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Predicting Students' Financial Knowledge from Attitude towards Finance

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Abstract

Attitude towards finance and financial attitude are very different constructs. Despite the popularity of the latter, it has recently been subject to criticism. Following Di Martino and Zan (2010), the former explicitly considers emotions and beliefs (about self and finance) and the mutual relationship between them. At present, there is a paucity of evidence on how 'attitude toward finance' may impact financial knowledge: this is a new area of inquiry in academic literature. Research is at a preliminary stage, although the jigsaw of financial literacy is receiving greater attention worldwide. This study measures individual attitudes towards finance and determines the effects of this profile on financial knowledge level. It uses about 500 economics students in Italy as sample respondents. It is based on a structured questionnaire survey as a data collection method. The data is analysed using Structural Equation Modeling. A significant positive correlation is found between financial knowledge and attitude toward finance. The direction of causality is found to be from attitude toward finance to financial knowledge, and this finding suggests that attitude toward finance can play an important role in financial education. Among the various dimensions of attitude toward finance, emotional disposition towards finance, and secondly, the self-confidence level, are the most influential factors on economic students' financial knowledge level. Gender is also found to be closely correlated to both financial knowledge and attitude toward finance. Findings mainly suggest the importance of attitude toward finance on financial knowledge. For policymakers, the results of this study could indicate new ways of solving the financial illiteracy problem.

Keywords: financial knowledge, financial education programs, students, financial attitudes, attitude toward finance, structural equation modelling

1. Introduction

Nowadays, financial knowledge is increasingly becoming a basic skill, in the same way as reading or numeracy. It is a 'life skill', an essential tool for anyone needing to perform basic daily tasks (OECD, 2014; Lusardi, 2019). But how can basic financial knowledge be acquired and constantly updated? What drives people to make sound financial decisions conducive to financial well-being? Recent evidence suggests that financial literacy tends to remain generally low across the world, regardless of the proliferation of efforts aimed at promoting economic and financial culture (Fernandes et al., 2014; Lusardi, 2019). This suggests that the final pieces of the jigsaw of financial literacy are still to fit into place (Goyal & Kumar, 2021).

According to the literature, non-cognitive variables such as attitudes can contribute to a more thorough comprehension of the financial education process (Atkinson & Messy, 2012; Arellano, Cámara & Tuesta, 2018; OECD, 2019). In psychology, an attitude is a "psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly & Chaiken, 1993, p. 1). Thus, when it comes to finance as an object, we can describe attitude "as a psychological inclination, which manifests when individuals evaluate the well-established practices of financial management with varying degrees of acceptance or non-acceptance" (Talwar et al., 2021). Research on attitudinal variables has recently become more frequent in academic literature. In the financial literature, attitudes are increasingly considered as influential as behaviours and knowledge for achieving financial wellbeing, which is the true goal of all financial literacy initiatives (Castro-González et al.,

2020; Consumer Financial Protection Bureau 2015).

Most studies focus on the financial attitude construct, although there are differences in its theoretical and operational definition (Haque & Zulfiqar, 2016; Garber & Koyama, 2016; Yap et al., 2016; Rai, Dua & Yadav, 2019). Despite the increasing convergence in framing financial attitude as what one believes and feels concerning financial issues (Kadoya & Khan, 2020; Johan, Rowlingson, & Appleyard, 2021), its measurement differs greatly across studies. For example, in the Anz Survey (2015) financial attitudes are operationalized in terms of four separate components: financial stress, financial self-efficacy, impulsiveness, and financial aspirations. In other recent studies (Talwar et al., 2021), financial anxiety, financial security, deliberative thinking, interest in financial issues, needs for precautionary savings, and optimism are the six dimensions used as measures. On the other hand, in the methodology of the OECD/INFE, attitudes in finance have only one dimension, which is a propensity toward longer-term financial planning (OECD/INFE, 2011). Although widely used in financial literacy measurement, the latter framework has been criticized recently for methodological weakness (D'Alessio et al., 2020; de Clercq, 2019; Sholevar & Harris, 2019; Riitsalu, Murakas, & Veeret, 2019).

In comparison to financial attitude, until very recently other attitudinal constructs (i.e., financial aptitudes and attitudes toward finance) have been largely neglected from both theoretical and empirical perspectives. The present study sets out to address this knowledge gap by focusing on the construct of attitude towards finance, which differs from financial attitude as described below. We aim to examine its relationship with financial knowledge and investigate how its constitutive sub-components are related to financial knowledge itself. In addition, we seek to provide a deeper understanding of how some socio-demographic variables relate to both financial knowledge and attitude toward finance respectively.

In this research, the term financial knowledge is intended as the cognitive pillar of the financial literacy construct, the one which captures the extent to which someone possesses the set of knowledge needed to make responsible financial decisions. Under the theoretical lens of the "Three-dimensional Model for Attitude" provided by Di Martino and Zan (2010), we also define "attitudes towards finance" as a combination of feelings and thoughts associated with the 'attitude object' finance, the latter being seen as both the sector of the economy made up of financial firms and institutions, and as a discipline of study. Attitudes towards finance is a multifaced concept that encompasses three dimensions: view of finance, emotional disposition towards finance, and perceived competence in finance. These judgements, feelings, and perceptions about finance then shape an individual's behaviour towards financial issues, in the sense that they can lead to acting positively or negatively towards it (Bocchialini & Ronchini, 2019). The population under study is a sample of Italian economic students. The Italian case seems relevant because Italy, among the major advanced economies, is the country with the lowest percentage of financially literate people (Lusardi, Mitchell & Oggero, 2017) and where the youngest generations show the least interest in financial topics (Russo, 2018). A structured questionnaire survey has been run to collect the primary data and Structural Equation Modelling has been used to analyse the data collected.

This paper contributes to the existing literature in several ways. The first is that, to the best of our knowledge, it is the first quantitative study that focuses on the attitude towards finance seen in terms of beliefs, feelings, and self-perceptions towards financial matters. These three constituent components are here combined in a single complete framework rather than being considered in isolation as done in previous studies so far (Grable, Heo, & Rabbani, 2015; Palameta et al., 2016; Dobni & Racine, 2016). Second, we provide evidence on the interrelationships between attitudes towards finance and financial knowledge and also seek to clarify their causal link. We investigate whether higher financial knowledge positively affects attitude toward finance or, vice versa, whether having a more favourable attitude towards finance leads to greater financial knowledge and skills. To date, the empirical findings on this point have been few and somewhat contradictory (Hayhoe, Leach, Allen & Edwards, 2005; Borden, Lee, Serido & Collins, 2008; Jorgensen & Savla; 2010; Potrich, Vieira & Mendes-Da-Silva, 2016). Finally, this study explores how demographic and socio-economic factors are associated with financial knowledge and attitude toward finance.

The remainder of the paper is organized as follows. Section 2 briefly discusses the literature on attitude in the financial field to frame our contribution. The data collection and empirical approach are described in Section 3. Section 4 presents the empirical results. Finally, Section 5 provides final remarks and concludes the paper; the limitations, some practical implications, and future lines of research are presented as well.

2. Literature Review

Since attitudes have been recognized as a fundamental component of financial literacy (OECD INFE, 2011), this topic has received growing attention in the research of financial education (Atkinson & Messy, 2012; Arellano, Cámara, & Tuesta, 2018; OECD, 2019). Early studies in the field mainly focused on measuring financial

(il)literacy in the general population and explored the determinants of this phenomenon. Within this first stream of research, it seems well established that financial knowledge differs across countries and the various groups of the domestic population, mainly based on education, age, gender, income, employment status, nationality, or family background (Lusardi, Mitchell, & Curto, 2010; Atkinson & Messy, 2012, Chen & Volpe, 1998; D'Alessio et al., 2020). Attitude has also been shown particularly important in affecting a person's financial literacy (Talwar et al., 2021).

