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The Relationship among Financial Education, Financial Literacy, and Financial Behavior

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A B S T R A C T

Financial education around the world has been promoted actively. However, the financial literacy level is still low, and financial illiteracy is prevalent. Evidence of the effectiveness of financial education on financial literacy and financial behaviors from previous studies are mixed. Several literature reviews and meta-analyses that discuss causal relationships of financial education, financial literacy, and financial behavior also reported mixed conclusions. Using more recent articles, we reviewed the literature to determine why a consensus has not been reached. We provide suggestions for future studies and evaluations of financial education. We further discuss the implications for policy to improve financial outcomes of individuals.

Keywords: Financial Education, Financial Literacy, Financial Behavior, Consumer Finance

Ⅰ. Introduction

Financial markets are becoming increasingly complex in today's world. New financial products, such as crypto-currency, are spreading rapidly and financial markets are becoming more accessible to individuals which allows them to choose among various investment options. However, many of these investment options are difficult for novice investors to understand. Not only are individuals getting more investment options, but they are also accepting more responsibility for managing their own finances. For instance, in many countries, pension schemes have changed from defined benefit plans to defined contribution plans and individual retirement accounts that result in individuals having to make their own financial decisions. This global trend of disintermediation requires people to determine how much to save and where to invest on their own (Lusardi and Mitchell, 2014).

Thus, how can individuals manage their finances well and become better investors? Many experts emphasize the importance of financial education and financial literacy. More financially literate individuals are expected to make fewer uninformed and irrational financial decisions. Indeed, many countries, including the U.S., promote financial education actively to improve financial literacy of individuals. For instance, the U.S. National Strategy for Financial Literacy 2020 emphasized the importance of financial education in the following quote: "financial education is key to unlocking the foundations of economic opportunity and powering a strong and resilient economy. Americans must acquire financial skills and knowledge to fully participate in our dynamic economy."[1]

However, the level of financial literacy of financial consumers around the world is not high. In fact, financial illiteracy is prevalent even in developed countries (Lusardi

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[1] U.S. Financial Literacy and Education Commission (2020)

and Mitchell, 2011a). Although financial education has been promoted actively, why is financial illiteracy still prevalent? Is financial education still not enough? Or is financial education not effective in improving financial literacy and financial behavior? Is the link between financial literacy and financial behavior weak? The motivation for this study starts with these questions.

There is a strong belief that to improve financial literacy, well designed and properly timed financial education is crucial. The assumptions that underlie financial education are that financial education increases financial literacy, greater financial literacy leads to better financial behavior, and better financial behavior leads to better financial outcomes (Hathaway and Khatiwada, 2008). However, several recent evaluations of financial education interventions reported that the effect of financial education was limited. Even more, the impact of financial education and financial literacy on financial behavior was questioned by scholars. Is it financial literacy or some other related psychological traits, such as numeracy, propensity to plan, or cognitive ability, that drive an individual's investment performance rather than financial knowledge? This question is often raised because the causal link between financial literacy and financial behavior is not clear (Lusardi and Mitchell, 2014).

The purpose of this paper is to review current studies on the causal relationships among financial education, financial literacy, and financial behavior and to discuss the implications of previous literature on future research and policy. There are several extensive literature reviews and meta-analyses on these causal relationships. However, previous literature reviews and meta-analyses do not provide consistent conclusions. Some papers supported the effectiveness of financial education interventions, but others did not. With more recent articles, we reviewed studies to find out why previous conclusions were not consistent.

This paper is organized as follows. In the next section, we discuss the definition and effectiveness of financial literacy. In section 3, we check the current level of financial literacy and financial education efforts. In Section 4, we discuss potential endogeneity in financial literacy and financial education. In Section 5, we focus on previous literature reviews that dealt with the link among financial education, financial literacy, and financial behavior. Section 6 discusses implications for future financial education, evaluation, and policy.

