
Why Women Do not Save for Retirement – In search of Determinants of Saving Procrastination, against the Background of Changes in Pension Systems

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Abstract

Purpose: Demographic changes in recent years have made the existing pension systems ineffective, which is why they are being reformed; the bottom line of the reforms, however, is the fact that it is the employee who has to save additionally for their retirement. It should be noted that the 'retirement period' is very feminized, therefore women should be interested in additional savings. Given the above, the aim of this article was to identify the nature and strength of the correlations between women's decisions to put aside additional funds for their retirement and factors relevant to decision making, from the perspective of procrastination.

Design/Methodology/Approach: In this study – which used the survey method – the authors analysed the situation in Poland. So far, the research on pensions has not linked the issues of saving for retirement by women and procrastination. In the study, the basket analysis method was used to achieve the purpose of the article and answer the research questions.

Findings: The results showed that majority of women did not save extra for retirement, and settled for the compulsory contributions to the pension system. Additionally, it was found that women did not save because their earnings were too low and, at the same time, they distrusted the pension system; they also lacked information on pensions and investment options and, moreover, perceived the retirement period as a distant future. Many of the behaviours of women can be classified as procrastination.

The obtained results may be useful to institutions that create the guidelines for pension policy in the European Union, as well as in its individual member states. They may also be a valuable analysis for women themselves, who should save to avoid poverty in retirement.

Originality/value: A new approach to the problem is that so far, the research on pensions has not linked the issues of saving for retirement by women and procrastination. Another new element of this study is the use of the basket analysis method to analyse the data from the survey.

Keywords: Pension system, voluntary retirement saving, economic exclusion, demographic changes, market basket analysis, machine learning.

JEL classification: H55, J32, H75, D91, G41.

Paper Type: Research study.

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1. Introduction

Pensions have two functions in the society – on one hand, they are a tool to equalize the level of consumption, which would be limited without the income received after the employment period; on the other hand, they are also a tool for dividing the current GDP between the working generation and the retired one.

Many countries have established pension systems for their citizens and residents to provide them with income when they retire. Typically, this requires payment of contributions throughout the working life of the employees so that they could later claim retirement benefits. Thus, until now, the basic state pension was a contribution-based benefit and depended on the professional history of an individual.

Most developed countries have adopted such a system, supplementing it with employer contributions and individual employee saving programs. However, currently almost 3 out of 10 elderly people in the world have no access to pensions (Ortiz and Schmitt, 2019). On one hand, state regulations and social programs are necessary. On the other, people should plan their income for the retirement period, so as not to be dependent only on the social policy of a state.

This is particularly important in the context of ageing societies and limited ability of governments to finance pensions.

The problem of funds available to retirees becomes noticeable when one takes into account the estimates that women live longer than men, therefore they are significantly more numerous in the retired population, and a similar phenomenon may be observed in every European country.

Despite many reforms and changes, women still receive much lower pensions than men, which may lead not only to lower living standards, but even poverty. That is why it becomes crucial to identify the factors that may influence the financial decisions made by women. It is also important to develop guidelines for the state policy in the field of future retirement provisions for citizens (Garritzmann and Schwander, 2021).

Thus, the empirical aim of this study was to identify the nature and strength of the correlation between women's decisions to put aside additional funds for retirement and factors relevant to decision making – from the perspective of procrastination. Since this study was exploratory in nature, the authors did not formulate hypotheses, but looked for dependencies supported by research questions, discussed in the Methodology (4.1).

With this article, the authors want to join the discussion on procrastination related to women's decisions to save for retirement, as well as on the activities of public institutions aimed at collecting funds for this purpose. The limitation of the analysis

to the study of women resulted from the fact that, according to OECD forecasts, the biggest problem concerning low retirement benefits in Poland and other European countries concerns women (Pensions at a Glance, 2021).

Since many aspects are related to procrastination and saving, we propose a new application of the method of finding dependencies, called the method of basket analysis (Han and Kamber, 2000). The advantages of the new approach are described in the Methodology (4.1 and 4.2). Procrastination is the result of present-biased preferences (Brown and Previhero, 2014). It is linked to the theory of avoiding uncertainty and hyperbolic advantage.

The latter is especially important, because it assumes that people tend to prefer earlier gains over later benefits, and this has an evident impact on the willingness to save (Dasgupta and Maskin, 2005). It is related as well to temporal motivation theory, developed by Steel and König (2006), which emphasizes that time is a critical and motivational factor in taking decisions. Hence, people struggle with procrastination.

