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## INCREASING THE QUALITY OF GERMAN PRIVATE PENSION SCHEMES THROUGH THE USE OF ETFS - AN ACCEPTANCE ANALYSIS

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**Abstract:** *Future german pensioners will face a pension gap in retirement age if they base their income exclusively on the statutory pension. Conventional private pension alternatives are not lucrative, but they are still the most widely used. Exchange Traded Funds (ETFs) have features that make them particularly attractive for pension provision and can therefore help to increase their quality. The aim of this paper is to find out which factors influence the acceptance formation process and thus the usage of ETFs. Therefore a model will be developed which is based on the widely known Technology Acceptance Mode (TAM). This model will then be tested by using an online survey within future German pensioners. The descriptive statistics are then first calculated for recorded data. Afterwards the relationships within the variable model are analysed for significant dependencies. The results show that the assumed external variables have an influence on the acceptance of ETFs. Moreover, they confirm the applicability of the original model for a financial product.*

**Keywords:** *Exchange Traded Funds, retirement planning, pension provision, behavioral finance, acceptance, TAM Model*

### 1. Introduction

*“Secure pension culminates in sarcastic poverty in old age”*

There is no better way to describe the current situation of the German pension system than Walden (2013) does it with his quote. As he correctly indicates, the problem is not a potential pension break down but the amount of pension payments that future German pensioners can expect from the state. The current pension atlas Germany 2017 which was published by Union Investment relentlessly shows the current situation. The average replacement rate of the last gross income of a regular employee from the younger generation provided by the first layer of the German old-age provision system, is at just 38.6% (Raffelhüschen et al., 2017). This

is not enough to keep the standard of living at a constant level after retirement. Therefore, it is the responsibility of each individual to supplement their old-age provision in such a way that they can at least keep their accustomed living standard. However, current statistics show that most of the Germans still rely on classic alternatives, which usually offer poor yields and are therefore not able to sufficiently close the pension gap (Verband der Privaten Bausparkassen, 2019). The financial market offers a remedy for this problem, especially Exchange Traded Funds (ETFs) have interesting features, which are particularly attractive for use in old-age provision.

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So this paper deals with the key question of why future German pensioners do not consider this alternative within their retirement planning. Therefore, the main objective of this work is to find out which reasons prevent the German population from using ETF savings plans as an old-age provision. For this reason the research question belongs to the field of behavioral finance, which tries to investigate the actual behavior of a human being while handling his financial situation (Suciu & Teodorescu, 2014). This paper thus makes a new contribution to financial behavioral research by providing an acceptance measurement model for financial products and using it to identify concrete reasons for the rejection of ETFs as retirement provisions. This model will be based on the Technology Acceptance Model (TAM) of Davis.

In addition, an extensive and keyword-based literature analysis was carried out using the scientific database “Business Source Premier”, in advance to give a complete overview of the current state of research in this field. 29 peer-reviewed journal articles were identified as relevant since they contained statements about factors which are influencing the decision-making process within retirement planning.

First of all, it should be mentioned that out of all the articles, only Kowak (2017) establishes a thematic link between ETFs and retirement provision. In his article, he identifies the challenges of the American pension system and thus for the first time, establishes this specific thematic connection. Some of the problems that he mentions, such as low interest rates or the shift in responsibility for old-age provision, are similar to the problems already identified in German old-age provision. In order to avoid these problems, he calls an ETF investment a good alternative. But at this point, Nowak (2017) and all other authors stop and do not give any insight into the reasons for a low usage rate of ETFs as private old-age provision. While all other authors identify clear reasons that can influence a person's decision making process within pension provision, these are only general. There is no indication if these also apply to alternative pension schemes, to which ETFs undoubtedly belong or if there are even special obstacles that apply exclusively to pension provision through a share-based product. However, 10 main behaviour patterns could be identified that have an influence on the decision making process of a person within the retirement planning process. The results are shown in table 1.

**Table 1.** Behaviour patterns which influence decision-making process within pension planning

Bias	Myopia (Self-Control/Hyperbolic discounting)	Inertia / Procrastination	Framing	Over-confidence	Info overload / Overwhelming Choices	Loss aversion	Financial Literacy	Heuristics	Mental accounting	Anchoring
<b>Number of Journals mentioning this Bias</b>	<b>10 (34%)</b>	<b>10 (34%)</b>	<b>9 (31%)</b>	<b>7 (24%)</b>	<b>6 (21%)</b>	<b>6 (21%)</b>	<b>5 (17%)</b>	<b>4 (14%)</b>	<b>3 (10%)</b>	<b>2 (7%)</b>

