

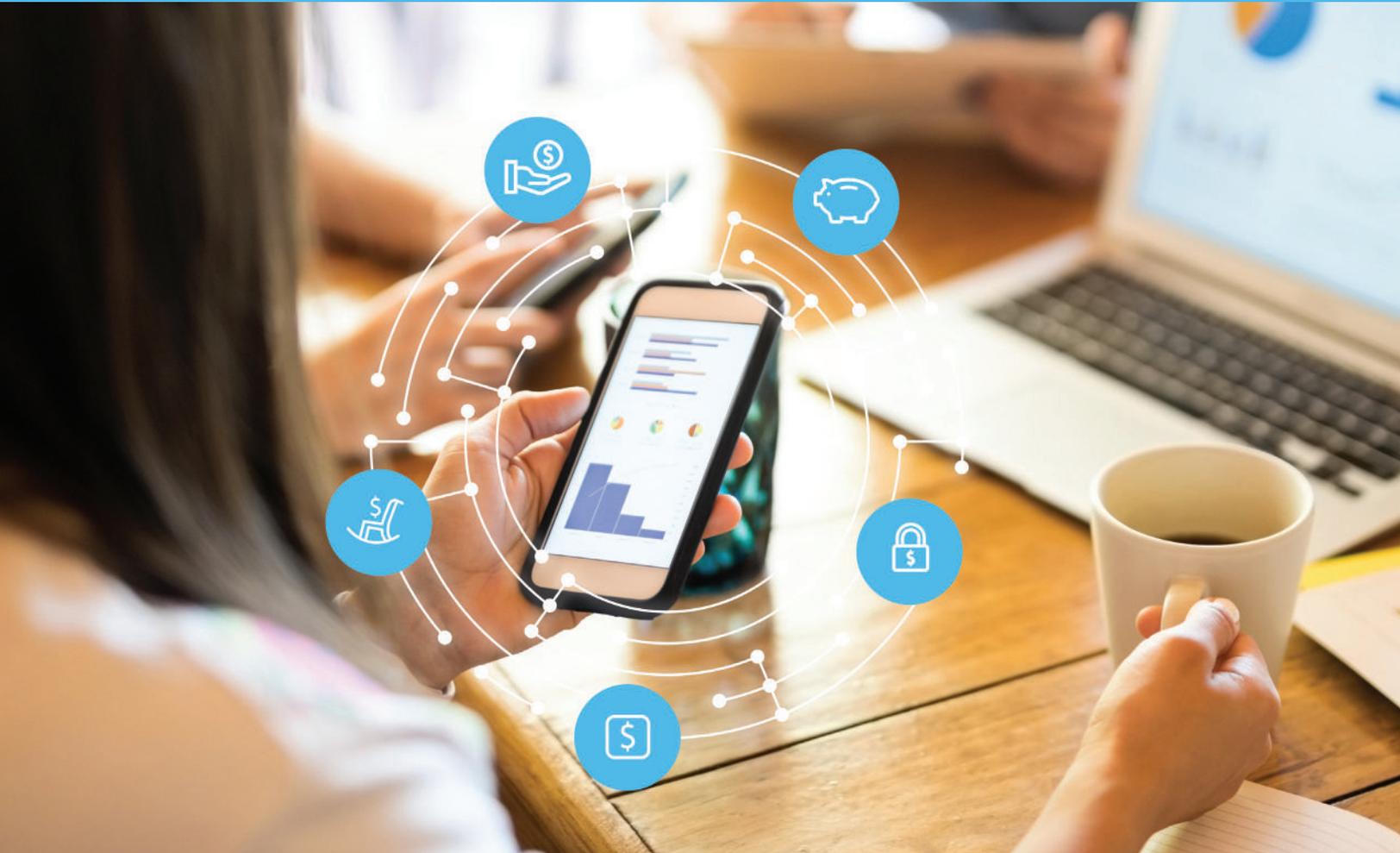
# Millennial Financial Literacy and Fin-tech Use: Who Knows What in the Digital Era

## New Insights from the 2018 *P-Fin Index*

Paul J. Yakoboski, TIAA Institute

Annamaria Lusardi, The George Washington University School of Business and Global Financial Literacy Excellence Center (GFLEC)

Andrea Hasler, The George Washington University School of Business and Global Financial Literacy Excellence Center (GFLEC)



# Executive Summary

Using an oversample of Gen Y in the 2018 wave of the *TIAA Institute-GFLEC Personal Finance Index (P-Fin Index)*, this report examines the financial literacy of millennials and how they engage with fin-tech, i.e., use smartphones for financial purposes.

There is a Gen Y financial literacy gap—on average, millennials answered 44% of the *P-Fin Index* questions correctly, while the U.S. adult population answered 50% correctly. But there is also a notable difference in financial knowledge between younger and older millennials. Older millennials answered 47% of the *P-Fin Index* questions correctly, on average, compared with 41% for younger millennials.

Financial literacy among both younger and older millennials is lowest in the areas of comprehending risk and insuring. The former is troubling because risk and uncertainty are inherent in most financial decision making. The latter is also troubling because individuals face a range of insurance choices—from which events to insure to how to structure insurance coverage. Insuring is a point of weakness in particular for younger millennials; it is the area in which their gap in financial literacy is greatest compared to older millennials.

Overlaying millennial personal finances is the reality that Gen Y lives a technology-enabled existence. Over 90% of millennials own a smartphone, and smartphones offer ready access to money management capabilities. While smartphones are a tool of convenience—80% of millennial smartphone owners use their device to some degree for transactional fin-tech purposes and 90% for informational fin-tech purposes—it is not clear whether fin-tech use represents a net gain for better personal finance outcomes.

We examine the use of smartphones for making payments and tracking expenses. These fin-tech activities are not linked to better financial management; those who use mobile payments are more likely to overdraw their checking account, and those who use their smartphone to track spending are not doing better in this regard than those who do not.

Moreover, fin-tech users benefit from being financially literate, as those with higher levels of financial literacy are less likely to overdraw their checking account. It seems that fin-tech is most appropriately viewed as a complement to, not a substitute for, financial literacy.

## Introduction

The transformative impact of Generation Y (Gen Y), also known as the “millennial” generation, on the U.S. economy is well underway—an inevitability given Gen Y’s sheer size.<sup>1</sup> There were more than 71 million millennials in 2016, a figure projected to reach 73 million in 2019, at which point they will surpass baby boomers as the largest generation in the U.S.<sup>2</sup> In fact, Gen Y already comprises the largest share of the U.S. labor force at 35% (56 million individuals).<sup>3</sup>

Gen Y’s impact also comes from a willingness to integrate new technologies into everyday life. Over 90% of millennials own a smartphone, and 85% use social media.<sup>4</sup> There are other uses for smartphones as well, such as financial. Depositing checks, transferring money, and comparison shopping are activities that can be executed via mobile technology. The use of smartphones and other mobile technologies for financial purposes, referred to as “fin-tech,” is now common among millennials.