2. Literature Review

The issue of decisions to save money is quite widely described in the literature, because it is related not only to economics and finances (Fornero and Monticone, 2011; García and Vila, 2020), but also to sociology and social policy (Ząbkowicz, A. 2016; Gupta and Hershey, 2016).

However, it should be highlighted that there is practically no literature on links between saving for retirement by women and procrastination. One of limited examples of this topic is the work of Piotrowska (2019). The author stated that poverty of the retirees depended on their accumulated assets and the amount of their retirement benefit, which was influenced by both the pension system and individual financial decisions. If the pension system did not allow to maintain a certain standard of living – as in Poland – individuals should protect themselves through retirement savings.

Many authors have stated that regardless of gender, human decisions on saving are often associated with economic factors, such as the level of income (Leśna-Wierszołowicz, 2016; Lorenti *et al.*, 2019). Lorenti, Dudel and Myrskylä (2019) noted that very little was known about factors that determined people's working life and how it affected the economic environment; they found out that, from the age of 15, the average woman only worked 1/3 of her professional life period, spending the remainder at home with young children on maternity leave, or remaining voluntarily unemployed.

Not only do women earn less on average than men in similar roles, but family responsibilities mean that women work fewer years, which translates into lower

incomes, lower pension contributions, and consequently – low pension. Apart from earnings, the amount of the retirement pension is significantly influenced by part-time work and long periods of unemployment, as well as the level of women's education (Bonner, 2015).

The gender pay gap constitutes a problem in most countries as well. So, women earn less, and then they start saving too late, which means they are not able to raise sufficient funds. As already mentioned, women prioritize family expenses, and tend to postpone thoughts of retirement for 'better times' (Byrne *et al.*, 2006). Naturally, many factors may influence human behaviours related to planning and saving for retirement.

According to Hershey *et al.* (2007), four main sets of impact factors may be distinguished:

- (1) features of the decision (task) itself, i.e. the level of complexity, one's experience in implementation, and the availability of various saving options;
- (2) psychological factors, which include personality, cognitive and motivational factors;
- (3) cultural and demographic factors, including family and social norms that shape people's thinking, attitudes and perceptions; this group also includes gender and current age;
- (4) financial sources and economic forces related to the amount of household income, the general economic climate, as well as financial and economic support of the environment.

The aforementioned theories of avoiding uncertainty and hyperbolic advantage, and temporal motivation theory, are related to all four factors, i.e. both the complex task and the psychological characteristics of a person, as well as cultural patterns and financial income of people (Steel and Konig, 2006). Gupta and Hershey (2016), França and Hershey (2018), and Banerjee (2011) emphasized that indecision about saving for retirement may be determined by cultural and demographic factors.

Cultural factors include for example family and social norms that shape the way of thinking, while demographic ones include gender, or current age. Among important factors that determine saving for retirement, many authors have included financial knowledge related to saving options for retirement (Banerjee 2011; Hershey *et al.*, 2013), as well as the perception of the importance of this decision and its complexity (Hershey *et al.*, 2007).

Brown and Previtro (2014) also suggest that procrastinators behave differently from non-procrastinators regarding financial behaviour related to retirement planning. Planning and saving for retirement, therefore, requires appropriate knowledge of this subject-matter and a positive attitude to the decisions made (Lusardi and Mitchell, 2014; Steel *et al.*, 2018).

Laenen (2018) stated that women's behaviours were influenced by decisions of public institutions and related social policies. Thus, public institutions and stable social programs are the foundation of targeted development; their functioning will reduce the tendency to procrastinate financial decisions (Wiener and Doescher, 2008). At the same time, transparency and stability of rules of the pension system are needed, as well as a certain spectrum of tax incentives for long-term savings, as reported by Ząbkowicz (2016).

Due to the problems discussed above, many pension systems are undergoing reforms, as reported by, for example, Ząbkowicz (2016), and Meurs and Giddings (2021). All this proves that the issue of pensions and additional savings is a current and burning issue.

3. Features of Procrastination

Every person must, more or less independently, receive the incoming information, evaluate it and make decisions; however, postponing matters is typical of most people. Tendency to procrastinate, postpone, and delay actions to a later date – for irrational reasons – is referred to as ‘procrastination’ (Ferrari, 2010). According to E. Jaworska (2013), the problem of procrastination may affect people of all ages, both students and adults, and may concern various areas of life, e.g., education, finance, and health. Thus, the concept of procrastination should be understood as a voluntary delay in the implementation of intended actions until it is too late, despite one’s awareness that the situation will deteriorate due to the delay.