Present bias or myopia basically describes the short-sightedness of people with regard to the time horizon of an investment (Riitsalu, 2018). That means it poses problems for them to make a decision that will have its effects in

the distant future since they are not capable of correctly estimating the situation (Kane, 2014). This is especially true and important within the retirement planning process (Knoll, 2011). This phenomenon is therefore

very closely linked to a person's self-control (Thorgeirsson & Kawachi, 2013), as continued consumption is often given higher priority than provision for old age, as this promises greater satisfaction (Mitchell & Utkus, 2006). This prioritization is described by the term hyperbolic discounting (Libson, 2017). Mental Accounting is another bias mentioned several times in the literature which is quite similar to this phenomenon. Individuals tend to divide their wealth into classes. These include spendable income, current asset income and future income (Suciu & Teo-dorescu, 2014). The issue is that these three classes are weighted differently according to the individual's assessment (Oehler & Werner, 2008). The most crucial class 3 in the long term is usually given the lowest priority. In addition, if current consumption can no longer be financed by the first two classes, the wealth in class 3 is used (Suciu & Teodorescu, 2014).

The status quo bias, often described in literature as inertia or procrastination, is also one of the most frequently named behavioral patterns when it comes to reasons why people are discouraged from provisioning for their retirement (Tapia & Yermo, 2007). Basically, this refers to the laziness of people to change their pension situation, especially if this is linked to increased psychological or mental effort (Kane, 2014). This must be considered particularly critically, as retirement provision is increasingly privatized and thus, the responsibility shifts to the individual (Oehler & Werner, 2008). This behavior is significantly influenced by the amount and complexity of information available, which is already higher in the context of old-age provision (Lucas, 2013). For this reason, the literature also mentions information overload as the reason why people do not or not adequately deal with their old-age provision (Bailey et al., 2003). Generally speaking, the higher the number of pension options, the lower the decision rate (Mitchell & Moore, 2011). The term heuristics must also be mentioned in connection with an information overload because this term describes a

strategy, which allows to make decisions and judgements with limited knowledge and time by reducing complexity. This leads to an often very poor diversification of the pension portfolio, as individuals only choose from what is proposed to them (Tapia & Yermo, 2007).

The term framing is mentioned as often as the two already described behavioral patterns and is therefore correspondingly relevant. In general, this term refers to the phenomenon which leads to the fact that equivalent decision options are perceived differently only through a different presentation or formulation (Mitchell & Moore, 2011). Thereby even small differences in terminology can strongly influence the decision making and lead to a different result (Lucas, 2013). Also, the past performance of the fund can have an influence on the perception and is therefore relevant for the decision-making process (Diacon & Hasseldine, 2007). In the context of this work, the presentation of an ETF investment has to be reviewed in order to find out whether the relevant information is presented attractively for the future pensioner. Here too, the already identified information overload has a negative effect on decision making (MacKenzie, 2017). Connected to the framing bias is anchoring since this phenomenon also refers to the influence of information on the decision-making process. In this case, this information is placed at the beginning of the decision-making process and is therefore perceived as more important (Austin, 2013).

Overconfidence is a further characteristic that can lead to significant problems within old-age provision. Investors overestimate the skills that are necessary to invest successfully and build long-term wealth (Byrne, 2004). This is usually manifested by the fact that these investors are unwilling to seek guidance and consider their own investment strategy to be the best, even if they have no information to compare with other strategies (Mitchell & Moore, 2011). This leads to an increased

optimism in which unnecessary investment risks are taken, which is a fatal mistake in retirement planning (Riitsalu, 2018). The result is often a poorly diversified asset portfolio (Mitchell & Utkus, 2006).

Only 6 articles mention this bias, but it is nevertheless considered to be one of the most influential, especially when it comes to capital market behavior. Loss aversion describes the simple effect in which the investor perceives losses emotionally more than profits (Riitsalu, 2018). This has an enormous effect, especially in old-age provision, since saving is first recognized as a form of loss because the capital is no longer available (Kane, 2014). In addition, investors tend to buy in good market phases and not in bad ones, which has a negative impact on the over-all portfolio performance (Austin, 2013). The characteristics of an ETF savings plan are particularly effective against this pattern of behavior, as the amount of the purchase is constant regardless of the market phase.

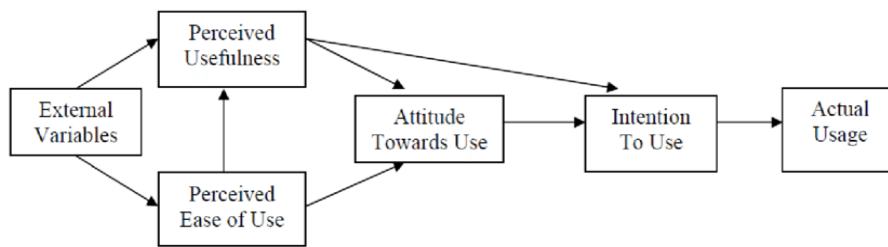
Financial literacy is probably one of the superior influencing factors in pension decision making, as it could change the influences of most other factors. In general, this term refers to the ability of an individual to adequately and rationally manage his or her own financial situation (Chatterjee et al., 2017). A person with sufficient financial general knowledge would first recognize the need for retirement provision and then examine possible alternatives in order to choose the best one for himself. However, other scientific studies show that this approach is rarely the norm (Riitsalu, 2018). Most people lack the basic knowledge to understand even the easiest economic relationships or simple pension models (Oehler & Werner, 2008). This lack of knowledge is the main reason for poor investment or pension decisions (Secunda, 2016). The results of the literature analysis show that the identified behavioural patterns

and barriers may also apply to the use of ETF savings plans. The following empirical study is intended to show this influence. Therefore, these factors will be examined within the acceptance analysis by specific items within the questionnaire.