The state of Gen Y personal finances matters greatly for the state of the economy as a whole. A more refined understanding of millennial financial literacy levels—their knowledge relative to the general population, variations among subgroups, and areas of strength and weakness—could accelerate initiatives to improve their financial well-being.<sup>5</sup>

This report presents an examination of Gen Y financial literacy using the 2018 wave of the *TIAA Institute-GFLEC Personal Finance Index (P-Fin Index)*.<sup>6</sup> The *P-Fin Index* measures knowledge and understanding which enable sound financial decision

<sup>1</sup> The Pew Research Center recently defined the Millennial Generation as spanning individuals born between 1981 and 1996. See Dimock, Michael. “Defining generations: Where Millennials end and post-Millennials begin,” Pew Research Center *Fact Tank News in the Numbers* (March 1, 2018).

<sup>2</sup> See Fry, Richard. “Millennials projected to overtake Baby Boomers as America’s largest generation,” Pew Research Center *Fact Tank News in the Numbers* (March 1, 2018).

<sup>3</sup> See Fry, Richard. “Millennials are the largest generation in the U.S. labor force,” Pew Research Center *Fact Tank News in the Numbers* (April 11, 2018).

<sup>4</sup> See Jiang, Jingjing. “Millennials stand out for their technology use, but older generations also embrace digital life,” Pew Research Center *Fact Tank News in the Numbers* (May 2, 2018).

<sup>5</sup> See de Bassa Scheresberg, Carlo, Annamaria Lusardi and Paul Jakoboski. *Hispanic Personal Finances: Financial Literacy and Decisionmaking among College-Educated Hispanics*, TIAA Institute and the Global Financial Literacy Excellence Center (May 2015).

<sup>6</sup> In this report, Gen Y includes individuals between the ages of 18 and 37.

Any opinions expressed herein are those of the authors, and do not necessarily represent the views of TIAA, the TIAA Institute or any other organization with which the authors are affiliated.

making and effective management of personal finances. It is unique in its capacity to examine financial literacy across eight areas of personal finance in which individuals routinely function, in addition to providing a robust indicator of overall personal finance knowledge and understanding.<sup>7</sup>

In addition, this report leverages a special set of questions in the 2018 survey to examine millennial fin-tech use across a range of activities and how fin-tech use relates to financial literacy and personal finance outcomes. These are important issues given recent research which found lower financial capability among mobile payment users.<sup>8</sup>

The 2018 wave of the *P-Fin Index* survey was fielded online in January 2018 with a nationally representative sample of adults, ages 18 and older; millennials were oversampled during survey fielding, with 1,007 participating in the survey.<sup>9</sup>

## **Millennial financial literacy (or lack thereof)**

Many Americans lack personal finance knowledge that enables sound financial decision making, but this reality is more pronounced among Gen Y. Millennials answered 44% of the *P-Fin Index* questions correctly, on average, compared with 50% among all U.S. adults (Figure 1).

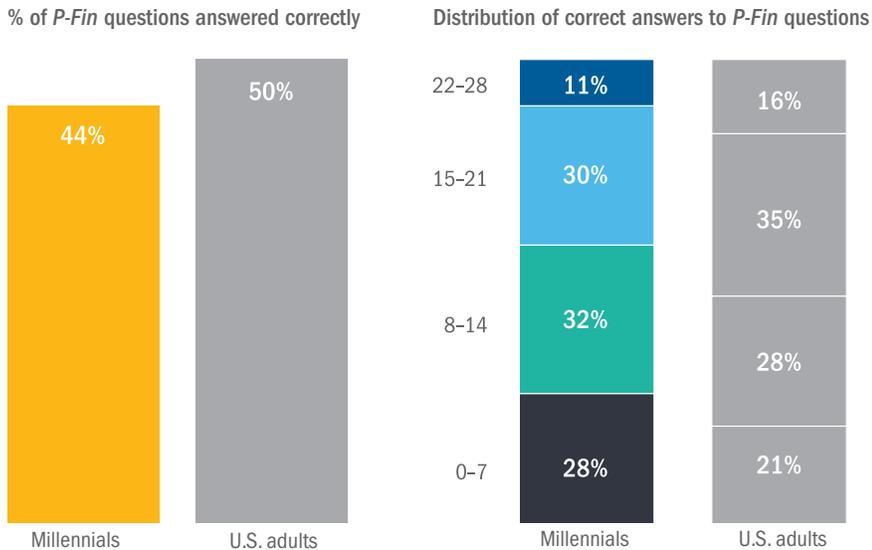
<sup>7</sup> For a full discussion of the *P-Fin Index*, see Yakoboski, Paul J., Annamaria Lusardi and Andrea Hasler. *The 2018 TIAA Institute-GFLEC Personal Finance Index: The State of Financial Literacy Among U.S. Adults*, TIAA Institute and the Global Financial Literacy Excellence Center (April 2018).

<sup>8</sup> Specifically, those who make mobile payments are more likely to overdraw their checking accounts, engage in expensive credit card practices, borrow through alternative financial services and make withdrawals from their retirement savings accounts. See Lusardi, Annamaria, Carlo de Bassa Scheresberg and Melissa Avery. "Millennial Mobile Payment Users: A Look into their Personal Finances and Financial Behaviors," GFLEC *Insights Report* (2018).

<sup>9</sup> The Millennial sample was weighted along the following dimensions: gender (male, female) by age (18-22, 23-27, 28-32, 33-37); race/ethnicity (white/non-Hispanic, Black/non-Hispanic, other/non-Hispanic, Hispanic, 2+ races/non-Hispanic); census region (northeast, mid-west, south, west); metropolitan status (metro/non-metro); education level (less than high school degree, high school degree, some college, college degree); household income (under \$25,000, \$25,000-\$49,999, \$50,000-\$74,999, \$75,000-\$99,999, \$100,000-\$149,999, \$150,000 and over); and language proficiency (English proficient Hispanic, bilingual Hispanic, Spanish proficient Hispanic).

## Figure 1. P-Fin Index millennial findings

Millennials are less financially literate than the general population.



Source: The TIAA Institute-GFLEC Personal Finance Index (2018).