Procrastination is a common problem that appears when people face tasks perceived as unwanted or difficult, and is associated – according to Siros and Pychyl (2013) – with a number of negative consequences in various areas of life. Publications on this subject appeared as early as in the 1980s and 1990s and concerned mainly research on human personality traits and everyday tasks (Milgram, 1987).

These authors began to distinguish three aspects of general procrastination: decision-based, behavioural (actions) and non-adaptive (avoidance), which was developed by Ferrari (2010). Procrastination is understood here as a gap between intention and action (Pychyl 2013).

Moreover, it may be noticed that a procrastinators work against their self-interest. They realize that action should be taken, but do not do so in a timely manner or postpone action until the last moment. Tibbet and Ferrari (2019) stated that procrastination includes activities such as:

- 1) avoiding places where one needs to complete a task,
- 2) trivializing tasks,
- 3) blaming external factors,
- 4) giving priority to other tasks, or distracting oneself with other matters.

Indecision, and therefore delaying important life decisions, is often associated with focusing on the present. Some researchers even defined procrastination as neurotic indecision manifested by repeated procrastination in making important life decisions.

An individual is not sure, hesitates, wonders what to choose, considers the advantages and disadvantages of a given decision, and the consequences of taking it (Tibbet and Ferrari, 2019). Thus, one can notice here a link between above-mentioned factors related to procrastination and the theories of avoiding uncertainty, hyperbolic advantage, as well as the temporal motivation.

4. Pension System in Poland and its Maladies

Procrastination regarding women's decisions to save extra for retirement is particularly dangerous in the light of the struggle of the current pension system to provide retirees with financial resources, which does not allow for a dignified retired life. Such maladies are faced by the pension system in Poland.

Until 1999, as in other countries of Central and Eastern Europe, the pension system in Poland operated on a pay-as-you-go basis. It was based on the so-called 'generation agreement', which meant the pensions for retirees were financed by those of working age. The main advantage of the system was that it was immune to the turmoil in financial markets, but it had the disadvantage of being sensitive to demographic fluctuations.

The transformation in the socio-economic system in Poland after 1989 was characterized not only by economic changes, but also by social ones. There was a process of rapid ageing of the population, i.e. an increase in the percentage of elderly people accompanied by a decrease in the percentage of children. The population of Poland has been decreasing since 2000, and in 2018 the population growth rate per 1000 people was -0.7 (GUS 2019).

Therefore, in 1999, a decision was made to change the pension system to a system consisting of three pillars. The first pillar remained to be pay-as-you-go, while the second pillar was based on open pension funds (it was a capital pillar). Both the first and the second pillar were mandatory. Additionally, a third pillar was established, which initially consisted mainly of Employee Pension Schemes (EPS), and in the following years was supplemented with Individual Retirement Accounts (IRA) and Individual Retirement Security Accounts (IRSA), which were also mostly capital-based. Thus, the third pillar was capital-based and voluntary.

The pension system in Poland is quite complex (see: appendix), and subject to constant transformation, which strongly affects the lack of trust in the national pension policy. It mainly stems from the fact that the introduced changes are not preceded by an information campaign about the effects of these changes, and also

from the fact that some of the introduced reforms are inconsistent with the previously implemented policy. Poles expect further transformations.

5. Research Methodology

5.1 Statistical Data and Research Method

This article is based on the results of online surveys carried out among women in Poland in 2018-2019. The number of received surveys was 838, but after cleaning the data (i.e., after elimination of questionnaires with incomplete answers), 763 questionnaires were used for further analysis. The respondents were selected purposefully, so the tested sample does not correspond to the structure of the entire population, which should be taken into account.

The overview of the tested group is as follow:

- 1) The age structure: 42.9% of the respondents were aged 18-30; 33.9% were aged 31-45, and 23.2% were aged 46-60.
- 2) Place of residence: 80.4% lived in the urban environment, 19.6% in rural.
- 3) Household size: 1-person household – 15.1%; 2-person household – 33.7%; 3-person household – 26.1%; 4-person (and more) household – 25.1%.
- 4) Employment: 81.5% of the respondents were professionally active and the vast majority had an employment agreement based on civil law contracts, however 4.2% worked without any contract; additionally, 2.8% of respondents had their own businesses.

