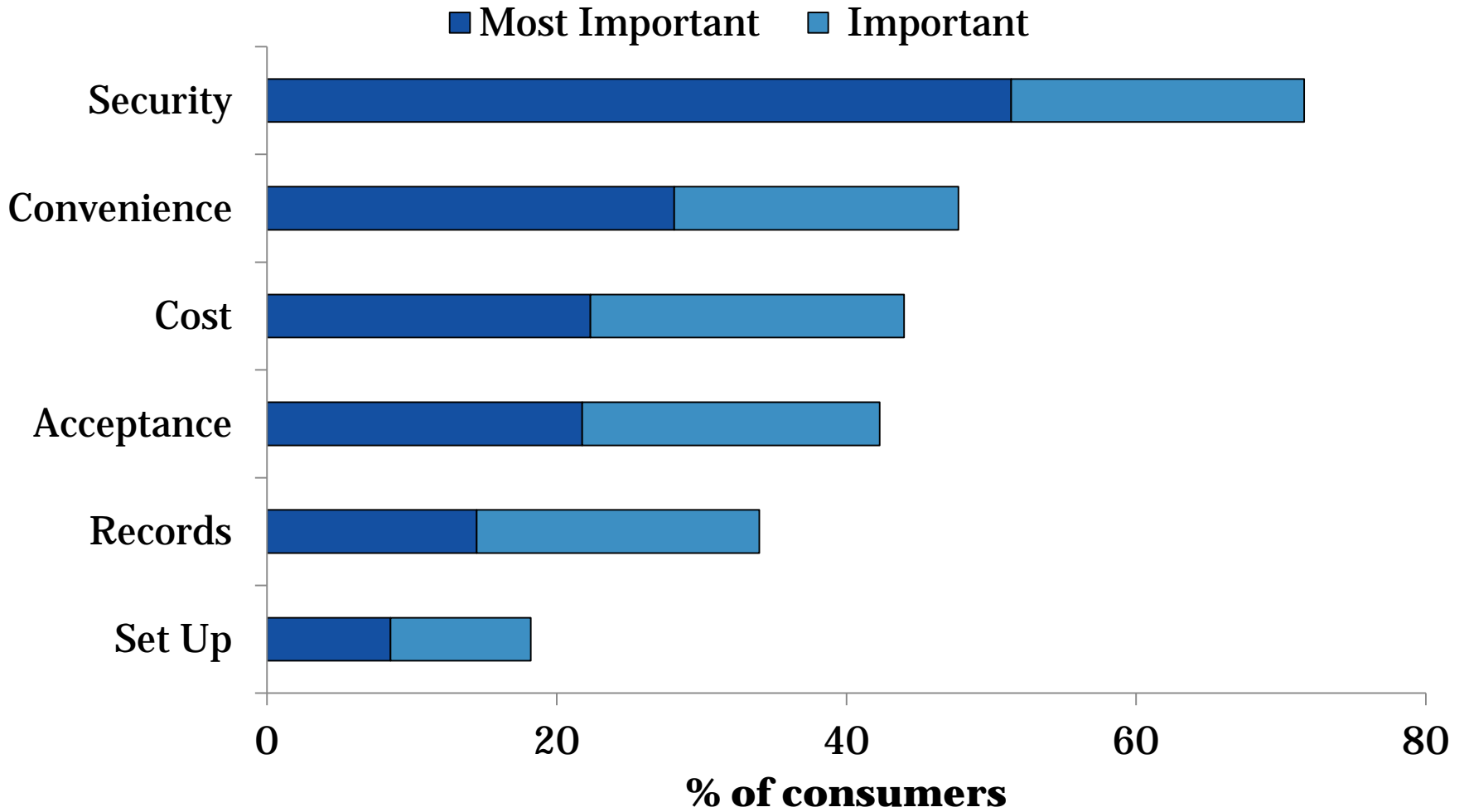


Assessments in prior surveys

	2008	2009	2010	2011	2012	2013
Acceptance	✓	✓	✓	✓	✓	✓
Speed	✓					
Security	✓	✓	✓	✓	✓	✓
Cost	✓	✓	✓	✓	✓	✓
Convenience	✓	✓	✓	✓	✓	✓
Record keeping	✓		✓	✓	✓	✓
Control over timing	✓					
Setup	✓		✓	✓	✓	✓