## 2. Technology Acceptance Model – TAM

The original Technology Acceptance Model (TAM) was developed by Davis in 1986 and is since then one of the most used and recognized model within the acceptance research, which is also characterized by more than 700 citations (Padilla-Meléndez et al., 2013). The TAM model is designed to explain and predict the acceptance formation process and thus identify which factors ultimately influence the adoption of a technology by the end user. Figure 1 shows the original scheme of the TAM, which originally had only 6 variables. Basically, Davis assumed that a user's acceptance is mainly influenced by two variables, which are defined as perceived usefulness and perceived ease of use. These two variables are explained in detail as follows by Davis et al. (1989).

The first variable perceived usefulness describes the degree to which a particular person believes that the use of a technology will improve their own performance. Whereas the second variable perceived ease of use measures how much effort the person associates with the use of this system. At this point it should be mentioned that variable two perceived ease of use has a direct positive influence on variable one perceived usefulness, according to Davis. In turn, both variables have a direct positive influence on the variable attitude towards using thus on the actual acceptance formation. Consequently, this variable has a direct positive influence on the variable behavioral intention to use and thus on the final use.



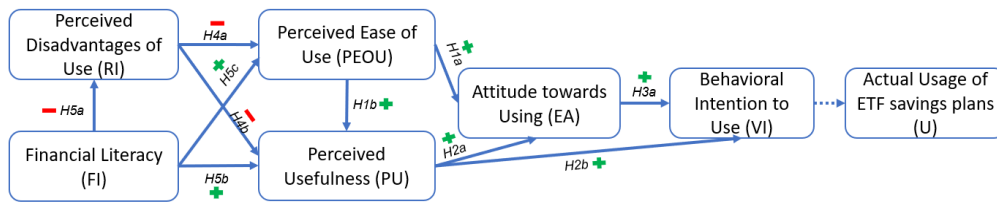
**Figure 1.** The principal scheme of the original TAM of Davis (1989)

The listed external variables influence the two main variables of the scheme and at the same time, offer the possibility to use and adapt the basic model for completely new research purposes. King and He (2006) confirm this versatility of the model in their meta-analysis. They point out that this model has even been used for acceptance measurements that do not undoubtedly belong to the field of technologies. The simplicity, flexibility and validity of the model makes it the perfect basis for the acceptance measurement model for ETF savings plans since there is no similar research to this one. The cross disciplinary use and extension of the TAM model for a financial innovation, which is the use of ETFs in the context of pension provision, represents a major part of the scientific contribution of this research, as it opens up new fields of application. The results obtained, then complete this scientific contribution, since they can help to make this investment product easier to understand and to address its use for future pensioners.

### 3. Research model and hypothesis

Based on the results of the literature analysis and the principles of the TAM, the acceptance measurement model for this research was developed. The behavioural patterns which were already identified by the literature analysis were allocated to the two variables perceived usefulness and perceived ease of use by using special items. This step is intended to check the applicability of the so far general behaviour patterns to the use of ETF savings plans. In addition, two external

variables were added which, from the author's point of view, have an extremely relevant influence on the overall model and must therefore be recorded separately. These are on the one hand the perceived disadvantages of use and on the other hand the general financial knowledge of the user, which is represented by the term financial literacy. The variable perceived disadvantages of use is the counterpart of the two main variables of the model and represents the risks and drawbacks of using an ETF savings plan as a pension provision tool. It is therefore assumed that this variable has a direct negative influence on these two variables. This variable of perceived disadvantages is particularly relevant in connection with the German culture, as financial products that are closely linked to the capital market have still not found access to the wider public, as the prevailing opinion classifies these products directly as high risk. This provides a good transition to the second elementary external variable, which measures the extent to which a person is able to manage their own financial situation, without having specific knowledge (Remund, 2010). It is assumed that this variable has a positive influence on the core variables of the model and a negative influence on the perceived disadvantages because with a higher financial general knowledge, people are better capable to weigh the advantages and disadvantages of a use and thus increase the effects. Figure 2 shows all relationships and dependencies between the variables of the developed acceptance measurement model for ETF savings plans as pension provision tool.