The survey questionnaire contained 14 questions about the circumstances that limit and encourage savings, regarding the perception of retirement, as well as the professional situation of the respondents and their income. To analyse the data, the market basket analysis method was used. During the analysis process, multiple question variables were transformed to obtain 72 dichotomous variables, which were then analysed in the Python software.

Our research is exploratory in nature, therefore we do not make any hypotheses, and hence we use the market basket analysis, which is one of the key techniques using to uncover associations between items. Exploratory research here means research carried out to identify the nature of the problem and to better situate it in existing knowledge, which is not finally established (in our article it is ‘procrastination and saving for retirement by women’).

Market basket analysis uses an ‘a priori’ algorithm, so this method is one of the methods of data mining and machine learning. It is also an unsupervised learning method, which means that it does not require any training and no predictions. Instead, it allows to detect hidden dependencies and previously unknown patterns in

large data sets. This feature makes that usually there are no hypotheses. However, the authors formulated the following research questions:

- Q1.** Do the surveyed women save extra for retirement?
- Q2.** Under what circumstances do women postpone the decision to save extra for retirement?
- Q3.** When do women decide to start saving extra for retirement?
- Q4.** What would women need to start saving extra for retirement?

Through such research, we want to discover phenomena that are not obvious. The nature of the study is also related to the choice of the new application of the method, which follows from two significant advantages: 1) the basket method allows - apart from revealing the strength of the relationship between factors - to analyse the frequency of occurrence of a given association in the analysed responses (which is not possible with correlation); 2) it allows for various strategies of searching for rules depending on the research questions posed (a priori approach). We show it precisely in the method description given below. To the best of the authors' knowledge, in this article they were the first to use basket analysis to analyse saving for retirement data.

5.2 Characteristics of the Market basket analysis method

In this technique, the whole data set creates a matrix of columns (with the names of categories) and rows (successive cases). If a given element is present, the cell is set to '1', and the remaining elements – if not present in the 'basket' – are set to '0' (Witten *et al.*, 2005). The use of this technique to analyse survey responses helps to get to know the respondents better and to identify reasons for their behaviours, which are often hidden.

During the data analysis, individual answers were broken down into prime factors using the association rule mining method – the answers of the respondents were the headings of the columns, and the rows corresponded to the individual cases. Association rule mining assumes that T is a collection of elements $T = \{I_1, I_2, \dots, I_m\}$ with predefined attributes.

Whereas D is the transaction base. Every transaction t represents a binary vector, where $t[k] = 1$, means that the attribute is present in a given transaction, while $t[k] = 0$, means that the given transaction does not contain the given attribute. It is also assumed that in the database there is one tuple for each transaction. The article assumes that if X is a set of certain elements in T , then transaction t satisfies X , if for all items I_k in X , $t[k] = 1$.

An important element of the basket analysis is the creation of association rules. The association rule is the implication in the form of $X \Rightarrow Y$, where X is the set of elements in T , and Y is a single element in the T set, which does not belong to X .

The X set is called the rule's predecessor (or body), and Y is called the rule's successor (or head).

X and Y elements in a rule may also be called antecedent (left-hand-side or LHS) and consequent (right-hand-side or RHS) (Hahsler *et al.*, 2005; Han *et al.*, 2000). In this article, the terms antecedent (X) and consequent (Y) shall be used, and the association rules take the following form: 'if antecedent, then consequent'. The record of an association rule may be represented as follows (Han and Kamber, 2000):

$$X \Rightarrow Y \quad (1)$$

where $X \subset T$, $Y \subset T$, $X \neq \emptyset$, $Y \neq \emptyset$, and $X \cap Y = \emptyset$

$X \Rightarrow Y$ rule has support s , where $0 \leq s \leq 1$ if s percentage of transactions in T supports $X \cup Y$. This is the probability of $P(X \cup Y)$ (Han and Kamber, 2000):

$$\text{Support}(X \Rightarrow Y) = P(X \cup Y) = \text{supp}(X \cup Y) \quad (2)$$

Support is interpreted as the probability of X and Y occurring simultaneously.

$X \Rightarrow Y$ has c (confidence), where $0 \leq c \leq 1$ if c percentage of transactions in T contains X, which also contains Y. This is so-called conditional probability $P(X|Y)$ (Han and Kamber, 2000):

$$\text{Confidence}(X \Rightarrow Y) = P(X|Y) = \frac{\text{supp}(X \cup Y)}{\text{supp}(X)} \quad (3)$$

Confidence (or reliability) is interpreted as the conditional probability of Y occurring, provided that X has occurred.