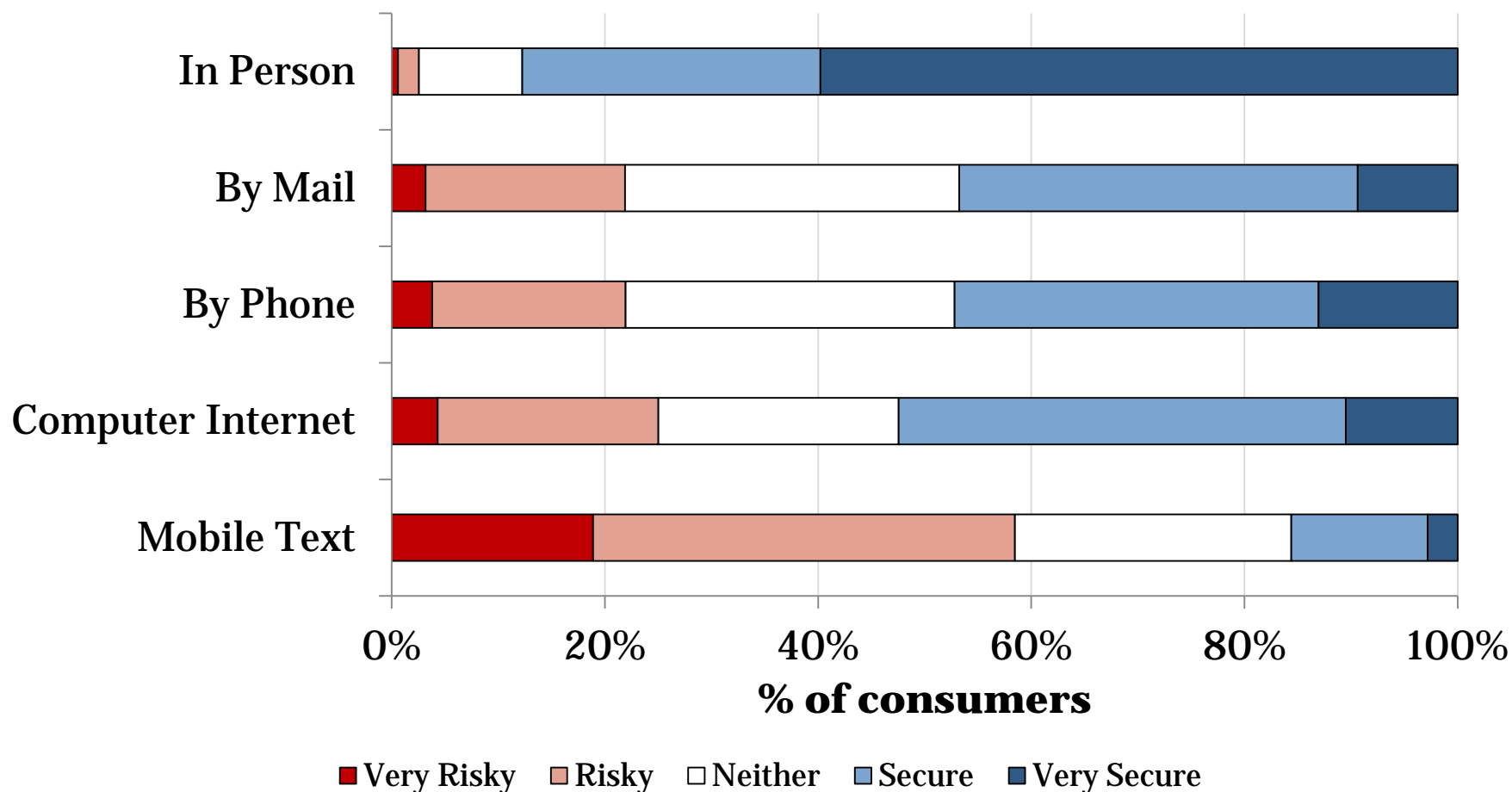
Importance of payment characteristics (2012)

several significant in regressions



2012 Survey of Consumer Payment Choice

Security by payment location



Source: 2012 Survey of Consumer Payment Choice;