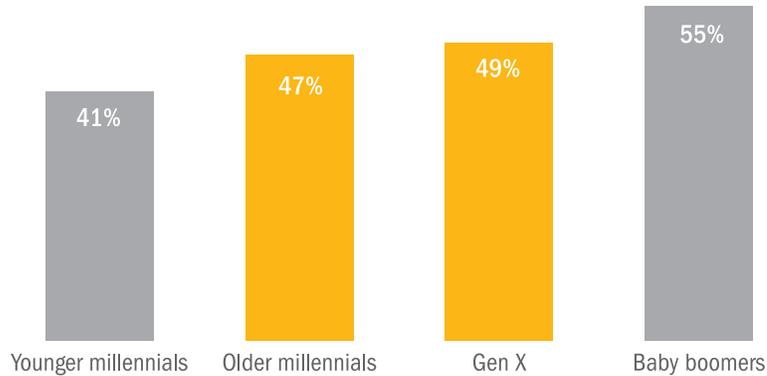
Eleven percent of millennials demonstrated a relatively high level of financial literacy by answering over 75% of the index questions correctly. At the same time, 28% demonstrated very low financial literacy by answering 25% or less correctly. In fact, only 41% of millennials answered over one-half of the index questions correctly, compared with 51% of all U.S. adults (Figure 1).

A notable difference in financial knowledge exists between younger (ages 18 to 27) and older (ages 28 to 37) millennials; so, focusing on Gen Y as a whole provides a distorted understanding of the millennial financial literacy dynamic. In fact, financial literacy among older millennials more closely resembles that among Gen X. Older millennials answered 47% of the P-Fin Index questions correctly, on average, compared with 49% for Gen X and 41% for younger millennials (Figure 2). Analogously, 46% of older millennials and 48% of Gen X answered over one-half of the P-Fin Index questions correctly, while 35% of younger millennials did so (see Appendix Figure A1). The increase in financial knowledge with age is consistent with findings from other surveys and is seen across the entire population. People are confronted with financial decisions through their course of life which contributes to increasing the level of financial literacy.

## Figure 2. Financial literacy across generations

Financial literacy of older millennials mirrors that of Gen X.

% of *P-Fin* questions answered correctly



Source: *The TIAA Institute-GFLEC Personal Finance Index* (2018).

[Appendix Figure A2 presents demographic variations in financial literacy levels among all millennials and separately for younger and older millennials.]

### Financial knowledge across functional areas

The *P-Fin Index* gauges personal finance knowledge and understanding in eight functional areas:

1. Earning—determinants of wages and take-home pay.
2. Consuming—budgets and managing spending.
3. Saving—factors that maximize accumulations.
4. Investing—investment types, risk and return.
5. Borrowing/managing debt—relationship between loan features and repayments.
6. Insuring—types of coverage and how insurance works.
7. Comprehending risk—understanding uncertain financial outcomes.
8. Go-to information sources—recognizing appropriate sources and advice.

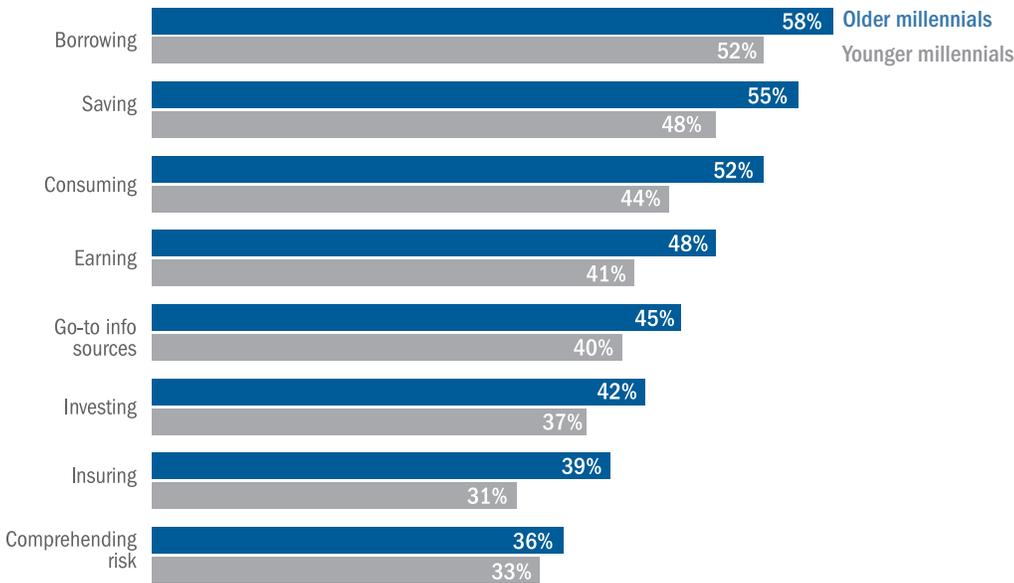
Financial literacy among younger millennials is lowest in the areas of comprehending risk and insuring (Figure 3). These are troubling findings because risk and uncertainty are inherent in most financial decision making, and because individuals face a range of choices regarding which events to insure and how to structure their coverage.

Understanding how insurance works (e.g., the trade-off between deductibles and premiums) and what constitutes appropriate coverage comprise functional knowledge in this area. Poor insurance decisions can leave an individual under-insured for some risks and over-insured for others, as well as overpaying for coverage.

### Figure 3. Millennial functional knowledge

Younger millennial financial literacy lags that of older millennials in every functional area.

% of P-Fin questions answered correctly



Source: The TIAA Institute-GFLEC Personal Finance Index (2018).

Comprehending risk and insuring are the two areas of lowest knowledge among older millennials as well. Nonetheless, insuring is where the difference in financial literacy between younger and older millennials is greatest (9 percentage points). The following question demonstrates younger millennials' lack of knowledge regarding the basics of insurance.

Sebastian wants the premium payments for his car insurance to be as low as possible. What can he do?

- **Increase the deductible on his car insurance (correct answer; chosen by 40% of younger millennials)**
- Lower the deductible on his car insurance (chosen by 9%)
- Nothing, because his premium payments are dictated by his driving record (chosen by 14%)
- Don't know (chosen by 37%)

Financial literacy is highest in the area of borrowing and debt management for both younger and older millennials. On average, 58% of the borrowing questions were answered correctly by older millennials and 52% by younger millennials (Figure 3). Debt is common across the life cycle for many individuals; knowledge and understanding may emerge from confronting accumulated debt, often from early in life.

[Appendix Figure A3 shows functional knowledge among millennials as a whole and how this compares with that of the U.S. adult population.]