Association rules usually have some minimum level of support and confidence. The conjunction $X \wedge Y$ is called high or frequent if the support is greater than or equal to the specified minimum value of σ .

It may be written as follows: rule $X \Rightarrow Y$ is satisfied if $\text{supp}(X \cup Y) \geq \sigma$, where σ is the agreed minimum support level.

Association rules that satisfy the minimum support level and the minimum confidence level δ , i.e. $\text{conf}(X \Rightarrow Y) \geq \delta$, are called strong association rules. This usually happens when the association rule $X \Rightarrow Y$ has a relatively strong support ($X \wedge Y$ is numerous) and at the same time has a relatively high confidence value (Poncelet, Teisseire and Maseglia, 2008).

An additional measure that may be calculated when analysing association rules is lift which is calculated as follows:

$$\text{Lift}(X \Rightarrow Y) = \frac{P(X \cap Y)}{P(X)P(Y)} = \frac{\text{supp}(X \cup Y)}{\text{supp}(X)\text{supp}(Y)} \quad (4)$$

This measurement takes into account the antecedents and consequents, and helps assess how much the confidence in action Y occurrence has increased, given the fact that X has already occurred. If the lift value is 1, the probability of the occurrence of the antecedent and consequent is independent of each other, so the analysed activities may occur separately. Values greater than 1 mean that the antecedent and the consequent are interdependent, which means that if X occurs, Y will also appear. Values below 1 mean that the given elements are substitutable, so either X or Y will appear.

6. Study Results

The key consideration in this study was whether women saved extra for retirement (**Q1**). Based on the data obtained, it can be concluded that almost 68% of respondents (519 individuals) did not save extra for retirement. The results are presented in Table 1.

Based on the obtained data it may be concluded that decisions about no additional savings for retirement are linked to women’s age. For youngest women (up to 30 years old), the probability of not saving was over 82%, while among older women (31-45 years old), the probability was reduced to 55%.

Interestingly, women aged 46-60 displayed an increased likelihood not to save – 60% (**Q1**). This may be explained by the fact that a significant proportion of these women were nearly 60 years old, i.e., close to the retirement age, and it was obvious to them that additional saving was pointless.

Table 1. Association rules for age

Antecedents	Consequents	Support	Confidence	Lift
Age 18-30	Does not save extra	0.344692	0.821875	1.212941
Age 31-45	Does not save extra	0.193971	0.554307	0.818059
Age 46-60	Does not save extra	0.138925	0.602273	0.888847

Source: Authors’ own work, calculations in Python.

Following the ideas of Hershey *et al.* (2007), the study identified 4 groups of factors that could have influenced decisions on additional retirement saving, namely:

- a) psychological factors, including the perception of the task itself,
- b) financial factors,
- c) cultural factors; and
- d) demographic factors, which will be discussed later in the article.

6.1 Psychological Factors

Among the psychological factors (i.e., factors related to the interaction ‘person vs environment’), the following were distinguished, trust in the pension system, knowledge about pensions, and motivation to save. Dependencies were sought between the fact that women did not save (antecedent) and their trust, knowledge and motivation (consequents). Additionally, it was analysed how women perceived the task of saving for retirement.

Trust (in the pension system)

In the analysis of the first psychological factor the association rule was assessed, where the antecedent was the answer ‘I do not save extra for retirement’ and the consequent was ‘I am not convinced that it will make any difference’. The results of this rule are presented in Table 2. Support for the rule was 0.1560, which indicates that less than 16% of women who did not save were not convinced that saving made sense.

Confidence in this rule was relatively low (0.230174). This means that among women who did not save extra, the probability that it resulted from the lack of conviction about the effectiveness of saving was slightly over 23%. Lift was above 1, which means that in this rule, the antecedent and the consequent were dependent on each other.

What’s more, the reverse association, i.e. when the antecedent is lack of trust and the consequent is lack of saving (i.e. if there is no trust, an individual does not save), is very strong and amounts to 95%. This shows how important for some women is trust in the pension system (related to the belief that a given choice is correct) in the context of additional savings for retirement (**Q2**).