**Figure 2.** The extended TAM for analysing the acceptance of ETF savings plans

Regarding to this model, the following hypotheses have been formulated:

- H1a: Perceived Ease of Use (PEOU) has a positive effect on Attitude towards Using (EA)
- H1b: Perceived Ease of Use (PEOU) has a positive effect on Perceived Usefulness (PU)
- H2a: Perceived Usefulness (PU) has a positive effect on Attitude towards Using (EA)
- H2b: Perceived Usefulness (PU) has a positive effect on Behavioral Intention to Use (VI)
- H3a: Attitude towards Using (EA) has a positive effect on Behavioral Intention to Use (VI)
- H4a: Perceived Disadvantages of Use (RI) has a negative effect on Perceived Ease of Use (PEOU)
- H4b: Perceived Disadvantages of Use (RI) has a negative effect on Perceived Usefulness (PU)
- H5a: Financial Literacy (FI) has a negative effect on Perceived Disadvantages of Use (RI)
- H5b: Financial Literacy (FI) has a positive effect on Perceived Usefulness (PU)
- H5c: Financial Literacy (FI) has a positive effect on Perceived Ease of Use (PEOU)

## 4. Methodology

### 4.1. Instrumentation

For each variable of the extended TAM based model, a specific construct was created,

which is represented by several items within the questionnaire. The questionnaire has always been prepared in accordance with scientific requirements. The used scales are based on already verified scales from other research papers. All used items are measured by a 6 point Linkert scale, which is marked on both corners. The value 1 stands for “I do not agree at all” and the value 6 stands for “I agree completely”. This applies to all variables except financial literacy. This variable is measured using a standardized financial general knowledge test consisting of 7 questions, which has been used in the literature several times previously (Hansen, 2015). Within this test, the respondent has to choose the correct answer from several options. The quantity of correct answers is determined for each data record and used for further calculations.

### 4.2. Population, sample and data collection method

After the successful completion of a pre-test, the survey was performed by an online survey tool between august and september 2019. The distribution was carried out as a random sample by one of the leading insurance companies in Germany. The focus was on people between 20 and 59 years of age, as this group was considered to be particularly relevant within the process of retirement provision planning. In total, the questionnaire was sent out to 1500 people within the previously defined age range, of whom 736 were completed. In the end, n=615 could be used for further evaluation. Out of the 615 respondents, 29.27% were female and the remaining 70.73% were male. In terms of age,



309 respondents were between the age of 20-29, 141 between the age of 30-39, 57 between the age of 40-49 and 108 between the age of 50-59. Looking at the monthly net income and the highest educational qualification of the test persons, the majority earn between 2000 € and 3000 € net per month (25%) and have a university degree (59%).

### 4.3. Data analysis

The collected data records were then analysed in two steps. First, the reliability of the scales used was checked via Cronbach's Alpha. The analysis showed that one item of both scales, perceived ease of use and attitude towards using, had to be removed to achieve the required value of more than  $\alpha = 0.7$ . A confirmatory factor analysis was then performed to confirm the previously assumed structures of the variable model. The KMO and Barlett test also showed, with a value of 0.858, the usefulness of this analysis. The result of the factor analysis and the final remaining items are shown in the next section. As a conclusion of the first analysis

phase, the descriptive statistics of each construct were determined. The second phase of data analysis deals with the relationships within the variable model. For this purpose, the regression analysis is used, to test the underlying hypotheses.

## 5. Results

### 5.1. Questionnaire evaluation and descriptive statistics

The first stage of the data evaluation is presented in table 2. The first column shows the ascribed construct of the already described variable model of the extended TAM for ETF savings plans as old-age provision tool. In column two, the final used items of the questionnaire are listed, after they have been verified by Cronbach's Alpha and the factor analysis. As mentioned before, 4 items have been excluded from further calculation due to these tests. Column 3 then shows the final values of Cronbach's Alpha for each scale.

**Table 2.** Results of the first stage data analysis

Factor / Construct	Questions - Items	Cronbach's $\alpha$	Factor Loading	Average Mean, Standard deviation per Item	Average Mean, Standard deviation per scale
Perceived Usefulness	<b>I think the following characteristic of an etf savings plan is useful:</b>				
	Higher return expectations compared to other pension alternatives	0.90	0,58	$\bar{X} = 4,95$ SD = 1,18	$\bar{X} = 4,79$ SD = 1,14
	Full transparency regarding the investment		0,79	$\bar{X} = 4,77$ SD = 1,25	
	Full cost transparency		0,76	$\bar{X} = 5,06$ SD = 1,13	
	Lower costs compared to other pension alternatives		0,72	$\bar{X} = 4,96$ SD = 1,23	
	High capital flexibility		0,71	$\bar{X} = 4,60$ SD = 1,36	
	Full independence to decide how the capital is invested		0,67	$\bar{X} = 4,51$ SD = 1,50	
	Wide variety of ETF savings plans available		0,67	$\bar{X} = 4,57$ SD = 1,24	
	High diversification (risk diversification) of the investments		0,72	$\bar{X} = 4,97$ SD = 1,21	
	cost-average effect		0,58	$\bar{X} = 4,53$ SD = 1,33	
	Capital security through treatment of ETF savings plans as special funds and thus no risk of total loss in the case of insolvency of the issuer		0,72	$\bar{X} = 4,81$ SD = 1,38	
Flexible adjustment of savings rates	0,74		$\bar{X} = 4,99$ SD = 1,19		