Given that the financial literacy of youngsters has recently become a long-term policy priority in many countries, it is not surprising that several of those previous studies have been performed in this specific study population. Especially the most educated among them (high school, college, and university students) have been widely investigated to date, both in terms of financial knowledge (Chen & Volpe 1998; Beal & Delpachitra, 2003; Wagland & Taylor, 2009; de Bassa Scheresberg, Lusardi, & Yakoboski, 2014) and, to a lesser extent, in terms of attitude (Setiyani & Solichatun, 2019; Yogasnumurti, Sadalia, & Irawati, 2020; Obagbuwa, Akande, & Tewari, 2021). After all, they are considered an interesting target because they "represent the future as a dynamic segment of the society" (Ozdemir et al., 2015). In addition, they are in a stage of emerging adulthood which is a notable "teachable moment" (Gerrans, 2021). Moreover, if they are properly financially knowledgeable, they can better navigate the complexities of modern financial life, even during pandemic times (Clark, Lusardi, & Mitchell, 2020). Among university students, those attending economics and business majors have often been found characterised by above-average financial literacy rates, at least whether compared to any other university faculty students or another circle of people (Chen & Volpe, 1998; Beal & Delpachitra, 2003; Lantara & Kartini, 2015, De Vincentiis, Pia & Zocchi, 2017). Although this result is quite natural and intuitive (given their most intensive educational content about financial subjects and their natural interest in finances, as implied by their educational choice), there is also evidence to the contrary (Pintye & Kiss, 2016; Palimaka, 2020). Thus, unfortunately, those prior studies yielded controversial results, probably also due to the absence of a shared conceptual framework. Hence, verifying the above suggestions represented the primary impetus for our research.

As stated in the introduction, the so-called "attitude toward finance" construct represents a novel concept in the financial literature, which has been borrowed from mathematics education (Di Martino & Zan, 2010). It captures one's emotional and cognitive disposition toward finance, seen as a sector and as a subject. The concept was first introduced by Bocchialini and Ronchini (2019) in their explorative study aimed at investigating a case of Italian business students. Attitude toward finance was conceived as a multifaceted construct characterised by three interlinked sub-components – view of finance, emotional disposition towards finance, and perceived competence in finance. Hence, it was used to refer to what is believed and felt about personal finance matters. In terms of a working definition, the construct was very different from the more popular financial attitudes concept as operationalised in the OECD paradigm (OECD, 2013) or other recent studies (Johan, Rowlingson, & Appleyard, 2021). Likewise, it also differed from other attitudinal variables, such as attitudes toward financial education (Chinen & Endo, 2012), money attitudes or attitudes toward money (Masuo & Reddy, 1998; Grohs-Müller & Greimel-Fuhrmann, 2018; Castro-González et al., 2020). The study used focus groups to take a snapshot of how young participants think and feel about finance. Based on the sign (positive or negative) and the strength of every single belief and feeling held toward finance, scholars also intended to reconstruct the specific attitude profile of respondents. A Pearson chi-square test indicated that respondents from the finance stream displayed stronger attitudes toward finance than their peers from other curricular areas: their familiarity with the attitude object (finance) elicited more positive affective responses to it (Hansen & Wänke, 2009). Furthermore, female students shared a similar attitude profile to the overall sample except for financial self-efficacy beliefs, which were systematically less positive than their male counterparts.

Prior research in the financial field has also widely highlighted that financial knowledge varies on several demographic-socio-economic characteristics and other psychosocial variables (Chen & Volpe, 1998; Johan, Rowlingson, & Appleyard, 2021). In this regard, the studies conducted specifically targeting student populations not only documented generally moderate levels of financial knowledge even among university students, but also found large heterogeneity across them (Yahaya et al., 2019). In general, a positive association has been found between the financial knowledge rate and the level of education, academic field, and income levels. Hence, older students, the males, those with higher incomes and with economics and business majors have been found to perform better than average when it comes to financial knowledge tests (Danes & Hira, 1987; Chen & Volpe, 1998; Chen & Volpe, 2002; Johnson & Sherraden, 2007; Atkinson & Messy, 2012). The overall performance at the secondary school and the type of secondary school attended also have been depicted to matter (Böhm et al., 2021). Among the socialization agents, parents have been documented to play a key influence on the financial literacy of young adults (Lusardi et al., 2010; Shim et al., 2010; Jorgensen & Savla, 2010). Regarding financial attitudes,

recent studies have also noted that they tend to be especially linked to gender, field of study, work experience, and financial socialisation from family (Johan, Rowlingson, & Appleyard, 2021). Unlike financial knowledge, the gender difference in financial attitudes has often been found in favour of women (Atkinson and Messy, 2012; D'Alessio et al., 2020). For example, Johan, Rowlingson, & Appleyard, 2021 documented that students who displayed more desirable financial attitudes in their sample were more likely to be female. Anyway, when moving beyond the traditional OECD paradigm in measuring financial attitudes, gender differences re-emerge to the disadvantage of women. In fact, according to several scholars, differences between men and women exist in personal interest related to financial topics, in financial anxiety, in financial self-confidence and various stereotypical beliefs toward finance (Driva et al., 2016; Bucher-Koenen et al. 2017; Alessie et al., 2021; Tinghög et al., 2021). Indeed, it is precisely these attitudinal traits that seem to account for the gender differences in the financial knowledge test.

Another interesting strand of research in personal finances has investigated the interrelatedness between financial attitudes, financial knowledge, and financial behaviour (Yong, Yew, & Wee, 2018; Rai, Dua & Yadav, 2019; Fessler, Silgoner & Weber, 2020). These three components of the financial literacy construct are significantly and reciprocally interrelated in many studies (Shim et al., 2009; Kadoya & Khan 2020). Nano (2015), for example, has provided evidence on their interrelationship in the specific case of Albanian university students. She proved a statistically significant linkage among the three components of financial literacy and documented a weak relation, but statistically significant, between financial knowledge and financial attitude. Regarding the specific link between financial knowledge and financial attitude, a positive correlation has been found in several studies (Hayhoe, Leach, Allen & Edwards, 2005; Riitsalu, Murakas, & Veeret, 2018), but sometimes a null or a weak association is documented (Agarwalla et al., 2013; Riitsalu, Murakas, & Veeret, 2018; Ramalho & Forte, 2018). Anyway, it is important to point out that those previous studies did not take into account the construct of attitude towards finance herein considered, on which there is, therefore, no empirical evidence to date. On the other hand, in the context of personal finance, there is indeed wide evidence on the relationship between financial knowledge and some specific attitude sub-components, such as beliefs about finance (Dobni & Racine, 2016; Cruijsen, Haan, & Roerink, 2021), emotional disposition toward finance (Hasler, Lusardi, & Valdes, 2021; Bongini, Trivellato & Zenga, 2016) or financial self-efficacy beliefs (Farrell et al., 2014; Fry & Risse, 2016; Palameta et al., 2016; Skagerlund et al., 2018). However, in contrast with the present study, most of that extant research has not considered those personality variables as interrelated sub-components of the attitude toward finance construct.