Table 2. *The association rule for trust in the retirement savings system*

Antecedents	Consequents	Support	Confidence	Lift
Does not save extra	Not convinced it would make any difference	0.155963	0.230174	1.404983

Source: Authors’ own work, calculations in Python.

Knowledge (of the additional retirement saving options)

For this association rule, insight was sought on the extent to which the lack of knowledge about additional savings for retirement affects the postponement of saving extra. In the survey, three questions touched upon this issue: ‘Are women interested in the pension reform?’, ‘Do they know what pension they will receive in the future?’ and ‘Do they have knowledge and know the options of increasing the amount of pension?’.

Characteristics of the association rules are presented in Table 3.

Table 3. Association rules for knowledge

Antecedents	Consequents	Support	Confidence	Lift
Does not save extra	No knowledge, no interest in reform	0.336828	0.497099	1.177908
Does not save extra	No knowledge, does not know what pension she will receive	0.475754	0.702128	1.127839
Does not save extra	No knowledge, does not know how to increase the pension amount	0.477064	0.704062	1.138134

Source: Authors' own work, calculations in Python.

Among the consequents the biggest support was noted for these two rules: 1) association of 'no saving extra' and 'no knowledge on how to increase pension' and 2) association of 'no saving extra' and 'no knowledge of the amount of the future pension' (**Q4**). These two association rules appeared in almost half of the analysed cases.

Moreover, in 1/3 of the cases, the answer of 'not saving extra' appeared simultaneously with the answer that the respondents were 'not interested in the pension reform'. The value of confidence was very similar and amounted to over 0.70. This means that the probability that a woman who did not save extra replied that she did not know the amount of her future pension or that she did not know how to increase the amount of her pension was 70% (**Q2**). In all of these three association rules antecedents and consequents were dependent on each other, which is confirmed by lift over 1.

In case of reverse association (where the answer 'does not save extra' was a consequent), it was confirmed that for this group, knowledge was a significant factor. Based on the data, it may be concluded that women perceived the task of additional saving as complicated, which might promote procrastination (**Q2, Q4**).

The next association rules were related to the assumption that in order to make a decision on saving, women needed information about the amount of their pension, extra saving options and needed information from the Social Insurance Institution (consequents), because without it, they perceived the saving task as unclear or complex (**Q2, Q4**).

Detailed data for this analysis is presented in Table 4, and the most relevant factor for lack of saving extra was the last factor in the table. Despite the fact that the support in this case was relatively low and amounted to 0.12499 (12.5%), and the confidence was 0.1992 (19.9%), lift was more than 1 – therefore both elements were interdependent (**Q2**).

Table 4. Association rules for the need of information

Antecedents	Consequents	Support	Confidence	Lift
Does not save extra	Needs information on the pension amount	0.288336	0.425532	0.949359
Does not save extra	Needs information on extra saving options	0.263434	0.388781	0.932831
Does not save extra	Needs information from NSII	0.264744	0.390716	0.961665
Does not save extra	No knowledge on extra saving options	0.134993	0.199226	1.407497

Source: Authors' own work, calculations in Python.

It may be concluded as well that the greatest probability of women not saving extra for retirement was related to the answer that 'it is too early to think about retirement' – support in this case amounted to 0.2739 (27.4%). This means that women perceived saving for retirement as something distant, unrelated to the present 'me', as well as something uncomfortable. This is related to the task perception.

Motivation (for saving extra for retirement)

Motivation is a state of readiness to take a specific action. Our study analysed this aspect a bit more broadly – the authors considered what motivated (and demotivated) women to save. Thus, the antecedent in the analysis was first 'saves extra', and the consequent was the answer 'the amount of the future pension is not satisfactory', because a low pension may be a motivating factor. The results of calculations are presented in Table 5.

Table 5. Association rules for motivation

Antecedents	Consequents	Support	Confidence	Lift
Saves extra	The calculated amount of the future pension is not satisfactory	0.138925	0.430894	1.309850
Does not save extra	The calculated amount of the future pension is satisfactory	0.001311	0.001934	0.295164

Source: Authors' own work, calculations in Python.

Based on the data in Table 5, it may be concluded that there was one identified relationship for the motivating factor: if women saved additionally, they believed that the estimated amount of the future retirement pension was unsatisfactory (**Q3**).

In that case, the rule had a support of 0.1389 (13.8%) and confidence of 0.4309 (43%). Importantly, the antecedent and the consequent were dependent on each other, since lift was over 1.