Perceived Ease of Use	<b>To what extent do the following statements agree with your personal opinion?</b>				
	I do not believe that the purchase of ETF savings plans is easy.	0,80	0,79	$\bar{X} = 2,84$ $SD = 1,71$	$\bar{X} = 2,91$ $SD = 1,62$
	I assume that the use of an ETF savings plan involves a lot of administrative effort.		0,84	$\bar{X} = 2,93$ $SD = 1,51$	
	I don't think managing ETF savings plans is easy for me.		0,75	$\bar{X} = 2,95$ $SD = 1,64$	
Attitude towards Using	<b>To what extent do the following statements agree with your personal opinion?</b>				
	The different attributes of ETF savings plans do not cause me to be interested in using them.	0,82	0,66	$\bar{X} = 2,65$ $SD = 1,65$	$\bar{X} = 2,56$ $SD = 1,61$
The use of an ETF savings plan is not desirable for me.	0,70		$\bar{X} = 2,47$ $SD = 1,56$		
Perceived Disadvantages	<b>To what extent do the following statements agree with your personal opinion?</b>				
	I see a major risk that I spend the saved capital on other things rather than keeping it for my retirement due to the capital flexibility of the ETF savings plans.	0,71	0,48	$\bar{X} = 2,90$ $SD = 1,47$	$\bar{X} = 3,18$ $SD = 1,43$
	I see a major risk of loss from investing my retirement capital in equities.		0,74	$\bar{X} = 3,19$ $SD = 1,39$	
	I see a major risk in the possibility that there could be financial crisis at the time I retire and therefore the value of my savings would be low.		0,78	$\bar{X} = 3,62$ $SD = 1,38$	
I see a risk in not being able to withstand possible price fluctuations and selling the shares of my ETF savings plan with losses.	0,72		$\bar{X} = 2,99$ $SD = 1,46$		
Behavioral Intention to Use	<b>It's about your intention to use ETF savings plans in the future. Please evaluate the following statements:</b>				
	ETF savings plans are a possible option within my pension provision planning.	0,95	0,89	$\bar{X} = 3,51$ $SD = 1,61$	$\bar{X} = 3,48$ $SD = 1,63$
I am seriously considering an active use of ETF savings plans to build a private pension.	0,89		$\bar{X} = 3,45$ $SD = 1,65$		
Financial Literacy	<b>Please choose the correct answer:</b>				
	Suppose you have €100 in your savings account. This balance bears interest at 2% per year and you leave it in this account for 5 years. What do you think: How much credit does your savings account have after 5 years?	-	-	correct answers 95,1%	$\bar{X} = 5,4$ $SD = 1,31$
	Let's say that the interest rate on your savings account is 1% per year and the inflation rate is 2% per year. What do you think: After one year, will you be able to buy as much, more or less than today with your savings account balance?			correct answers 87,8%	
	Is the following statement right or wrong: "Investing in shares of an individual company is usually less risky than investing in an equity fund"?			correct answers 85,9%	
	What happens to the price of a fixed-rate bond when market interest rates rise?			correct answers 37,6%	
	Is the following statement right or wrong: "A credit with a 15-year term usually requires higher monthly repayment rates than a credit with a 30-year term for the same credit sum. However, the sum of interest earned over the entire term is lower for a 15 year loan."			correct answers 75,6%	
	Is the following statement right or wrong: "The statutory pension increases steadily every year"?			correct answers 81,5%	
	Is the following statement right or wrong: "The Riester pension is not the only old-age provision subsidised by the state"?			correct answers 76,1%	

Column 4 shows the factor charges of the individual items on the respective construct. Finally, column 5 and 6 show the average means and standard deviations of the used items and scales. The total factor analysis explains a total variance of 62.49%. At this point, it should be noted that the factor analysis proposed a 4 factor solution in which the two scales attitude towards using and behavioral intention to use were loaded onto

same factor. This phenomenon can be explained by the similarity of both scales. Since these two variables can no longer be regarded as uncorrelated, they are not consolidated into one variable but are still treated separately. All other scales that were considered in the factor analysis are aggregated to sum indices in order to use the resulting new variables for the regression analysis.