Ⅱ. The Definition and Effectiveness of Financial Literacy

What is financial literacy? There are various definitions. For example, Lusardi and Mitchell (2014) defined financial literacy as people's ability to process economic information and to make informed decisions about financial planning, wealth accumulation, debt, and pensions. The Jump$tart Coalition for Personal Financial Literacy (2015) defined financial literacy as "the ability to use knowledge and skills to manage one's financial resources effective for lifetime financial security." OECD and International Network on Financial Education (OECD/INFE, 2011) provided a more comprehensive definition that financial literacy is a combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately to achieve an individual's financial wellbeing. Hastings et al. (2013) proposed that financial literacy included several aspects, such as knowledge of financial products, knowledge of financial concepts, mathematical skills or numeracy, and engagement in certain activities, for example, financial planning.

Although the definition of financial literacy varies, researchers have emphasized consistently that financial literacy is a multi-dimensional concept. This implies that it is difficult to disentangle financial behavior from financial literacy, which is the cause of the problem in estimating the effect of financial literacy on financial behavior. Because a behavioral component is already included in the definition and measurement of financial literacy, we are estimating the effect of financial behavior and financial knowledge combined on financial behavior. Individuals can learn from their investment experience. Hilgert et al. (2003) reported that individuals cited personal experience as the most important source of financial learning, which implied the possibility of reverse causality. Hence, if we do not choose the estimation method carefully, reverse causality or reciprocal causality may bias the estimate of the impact of financial literacy.

People who are more financially literate are more likely to plan retirement and to accumulate more wealth (Lusardi and Mitchell, 2007a, 2007b, 2011b, 2011c). Those with low financial literacy are more likely to engage in costly credit card usage (Motola, 2013). More rigorous methods to find a causal relationship, such as instrumental variables and experimental approaches, also suggested that financial

literacy plays a role in influencing financial decision-making (Lusardi and Mitchell, 2014). However, some other studies reported limited effectiveness of financial education and financial literacy. Financial education interventions have been evaluated in the U.S., Europe, and around the world for more than 30 years. Yet, the impact of financial education on financial literacy is unclear, and the impact on financial behavior is even more unclear (Rutledge, 2010). Cole and Shastry (2007) argued that financial education did not affect financial decisions, but financial education may have affected decision-making through personality and other psychological factors. Other researchers, such as Willis (2008), further argued that financial education failed to improve consumer decision-making and may even have been harmful by developing over-confidence. Rutledge (2010) suggested that building financial literacy was a long-term investment, and the effectiveness of financial education should be measured and evaluated carefully.

Ⅲ. Current Level of Financial Literacy and Financial Education Interventions

The current level of financial literacy around the world is quite low (Lusardi and Mitchell, 2011a). For example, in the U.S., financial literacy for the general population is quite low. In the 2018 National Financial Capability Study, only one-third of adults could answer at least four out of five financial literacy questions on concepts such as mortgages, interest rates, inflation, and risk (U.S. Financial Literacy and Education Commission, 2020). The older U.S. population was quite illiterate financially, and most high school students received a failing grade for financial literacy (Lusardi and Mitchell, 2014).

In Korea, according to the Bank of Korea and the Financial Supervisory Services' 2020 measurement of financial literacy[2], the financial literacy score of Korean adults was on average 66.8 out of 100, which was a bit higher than the OECD average of 62. Among the three components of financial literacy, financial knowledge and financial behavior scores were above the OECD average, but the financial attitude score was below average, especially for the younger generation. The elderly's financial literacy scores were lower than the total average.

Low levels of financial literacy are also prevalent in other countries. Hastings et al. (2013) summarized results of financial literacy assessments that included the Netherlands (2010), U.S. (2004, 2009, 2010), Japan (2010), Chile (2009, 2012), Mexico (2010), Indonesia (2007), and India (2006). Other surveys around the world showed low financial literacy scores in general. Lusardi and Mitchell (2011a) reported a high level of financial illiteracy in Germany, the Netherlands, Sweden, Japan, Italy, New Zealand, and the U.S., especially among the older population. The older population believed they had financial knowledge, but according to the survey, their financial literacy scores were below average.