## Millennial fin-tech use

Given the availability of fin-tech that has fundamentally changed how individuals can conduct and manage personal finances, the 2018 *P-Fin Index* survey included questions to gauge smartphone use for a number of transactional and informational financial activities. These questions also enable examining how fin-tech use relates to financial literacy and personal finance outcomes.

The 2018 *P-Fin Index* survey asked respondents with a smartphone whether they used their device frequently, sometimes or never for four transactional activities:<sup>10</sup>

- Depositing checks into a bank account.
- Sending and/or receiving money from friends, family or other individuals.
- Paying for a product or service in person at a store, gas station or restaurant, i.e., making mobile payments.
- Paying bills.

<sup>9</sup> Ninety-two percent of millennials reported owning a smartphone. This figure is identical to the ownership rate reported by the Pew Research Center. See Jiang, Jingjing. "Millennials stand out for their technology use, but older generations also embrace digital life," Pew Research Center *Fact Tank News in the Numbers* (May 2, 2018).

The survey also asked about smartphone use for four informational activities:

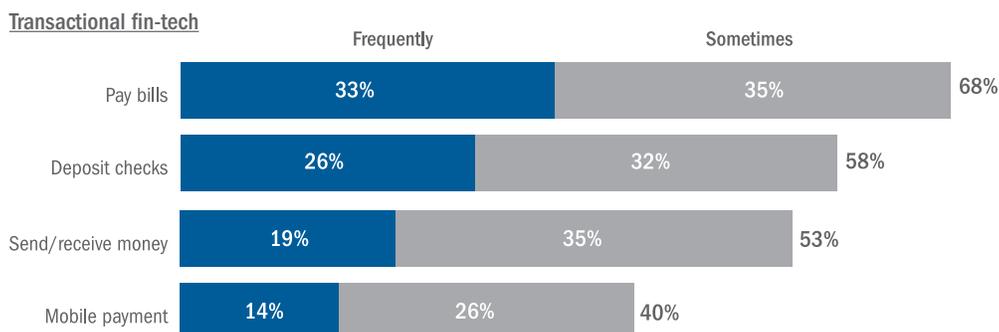
- Checking credit score.
- Comparing prices or product features when shopping.
- Getting personalized investment advice.
- Tracking spending.

Paying bills is the most common transactional fin-tech activity among millennials with a smartphone; 33% frequently use their device to pay bills, and an additional 35% sometimes do so. The next most common transactional activity is depositing checks, followed by sending/receiving money and making mobile payments (Figure 4).

### Figure 4. Gen Y and transactional fin-tech

Paying bills is Gen Y's most common transactional fin-tech use.

% of millennials using their smartphone to...



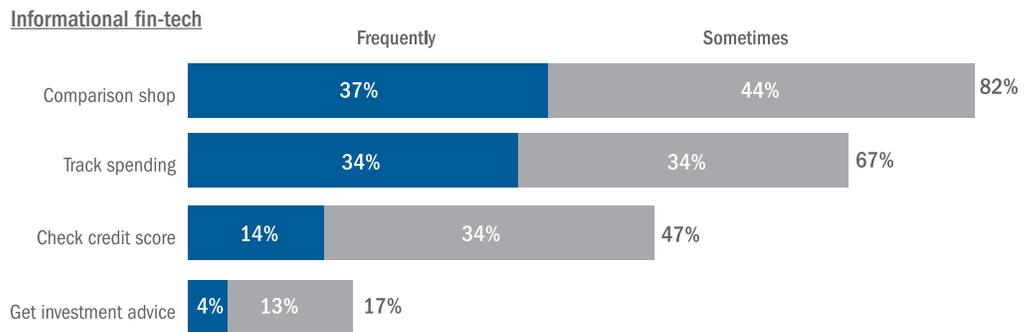
Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

Comparison shopping, i.e., comparing prices or product features when shopping, is the most common informational activity among millennials with a smartphone, as well as the most common fin-tech use overall; 37% frequently use their smartphone to comparison shop, and an additional 43% sometimes do so. At the other end of the spectrum, less than 20% of those with a smartphone use their device at all to get investment advice, making it the least common fin-tech activity overall (Figure 5).

## Figure 5. Gen Y and informational fin-tech

Comparison shopping is Gen Y's most common informational fin-tech use and most common fin-tech use overall.

% of millennials using their smartphone to...



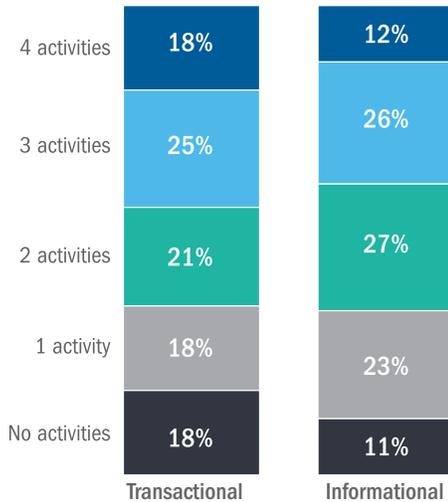
Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

Almost all millennial smartphone owners use their device for some fin-tech activity. Only 18% never use their device for transactional fin-tech; even fewer—11%—never use their smartphone for informational fin-tech. Eight percent do not use their smartphone for any fin-tech activity at all. At the other end of the spectrum, over 40% use their smartphone for 3 or 4 transactional activities, while just under 40% use their device for 3 or 4 informational activities (Figure 6). Clearly, fin-tech is now part of how millennials handle personal finances.

## Figure 6. Gen Y fin-tech activity

2/3 of millennials use their smartphone for 2 or more transactional and informational activities.

Frequently or sometimes use smartphone for:



Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

There is little consistent variation by demographics in fin-tech use across the eight activities. For example, females are more likely to use their smartphone for five of the activities, males are more likely for the other three, and sometimes the differences are slight (Appendix Figures A4 and A5).