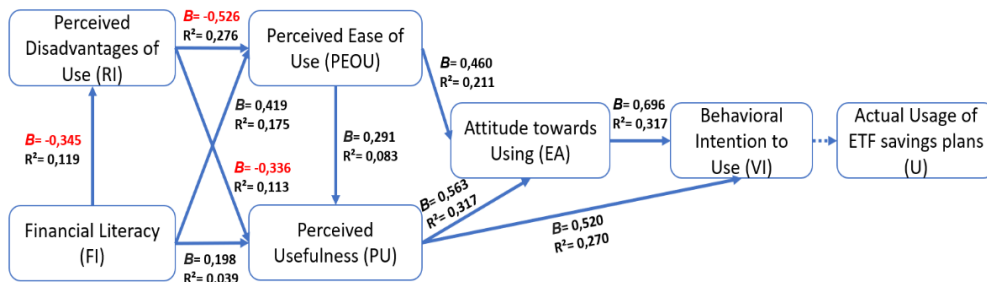
The last column of table 2 shows that the usefulness of the characteristics offered by ETF savings plans is clearly recognised by the participants. This is confirmed by the highest average mean of 4.79 and the lowest standard deviation of 1.14. Furthermore, it can be stated that the perceived ease of use is relatively low with an average mean of 2.91. Since the items were all reverse phrased, it can be assumed that the usage is not considered to be particular difficult. Compared to the perceived usefulness, the ease of use does not reach the same maximum value, but nevertheless the variable is seen more positively than the remaining ones.

The perceived disadvantages are rated with a mean average of 3.18 as tending to be neutral with a slight tendency to unproblematic. This indicates that the disadvantages are noticed by the participants but do not have an unusually high influence within the overall model. For the two variable attitude towards using and behavioral intention to use applies the same statement, since these two mean averages also are within the neutral, slightly negative area, with values of 2.56 and 3.48. It

should be noted that for the first mentioned scale were also phrased reverse. These results show that, despite the recognition of the high benefits of an ETF savings plan, the respondents currently do not necessarily see it as a potential alternative for their pension provision. At the same time, it should be mentioned that they do not clearly reject this alternative, which is very relevant for further evaluation.

### 5.2. Regression analysis

The second step of the data analysis is mainly focused on the hypotheses to be tested, which will be done by performing a regression analysis for each of them. The aim of this analysis is, on the one hand, to confirm or falsify the hypotheses and, on the other, to measure the strength of the relationship between the variables, in order to see which one has the biggest influence on the other. The latter is measured by the standardised coefficient Beta (B). The results of the regression analysis are presented in the figure 3.



**Figure 3.** Results of the regression analysis within the extended TAM

All dependencies were tested at a significant level of 5%, 1% and 0.01%. All dependencies are significant at a 0.01% significance level. Starting with the predefined dependencies within the classical model TAM model, the hypotheses H1, H2 and H3 are tested. The variable perceived ease of use has a significant positive effect on the perceived usefulness ( $B=0.291$ ,  $R^2=0.083$ ) and on the attitude towards using ( $B=0.460$ ,  $R^2=0.211$ ).

Therefore, both hypotheses H1a and H1b can be confirmed. The hypotheses H2a and H2b examine the influence of the variable perceived usefulness on attitude towards using and behavioral intention to use. The independent variable perceived usefulness has a significant positive effect on attitude towards using ( $B=0.563$ ,  $R^2=0.317$ ). The same applies to the effect on behavioral intention to use ( $B=0.520$ ,  $R^2=0.270$ ). This

confirms both hypotheses H2a and H2b. H3a describes the influence of attitude towards using on behavioral intention to use, which is significantly positive ( $B=0.696$ ,  $R^2=0.317$ ). Therefore, this hypothesis can be confirmed. In the following, the hypotheses are tested which show the influence of the newly added variable perceived disadvantages of use and financial literacy. The variable perceived disadvantages of use has, as expected, a significant negative effect on perceived ease of use ( $B=-0.526$ ,  $R^2=0.276$ ) and perceived usefulness ( $B=-0.336$ ,  $R^2=0.113$ ). For this reason both hypotheses H4a and H4b can be confirmed. Two effect directions were predicted for the variable financial literacy. One was a negative effect on the perceived disadvantages of use predicted and the other a positive effect on the perceived simplicity of use and perceived utility. For the first mentioned relationship there is a significant negative influence ( $B=-0.345$ ,  $R^2=0.119$ ), therefore hypothesis H5a can be confirmed. The two other expected correlations were also proven, with the variable financial literacy having a significantly positive effect on perceived usefulness ( $B=0.198$ ,  $R^2=0.039$ ) and perceived ease of use ( $B=0.419$ ,  $R^2=0.175$ ). As a final result, the hypotheses H5b and H5c can be confirmed as well.