Finally, it is worth noting that when it comes to the relationship between financial knowledge and financial attitude almost all existing studies focused on correlation rather than causation (Hastings, Madrian, & Skimmyhorn, 2013). In fact, notwithstanding calls to expand causal research on financial education (Hastings, Madrian, & Skimmyhorn, 2013; Lusardi & Mitchell, 2014), such studies are relatively rare so far. Although Yahaya et al., 2019 found that "financial knowledge significantly influenced financial attitudes", conversely Bruhn et al., (2016), as quoted by Bhattacharya and Gill (2020), "stressed the importance of financial attitudes toward achieving financial capability". In the same vein, Lee and Hanna, (2014) stated that "financial education for female students should focus on the formation of positive attitude". Certainly, to date the literature does not offer clear evidence on this issue so it is not possible to fully disentangle the two causal directions. It follows that it is generally unclear if an individual's financial knowledge is essentially driven by financial attitudes or whether financial knowledge does increase financial attitudes. Least of all we know whether attitude towards finance does predict financial knowledge or if, conversely, being financially knowledgeable is the cause of a general more positive finance-related attitude. Since the causality ideally can work in both directions, it is relevant to elucidate how the attitude towards finance and financial knowledge circle unfolds, because this aspect could contribute important inferences for policymakers.

3. Method

3.1 Goals and Research Hypotheses

This paper has several objectives. The first is to investigate the attitude towards finance in university students and to assess their financial knowledge levels. The second is to determine the relationship between attitude towards finance and financial knowledge in terms both of correlation and causation. The third is to identify some prominent socio-demographic factors (including age, gender, level of education, math aptitudes) which can facilitate both financial knowledge and attitude. The fourth objective is to determine whether and which of the three sub-dimensions of attitude toward finance – view of finance, emotional disposition towards finance, and perceived competence in finance – leads most effectively to be financially knowledgeable. The final objective is to clarify any causal link between the attitude towards finance and financial knowledge. Based on previous literature, the following hypotheses have been proposed and tested:

- H_1: Economic students in the sample have a relatively high degree of financial knowledge.
- H_2: Economic students in the sample hold a positive attitude toward finance.
- H_3: Socio-demographic characteristics (including gender, income, year/field of study) impact financial knowledge and affect attitude towards finance.
- H_4: Attitude towards finance is associated with financial knowledge (level of economic students in the sample) (Note 1).

$H_{4.1}$ The beliefs towards finance affect financial knowledge (level of economic students in the sample)

$H_{4.2}$ The emotional disposition toward finance affects financial knowledge (level of economic students in the sample)

$H_{4.3}$ The self-efficacy beliefs in finance affect financial knowledge (level of economic students in the sample)

- H_5: Attitudes toward finance predict financial knowledge (level of economic students in the sample).

3.2 Analytic Framework

For the purposes of this paper, we propose a theoretical framework drawn on previous studies from the contiguous domain of mathematics education (Lusardi, 2012). In this field of study, attitudes have been widely investigated and shown as one of a possible range of drivers of one's attainments. We have been inspired by the "Three-dimensional Model for attitude", originally used as a model for assessing students' attitudes towards mathematics (Di Martino & Zan, 2010). Precisely because it excludes the behavioural component of attitudes and only tap the cognitive and the affective ones, the above model is considered better suited to be transposed to finance than the tripartite model of attitudes originates from social psychology discipline (Rosenberg & Hovland, 1960). It has been thought that the latter model may confuse when applied to the financial context because the behavioral dimension appears in more than one role, namely as an antecedent of both financial literacy and attitude (Bocchialini & Ronchini, 2019). Indeed, as shown in Figure 1, our conceptual model allows us to explain how one's attitudes towards finance, together with several socio-demographic variables, affect financial knowledge.

In this research, the term financial knowledge evokes the cognitive component of financial literacy and refers to what and how much is known about financial concepts. Inspired by Di Martino and Zan, (2010), we define "attitude towards finance" as the combination of one's beliefs, feelings, and self-perception with finance which determine the predisposition to respond favorably or unfavorably to a particular financial stimulus. The above construct is characterised by three interlinked subcomponents – view of finance, emotional disposition towards finance, and perceived competence in finance – each of which can be characterized as positive, negative or neutral. Based on the various combinations of the three components of attitude, every individual has a different state of overall attitude: his own "profile of attitude". For example, two people can share the same vision of finance but differ in terms of emotional reactions and/or self-efficacy beliefs. Thus, the individual profile depends on whether every single component of the construct, beliefs, emotions and perceived competence are 'positive' or 'negative'.

The view of finance is the combination of thoughts and beliefs related to 'finance' as an attitude object. Hence, a personal "image of finance" comprises the sum of several opinions such as "Finance is hard to understand and unapproachable to non-experts", "Financial education is an essential tool both for everyday and professional life", "Learning finance is a question of inherent natural ability". These beliefs, like the pieces of a jigsaw, make up one's overall image of finance, which ranges from favorable to unfavorable and everything in between. Of course, there is not necessarily a "right" or "wrong" view towards finance, although there are thoughts that enhance or impede motivation and engagement with finance. As such, in this study, we label a belief towards finance as positive when it is presumed to favor a positive feeling about the finance or leads the way to positive behaviour. Opposite beliefs are labelled as negative when they open up to anxiety, avoidance, procrastination or disengagement towards finance.

The second component of the construct is the emotional disposition towards finance. This consists of affective reactions of liking or disliking related to the attitude object (finance). For instance, a positive characterization of this component implies a positive emotional state when the individual is faced with finance-related issues, which are perceived as pleasurable. Such reactions are likely to promote interest, engagement, and motivation. On the other hand, a negative characterization implies negative affective reactions such as anxiety or a sense of insecurity when the individual is faced with financial tasks.

Finally, the third component of attitude is the perceived competence in finance, or the individuals' self-efficacy level on financial literacy, decisions, and practices. It involves the self-beliefs that a subject holds as to whether they are able or unable to succeed in finance-related issues. Even though "not all beliefs have the same importance

for an individual", self-efficacy beliefs are psychologically central to an individual's belief system and are generally considered more critical than others (Eagly, 1967; De Martino & Zan, 2015). This study classifies as positive those beliefs about the self which are characterised by a good sense of self-efficacy and are thus motivating ("I'm able", "I can easily understand, learn and use finance", "I can succeed and obtain high achievement in finance-related issues").

Essentially, in this study, having a favorable attitude towards finance means that an individual holds a belief system towards finance and on self and an emotional system that makes him or her open towards finance-related issues and willing to engage with them. In more detail, a positive attitude towards finance is a complex concept which implies that at the same time an individual: (1) Has a favourable view of finance, for example, acknowledging the value of finance as a sector, believing that finance shapes our economic environments, and holding bankers in esteem. (2) Enjoys finance learning experiences and finance-related activities and has no (or low) anxiety towards them. (3) Has self-esteem in finance and is confident of succeeding in finance-related issues.