As a result, many countries have started national initiatives. For example, in the U.S., concerns about poor financial decision-making and weak consumer protections in financial markets resulted in the creation of the Consumer Financial Protection Bureau (CFPB) in 2010. In addition to its regulatory function, CFPB is mandated to establish an office of financial education to develop a strategy to improve the financial literacy of consumers. In addition, the Financial Literacy and Education Commission (FLEC), which is composed of 23 federal government entities, was created to improve the financial literacy and education of people in the U.S. (FLEC, 2020). FLEC oversees creating, implementing, reviewing, and updating the national strategy to promote financial literacy and education. The Jump$tart Coalition for Personal Financial Literacy is a nonprofit, public-private partnership of educators, private companies, and government that was founded in 1995. They provide personal finance education in schools for kindergarten through 12 grades.

Some reviews of large-scale interventions reported that the impact of financial education was lower than expected. Tennyson and Nguyen (2001) analyze a 1997 survey of high school students conducted by the Jump$tart Coalition for Personal Financial Literacy and report that states' personal finance curriculum mandates are not associated with students' financial literacy test scores. The 2008 Jump$tart survey of high school seniors found that financial literacy of high school students was at the lowest level since they started measuring, and students who took a personal finance course did no better than those who did not (Mandell, 2009). Dwyer et al. (2020) compiled youth

[2] Bank of Korea and Financial Supervisory Service (2020)

financial education spending by U.S. state governments and nonprofit organizations since 2001 and identified the impact of this spending for low- and moderate-income U.S. residents. They found that financial education for students had increased since early 2000 and that increased financial education mandates were linked to a decrease in financial fragility. Although they found that individuals were more likely to be able to afford emergency expenses, they did not find that financial education was associated with an individual's ability to afford routine health care. In addition, although increased spending on financial education by nonprofits was related to a lower likelihood of the individual having a retirement savings account, this was because nonprofits provided financial education to those who did not have a retirement savings account.

Despite these interventions, why is the level of financial literacy still low? There are several possibilities. The first is that we have not provided enough financial education yet. There is still not enough financial education, and we need to create more interventions. The second possibility is that financial education interventions undertaken so far may not have been effective enough. Third, financial education may not have much effect on financial literacy. To find out more, we need to look at the findings in the literature and to discuss the relationship among financial education, financial literacy, and financial behavior.

Ⅳ. Endogeneity in Financial Literacy and Financial Education

Why is it challenging to establish a causal link between financial literacy and financial behavior? In section 2 we discussed why it was difficult to disentangle the effect of financial literacy on financial behavior. Is there any endogeneity in financial literacy? According to studies, it is an individual's decision to acquire financial literacy. Financial literacy is a choice variable. Individuals invest in financial knowledge (Lusardi et al, 2011, 2013; Lusardi and Mitchell, 2014). Those with higher net worth were more likely to improve their financial knowledge because they had more at stake (Lusardi and Mitchell, 2014). This implied a potential reverse causality in that net worth may have affected an individual's financial literacy through an individual's experience or financial behaviors. Does financial literacy affect financial outcomes or does an individual's experience in managing their finances improve financial literacy?

If financial literacy is a choice, then, on the other side, some people will rationally choose not to invest in financial literacy. For low income and less educated people, investing in financial education and financial knowledge may not have been worth it, because most of them were eligible for social transfer programs (Lusardi and Mitchell, 2014). This implied that without addressing the endogeneity of financial literacy, this can bias the estimate. Another source of endogeneity is omitted variable bias. There are other confounding factors that are potentially related to financial literacy, such as numeracy, cognitive ability, intelligence, and other psychological traits. Individuals with higher general cognitive abilities or numeracy were likely to have higher levels of financial literacy (Banks and Oldfield, 2007, Gerardi et al., 2010, Hastings et al., 2013).

Another problem arises when evaluating financial education programs because of their voluntary participation. In Korea, financial education is focused on future financial consumers, such as students and military personnel, rather than current financial consumers. In addition, participation in financial education programs is voluntary (Kim, 2020). The government encourages individuals to participate, but it cannot enforce the participation. In practice, financial consumers do not participate in financial education eagerly, especially those who need to improve financial literacy. Whereas those volunteers who participated in financial education programs were more motivated, which caused a self-selection problem. Because their motivation was higher than non-participants, the effect of the program on the participants was estimated as higher than its true effect if the intervention was not randomized. In practice, many financial education programs have often omitted evaluation as a component of the program design (Fox et al., 2005).

