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Can We Effectively Allocate Time for Work and Life and Be Happy? The Empirical Evidence from Self-Employed Persons in Lithuania

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Abstract. There is not enough attention paid to the analysis of time allocation in the context of happiness. Perhaps it is because happiness economics is an expanding interdisciplinary field. So, recommendations for self-employed persons in Lithuania how daily time should be effectively allocated for life (sleep, personal care, study, housework, family care, leisure, travel and other activities) and work in order to be happy still remain an open question. In this paper the specific recommendations about it are provided for that case. So, this paper analyses two phenomena, i.e. time allocation and happiness. The main attention is given to self-employed persons in Lithuania during 2019 years. Data collection (time diary, survey, interview) and optimization methods are used to identify how daily time should be effectively allocated for two main areas (work and life) in order for self-employed persons to be happy. Having mathematical modeling of time allocation and happiness accomplished, it has been found that 36.1% of day time should be allocated for work and the rest time of the day (63.9%) should be allocated for life. The person's levels of job satisfaction, life satisfaction and happiness should be equal to 9 points (on a ten-point scale). In this case, monthly net income would be 1001 euros and desirable monthly net income 1101 euros. The number of children should be two. The scientific and practical uniqueness of this article lies in the creation of a mathematical model that can determine how to effectively allocate work time and life time in order for a person to be happy. Although the mathematical model constructed in this paper is based on Lithuanian data, it is not country specific.
Keywords: time allocation, happiness, self-employed persons; work–life balance.

Introduction

Scientists, such as Prodromídis (2014), Lyonette (2015), Borah, Bagla (2016), Kristensen, Pedersen (2017), Vallasek (2021), Mladenović, Krstić (2021), Sriram et al. (2022), Owens-Horton (2022), Aksoy et al. (2023) examine the time allocation from a particular aspect but do not provide, usually, recommendations for time allocation. Moreover, there is not enough attention paid to the analysis of time allocation in the context of happiness.

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Perhaps it is because happiness economics is an expanding interdisciplinary field, which began to emerge at the turn of the 20th and 21st centuries (Navaitis, Gaidys, 2016). So, recommendations for self-employed persons in Lithuania how daily time should be effectively allocated for life (leisure, sleep, personal care, study, housework, family care, travel and other activities) and work in order to be happy still remain an open question. In this paper the specific recommendations about it are provided for that case.

The aim of this empirical research is, having analysed theoretical view of the time allocation for work and life and also of happiness economics, to provide the content of the day time allocation for life and work in order for self-employed persons to be happy.

Theoretical aspects of the research are analyzed employing the comparative analysis and the method of generalization. Statistical data and correlation analyses are conducted while carrying out a mixed empirical study and modelling the day time allocation of the self-employed persons for work and life, assessing the happiness economics. Data collection (questionnaire, time diary and interview) and optimization methods (target optimization, priority, Simplex, fuzzy programming methods) are used. Microsoft Excel and SPSS Statistics program are employed for empirical data analysis, and Solver tool is used to resolve the optimization task.

The remainder of this article is organized as follows. Firstly, the review of literature on time allocation, happiness and links between them is provided. Secondly, the methodology of the research is introduced. Thirdly, the main results about the day time allocation for work and life and happiness are analyzed. Finally, the main conclusions are presented.

1. Literature Review

1.1. Time allocation for two dimensions: life and work

Analyzing time allocation, the main attention is paid to the self-employed persons. These people are important because they have the ability to independently control their time allocation. Self-employed persons are understood as employed individuals aged 15 and older, whether employed or not, not paid but receiving income or share of profits and meeting at least one of the following parameter: having their own business, farmers, working under a business license (LR Statistikos departamentas, 2017).

The work–leisure (work–life) model characterizes the behavior of the participants of labor supply, where individuals' time can be divided into these areas: work and leisure (Bodie et al., 1992). In literature, the time for work usually is described as time spent on paid work (Kool, Botvinick, 2014; Aguiar, Hurst, 2007). This definition of working time is used in this study as well.

Leisure time is often characterized as other time left from work, i.e. unpaid work time (Douglas, Morris, 2006; Aguiar, Hurst, 2007). In this point of view, the concept of leisure is described in a broad sense. In a narrow sense, the concept of leisure can be defined as the set of these elements: social activity, entertainment, active leisure and relaxation (Aguiar, Hurst, 2007). In this study, the characteristic of leisure is used in a broad sense.

In this research, day time is divided into two categories: time spent for work, time spent for life. These time categories are applied by Douglas, Morris (2006), Baral, Bhargava (2010), Anttila et al. (2015), Irawanto et al. (2021), Jain, Mohanan (2020) and other scientists. So, leisure in the broad sense is described as time spent on all activities except for the time that is allocated to paid work.