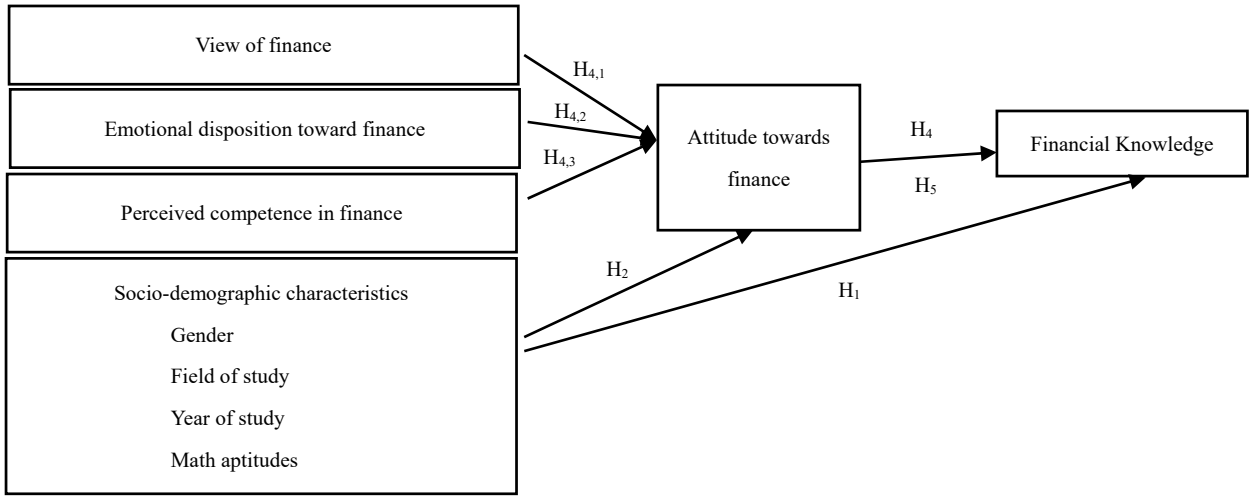

Figure 1. Proposed model and research hypothesis

3.3 Sample

In this research, the primary data were collected through a survey with questions specially constructed for the study. The survey was largely based on pre-existing literature (Lusardi & Mitchell, 2011; Van Rooij et al., 2012; Walstad & Soper, 1983; Bocchialini & Ronchini, 2019). When it comes to attitude towards finance, the questions were refined to suit the sample and the financial setting (Note 2). We used mixed-methods survey questions which included multiple-choice and Likert-type scales. The questionnaire consisted of three main sections covering: (1) socio-demographic information; (2) financial knowledge; (3) attitude towards finance.

We first surveyed the various socio-demographic and socioeconomic characteristics, including gender, age, nationality, area of origin, and level of study of participants. The second part of the questionnaire identified respondents' awareness and understanding of key financial concepts which are a prerequisite for making sound, appropriate, and well-informed financial decisions. To measure financial knowledge, we used six questions, divided into two levels: basic financial knowledge and advanced financial knowledge. The understanding of basic financial concepts was assessed through the three core questions – the so-called 'big three' – widely adopted around the world, which has become the standard in the literature (Lusardi & Mitchell, 2011) (Note 3). They deal with (simple and) compound interest, real rates of return (inflation), and risk diversification. The understanding of advanced financial concepts was also assessed through three main questions, taken from Van Rooij et al., 2012 (Note 4). For each question, 1 point was awarded for the correct answer and 0 points for the wrong or missing answer. The option "I don't know" was included and it was specified that this option had no penalty, to reduce the probability that a correct answer had been chosen randomly. The answers to the six questions were used to create two distinct sub-indicators: (1) *FK_basic*, as an indicator of basic knowledge, from answers to the first three questions; (2) *FK_adv*, as an indicator of advanced knowledge, from answers to the second trio of questions. The sum of the two above sub-indicators provided the overall index of financial knowledge (*FK_tot*). For both sub-indicators, the minimum score was 0, and the maximum score was 3.

The last part of the questionnaire gauged respondents' profiles of attitude towards finance (ATF). The latter was

measured using a 51 item questionnaire developed by Bocchialini and Ronchini (2019) for a student audience with the specific purpose of understanding how economic students perceive and think about finance. It contains various statements for which respondents indicate the strength of their agreement, expressed in a four-point Likert scale (with options ranging from "strongly disagree", "somewhat disagree", "somewhat agree" to "strongly agree"). Participants' attitudes were explored across each dimension of the ATM model. The first set of attitude statements asked for their view of finance, the second covered their emotional disposition towards finance and the third was about their perceived competence in the financial field. Accordingly, participants were asked for responses to the following items (1) Finance is a difficult and math-heavy subject or not (2) Financial education is useful in their daily and professional life or not (3) Finance is a male, female, or gender-neutral domain (4) Their financial skills are fixed or malleable (5) How they emotionally feel when dealing with finance-related issues (6) Their level of self-confidence in financial matters. To construct the overall attitude index, we summed up the relevance scores of all 51 attitude statements administered. As some statements depicted negative attitudes (e.g. "Acquiring financial knowledge is a waste of time") while others are positive (e.g. "Financial knowledge is an essential skill for the 21st century") we reversed the scale for some questions so that a higher total score indicated a better financial attitude (Potrich, Vieira & Mendes-Da-Silva, 2016). Three different sub-indicators, one for each dimension of attitude, were created. Thirty items defined the "*VIEW*" sub-indicator; 9 items defined the "*EMOTION*" sub-indicator and 12 items the "*SELF-CONF*" sub-indicator. All indicators were then converted into a standardized score on a basis of 1 for comparison. The "overall *ATF* indicator" was constructed using the sum of the scores for all items (51).

The primary data were collected during the second semester of the academic year 2019–2020. The survey was administered to a convenience sample of university Economic students, residents across the whole of Italy enrolled at the Department of Economics and Management of Parma University in the northern industrialized part of the country. All students participated voluntarily after they were given information about the general aim of the investigation (i.e., collecting data for a research project on students' attitudes towards finance profiles). A total of about 500 questionnaires were distributed. After filtering, 34 invalid questionnaires were rejected in the tabulation process because of missing information. The final sample consists of 466 respondents.

Table 1 presents an overview of the socio-demographic characteristics of respondents.

Table 1. Study participant characteristics

		Freq.	**Freq. %**	**Freq. Cum**	**%**
Gender	Male	239	51,29	51,29	
	Female	223	47,85	99,14	
	NA	4	0,86	100	
Age	19-22	140	30,04	30,04	
	23-25	232	49,79	79,83	
	26-29	86	18,45	98,28	
	=>30	6	1,29	99,57	
	NA	2	0,43	100	
Nationality	Italian	418	89,70	90,09	
	Foreign	46	9,87	99,96	
	NA	2	0,43	100	
Area/Region of origin	Nord	230	49,36	49,36	
	Center	34	7,30	56,65	
	Sud	169	36,27	92,92	
	Foreign	14	3,00	95,92	
	NA	19	4,08	100	
Level of University study	First Cycle	206	44,21	44,21	
	Second Cycle	260	55,79	100	
	NA	0	0,00	0,00	

Type of Degree course	Finance	167	35,84	35,84
	No Finance	299	64,16	100
	NA	0	0,00	0,00
Type of High school diploma	scientific high school or similar	185	39,70	39,70
	classical or linguistic or humanistic/social high school	79	16,95	56,65
	technical commercial institute	168	36,05	92,70
	technical-industrial or tourist or hotel-management institute	14	3,00	95,70
	institute for surveyors	7	1,50	97,20
	professional institute	11	2,36	99,56
	NA	2	0,43	100
High school mark	60-65	37	7,94	7,94
	66-70	59	12,66	20,6
	71-75	78	16,74	37,34
	76-80	77	16,52	53,86
	81-85	56	12,02	65,88
	86-90	63	13,52	79,4
	91-95	29	6,22	85,62
	96-100	63	13,52	99,14
	NA	4	0,86	100
Cohabitation	*off-site student (student lives alone/ out of the family)*	220	47,21	47,21
	student lives with family	244	52,36	99,57
	NA	2	0,43	100,00

The sample was approximately half male (51.29%) and half female (47.85%). The age of the respondents was between 19 and 29 and just 6 were older than 30. As they were university students, the most frequent age groups were 19-22 and 23-25. The majority of the interviewees (89.70%) were of Italian nationality. About half, 49.36%, of the students came from the North of Italy, 36.27% from the South, and 7.30% from the centre of the country. Only 3.00% of the students came from abroad. The sample was fairly evenly divided between first-level degree students (44.21%) and master's degree students (55.79%). Students studying for a degree in non-finance-related fields and students in finance fields were included in the study sample. The survey was distributed on only one campus, but it reached students of different majors. The students in the sample came from different educational backgrounds and also differed considerably in the final score obtained in the school-leaving diploma. Just over half of the sample (52.36%) were students still living with their families, compared to 47.21% of students living outside the family home.