6.2 Financial Factors

Another analysed aspect that could influence women's decision not to save extra for retirement were financial factors, related to household income and expenses. First of all, women said that they did not save because daily expenses consumed all their resources (52.5%). Understandably, 82.7% of the respondents stated that in order to save extra for retirement, they would need higher earnings.

Earnings were most often related to age and seniority at work, therefore – in accordance with the described methodology – the association rules between age (antecedent) and lack of savings (consequent) were analysed. Several association rules were therefore analysed, where the lack of additional savings was linked to the following answers (consequents): 1) ‘one can only save when there are available funds’, 2) ‘one could save if earnings were higher’, 3) ‘one cannot save because all resources are spent on daily expenses’ (Table 6).

Table 6. Association rules for financial factors

Antecedents	Consequents	Support	Confidence	Lift
Does not save extra	One can save when there are available funds	0.374836	0.553191	1.192331
Does not save extra	One could save when the earnings were higher	0.587156	0.866538	1.036314
Does not save extra	One cannot save because all resources are spent on daily expenses	0.380079	0.560928	1.426628

Source: Authors' own work, calculations in Python.

The most common answer of the respondents was that ‘one can save when the earnings are higher’. Such responses were given in 58% of cases (confidence 87%). So, it may be stated that the most important factor determining saving was the level of earnings, while the main problem was that all resources were spent on daily expenses (Q2, Q3, Q4). The reverse association was also checked, where different levels of women's earnings were antecedents, and the consequent was the answer ‘I do not save extra’. The results show that low-income women do not save, which is quite obvious and in agreement with the earlier results of authors such as Byrne *et al.* (2006), and García and Vila (2020).

6.3 Cultural Factors

Cultural factors included family and social norms, that shape people's thinking. In this study, these norms include the way of thinking about the family. Therefore, assessment of association rules was carried out, where the antecedent was the declared lack of saving, and the consequents were, respectively: 1) ‘to save, one needs support from children’, 2) ‘to save, one needs support from a spouse’, 3) ‘to

save, children must be self-sufficient'. The results of the analysis are presented in Table 7.

Table 7. Association rules for cultural factors

Antecedents	Consequents	Support	Confidence	Lift
Does not save extra	Need for support from children	0.028834	0.042553	1.082270
Does not save extra	Need for support from spouse	0.043250	0.063830	0.918908
Does not save extra	I will start saving once the children are self-sufficient	0.090433	0.133462	1.119030

Source: Authors' own work, calculations in Python.

Based on the data in Table 7, it may be concluded that there is a certain weak link between lack of extra saving for retirement and needs such as supporting one's children. It is surprising, however, that the share of these occurrences in the total of analysed associations is relatively small.

This means that women do not count on financial support from their partners or children. The highest support and lift (9% and 1.11, respectively) were found in the association 'does not save extra' and 'I will start saving when the children are self-sufficient', which means that financial resources were first allocated to raising children and only then could they be used as retirement savings (**Q2**, **Q3**).

6.4 Demographic Factors

The main demographic factors are: race, age and gender, as well as family size (number of children). In our study, the respondents were only white women, so the aspect of race and gender was omitted in the analysis; however, the age of the women (Table 1) and family size (Table 8) were analysed. Based on the data in Table 1, it may be concluded that women who declared no additional savings for retirement belonged mostly to the youngest age group (18-30).

Table 8. Association rules for family size

Antecedents	Consequents	Support	Confidence	Lift
1- person family	Does not save extra	0.111402	0.739130	1.090825
2- person family	Does not save extra	0.238532	0.705426	1.041084
3- person family	Does not save extra	0.273919	0.958716	1.414894
4- person family	Does not save extra	0.167759	0.656410	0.968745

Source: Authors' own work, calculations in Python.

The share of these cases was 34% and there was a visible relationship between age and the declaration of no extra savings. In other cases, no such relationship could be found because lift was less than 1 (**Q2**, **Q3**). It may be concluded as well, that

women living alone (antecedent: 1-person family) did not save with 73% confidence. It turned out, therefore, that the size of the family was an important factor determining the propensity to save.

7. Discussion and Conclusions

As shown in this article, the retirement period is heavily feminized, therefore it is mainly women who should think about saving for retirement. Polish women, with an average life expectancy of over 81 years, will receive their retirement pension for almost 7 years longer than Polish men (Worldometer, 2021). A similar situation is also in other developed countries, hence, women in particular should be interested in the level of future benefits and make appropriate decisions to ensure better financial situation as retirees.