## 6. Discussion

The first main objective of this paper was to identify potential influencing variables which could affect the acceptance formation process and thus the potential final use of ETF savings plans by future German pensioners in order to than increase the overall quality of the German private pension. Due to the extensive literature analysis on this topic, some influencing factors were identified, which were then processed within the variable model. In addition, 2 primary influencing factors were added, which were not considered separately before. The variable external factors defined in the original TAM model of Davis was replaced by 2 variables, perceived disadvantage and financial literacy,

which are of significant importance for this topic area. Within the regression analysis, the influence of these two variables on the main variables perceived ease of use and perceived usefulness was proven. For this reason, it can be asserted that these also have an influence on the variable attitude towards using and behavioral intention to use, which are decisive within the acceptance formation process and thus for the final use. Looking now at all variables and their interactions in more detail, it can be stated that both of the original variables have a relatively strong impact on the variable EA and therefore on acceptance formation, whereby PU has a slightly stronger influence. This result is not exceptional and can be observed in many other papers, such as Hakka et al. (2013) or Zhou et al. (2018). The same applies to the relatively weak influence of PEOU on PU. In detail, this means that the actual use of ETF savings plans in the context of old-age provision is more important to the probands than the effort they would have to make. Furthermore, for the variable RI, the predicted negative influences on the core variables of acceptance formation were confirmed, which is also in line with the results of Ganciu and Niculescu (2019). Last but not least, the observed positive influence of a person's general financial knowledge matches the results of comparable research such as that of Secunda (2016).

The second main objective of the paper was then to verify the previously established relationships between the variables of the new extended TAM. First, the empirical results show that the relationships between the 3 classical TAM variables can be confirmed. In detail, the study shows that the perceived usefulness and the perceived ease of use of an ETF savings plan have a positive influence on the final intention to use and thus on its acceptance. This also demonstrates the applicability of the TAM for a financial product, which mainly strengthens the scientific relevance of this model and extends its scope.

As usual in any scientific study, this study has some limitations that should be considered in future studies. For example, the demographic characteristics of the probands may have an influence on the relationships of the variable model. It would be very interesting to verify these results by using data of other countries with a similar pension system. The results may also differ due to cultural and social differences in other countries. Furthermore, the used regression analysis is only able to prove the predicted relationships within the variable model. In a next step, a more in-depth interaction analysis can be applied to detect possible mediator or moderator effects within this model. However, all limitations can be potential next research steps.

## 7. Conclusion

The focus of the paper was the development of a usable acceptance measurement model for ETF savings plans based on the TAM of Davis, whose results can then be used to sustainably improve the quality of German private pension provision through the use of ETFs. The variables of the original model were retained and extended by topic-specific variables, which were considered to have a high influence on the acceptance formation process. For this reason, the variables perceived disadvantages of use and financial literacy were added. The model was then tested by an online survey, which was distributed to a group of people aged 20 to 59 who are particularly relevant within the area of pension provision. The questionnaire used for this purpose was checked by using a confirmatory factor analysis to determine whether it maps the underlying variable model. In addition, the reliability of the scales used was tested using Cronbach's Alpha. In a second data analysis step, first, the descriptive statistics were determined and then the relationships within the model were evaluated

using the regression analysis. The empirical results prove that all the interactions and their effects within the developed model are statistically significant. As this applies appropriately to the classical variables and relationships of the TAM, the functionality of this model can also be confirmed for a financial product. It is therefore the first acceptance measurement model that exists for ETFs. This fact expands the already large scientific scope of the model and opens up a new field of application, which in turn increases its scientific validity and relevance. In addition, the expected influence of the two added external variables could be statistically confirmed, which shows the direct influence of these two factors on the acceptance formation process. These two points justify the scientific rationale and relevance of this paper. Accordingly, it is now necessary to address these two factors with potential measures in order to increase the acceptance of the ETF savings plan decisively within the German population, which essentially corresponds to the practical implication of this research. If this is successful, it will be possible to improve the quality of private German pension provision for future pensioners. In summary, it can be said that the objectives of the paper were achieved. The model developed proved to be useful for examining the acceptance formation process for ETF savings plans. The findings of this study can be particularly valuable for any institution involved in the distribution of ETFs or similar financial products. Furthermore, any person dealing with the topic of retirement provision can benefit from these results. In further research steps, reference is increasingly made to demographic factors in order to identify potential differences. Therefore, this will help to analyse the different stakeholders even more precisely in order to derive even more precise measures to increase acceptance.