Note that we purposely focused on those studying economics and similar subjects in higher education. There were three main reasons for this. First, it is important to note that there are no studies that have specifically explored this aspect of young persons in Italy so far, although there are numerous studies that have measured university students' financial knowledge. This is a type of frequently used convenience sample in financial literacy studies (Chen & Volpe 1998; Beal & Delpachitra, 2003; Bongini, Trivellato & Zenga, 2016). Second, this segment of young people is at the stage in life when financial issues become more important as they start to become more independent of their parents (Mendes-Da-Silva, Nakamura & Moraes, 2012). Third, the section of our questionnaire assessing the attitudes towards finance was specifically calibrated to this specific target group (Bocchialini & Ronchini, 2019). Furthermore, an investigation conducted on a sample that is homogeneous in terms of educational background is best suited to eventually explore the gender gap (Bongini, Trivellato & Zenga, 2016).

3.4 Method

Structural Equation Modelling (SEM) is a complex tool able to capture causality relations between variables which can be either measurable (manifest variables) or not measurable (latent variables or factors) (Bollen, 1989; Kaplan, 2009). A variable is not measurable when the values assigned to it are uncertain because, for example, of errors generated by the measurement method. SEM can be divided into two sub-models: (1) structural or internal models

which capture relationships between latent variables, (2) measure or external models which capture relationships between manifest and latent variables.

The relations between variables can be estimated using either covariance-based methods or component-based methods. Covariance-based methods work mainly on manifest variables, and component-based methods on latent variables, through multivariate linear techniques, in particular path analysis which was introduced by Wright, 1921 to genetics research and originally applied by Joreskog 1973 in SEM. The underlying mathematical tool is the decomposition of the total correlation or covariance between two variables among all paths which connect them. Decomposition of total correlation produces the path coefficients, which express the strength of the causality relation. The path diagram is the graphical representation of a system of the simultaneous equation where latent and manifest variables are represented by circles and squares respectively. SEM has been used to study attitude to different subjects: in particular, in mathematics (Papanastasiou, 2000; Yurt, 2014; Davadas, 2018), in statistics (Escalera-Chávez, 2014) and finance (Potrich, Vieira & Mendes-Da-Silva, 2016; Nadeem et al., 2020; Talwar et al., 2021). Based on these studies, the next section presents the relationship between attitude and knowledge of finance. Table 2 presents the name, abbreviation, and description of variables used in the analysis.

Table 2. Description of variables used in this study

Variable Name	Variable abbreviation	Variable Description
Socio-demografic variables		
Gender	GEN	Student gender. Dummy variable: the value is 1 if the student is male; 0 if the student is female.
Age	AGE	Student age at the time of observation.
Nationality	NAT	Nationality of the student. Dummy variable: the value is 1 if the student holds Italian nationality; the value is 0 if the student does not hold Italian nationality.
Area/Region of origin	AREA	Students' region of origin. The variable was expressed as NORTH, CENTRAL, SOUTH, and FOREIGN, according to the classification of regions by ISTAT. The appropriate dummy variables were constructed.
Study levels and degrees	LEVEL	The first level is a bachelor's degree (1) and the second level is a master's degree (2).
High school diploma	HSD	Type of diploma obtained by the student: (1) scientific high school or similar, (2) classical or linguistic or humanistic/social high school, (3) technical-commercial institute, (4) technical-industrial or tourist or hotel-management institute, (5) institute for surveyors, (6) professional institute. The appropriate dummy variables were constructed.
Mark of high school diploma	HSD_M	Final diploma result obtained by the student: (1) 60-65, (2) 66-70, (3) 71-75, (4) 76-80, (5) 81-85, (6) 86-90, (7) 91-95, (8) 96-100.
Mathematics	Math	Answer to the question "Do you like maths"? 4 alternatives: (1) yes, (2) no, (3) so-so, (4) refuse to answer.
Level of University study	Level	Level of university education of the student. Dummy variable: the value is 1 if the student is following a bachelor's degree; the value is 0 if the student is following a master's degree.
Years Course	Years	The year of the course the student is attending. The alternatives are the first year, the second year, the third year, outside prescribed time for the bachelor's degree; the first year, the second year, outside prescribed time for the master's degree.
Father's educational attainment	Father_Edu	Level of education of father. Alternatives were: (1) no qualification, (2) primary school l, (3) junior high school diploma, (4) vocational school diploma, (5) high school diploma, (6) university degree.
Mother's educational attainment	Mother_Edu	Level of education of mother. Alternatives were: (1) no qualification, (2) primary school, (3) junior high school diploma, (4) vocational school diploma, (5) high school diploma, (6) university degree.
Household income	Income	Income level of the household.
Ownership of material goods	Mobile TV Pc_tablet Car Bathroom	Variables were created by answering the question: "How many of these material goods does your household possess?". The goods are mobile phone, television, personal computer-tablet, car, bathroom, private boat, motorbike, beach house, mountain house. For all assets, it was possible to choose the options: 0, 1, 2, 3 or more.

	Boat	
	Moto	
	Hsea	
	Hmountain	
Financial Knowledge indicator		
Indicator of basic knowledge	FK_basic	Indicator of the student's level of basic financial knowledge (discrete variable). It is calculated as the sum of 3 basic financial knowledge questions. Answers are scored 1 point if correct, 0 points if incorrect or missing.
Indicator of advanced knowledge	FK_adv	Indicator of the student's level of advanced financial knowledge (discrete variable). It is calculated as the sum of 3 questions of advanced financial knowledge. Answers are scored 1 point if correct, 0 points if incorrect or missing.
Indicator of total financial knowledge	FK_tot	Indicator of the student's overall financial knowledge, calculated as the sum of the previous two indicators.
Attitude towards finance indicator		
Indicator of ATF understood as "view of finance"	VIEW	Indicator of ATF, with specific regard to the component "view of finance" (discrete variable). The variable is used as a summation of the scores obtained by the students expressing their agreement or disagreement to 30 items on the topic of vision. The score is normalised and returned to a unit basis.
Indicator of ATF understood as "emotional disposition"	EMOTION	Indicator of ATF, with specific regard to the component "emotional disposition towards finance" (discrete variable). The variable is used as a summation of the scores obtained by the students expressing their agreement or disagreement with 9 items examining their view. The score is normalised.
Indicator of ATF understood as "self-confidence"	SELF-CONF	Indicator of ATF, with specific regard to the component "self-confidence towards finance" (discrete variable). The variable is used as a summation of the scores obtained by the students expressing their agreement or disagreement with 12 items examining their view. The score is normalised.
Indicator of total attitude towards finance	ATF	Overall indicator of attitude towards finance, derived from the sum of the previous three indicators.

4. Results

4.1 Students' Levels of Financial Knowledge

As mentioned above, the first objective of this study was to define the levels of financial knowledge of the sample. Table 3 below presents the main descriptive statistics of the variable financial knowledge and Table 4 displays the relative frequency distribution. Our empirical evidence shows that the student's overall financial knowledge scores were in the medium-high level. This is evident from the fact that the mode – which tell as the most common result in the sample, namely the score with the highest frequency – was 5 out of a maximum of 6, while the mean was 4.2, out of 6 which give as the overall average result. It is also interesting to note that about 23% of the respondents in the sample answered all six questions correctly, while approximately 3% of them got them all wrong.