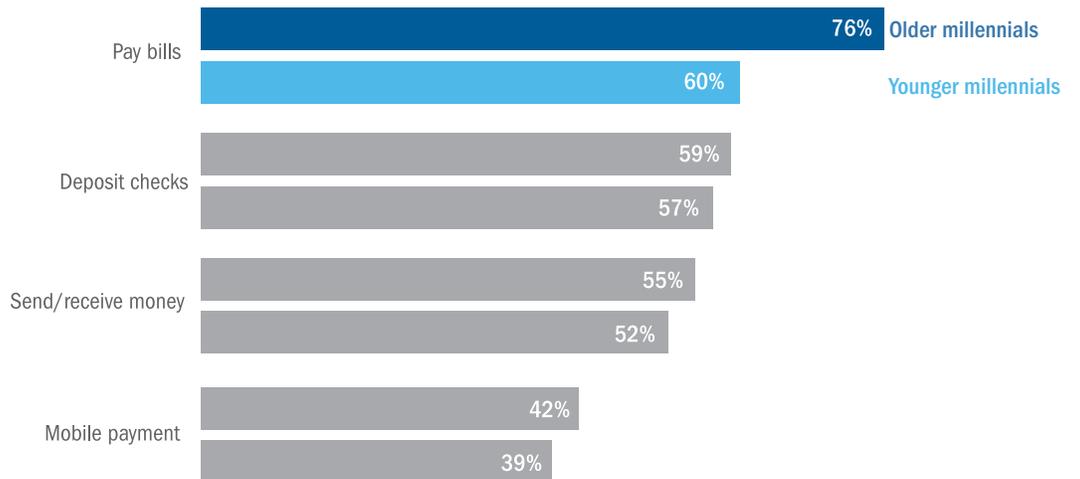
Age is a demographic where there is a consistent pattern in fin-tech use—seven of the eight activities are more common among older millennials than younger millennials, with the usage rate of the eighth being the same. However, the difference is slight (only 2 or 3 percentage points) with four of the seven. The fin-tech activities where use notably differs between older and younger millennials are paying bills, comparison shopping and checking credit score (Figures 7 and 8).

## Figure 7. Transactional fin-tech use among older and younger millennials

Older millennials are more likely to pay bills with their smartphone.

% of millennials using their smartphone to...

### Transactional fin-tech



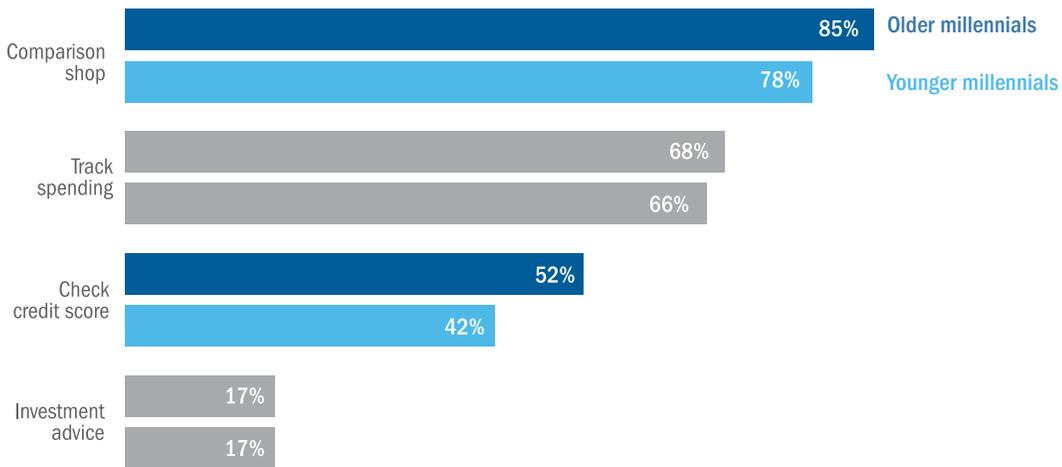
Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

### Figure 8. Informational fin-tech use among older and younger millennials

Older millennials are more likely to comparison shop and check their credit score with their smartphone.

% of millennials using their smartphone to...

#### Informational fin-tech



Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

There is no consistent pattern related to financial literacy levels. Some fin-tech uses appear more common at higher financial literacy levels, while other activities appear more common at lower financial literacy levels. Nor is there a consistent pattern within either the transactional or informational groups (Appendix Figures A4 and A5).

These findings show that the eight fin-tech activities examined, which vary in purpose and nature, attract different users with different needs and economic circumstances, potentially indicating new opportunities for fin-tech developers.

## Fin-tech and personal finance outcomes

One might view fin-tech as a tool that provides convenience, but one that also has the potential to improve personal finance decisions and behavior. It could then promote better personal finance outcomes. But the dynamic is more complex and nuanced, especially when viewed at the level of separate fin-tech activities. One could readily develop a narrative where some fin-tech activities result in poorer financial outcomes, at least for some individuals. For example, consider the ability to make mobile payments at the point of purchase. This convenience creates another degree of separation from handing over cash (now an individual does not even need to open a wallet to remove a debit or credit card), and in doing so it could increase the likelihood that some individuals overspend.

Two fin-tech activities—one transactional and one informational—were analyzed to provide insight into the connection between fin-tech use and personal finance outcomes. The transactional use is mobile payments. The informational use is tracking spending. As mentioned above, smartphone use to make mobile payments could hurt the personal finances of some individuals. On the other hand, using a smartphone to track spending would seem likely to improve financial outcomes by helping individuals to not overspend.

### Mobile payment users

The allure of mobile payment apps, such as Google Pay, Apple Pay and Samsung Pay, is that they facilitate and speed the point-of-sale transaction. Mobile point-of-sale payments totaled over \$70 billion in 2017 and are forecast to reach approximately \$370 billion in 2022. The number of users is expected to grow from almost 50 million in 2017 to 90 million in 2022.<sup>11</sup>

The 2018 *P-Fin Index* survey asked respondents whether they use their smartphone frequently, sometimes or never to pay for a product or service in person at a store, gas station, or restaurant. It cited as examples waving or tapping their mobile phone over a sensor at checkout, scanning a barcode or QR code, or using some other mobile app at checkout. As previously noted, 40% of millennials with a smartphone used it (frequently or sometimes) for mobile payments.<sup>12</sup>

<sup>11</sup> Statista Digital Market Outlook, “FinTech Report 2018 – Digital Payments,” June 2018.

<sup>12</sup> This question was previously asked in the 2015 National Financial Capability Study and the 2016 GFLEC Mobile Payment Survey. The former found that 39% of millennials use their smartphone for mobile payments; the latter found that 49% of millennials did so. See Lusardi, Annamaria, Carlo de Bassa Scheresberg and Melissa Avery. “Millennial Mobile Payment Users: A Look into their Personal Finances and Financial Behaviors,” GFLEC *Insights Report* (2018).