Previous literature

- Characteristics of payment methods significant in explaining adoption and use of payments
 - Schuh and Stavins (2010, 2013): characteristics explain more than demographics and income
 - Security NOT as significant as convenience or cost
- Experiencing identity theft might affect payment behavior (Kahn and Liñares-Zegarra 2015)
- Consumers' payment preferences affected by their perceptions of safety (Kosse 2013)
- Lack of research on speed of payments

Speed questions added to survey in 2013

- Speed at time of payment
- Speed of payment deduction
- Speed of recipient receiving payment
- Speed of notification of balances



Security questions added to survey in 2013

Consumers assess financial security and privacy differently!

- Financial loss
- Disclosure of personal information
- Confidentiality of payment transactions



Federal Reserve Financial Services vs. SCPC: aspects of speed

FRFS	SCPC
Transaction speed	Speed at time of payment
	Speed of notification of balances
Availability speed	Speed of recipient receiving payment
Posting speed	Speed of payment deduction

Importance ranking

- Security ranked more important than speed



		Least important	Most important
Security	Financial loss	2.0	56.3
	Personal info	3.3	30.5
	Confidentiality	7.1	19.8
Speed	At checkout	13.2	13.1
	Deduction	14.5	10.9
	Notification	12.9	10.0
	Recipient	24.7	9.7

Note: percentages add to 100; 2013 SCPC

Security is rated least favorably

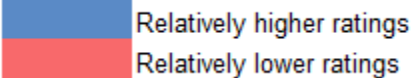
	Cash	Check	Debit card	Credit card	Prepaid card	OBBP	BANP
Acceptance for payment	4.6	3.4	4.4	4.5	3.9	3.5	2.7
Acquisition & setup	4.2	3.7	4.0	3.7	3.5	3.5	3.4
Cost	4.4	3.8	4.0	2.9	3.3	4.0	3.9
Convenience	4.1	3.3	4.3	4.3	3.4	3.9	3.2
Record keeping	2.3	4.1	4.1	4.3	2.8	4.2	4.0
Security	2.8	3.0	3.2	3.3	2.8	3.2	2.7

Source: 2013 Survey of Consumer Payment Choice.

 Relatively higher ratings
 Relatively lower ratings

Cash gets highest security ratings

	Cash	Check	Debit card	Credit card	Prepaid card	OBBP	BANP
Security of financial wealth	2.6	2.7	2.9	3.1	2.6	2.9	2.8
Security of personally identifiable information	3.9	2.7	2.9	2.9	3.3	2.9	2.6
Security of transaction confidentiality	3.6	2.9	2.9	2.8	3.1	2.8	2.8


 Relatively higher ratings
 Relatively lower ratings

Source: 2013 Survey of Consumer Payment Choice

Econometric research

- Used survey data to test whether and how faster speed or more secure payments affect consumer payment behavior
 - Do they affect adoption and/or use of payment instruments?
 - What would happen if payments are processed faster or become more secure as a result of Fed policy?

Model

- 2-stage Heckman model of adoption (stage 1) and use (stage 2):

$$A_{ij} = A(\overline{RCHAR}_{ij}, DEM_i, Y_i, Z_i)$$

$$U_{ij} = U(\overline{RCHAR}_{ij}, DEM_i, Y_i, MR_i^{-1})$$

Where

$$RCHAR_{ki}(j, j') \equiv \log \left(\frac{CHAR_{kij}}{CHAR_{kij'}} \right)$$

$$\overline{RCHAR}_{ki}(j) \equiv \frac{1}{\tilde{J}_i} \sum_{j' \neq j} RCHAR_{ki}(j, j')$$

Adoption results

characteristics only

Speed of deduction affects ACH payments (OBBP and BANP)