The golden rule of evaluation is the experimental approach (Collins and O'Rourke, 2010; Lusardi and Mitchell, 2014). That is, to evaluate the effectiveness of a financial education intervention, experimental or quasi-experimental designs are the best ways to establish a causal inference. A randomized controlled design with treatment and a control group is essential. Randomized controlled trials (RCTs) provided more consistent internal validity than observational and quasi-experimental studies, because

there were no consistent instruments for financial literacy (Kaiser et al, 2020). However, few financial education programs have been designed or evaluated with this approach (Lusardi and Mitchell, 2014).

V. Linking Financial Education, Financial Literacy, and Financial Behavior

There are several extensive literature reviews on the effectiveness of financial education on financial literacy and financial behavior, such as Fox et al. (2005), Lyons et al. (2006), Martin (2007), Hathaway and Khatiwada (2008), Collins and O'Rourke (2010), Gale et al. (2012), Hastings et al. (2013), and Lusardi and Mitchell (2014) (Table 1).

All the literature reviews considered here looked at the effectiveness of financial education. However, not all of them provided clear evidence that financial education was effective for improving financial literacy and financial behavior. For example, Hathaway and Khatiwada (2008) argued that evidence in favor of financial education pro-

Table 1. Literature reviews of the relationship among financial education, financial literacy, and financial behavior[1)]

Authors	Title and Summary
Fox et al. (2005)	*Building the case for financial education* provides an overview and effectiveness of financial education programs. Provides a framework to guide financial education evaluation.
Lyons et al. (2006)	*Are we making the grade? A national overview of financial education and program evaluation* provides an overview of financial education and program evaluation. Surveyed and interviewed financial educators using focus groups.
Martin (2007)	*A literature review on the effectiveness of financial education* reviews the literature on the effectiveness of financial education programs to enhance financial literacy. Concluded that financial education was necessary and effective. However, did not differentiate non-experimental designs and experimental designs.
Hathaway and Khatiwada (2008)	*Do financial education programs work?* provides review of research that investigated the impact of financial education programs on financial behavior and concluded that the evidence for effectiveness of financial education was not sufficient. Pointed out that some financial education programs were effective if the audience, the area of financial activity, and time were targeted.
Collins and O'Rourke (2010)	*Financial education and counseling - still holding promise* reviews evaluation of financial education and counseling for adults and found that the estimates of the impact of financial education that was reported in most research reports were positive, but when compared with comparison groups they were often small. In addition, self-reported measurements, short time periods, and self-selection into programs may have biased the estimates.
Gale et al. (2012)	*Raising household Saving: does financial education work?* reviews research on how financial literacy affects saving, and reports that previous results were mixed. Workplace interventions increased saving, but estimates varied. When financial education was targeted to groups other than workplace, the impact was much more ambiguous. Suggested more rigorous evaluations are needed.
Hastings et al. (2013)	*Financial literacy, financial education, and economic outcomes* reviews literature on financial literacy, financial education, and financial outcomes. The evidence in the literature on whether financial education improved financial outcomes was mixed. Current literature was inadequate to conclude financial education was cost-effective.
Lusardi and Mitchell (2014)	*The Economic Importance of Financial Literacy: Theory and evidence* provides a comprehensive review of literature on financial literacy including an overview of theoretical research and a survey of literature on less financially literature groups, and the impact of financial literacy on economic decision making Also provided implications for future research and policy.
Fernandes et al. (2014)	*Financial literacy, financial education, and downstream financial behaviors* conducts a meta-analysis of the relationship of financial literacy and of financial education to financial behavior in 168 papers with 201 studies. Reported that interventions improved 0.1% of variance[2)] in financial behavior.
Kaiser et al. (2020)	*Financial education affects financial knowledge and downstream behaviors* conducts a meta-analysis of 76 RCTs and concluded that financial education had positive effects on financial knowledge and financial behaviors. Reported that treatment effects were economically meaningful in size.