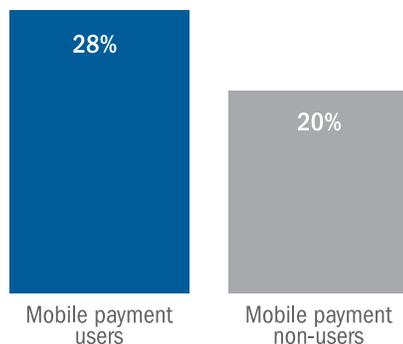
Overdrawing one's checking account is a negative personal finance outcome indicating some degree of financial mismanagement. Almost 30% of millennials who use their smartphone to make mobile payments reported overdrawing their checking account. By comparison, 20% of millennials who do not use their smartphone to make mobile payments have overdrawn their account (Figure 9). Regression analysis finds that this relationship between mobile payment use and overdrawing one's checking account holds even after allowing for the effect of other factors such as gender, income, education and employment status (Appendix Figure A6). This is consistent with previous research which found that millennial mobile payment users are more likely to engage in poor personal finance practices.<sup>13</sup>

This correlation does not necessarily mean that fin-tech use increases the likelihood of a poor personal finance outcome. It's possible, for example, that individuals who are more likely to overdraw their checking account to begin with are also more likely to choose mobile payments. Nonetheless, this finding points to the importance of studying fin-tech use in more detail, in particular among heavy users such as millennials.

### Figure 9. Mobile payment and financial outcomes

Millennials who make mobile payments are more likely to overdraw their checking account.

% overdrawing their checking account



Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

<sup>13</sup> In addition to overdrawing their checking account, mobile payment users were found to be more likely to engage in expensive credit card practices, to borrow through alternative financial services, and to make withdrawals from their retirement savings accounts. See Lusardi, Annamaria, Carlo de Bassa Scheresberg and Melissa Avery. "Millennial Mobile Payment Users: A Look into their Personal Finances and Financial Behaviors," *GFLEC Insights Report (2018)*.

## Using mobile to track spending

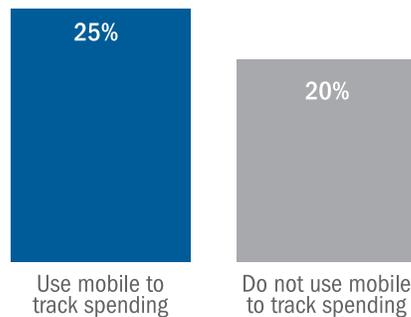
As previously noted, over 70% of millennial smartphone owners use their device (sometimes or frequently) to track the amount they spend and what they spend it on. One would expect this fin-tech activity to improve cash flow management and thus personal finance outcomes. In particular, it should decrease the likelihood of overdrawing checking accounts.

However, millennials who use their phone to track spending are not doing better in this regard. More specifically, one-quarter of those who track spending with their smartphone report overdrawing their checking account compared with 20% of those who do not track spending via their smartphone (Figure 10). It should be noted that this difference is not statistically significant. Even after accounting for other factors, this finding does not change; i.e., those who use their smartphone to track spending are not less likely to overdraw their checking account (Appendix Figure A7).

### Figure 10. Tracking spending with mobile and financial outcomes

Millennials who track spending with their smartphone are not less likely to overdraw their checking account.

% overdrawing their checking account



Source: *The TIAA Institute-GFLEC Personal Finance Index* (2018).

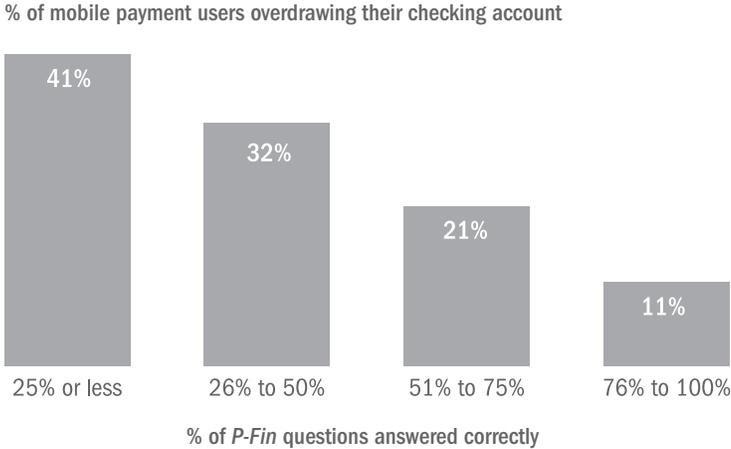
Analogously, this lack of correlation does not necessarily mean that using one's smartphone to track spending does not improve personal finance outcomes. For example, it's possible that individuals who are more likely to overdraw their checking account to begin with are also more likely to track spending with their phone. It's also possible that using one's smartphone to track spending is correlated with another fin-tech activity which leads to overdrawing one's account.

### The link with financial literacy

Understanding the separate contributions of financial literacy and fin-tech to personal finance outcomes is of particular interest, as is understanding how they interact and impact outcomes. Fin-tech and financial literacy are likely best viewed as complements. Financial literacy has been shown to improve personal finance outcomes.<sup>14</sup> Here it appears that financial literacy also might mitigate the effect of mobile payment use on checking account overdrafts (Figure 11.)

**Figure 11. Mobile payment and financial outcomes**

Higher financial literacy lessens negative effects of using smartphone for mobile payments.



Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

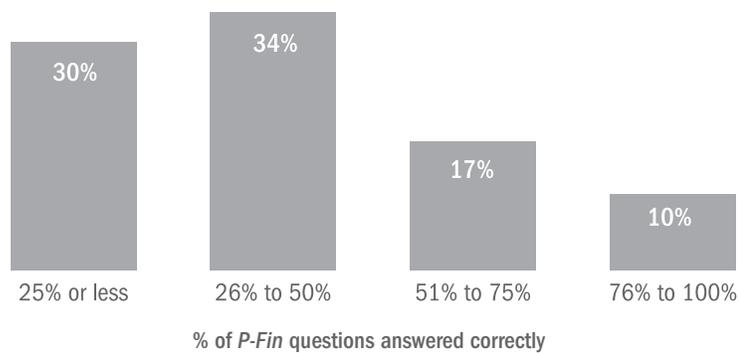
<sup>14</sup> See Yakoboski, Paul J., Annamaria Lusardi and Andrea Hasler. *The 2018 TIAA Institute-GFLEC Personal Finance Index: The State of Financial Literacy Among U.S. Adults*, TIAA Institute and the Global Financial Literacy Excellence Center (April 2018).

Similarly, the percentage of those using their smartphone to track spending who overdraw their checking account decreases sharply with higher levels of financial literacy (Figure 12).

### Figure 12. Tracking spending via smartphone and financial outcomes

Higher financial literacy lessens any negative effect of using smartphone to track spending.