Variables	Check	Debit	Credit	Prepaid	OBBP	BANP	Money Order
Acceptance	.00	.07 *	-.07 *	.12 ***	.06	.00	.07 ***
Cost	.02 *	.10 ***	.05 ***	-.04	.20 ***	.12 ***	.03 ***
Convenience	.01	.11 ***	.14 ***	.00	.30 ***	.09 ***	.07 ***
Setup	.05 ***	.12 ***	.15 ***	-.01	.17 ***	.07 *	.10 ***
Records	.04 ***	.09 ***	.14 ***	-.02	.20 ***	.08 **	.06 **
Speed Time at Checkout	.00	.19 ***	.05	.07	.14 ***	.06	.03
Speed Deduct	.02	.05	.01	.03	.24 ***	.27 ***	.06 **
Speed Notify	.00	.04	-.03	.09 *	.07	-.02	.11 ***
Speed Receipt	.01	.06	-.05	.04	-.21 ***	.10 **	-.07 **
Security Wealth	.01	.02	.05 **	-.05 *	.07 *	.05	-.02
Security PII	-.02 *	.05 *	.02	.00	.15 ***	.01	.04
Security Confidentiality	.01	.02	.03	-.02	.02	.04	.02

Use results

characteristics only

Security of financial wealth affects debit and credit use

Variables	Cash		Check		Debit		Credit		Prepaid		OBBP		BANP		Money Order	
Cost	.05	***	-.02	*	.05	*	.08	***	-.01		.00		-.01		.00	
Convenience	.08	***	.04	***	.04		.10	***	.02	***	-.01		.02	*	.06	***
Records	.03	***	.01		.03		.02		.01	*	.03		.00		.01	
Speed Time at Checkout	.02		.04	***	.06		.04		.02	*	.05	***	.02	**	.00	
Speed Deduct	.01		-.05	***	-.01		.02		.01		-.02		-.02		-.01	
Speed Notify	-.01		.01		.03		.03		.02	*	-.02		.00		-.01	
Speed Receipt	.02		-.01		-.02		-.02		.00		.00		-.01		.00	
Security Wealth	.00		.00		.05	***	.06	***	-.01	**	.01		-.02	***	-.01	
Security PII	.01		.02	**	.01		-.01		-.01	*	.03	**	.01	*	.02	
Security Confidentiality	.01		.01		-.01		-.03	*	.01		-.01		.00		.02	

Policy simulations

- Speed of payment deduction affects adoption of OBBP and BANP
- Security of financial wealth affects use of debit and credit
- Two simulations:
 - faster speed for ACH-based payments (OBBP and BANP)
 - security enhancement for debit and credit cards (e.g., EMV)

Speed of deduction makes a VERY small difference

	Online Banking Bill Pay	Bank account number payment
Adoption, Percentage of Consumers (2013)	55%	63%
	10% increase in assessment	
Increase Speed of Deduction and Notification	.43	.37
Increase Speed of Deduction	.32	.41
Increase Speed of Notification	.11	-.04

For every 1% improvement in speed → less than 0.1% ↑ in adoption

Security of wealth makes a VERY small difference

	Debit	Credit
Percent share of use (2013)	28.63	19.49
	10% increase in assessment	
Increase All Components of Security	.16	.10
Security of Wealth	.16	.22
Security of Personally Identifiable Information	.02	-.04
Security of Confidential Information	-.02	-.08

For every 1% improvement in security → less than 0.1% ↑ in card use

Is the Fed's strategic plan worthwhile?

- Direct effect of speed or security changes on consumer behavior likely small in the short run
- Effect of security breaches short-lived: Target and other breaches did not lower credit or debit use 2013 to 2014
- But if merchants or banks benefit, consumers will likely benefit indirectly
- Fraud is a big issue, even though no quantitative reaction
 - *may reinforce payment system stability and trust*

Consumer Payments Research Center (CPRC)

<http://www.bostonfed.org/economic/cprc>

Joanna Stavins
Senior Economist and Policy Advisor
Federal Reserve Bank of Boston
joanna.stavins@bos.frb.org