Table 3. Descriptive statistical analysis for the level of students' financial knowledge

Variable	Obs	Mean	Mode	Median	Std. Dev	Min	Max
FK_basic	466	2.244635	3	3	0.9229588	0	3
FK_adv	466	1.972103	2	2	0.9142096	0	3
FK_tot	466	4.216738	5	5	1.559645	0	6

Table 4. Frequency distribution of financial knowledge indicators

FK_basic	**Score**	Freq.	Freq. %	Freq. % Cum
	0	29	6.22	6.22
	1	68	14.59	20.82
	2	129	27.68	48.5
	3	240	51.5	100
FK_adv	**Score**	Freq.	Freq. %	Freq. % Cum
	0	32	6.87	6.87
	1	105	22.53	29.4
	2	173	37.12	66.52
	3	156	33.48	100
FK_tot	**Score**	Freq.	Freq. %	Freq. % Cum
	0	13	2.79	2.79
	1	20	4.29	7.08
	2	36	7.73	14.81
	3	59	12.66	27.47
	4	103	22.1	49.57
	5	126	27.04	76.61
	6	109	23.39	100

Though students obtained higher scores on the basic financial knowledge questions compared to the sophisticated financial knowledge ones, both sub-indicators (FK_basic and FK_adv) had medium-high average values. Just over half of the study population displayed a broad understanding of basic financial concepts which underpin day-to-day financial decision making. In fact, for the basic indicator, 51.5% of the sample obtained a score of 3 (and the modal value was equal to 3 up 3), compared to a percentage of 33.38% for the advanced indicator (in this case, the modal value was 2 up 3). Finally, Table 5 reports an in-depth analysis of student performance for each question.

Table 5. Correct/incorrect/missing answers per question

Questions	Freq.			Percent		
	Correct answers	Incorrect answers	Missing answers	Correct answers	Incorrect answers	Missing answers
1	386	46	34	82,83	9,87	7,30
2	328	74	63	70,39	15,88	13,52
3	332	28	111	71,24	6,01	23,82
4	217	183	66	46,57	39,27	14,16
5	393	56	17	84,33	12,02	3,65
6	309	57	100	66,31	12,23	21,46

The question where students performed best was Q. 5 (knowledge of the differences between stocks and bonds), followed by Q. 1 (interest rates) and Q. 3 (risk diversification). The question where students performed worst was Q. 4 (relationship between interest rates and bond prices), followed by Q. 2 (inflation). Question 4 was particularly difficult for respondents: a large proportion of them had not understood that bond prices and interest rates are inversely related: as interest rates rise, the price of a government bond falls. The question with the highest percentage of missing answers was Q. 3, almost the same as Q. 6. Both questions involved knowledge of the risk diversification principle.

4.2 Students' Profile of Attitude towards Finance

The attitudinal profiles towards finance were evaluated to better understand whether students in the sample eventually differed in their emotional and cognitive components of attitudes towards finance. Table 6 reports the descriptive statistics of the indicator of sample attitudes towards finance. Table 7 presents the relative frequency distribution; as can be noted, the level of students' attitudes towards finance was categorized into five levels, ranging from low to high.

Table 6. Descriptive statistical analysis for the level of students' attitude towards finance

ATF Components/Indicators	Obs.	Mean	Median	Mode	Min	Max	Range
View	466	0.737	0.767	0.833	0	1	0-1
Emotion	466	0.764	0.778	0.833	0	1	0-1
Self-Confidence	466	0.715	0.729	0.854	0	1	0-1
Overall ATF	466	0.736	0.752	0.819	0	1	0-1

Table 7. Frequency distribution of attitude towards finance indicators

Level		View		Emotion		Self-Confidence	
		Freq.	%	Freq.	%	Freq.	%
Low	0-0,20	8	1,717	1	0,215	8	1,717
medium-low	0,21-0,40	3	0,644	15	3,219	10	2,146
medium	0,41-0,60	31	6,867	58	12,446	98	21,030
medium-high	0,61-0,80	293	62,876	186	39,914	189	40,558
High	0,81-1	130	27,897	206	44,206	161	34,549

Overall, our result showed that the level of students' attitudes towards finance in the sample was found to be 'Positive'. In line with a priori expectations, the vast majority of the sample displayed high attitude scores and thus a positive profile of attitude towards finance, as evidenced by the fact that all the measures of central tendency (mean/median/mode) fell over the value of 0.7 in a range 0-1. For each attitude component, about 70% of the students of the sample were in the medium-high and high levels. Only a minority of students displayed some emotional or cognitive resistance to finance and has been categorized as a low or moderate profile. Though they were found to hold a basically positive attitude for all of the attitude sub-components, they scored highest on the emotional disposition towards finance and lowest on the self-efficacy beliefs sub-dimension of attitude_

4.3 Analysis of Demographic Variables

The study also examined the effect of various socioeconomic factors (gender, age, educational and family background, personal income and other wealth factors, nationality, region of origin, year and study levels) on the respondents' financial knowledge levels and their attitude profiles. Our results indicate that socio-demographic factors matter. Among the many exogenous variables collected in the survey, gender was found to be the most influential factor in the sample. Educational and family background, as well as wealth factors, also matter, but to a much lesser extent.

Gender had a significant influence on both students' financial knowledge, their emotional disposition towards finance, and their financial self-confidence. Conversely, it was not significant in the view of finance. The results of this study show that men and women have both different levels of financial knowledge and a diverse attitude profile. The differences favour males with regard to financial knowledge (males on average have more financial knowledge and skills), emotional disposition (males on average have more positive emotions towards finance) and self-confidence (males on average feel more comfortable in handling financial matters). Instead, regarding the profile of the view of finance, the difference between males and females favours females, who appear to have more positive perceptions about the financial world than their male counterparts. In addition, the number of mobile phones and the year, of course, have a significant positive influence on financial knowledge and on the emotional disposition towards finance. The type of secondary school also has a significant relationship with financial knowledge and with the view. Finally, the father's educational attainment and the mark in the high school diploma had a positive significant impact on the financial knowledge, but they affected poorly the three sub-components of attitude towards finance.

4.4 Relationship between Attitude towards Finance and Financial Knowledge

Yet another objective of this study was to analyze the relationship between attitude towards finance and financial knowledge. Prior studies showed the link between them, although the evidence was mixed. Most of them were correlational studies rather than causal research and, anyway, they focused on financial attitudes; accordingly, attitude towards finance remains an unexplored topic so far.

SEM was applied to the data collected as described above, in order to estimate the causal relationship between the

attitude to finance and actual financial knowledge (basic, advanced and overall). We investigated whether a good/bad attitude to finance caused good/poor knowledge of finance, or whether the relationship was the other way around. We next studied which of the different attitude components was most closely related to financial knowledge. We identified the most significant exogenous variables provided by the questionnaire. The analysis was conducted using SAS (https://www.sas.com/). For other possible statistical packages see Narayanan, 2012.

For all the SEM analyses described we monitored the most relevant indicators for the goodness of the model: the Goodness of Fit Index, the Standardized Root Mean Square Residual, the baseline model Chi-Square, the Satorra-Bentler-Scaled Base Model Chi-Square, and verify whether they are above or below the suggested thresholds (e.g. the Goodness of Fit Index above 0.9, the Standardized Root Mean Square Residual below 0.08).

4.4.1 Causal Relationship between Attitude towards Finance and Financial Knowledge

To identify which way the causation ran between attitude and knowledge, two sets of SEM were used. The first took the attitude towards finance as the independent variable which causes knowledge (ATF -> FK), and the second took the knowledge as the independent variable which causes the attitude towards finance (as FK -> ATF). The two sets of models were run on the questionnaire data and the p-values of the model parameters were compared: the model with the lowest p-values can be considered the best.