The conducted study shows that most of the women who participated in the survey were aware of the fact that they were facing low pensions: more than half of them were interested in the pension system reform and related changes.

However, only every third woman claimed to know the amount of her future pension and reported saving extra, so therefore – according to our study – 68% of women did not save extra for retirement (Q1). Especially women living in single-person households, aged 18-30, were not willing to save money. This approach was influenced by their relatively low earnings, which was already seen in previous studies, therefore we do not go deeper into it.

Postponing saving decision may stem from the perception of the task itself, as well as internal motivation, self-perception, and social norms which encourage commonly accepted decisions. In this study, these determinants were also seen as important for the decision to save for retirement (Q2).

If women do start saving, it is often only once their children have become self-sufficient. The information about the amount of the future retirement pension also influences the decision to start saving – apparently, a low retirement pension is an incentive to save (Q3). This is consistent with the observations of other works mentioned in this article.

When asked about what they would need to start saving extra, women mostly pointed to higher earnings (Q4). It is obvious in the case of young women with little earnings, so this situation cannot be called procrastination (it is independent of women). Additionally, women also stressed the need for information on pensions and investment opportunities for the future.

Our results confirm the conclusions of other studies, e.g., Baker *et al.* (2019). What is surprising is the fact that even though women earn more, they are still not saving, either because they are helping their adult children (or grandchildren) all the time,

or they are convinced that it is too late. This is due to the social patterns of behaviour and the parent-child model. Thus, it is necessary to educate women economically and change the way they make their decisions.

The answers to the research questions were linked to procrastination, which means irrational postponing of an action and at the same time trivializing it, blaming external factors, or giving priority to other actions (Tibbet and Ferrari, 2019). Given the above, it may be assumed that procrastination will take place if women do not save due to the following reasons:

- 1) they do not trust the national pension system,
- 2) they do not have sufficient information from public institutions regarding additional savings for retirement,
- 3) they do not know the forecast amount of their pension,
- 4) they do not have sufficient knowledge of pensions and the option of increasing its amount
- 5) they are waiting for children to become self-sufficient,
- 6) they see themselves as still having plenty of time / too young to start thinking about retirement.

The above points are linked to blaming the lack of saving on external factors, giving priority to other tasks, as well as disregarding the issue of additional saving for retirement, therefore they may be called 'procrastination'. Irrational procrastination applies also to those women who do not save extra because, for example, they focus too much on the present and on meeting their current needs, so they believe that they do not need to think about retirement yet.

So women do not save because: they earn too little, live in single-person families, have no knowledge, trivialize the task of saving, or perceive themselves as "far from retirement". Not all of these factors can, of course, be called procrastination, that we wish to emphasize once again.

However, several aspects of procrastination are noticeable: decision-based (delaying the choice), behavioural (other tasks are more important and given priority) and non-adaptive (women, lacking knowledge on options to increase their pension, are afraid of failure and do nothing about it). Admittedly, according to Siros and Pychyl (2013), procrastination is a fairly common phenomenon, but as it brings negative social consequences in the area of pensions, it must also be viewed from the perspective of the national education policy about pensions.

The pension policy, implemented by the pension system, is part of the social policy aimed at, inter alia, ensuring social security, meeting the needs of a broader spectrum of citizens, and ensuring social order. Hence, it is understandable that frequent modifications in the pension system result in low confidence in the entire

pension system and make it difficult to understand its rules. As a result, this does not encourage saving, which has been proven by our results.

It should be realized that ineffective pension systems which are not reformed, will eventually prove to be insufficient and collapse under the weight of the ageing society (The 2021 Pension Adequacy Report).

Thus, pension system reforms are needed, but the example of Poland shows that they may be unclear and inconsistent, and thus discourage citizens from participating in voluntary forms of saving. Without solid knowledge, women tend to be impulsive (spend money 'now'), misjudge the future, avoid uncertainty (they don't trust the pension system) and do not make rational decisions. This conclusion is entirely supported by the results of our study.

Currently pension systems in the world are under more pressure than ever before due to increased life expectancy, higher public debt in many countries, and uncertain economic conditions. Additionally, there are inequalities in earnings and pensions of men and women, as well as an unfavourable pension replacement rate. The general economic conditions for the functioning of pension systems, however, must be understandable enough for their participants so that they can avoid procrastination and consciously prepare for their retirement.

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