So, the work–life balance is the combination of work and private life, finding an optimal solution in balance between work and private life, taking into account personal preferences, priorities, goals, requirements formed by external factors.

Scientists (Beauregard, Henry, 2009; Benito-Osorio et al., 2014; Borah, Bagla, 2016; Richert-Kaźmierska, Stankiewicz, 2016; Kristensen, Pedersen, 2017) examine time allocation, balance between work and life, while identifying the negative consequences of inefficient time management, happiness, productivity, health, etc.

1.2. The economic phenomenon of happiness

The happiness economics has developed gradually. On the other hand, there is still a lack of analysis of happiness from the position of economics. Although interest in happiness economics is obvious in the 21st century (Kasman, Kasman, 2023).

Happiness usually is discribed as the satisfaction of whole life. According to Kumari, Selvi (2016), happiness may be divided into these categories: job satisfaction and life satisfaction. Job satisfaction describes an employed person's feelings at work and when performing work-related activities (satisfaction or dissatisfaction with a paid work; Ranaweera, Li, 2018; Crespi-Vallbona, Mascarilla-Miró, 2018; Amin et al., 2021; Fettouh, 2022; Aziz et al., 2021; Alzougool, Awawdeh, 2022 and others). And life satisfaction is defined as an employee's emotional reaction to his/her own life (Makabe et al., 2015).

According to the bottom-up theory, the satisfaction of individual areas of life determines the overall life satisfaction, i.e. happiness (Easterlin 2006; Lee et al., 2018). This theory may be linked to time allocation for work and private life: a person having optimally reconciled work and life maximizes the benefits from time allocation and minimizes potential losses. It is assumed that in such a case the person would be satisfied with work and life, thus, he/she would be happy.

Thus, after analyzing the scientific literature, the main theoretical concepts, which are important in the context of the analyzed topic, are defined, analyzed and interpreted.

2. Research Methodology

2.1. Methodological assumptions

The aim of the empirical research is to model time allocation of employed persons in Lithuania for work and life, assessing the happiness economics. The main reasons for choosing the Lithuanian case are: the lack of time allocation statistics in Lithuania (Harmonized European Time Use Survey; hereinafter – the latest data from the HETUS survey in 2003); lack of research on Lithuanian topics in the context of time allocation

and happiness; easier access to primary data from survey, time diary and interview; better knowledge of the legal basis, social and cultural environment in the case of Lithuania. The empirical evidence of Lithuania is chosen as an example and could be used correctly for another country provided that relevant methodological conditions are applied. The context of European countries is used when performing comparative analysis.

The empirical research is conducted according to the following main methodological assumptions.

1. The target group is self-employed persons.
2. The time of day of self-employed person may be divided into nine time allocation areas: sleep, work, study, housework, family care, leisure (in narrow sense), personal care, travel, other activities. Other variables of time allocation areas do not change and do not affect the allocation of time of day of the employed population (ceteris paribus).
3. The self-employed person devotes time to only one activity at a time.
4. The ordinary time allocation behavior of the self-employed person is fully reflected in the time allocation data provided in the two-calendar-day (a working day and a day off) time diary.
5. There exist these links between time allocation and happiness: the optimal time allocation for work and life achieves a work–life balance, the employed person feels satisfied with work and life, i.e. the person is happy.
6. A self-employed person is satisfied with work, satisfied with life and is happy when job satisfaction level, life satisfaction level, happiness level are not less than 9 points but not more than 10 points (on a ten-point scale).
7. The data collected through the survey, interview and the time diary are interpreted as average data of allocation of the time of day in 2019.
8. The factual empirical research structure: survey, time diary. These data were collected in Lithuania from September 2nd to November 30th, 2019. 1073 surveys and diaries were recognized as suitable. The survey and time diary data were harmonized according to these criteria: type of economic activity, place of residence, gender, age, type of person (individuals who prioritize their personal lives; individuals seeking to balance work and life; workaholics). The results of the survey reflect the population of self-employed persons in Lithuania with a 97 percent probability.
9. Six experts from the relevant category (linked to the relevant time allocation area) properly and fully reflect the beliefs and assessments of the category of persons examined in 2019. Experts from 8 categories – medical, economics and business, healthy lifestyle, education and science, social area, cultural area, transport, politics and law – were examined by means of interview. 48 experts were interviewed, taking in mind their area of expertise and length of service.
10. Priorities, nature of goals, and recommendations for time allocation areas for targeted optimization are determined according to the results of a questionnaire survey, time diary, and interviews.