Table 8 summarizes the p-values of the main parameters of a model ATF -> FK_basic and FK_basic -> ATF, where FK_basic is the basic financial knowledge indicator. Comparing the pairs of p-values present in each row, it was clear that the parameters of the basic knowledge in the model ATF -> FK_basic were always smaller than the parameters of the attitude towards finance in a model FK_basic -> ATF. Hence, the first model was preferable. The same conclusion can be obtained from advanced knowledge of finance, FK_adv, in Table 9 and the overall financial knowledge, FK_tot in Table 10.

Table 8. P-values obtained in a SEM model where it is assumed that (1) each measured dimension of 'ATF' (first column) determines the basic knowledge 'FK_basic' (column ATF -> FK_basic) and (2) the basic knowledge 'FK_basic' determines each measured dimension of 'ATF' (column FK_basic -> ATF)

ATF dimensions	**ATF -> FK_basic**	**FK_basic -> ATF**
View	1.04E-6	2.47E-4
Self Confidence	2.50E-10	7.06E-8
Emotion	1.36E-10	6.61E-7

Table 9. P-values obtained in a SEM model where it is assumed that (1) each measured dimension of 'ATF' (first column) determines the advanced knowledge 'FK_adv' (column ATF -> FK_adv) and (2) the advanced knowledge 'FK_adv' determines each measured dimension of 'ATF' (column FK_adv -> ATF)

ATF dimensions	**ATF -> FK_adv**	**FK_adv -> ATF**
View	1.68E-4	5.38E-2
Self Confidence	7.15E-6	5.89E-3
Emotion	8.97E-6	5.56E-3

Table 10. P-values obtained in a SEM model where it is assumed that (1) each measured dimension of 'ATF' (first column) determines the total knowledge 'FK_tot' (column ATF -> FK_tot) And (2) the total knowledge 'FK_tot' determines each measured dimension of 'ATF' (column FK_tot -> ATF)

ATF dimensions	**ATF -> FK_tot**	**FK_tot -> ATF**
View	2.89E-7	7.25E-6
Self Confidence	2.68E-12	2.28E-12
Emotion	5.62E-12	2,79-11

The low levels of all p-values show that a direct and significant link exists between attitude towards finance and financial knowledge.

Moreover, the direction of the causation was also clearly shown. Causation could theoretically run in either direction, but there was in fact clear evidence of a causal link from attitude to knowledge, as shown in Tables 8 and 9. Our data provided stronger statistical evidence that the attitude towards finance causes financial knowledge

rather than that financial knowledge causes the attitude to finance. Attitude toward finance did therefore affect financial knowledge: the more favorable the profile of attitude, the higher the level of financial knowledge. In other words, students in the sample with a positive attitude towards finance were more likely to be more financially knowledgeable than their peers characterized by a basically negative profile of attitude.

The next section thus focuses on SEM where the attitude towards finance is the dependent/response variable and the knowledge of finance is the independent/exogenous variable.

4.4.2 The Relative Importance of Each Attitude Sub-Component on Financial Knowledge

Having established that the strongest causality relation was from the attitude towards finance to the financial knowledge, this section investigates which dimension of attitude towards finance most influences the knowledge of finance. The fourth aim of this study was in fact to determine which of the three attitude sub-components – view of finance, perceived financial competence, and emotional disposition – played the most significant role in becoming financially knowledgeable. The three components were the result of aggregation of the scores obtained in a large number of questions: respectively 30, 12 and 9 questions for each component. However, not all questions had the same relevance to basic and advanced knowledge of finance. We therefore build 30+12+9=51 SEM models to study the significance of the parameters of each relation and re-compute the three attitude components 'view', 'self-confidence' and 'emotion' using only the questions for which the relation with the two types of knowledge of finance were both significant at 0.01 level. Of the 30 questions relating to view of finance, only 8 were significant and retained; of the 12 questions relating to perceived financial competence, 7 were retained and of the 9 questions relating to emotional disposition, 7 were retained.

Looking at the extent to which each attitude sub-dimension was associated with overall financial knowledge index in the sample, the results revealed that they all had a positive impact, with emotional disposition towards financial matters exerting the strongest influence, followed by financial self-confidence. The results of the SEM obtained using the re-computed ATF components are in Table 11.

We also tested the extent to which the three attitude sub-components were associated with each other. Table 12 reports that the three re-computed dimensions of attitude were positively interlinked. Financial self-confidence and emotional disposition towards finance were the most strongly associated, with a Pearson coefficient larger than 0.8. These associations have been reported previously, for example by Lind et al., 2020.

Table 11. P-values obtained in SEM where scores for 'view', 'self-confidence' and 'emotion' are recomputed using only significant questions

ATF dimensions	**ATF -> FK_tot**
View	2.32eE-8
Self Confidence	6.18E-10
Emotion	7.29E-12

Table 12. Statistical associations between the three dimensions of attitude: Pearson Coefficients

	View	Self Confidence	Emotion
View	1	0.67450	0.61641
Self Confidence		1	0.82424
Emotion			1

Finally, Table 13 reports the top five attitudinal statements affecting financial knowledge in our sample. Interestingly, our data indicates that the most financially knowledgeable students were those showing the greatest engagement and personal interest in financial matters, along with those who thought that financial skills are basically malleable (namely, increasable with effort and practice). Feeling the financial environment as fully congruent with one's gender identity also proved important. On the other hand, students perceiving finance as a subject that requires significant use of mathematics were less likely to be financially knowledgeable. Finally, we also found that respondents who were more confident of their own financial capability scored higher in financial knowledge tests.

Table 13. Top five attitudinal statements affecting financial knowledge

Statements	Descriptions	P-value	Parameter estimate
e4	I am interested in financial matters	0.0496	0.30539
v47	Financial skills can be developed through practice, perseverance and commitment	0.0742	0.22048
v45	I expect that females who succeed in finance would be nonconformist and possess more masculine than feminine traits	0.0926	0.19575
v49	To succeed in finance you need to have adequate mathematical skills	0.0955	-0.16063
sc11	I can get good results in financial learning and other finance-related experiences	0.1015	0.26302

Table 14 gives an overview of the research hypotheses and summarises the results of hypotheses testing.

Table 14. Results of hypotheses testing

RESEARCH HYPOTHESES	CONCLUSION/DECISION
H_1 = *On average, Economic students have a good level of financial knowledge*	This hypothesis was confirmed.
H_2 = *On average, Economic students have a positive attitude towards finance*	This hypothesis was supported.
H_3 = *There is an association between* several socio-demographic and some personal traits, *financial knowledge and attitude towards finance.*	The hypothesis was partially confirmed. Various factors proved to be statistically significant, with gender being the most powerful, followed by educational and family background or wealth factors.
H_4 = *Attitude towards finance is positively associated with financial knowledge (level of Economic students)*	This hypothesis was confirmed. A statistically significant correlation was found.
H_5 = *Attitudes towards finance predict financial knowledge*	This hypothesis was supported. The stronger causal direction was from attitude to knowledge

5. Discussion and Conclusion

This study aimed at investigating the role of attitude towards finance in becoming a financially knowledgeable person. Thus, its first purpose was to conjunctly measure both attitude towards finance in a sample of Italian university students and their financial knowledge levels, using the definitions outlined in the introduction.

In this regard, the general indication from extant literature was that a college education generally leads to a higher financial knowledge level than the level held by the general public. Therefore, in this study, economic students in the sample were expected to have good results in financial knowledge tests as being highly exposed to economic-financial issues and interested in them. Indeed, amongst university students surveyed we found that the basic financial knowledge level was medium-high, though the understanding of advanced concepts was a bit lower. On average, their overall levels of financial knowledge were rated as medium to high, with over 50% of students answering the three basic test questions correctly (33% for the advanced test). Empirical evidence thus confirmed the first hypothesis and was consistent with the literature (Ergün, 2018; Chen & Volpe, 1998; Beal & Delpachitra, 2003; Lantara & Kartini, 2015, De Vincentiis, Pia & Zocchi, 2017).