Note: 1) Papers introduced here are not a complete list of the literature reviews of the relationships among financial education, financial literacy, and financial behavior. The articles introduced here were widely cited by others.; 2) r^2= 0.0011. The effect size was computed by the partial correlation coefficient, r, following the common guidelines for meta-analysis.

grams was not clear overall, but they saw a pattern that programs that were more targeted were more effective in changing financial behavior. They suggested that financial education programs should target specific audiences, behaviors, and timing. They also suggested program evaluation should be included in the design of the education program itself. Gale et al. (2012) reported that results from previous financial literacy interventions were mixed. Interventions in the workplace changed behavior, but the evidence was more ambiguous when initiatives were targeted to other groups. Hastings et al. (2013) investigated the literature on financial education and financial outcomes that ranged from small scale experiments to large scale natural experiments, and they concluded that the evidence from previous evaluations on whether financial education improved financial outcomes was best described as mixed.

Further, some researchers provided meta-analyses of the impact of financial education and financial literacy on financial behavior. The first meta-analysis of financial education was done by Fernandes et al. (2014). They analyzed 168 papers that included 201 studies from 1969 to 2013. They searched using keywords “financial literacy”, “financial knowledge”, and “financial education” and focused on empirical tests. They classified studies into two types. The first was experimental and quasi-experimental studies of financial education interventions that they called manipulated financial literacy. The second type were correlational studies that measured financial literacy. Among these studies, 15 were RCTs and 24 studies used instrumental variables to control for endogeneity of financial literacy. The remaining studies used pre-post designs with ordinary least square regressions to estimate the effect of financial literacy on financial behavior.

Fernandes et al. (2014) reported that correlational studies that measured financial literacy found stronger associations between financial education and financial literacy. However, with quasi-experimental methods, the partial effects of financial literacy diminished after controlling for psychological traits, which implied that there was omitted variable bias. In the interventions, financial literacy only explained 0.1 % of the variance in financial behaviors, with weaker effects in low-income groups. Studies that used randomized control groups showed no significant effects and significantly lower effects than other types of studies. The authors explained that larger effect sizes for measured financial literacy may have been, in part, due to the correlation of measured financial literacy with other psychological traits that were omitted from prior research. These omitted variables may have caused overestimation of the effect of financial literacy on financial behaviors.

Meta analysis results by Fernandes et al. (2014) implied that financial education did not improve financial literacy very much. In their conclusion, financial education interventions were overestimated by correlational studies. The effect of financial literacy was also overestimated because of other related psychological traits.

Since Fernandes et al. (2014), studies related to financial literacy have increased exponentially. The number of RCTs of financial education increased from 15 in Fernandes et al. (2014) to 76 by 2019 (Kaiser et al., 2020). Exploiting this increase in the literature, Kaiser et al. (2020) provided an updated meta-analysis of financial education. Specifically, they analyzed 76 RCTs of financial education interventions published up to 2019.

Kaiser et al. (2020) observed that the number of recent RCTs drove more positive results of treatment effects of financial education on financial knowledge and behaviors. First, they found that financial education programs had positive causal treatment effects on financial knowledge and financial behaviors. Second, they claimed that treatment effects were economically meaningful in size and, specifically, that the effect was three times more than what was reported in Fernandes et al. (2014). The treatment effects on financial knowledge were similar or larger than the average effect sizes by math and reading education interventions. Also, the effects on financial behaviors were comparable to those behavior-change interventions in the health care area (Kaiser et al., 2020). Third, their results suggested that recent interventions were more targeted and more effective. They also pointed out that accounting for heterogeneity in studies and programs was important in assessing the average impact of financial education.

Although it is encouraging to see that the most recent meta-analysis showed positive and significant impacts of financial education, it needs to be validated by other studies. Other than Kaiser et al. (2020), most of the recent literature reviews reported that effectiveness was still inconclusive. Hastings et al. (2013) pointed out that the reason we cannot determine the effectiveness of financial education was because we did not have enough valid evidence from large scale RCTs. Based on the experiments

analyzed in Kaiser et al. (2020), three randomized experiments out of 76 that were published after 2004 had a sample size greater than 10,000. These larger experiments were published after 2016 with samples from school age students.