## References:

- Austin, R. (2013). The Impact of Behavioral Economics on Retirement Plans. *Benefits Quarterly*, 3, 25-32.
- Bailey, J., Nofsinger, J., & O'Neill, M. (2003). A Review of Major Influences on Employee Retirement Investment Decisions. *Journal of Financial Services Research*, 23(2), 149-65.
- Byrne, A. (2004). Investment decision making in defined contribution pension plans. *Pensions: An International Journal*, 10(1), 37-49.
- Chatterjee, S., Fan, L., Jacobs, B., & Haas, R. (2017). Risk Tolerance and Goals-Based Savings Behavior of Households: The Role of Financial Literacy. *Journal of Personal Finance*, 16, 66-77.
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 13(3), 319-340.
- Diacon, S., & Hasseldine, J. (2007). Framing Effects and Risk Perception: The Effect of Prior Performance Presentation Format on Investment Fund Choice. *Journal of Economic Psychology*, 28(1), 31-52.
- Ganciu, M.-R., & Niculescu, A. (2019). Using Technology Acceptance Model to Adopt Intelligent Banking. *FAIMA Business & Management Journal*, 7(4), 12-23.
- Hakka, M., Vahdati, H., & Biranvad, V. (2013). An extended technology acceptance model for detecting influencing factors: An empirical investigation. *Management Science Letters*, 3, 2795-2804.
- Hansen, L. (2015). *Financial Literacy und Entscheidungsverhalten als Erklärungsgrößen des finanziellen Erfolgs von Personen - Eine empirische Untersuchung am Beispiel 30- bis 49-jähriger erwerbstätiger Personen in Deutschland* [Financial literacy and decision-making behaviour as explanatory factors for the financial success of individuals - An empirical study using the example of 30 to 49-year-old employed persons in Germany]. Flensburg.
- Kane, M. (2014). Overcoming Obstacles to Retirement Plan Success: Inertia, Myopia, and Loss Aversion. *Journal of Pension Benefits: Issues in Administration*, 21(2), 23-57.
- King, W., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*, 42, 740-755.
- Knoll, M. (2011). Behavioral and psychological aspects of the retirement decision. *Social Security Bulletin*, 71(4), 15-32.
- Lucas, L. (2013). Participant-Proofing the DC Investment Fund Lineup. *Benefits Quarterly*, 29(3), 33-38.
- MacKenzie, K. (2017). Is There a Better Way to Present the Social Security Claiming Decision? *Journal of Financial Service Professionals*, 79(1), 46-49.
- Mitchell, J. B., & Moore, A. J. (2011). Lifetime Individual Retirement Arrangements: An Application of Thaler and Sunstein's NUDGE. *Journal of Accounting & Finance*, 11(2), 16-25. 10p.
- Mitchell, O., & Utkus, S. (2006). How Behavioral Finance Can Inform Retirement Plan Design. *Journal of Applied Corporate Finance*, 18(1), 82-94.
- Nowak, K. (2017). Low cost retirement solutions based on Robo-Advisors and Exchange Traded Funds. *Copernican Journal of Finance & Accounting*, 6(3), 75-94.

- Oehler, A., & Werner, C. (2008). Saving for Retirement--A Case for Financial Education in Germany and UK? An Economic Perspective. *Journal of Consumer Policy*, 31(3), 253-83.
- Padilla-Meléndez, A., Del Aquila-Obra, A. R., & Garrido-Moreno, A. (2013). Perceived playfulness, gender differences and technology acceptance model in a blended learning scenario. *Computers & Education*, 63, 306-317.
- Raffelhüschen, B., Metzger C., & Seuffert, S. (2017). *Vorsorgetatlas Deutschland 2017* [Provision atlas 2017]. Union Asset Management Holding AG, Frankfurt.
- Remund, D. L. (2010). Financial Literacy Explicated. The Case for a Clearer Definition in an Increasingly Complex Economy. *The Journal of Consumer Affairs*, 44(2), 276-295.
- Riitsalu, L. (2018). Taking the Path of Least Resistance in Managing Personal Finances for the Longer Term. *Journal of Management & Change*, 37(2), 56-67.
- Secunda, P. M. (2016). The Behavioral Economic Case for Paternalistic Workplace Retirement Plans. *Indiana Law Journal*, 91(2), 505-548.
- Suciu, M.-C., Teodorescu, I. (2014). An introduction to behavioural economics: under saving for retirement and new economic models for predicting savings. *Management & Marketing*, 9 (2), 337-344.
- Tapia, W., & Yermo, J. (2007). Implications of behavioural economics for mandatory individual account pension systems. *OECD Papers*, 7(7), 1-28.
- Thorgeirsson, T., & Kawachi, I. (2013). Behavioral Economics: Merging Psychology and Economics for Lifestyle Interventions. *American Journal of Preventive Medicine*, 44(2), 185-189.
- Verband der Privaten Bausparkassen (2019). *Top 10-Geldanlagen der Bundesbürger 2019 – Sparbuch wieder vor Girokonto* [Top 10 money investments of the German citizens 2019 - savings book again before current account]. Verband der Privaten Bausparkassen, Berlin.
- Walden, R. (2013). *Beim Wort genommen* [Taken at the word]. Retrieved January 10, 2020, from <https://raymond-walden.blogspot.com/search?q=rente>.
- Zhou, W., Tsiga, Z., Li, B., Zheng, S., & Jiang, S. (2018). What influence users' e-finance continuance intention? *The moderating role of trust. Industrial Management & Data Systems*, 118(8), 1647-1670.

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