The second aim of this study was to assess the attitude towards finance profile of the study population, thus filling a gap in the literature. Given that economic students are familiar with economic-financial issues, as implied by their educational choice, we considered being theoretically plausible to consider and test the hypothesis that they displayed a basically positive attitude towards finance. This hypothesis was confirmed: over 90% of respondents had a positive attitude. Economic students in our sample scored higher on emotional disposition towards finance sub-dimension and lowest on self-efficacy beliefs sub-dimension of attitude.

The third purpose of this study was to shed light on the relationship between attitude towards finance and financial knowledge. Many previous studies emphasised the interlinking between financial attitude and knowledge, but evidence about the intensity and significance of their link was quite inconclusive across studies (Hayhoe, Leach, Allen & Edwards, 2005; Borden, Lee, Serido & Collins, 2008; Jorgensen & Savla; 2010; Potrich, Vieira & Mendes-Da-Silva, 2016; Riitsalu, Murakas, & Veeret, 2018; Agarwalla et al., 2013). Moreover, most importantly, none of them has ever tested the attitude construct considered here. Hence, we explored whether and how financial knowledge could be linked to the attitude towards finance as we interpreted it. As we used broad and

comprehensive measures of the latter construct, we had also some relevant differences to that strand of extant studies that have mostly focused on single sub-components of attitude (i.e. financial self-confidence, emotional disposition to finance, beliefs towards finance) taken in isolation, thus neglecting the dimension of their interaction (Grable, Heo & Rabbani, 2015; Palameta et al., 2016; Dobni & Racine, 2016). Empirical results also supported our third hypothesis: in fact, a direct and significant correlation existed between attitude towards finance and financial knowledge. Exploring the relative importance of each attitude component on financial knowledge, we also found that the most financially knowledgeable students were those who have the greatest engagement in financial learning, those who believe that financial skills are malleable rather than a question of inherent natural ability, those who perceive the financial domain as fully congruent with their own gender identity.

Meeting the challenge of the establishment of the direction of causality (Hastings, Madrian, & Skimmyhorn, 2013; Lusardi & Mitchell, 2014), we have finally also documented that attitude towards finance does affect and predict financial knowledge. This evidence was the main finding from this study. In more detail, emotional disposition towards financial matters was found to be the stronger predictor of financial knowledge, followed by financial self-efficacy beliefs. Moreover, a significant association between the emotional disposition towards financial matters and the financial self-efficacy beliefs was also found, which suggests that interventions to improve one of them could beneficially affect the other. This perspective substantiates and widens previous findings (Bucher-Koenen et al., 2016; Bongini, Trivellato & Zenga, 2016; Arellano, Camara & Tuesta, 2018; Skagerlund et al., 2018; Farrell, Fry & Risse, 2016), but our study makes an important contribution by addressing the need to measure all these attitude dimensions simultaneously and test the extent to which they – in their interplay – are associated with financial knowledge.

Finally, another goal of this paper was to identify prominent demographic factors facilitating financial knowledge. In brief, we investigated whether attitude towards finance and financial knowledge differed according to demographics. In this regard, gender was found the most influential factor on the overall financial knowledge index. In line with previous findings, we found that being male was correlated with higher financial knowledge levels (Chen & Volpe, 2002; Lusardi & Mitchell, 2008; Lusardi et al., 2010). Moreover, gender also affected all the sub-dimensions of attitude, apart from the view of finance. In fact, after controlling for other observable variables, female and male students differed significantly in terms of both emotional disposition toward finance and "ability beliefs". Consistent with past results, we found that female students generally displayed weaker financial self-confidence and more negative feelings to finance (such as financial and math anxiety) than their male peers (Palameta, et al., 2016; Farrel, Fry & Risse, 2016; Alessie et al., 2021).

The data from this research reveals some practical implications. Firstly, this study provides indications to educators and policymakers regarding a number of desirable "skills" that learners may need to have or develop in order to become financially knowledgeable people. In fact, it has been shown that having a neutral or even positive attitude towards finance predisposes to be more open and willing for an ongoing basis engagement in financial learning and practices. As so, attitudes towards finance should be targeted to enhance individuals' financial knowledge. It implies the need to invest in financial literacy programs based on prior diagnosis and the next restructuring of attitudes as a driver of financial learning. Positive attitudes towards finance can also become a final goal of a training program. Encouraging students to think in a certain way about finance and restructuring their negative beliefs may support their financial literacy process. Moreover, reinforcing financial self-confidence and targeting the affective reaction towards finance seems to be the key to designing effective financial education programs, especially when targeted specifically at women. In this sense, our research clearly signposts the main dimensions of a framework for becoming financially knowledgeable. These dimensions are a positive vision to finance, financial self-confidence, affective reaction towards financial issues. The framework is premised on the notion that such dimensions not only have complex relationships and affect each other, but they particularly matter on financial knowledge. Thus, if they are preliminarily assessed, monitored and continually managed by educators, can facilitate crucial processes of learners' financial learning over time. The framework also suggests that we should abandon the idea that financial education is a challenge only at a cognitive level. The suggestion instead is to embrace more affective factors-centred approaches and solutions. As the mainstream model for measuring financial attitude suffers from some methodological limitations, it is expected that our conceptual model can inspire further studies on financial literacy education and help policymakers design appropriate financial education programs. Specifically, the evidence from this study suggests that such initiatives can be beneficially complemented by interventions that initially assess the students' attitude profile as a starting point to be followed by possible remedial actions aimed at modifying the component(s) identified as negative in order to optimize their overall attitude profile and hence their achievements.

The research has certain limitations. The first and most important is that our study population came from one

university, in one particular country, at one particular point in time. Caution should therefore be used in generalizing findings across different study populations. Neither does the small size of the non-random sample allow generalization to a larger population beyond the scope of the present study. Further studies in the finance framework need to focus on attitude-knowledge relations to validate our findings on a larger scale. Future investigations are also required to explore whether attitude towards finance may also affect financial behavior and financial wellbeing, which are the true goals of financial literacy initiatives. Finally, exploring how to develop the right attitude towards finance through formal financial education programs is another interesting avenue for further study.

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Notes

Note 1. Given the multifaced nature of the above construct, this third assumption in turn implies three sub-hypotheses.

Note 2. Although several tests on financial attitudes were ideally available in the field of finance, we used the questionnaire first proposed by Bocchialini & Ronchini (2019) which was internally developed just to take a snapshot of young people's attitude toward finance. After all, the latter construct – as just noted – has a quite different working definition than financial attitude as commonly assessed through the OECD methodology.

Note 3. The "big three" questions are: (1) Compound – "Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?" a. More than $102; b. Exactly $102; c. Less than $102; d. Don't know/ Refuse to answer; (2)

Inflation – "Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy…" a. More than today; b. Exactly the same as today; c. Less than today; d. Don't know/ Refuse to answer; (3) Stock Risk – "Do you think the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund." a. True; b. False; c. Don't know/ Refuse to answer.

Note 4. In this case, the questions are: (1) Relationship Between Interest Rates and Bond Prices – If the interest rate falls, what should happen to bond prices? a. Rise; b. Fall; c. Stay the same; d. None of the above; e. Don't know/ Refuse to answer (2) Riskier: Stocks or Bonds – Stocks are normally riskier than bonds. a. True; b. False; c. Don't know/ Refuse to answer; (3) Risk Diversification: Spreading Money Among Different Assets – When an investor spreads their money among different assets, does the risk of losing money: a. Increase; b. Decrease; c. Stay the same; d. Don't know/ Refuse to answer.