% overdrawing their checking account among those who use smartphone to track spending



Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

The ability to measure financial literacy across eight functional areas enables a more nuanced look at the interplay between financial literacy and fin-tech use, such as mobile payments and tracking spending. Interestingly, the functional knowledge that is significantly linked to the use of smartphones to track spending differs from the functional knowledge linked with mobile payment use. On one hand, the data show that millennials who are more knowledgeable about the earnings and savings questions are more likely to use their smartphone to track their spending. On the other hand, individuals who are more knowledgeable about borrowing are less likely to use mobile payment applications.

These findings again show that fin-tech services attract segments of users who have different needs and characteristics.

## Discussion

Financial literacy positions one to make appropriate decisions and experience better financial outcomes. Research confirms this dynamic. Unfortunately, millennials in general, and younger millennials in particular, are operating from a limited base of financial knowledge. Nonetheless, these individuals must make numerous financial decisions on an ongoing basis. Some decisions are relatively trivial in the moment, but have a cumulative effect over time. Other decisions have self-evident importance for financial well-being now and even decades into the future.

Furthermore, there are areas where financial literacy is particularly low—comprehending risk and uncertainty, as well as insuring. This is clearly problematic. Risk and uncertainty are inherent elements in financial life, while insurance presents a means to mitigate some risks. So low financial literacy in these areas raises the question of whether millennials are insuring appropriate risks at appropriate levels, and doing so in a cost-efficient way.

Overlaying financial literacy, personal finances and financial well-being is the reality that Gen Y lives a technology-enabled existence. For example, over 90% of millennials own a smartphone, which is a tool of convenience—80% of millennial smartphone owners use their device to some degree for transactional fin-tech purposes and 90% for informational fin-tech purposes.

Mobile payments at the point of purchase are convenient, but does another degree of separation from handing over cash (now an individual does not even need to open a wallet to remove a debit or credit card) increase the likelihood that someone overspends available funds? The answer likely varies across individuals. Findings here indicate that the technology might exacerbate a relative tendency among those with low financial literacy to overdraw their checking account.

On the other hand, it seems that the capability to track spending with a smartphone should improve personal finance outcomes, but how much and among whom? Findings here indicate that the technology may create new trackers, but with marginal, if any, improvement in outcomes.

The use of fin-tech in combination with financial literacy has the potential to improve personal finance outcomes. Just as choice architecture (i.e., nudges) is best viewed as a complement to financial literacy in producing better outcomes, so should fin-tech be viewed as a complement to, not a substitute for, financial literacy. Financial education that is designed for a tech-enabled financial life should help ensure that the net result is improved financial well-being.

## About the authors



Paul Jakoboski

**Paul Jakoboski** is a senior economist with the TIAA Institute. He is responsible for research on lifetime financial security, including topics related to defined contribution plan design, individual saving and investing, financial literacy and capability, and asset management during retirement, as well as research on workforce issues in the higher education and nonprofit sectors. Prior to joining the Institute, Jakoboski held positions with the American Council of Life Insurers, the Employee Benefit Research Institute and the U.S. Government Accountability Office. Jakoboski earned his B.S. in economics from Virginia Tech and M.A. and Ph.D. in economics from the University of Rochester.



Annamaria Lusardi

**Annamaria Lusardi** is Denit Trust Chair of Economics and Accountancy at the George Washington University School of Business, and the founder and academic director of GFLEC. She has published extensively and in many leading economics journals and is the recipient of several prestigious awards. Lusardi was recently appointed as director of the newly established Financial Education Committee in Italy. In addition, she chairs the OECD's International Network for Financial Education Research Committee. She previously taught at Dartmouth College, Princeton University, the University of Chicago Harris School of Public Policy and Booth School of Business, and Columbia Business School. She also was a visiting scholar at Harvard Business School. She earned her B.A. from Bocconi University in Milan and Ph.D. from Princeton University. Lusardi is a TIAA Institute Fellow.



Andrea Hasler

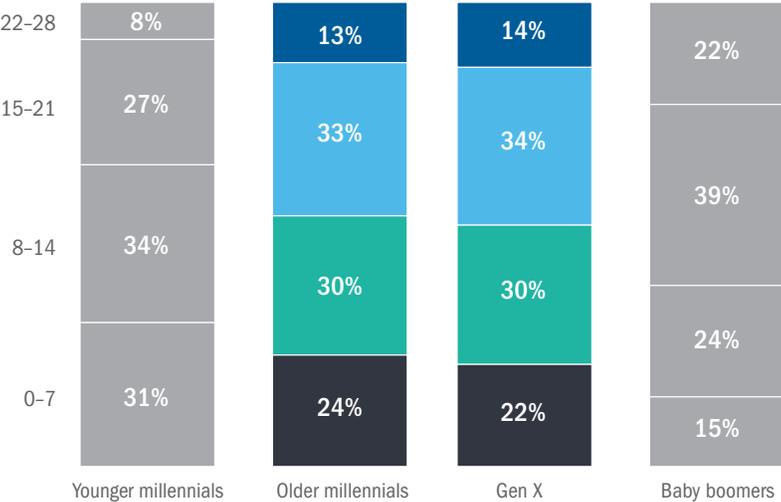
**Andrea Hasler** is an Assistant Research Professor in Financial Literacy at GFLEC. She leads the team of researchers working on financial literacy and capability and develops analyses for educational and policy initiatives. Hasler has recently worked on projects focused on financial literacy levels of the young, women, entrepreneurs, investors, and minorities in the U.S. and around the world. She holds a Ph.D. in Finance as well as an M.Sc. and B.A. in Business and Economics from the University of Basel. During her doctorate, she spent two years at the New York University Stern School of Business conducting research on household saving and financial decision making. She also has been a lecturer at the University of Basel for six years. Her professional experience includes the development of an online advanced studies course in financial market theory and work as an analyst conducting global equity market research.

# Appendix

## Figure A1. Financial literacy across generations

Financial literacy of older millennials mirrors that of Gen X.

Distribution of correct answers to the *P-Fin* questions



Source: The TIAA Institute-GFLEC Personal Finance Index (2018).