VI. Discussion

In this paper, we reviewed the literature that discussed the impact of financial education on financial literacy and financial behavior. We conclude with a few implications for future evaluations, financial education interventions, and policy. We start with the implications in evaluating financial education. First, the impact of interventions on the delivery of financial education on financial literacy and on financial behavior is evolving (Rutledge, 2010; Collins and O'Rourke, 2010). However, the effectiveness of these programs should be measured and evaluated carefully. Without valid control groups and a randomized design, the estimated impact of intervention may not be convincing.

Literature consistently claims that there is still no concrete evidence that financial education is effective, and the effectiveness of financial education on financial literacy can best be described as mixed. The effect on financial behavior is even more controversial. One of the reasons why we cannot make a conclusion is because we do not have enough valid evidence from large-scale randomized interventions to identify causal relationships (Hastings et al., 2013). It would be helpful if future financial education programs included evaluation as a component of the program design (Hathaway and Khatiwada, 2008), and existing large-scale surveys should include experimental components (Hastings et al., 2013).

Next, suggestions for financial education programs are that they should be targeted to the audience, to certain types of financial behavior, and to timing. As we have seen from the literature, financial education is not effective for everyone. Financial education is costly, and it can be more cost-effective when the audience is targeted.

In terms of targeted time, in Korea for example, financial education is mostly provided to students and military, but not to financial consumers. Although it is optimal socially to increase financial knowledge early in life (Lusardi and Mitchell, 2014), the timing of financial education is not at a point when financial decisions are made. Hence, the impact of financial education is expected to be limited (Kim, 2020). Financial education is expected to be more effective when it is provided at the time when financial decisions are made (Fernandes et al., 2014).

In addition, the content of financial education for students should focus on basic financial concepts rather than up-to-date financial terminology. Many of the financial decisions that individuals face in their adult lives have little relevance to a high school student. Likewise, when a high school student becomes an adult, the financial environment may have changed. Hence, financial education should focus on basic financial concepts, such as compound interest, good debt, diversification, mutual funds, liquidity, and so on (McGee, 2021).

Given the inconclusive evidence on the effectiveness of financial education, are there alternative ways to improve financial behavior? First, we need to clarify what the goal of the policy is. If the goal is to improve an individual's financial capability, we need to know how one acquires financial capability. Is education the only way to improve one's financial capability? Individuals can also learn from their own experience, which is well implied by wealthier individuals who are more financially literate (Hastings et al., 2013). If the goal is to improve an individual's financial outcomes, then we need to clarify whether financial education accomplishes that. Does an investor who is more financially literate perform better in financial markets?

One alternative way to improve an individual's financial behavior is to design policies that address biases and reduce the decision-making costs that consumers face in financial markets. For example, as financial markets around the world are becoming more accessible to individuals and individuals have more investment choices, to help an individual's financial decision-making it will be important to reduce search costs through standardized and centralized information (Lusardi and Mitchell, 2014). For contracts or decisions that people make infrequently, such as buying a house or saving for retirement, it may be useful to structure the information to make it easy to understand.

Another way of enhancing an individual's performance in financial markets might be to outsource to financial advisory services. Some have argued it is not feasible or even desirable to make everyone a financial expert

(Willis, 2008). Financial advisory services can complement or substitute for financial literacy, especially for lower socioeconomic status groups. Collins (2012) found from empirical analysis that financial advice often worked as a complement to financial capability, given that individuals with more income, more education, and a higher level of financial literacy were more likely to receive financial advice.

We also need to be aware of principal-agent problems in financial advisory services that have been reported in some studies. For example, Mullainathan et al. (2012) found that many advisors acted in their personal interests regardless of the client's actual needs and that they reinforced client biases. Anagol et al. (2015) studied life insurance agents in India and found they recommended products with higher commissions even if the products were suboptimal for the customers. Governments can monitor the market to check whether this kind of market failure exists.

Overall, the literature suggests that there are alternatives to financial education that can be used to improve financial outcomes for individuals. Financial education is one option. At this point, we cannot draw conclusions as to which tool is more cost-effective in improving an individual's financial behavior because the evidence is still developing. Future research may compare different policy options (e.g., direct regulation, financial education, choice architecture) to enhance an individual's financial capability. To do this, we need not only estimates of effectiveness, but also the cost of each tool.

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