## Figure A2. Gen Y demographics and financial literacy

% of P-Fin questions answered correctly

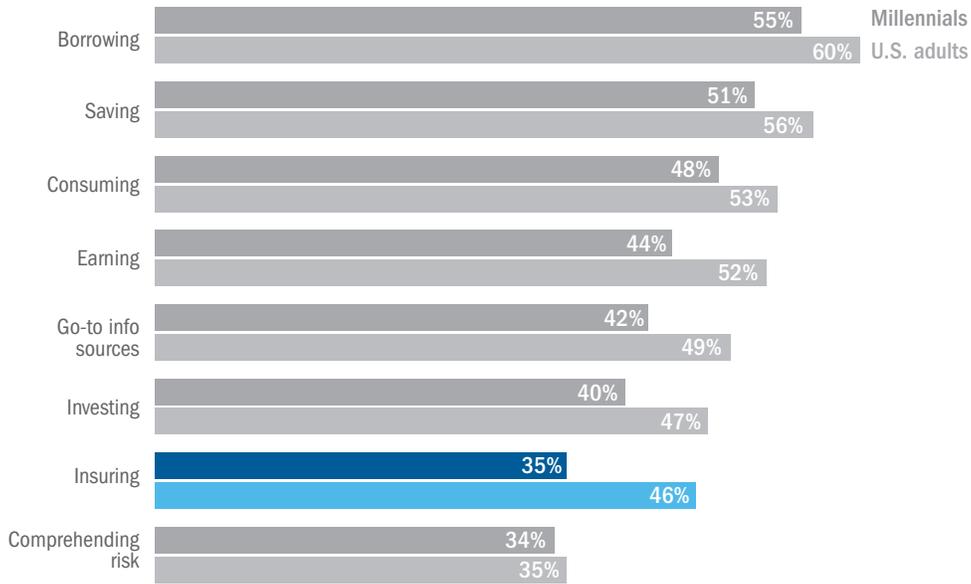
	All millennials	Younger millennials	Older millennials
<b>Gender</b>			
Males	47%	44%	50%
Females	41	37	45
<b>Household income</b>			
Less than \$25,000	28%	26%	30%
\$25,000 to \$49,999	35	36	35
\$50,000 to \$99,999	45	43	48
\$100,000 or more	54	47	61
<b>Education level</b>			
No high school degree	27%	27%	28%
High school degree	36	36	35
Some college	43	42	45
College degree	59	53	62
<b>Job status</b>			
Employed	46%	43%	49%
Not employed	39	39	40
<b>Received financial education</b>			
Yes	53%	50%	55%
No	41	37	44

Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

## Figure A3. Functional knowledge

Insuring is where millennial financial literacy most lags that of the general population.

% of P-Fin questions answered correctly



Source: The TIAA Institute-GFLEC Personal Finance Index (2018).

## Figure A4. Gen Y transactional fin-tech use

% frequently or sometimes using their smartphone for each activity

	Pay bills	Deposit checks	Send/receive money	Mobile payments
<b>Gender</b>				
Males	66%	57%	52%	43%
Females	70	59	55	38
<b>Household income</b>				
Less than \$25,000	69%	54%	43%	46%
\$25,000 to \$49,999	76	47	46	39
\$50,000 to \$99,999	71	58	48	37
\$100,000 or more	60	65	66	42
<b>Education level</b>				
No high school degree	71%	44%	39%	39%
High school degree	62	53	38	37
Some college	68	57	52	39
College degree	72	67	72	44
<b>P-Fin Index score</b>				
0-7 correct answers	65%	61%	49%	42%
8-14 correct answers	73	51	51	42
15-21 correct answers	68	62	57	38
22-28 correct answers	59	62	60	39

Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

## Figure A5. Gen Y informational fin-tech use

% frequently or sometimes using their smartphone for each activity

	Comparison shop	Track spending	Check credit score	Investment advice
Gender				
Males	82%	62%	44%	20%
Females	81	72	51	15
Household income				
Less than \$25,000	74%	65%	53%	23%
\$25,000 to \$49,999	80	69	55	15
\$50,000 to \$99,999	83	70	50	17
\$100,000 or more	84	65	39	16
Education level				
No high school degree	61%	62%	45%	17%
High school degree	77	65	45	17
Some college	83	65	47	15
College degree	91	73	51	19
P-Fin Index score				
0-7 correct answers	69%	71%	45%	20%
8-14 correct answers	84	68	55	19
15-21 correct answers	86	66	46	14
22-28 correct answers	91	63	38	15

Source: *The TIAA Institute-GFLEC Personal Finance Index (2018)*.

**Figure A6. Mobile payment regression on overdrawing checking account**

	(Model 1) Overdrawing checking account	(Model 2) Overdrawing checking account
Uses mobile payment	0.064**	0.204***
	(0.030)	(0.063)
Financial literacy score		0.003
		(0.003)
Mobile payment*financial literacy		-0.011**
		(0.004)
Constant	0.277***	0.221***
	(0.076)	(0.082)
Controls	YES	YES
Observations	804	804
R-squared	0.117	0.124

Note: The dependent variable is an indicator variable coded as 1 if the respondents answered that they frequently or sometimes overdraw their checking accounts and 0 if they indicated they never do it. The sample is restricted to those who own a checking account and a smartphone. The dummy for uses of mobile payment is coded as 1 if respondents answered that they sometimes or frequently use their smartphone to pay for a product or service in person at a store, gas station, or restaurant and 0 otherwise. For both variables, respondents who indicated “Don’t know” or “prefer not to say” are excluded. The financial literacy score is a variable including the 28 questions of the *P-Fin Index*. Controls are: age, gender, ethnicity, marital status, education, income and employment. OLS regressions were used. Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Source: *The TIAA Institute-GFLEC Personal Finance Index* (2018).

**Figure A7. Track spending regression on overdrawing checking account**

	(Model 1) Overdrawing checking account	(Model 2) Overdrawing checking account
Does track spending	0.029	0.051
	(0.032)	(0.066)
Financial literacy score		0.000
		(0.004)
Track spending*financial literacy		-0.002
		(0.004)
Constant	0.309***	0.300***
	(0.077)	(0.087)
Controls	YES	YES
Observations	808	808
R-squared	0.109	0.109

Note: The dependent variable is an indicator variable coded as 1 if the respondents answered that they frequently or sometimes overdraw their checking accounts and 0 if they indicated they never do it. The sample is restricted to those who own a checking account and a smartphone. The dummy for track spending is coded as 1 if respondents answered that they sometimes or frequently use their smartphone to track the amount they spend and what they spend it on and 0 if they never track they amount with their smartphone. For both variables, respondents who indicated “Don’t know” or “prefer not to say” are excluded. The financial literacy score is a variable including the 28 questions of the P-Fin Index. Controls are: age, gender, ethnicity, marital status, education, income and employment. OLS regressions were used. Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Source: *The TIAA Institute-GFLEC Personal Finance Index* (2018).



TIAA Institute is a division of Teachers Insurance and Annuity Association of America (TIAA), New York, NY.  
©2018 Teachers Insurance and Annuity Association of America-College Retirement Equities Fund (TIAA-CREF), 730 Third Avenue,  
New York, NY 10017