2.2. Sample and detailed information about it

So, the data are collected through the survey, interview and the time diary. The survey consisted of seven structural parts: control questions for the respondent (determination of the respondent's self-employed area, economic activities); respondent's needs (identification of the respondent's prioritization of time allocation areas by importance); satisfaction with work, life and happiness (determination of respondent's satisfaction level with work, life and happiness and analysis of related aspects); respondent's knowledge about the happiness economy, concepts of time allocation and key aspects (analysis of theoretical and factual concepts); wage (determination of respondent's existing financial resources); substitution/income effects (analysis of respondent's substitution effect); demographic, general questions (respondent's knowledge in demographic aspect). The questions about wage were relevant for identifying the links between happiness and wage. In the survey, this variable was divided into 23 interval choice options. It should be noted that due to the limited scope of the article, not all aspects that were identified and not all collected empirical data are reviewed in this article. Along with the survey, respondents were also presented with a time diary, the methodological aspects of which are more detailed in methodological assumptions 2–4. Although the aim was to make the questionnaire and time diary simple, without including redundant information questions, the logic of the HETUS study (in the case of the time diary) was maintained. Therefore, the structure of the survey was prepared with arguments, based on previous studies, theoretical analysis of scientific literature, the need for data necessary for the implementation of the study, social experience and the author's ideas related to the analyzed topic.

The interview questionnaire consisted of six structural parts: expert position – expert field; type of expert (identifying the informant type in terms of time allocation: a person who prioritizes personal life; a person seeking to balance work and life; a person who prioritizes work (workaholic)); time allocation (identification of the dominance of the main area of time allocation, weights of time allocation areas, nature of goals, most suitable time allocation during working days and weekends and related aspects); satisfaction with work, life and happiness aspects (identification of the informant's satisfaction level with work, life and happiness and analysis of related aspects); connections between time allocation and happiness; demographic, general questions (respondent's knowledge in demographic aspect). More detailed information about the experts who participated in the interview is provided in methodological assumption 9. It should be emphasized that interview informants were sought using public sources of information on the internet and social networks. Key criteria for selecting experts: 1) expert field; 2) work experience in the expert field (not less than five years).

Empirical research structure: survey. Respondents most often engaged in activities using an individual activity (38.1%) or a business license (37.1%). In the study sample, respondents most often had two children (38.0%). Respondents' work experience ranged from 0 years (0.7%) to 45 years (0.7%), but most commonly was 30 years (9.3%).

The factual structure of the empirical study: interviews. It was conducted from September 4th to November 27th, 2019. The average duration was 00:33 hours. 48 interviews were deemed suitable for analysis. The majority of experts were interviewed via telephone (79.2%). The most common length of professional experience among the experts was 5 years (14.6%), then 20 years (12.5%), and 30 years (10.4%). The majority of experts were interviewed from the Vilnius region (79.2%). In terms of gender, the experts were evenly distributed: 52.1% female and 47.9% male. The majority of participants in the interviews were individuals seeking to balance work and life (77.1%).

2.3. Methods

The following methods are used for research: scientific literature analysis; comparative analysis – for literature review; survey, time diary, interview – for data collection; targeted optimization – for mathematical model; statistical data analysis, comparative analysis correlation analysis – for empirical research. Expression for the objective function of the target optimization problem (Charnes, Cooper, 1961; see Formula 1) is:

$$\min Z = \sum_{i=1}^{p}(d_i^+ + d_i^-), \tag{1}$$

where *Z* is a function of minimization of deviation from relevant objectives,
d_i^- is a deviation, which measures how much is missing to the goal, $d_i^- \geq 0\ (i = \overline{1,p})$,
d_i^+ is a deviation, which measures how much the goal is exceeded, $d_i^+ \geq 0\ (i = \overline{1,p})$.

The priorities and fuzzy programming methods are applied as well. The fuzzy programming method with a triangular membership function is used when analyzing time allocation areas. According to interviews data, when a person seeks to balance work and life, and feel happy, the following values of time allocation for relevant time allocation spheres are known: minimum (lower) (a), maximum (upper) (c), and the most likely (b). According to Ounaies et al. (2008), a triangular fuzzy membership function is used (μ; see Formula 2):

$$\mu(x) = \begin{cases} 0,\ x \leq a, \\ \frac{x-a}{b-a}, a \leq x \leq b, \\ \frac{c-x}{c-b}, b \leq x \leq c, \\ 0, x \geq c. \end{cases} \tag{2}$$

It is more convenient to use the expression of the triangular fuzzy membership function to solve the optimization problem (see Formula 3).

$$\mu(x) = \max\left(\min\left(\frac{x-a}{b-a}, \frac{c-x}{c-b}\right), 0\right). \tag{3}$$

2.4. Mathematical model

The following *variables* (expressed as allocated time per day, in minutes) are used, indicating allocated time:

x_1 – for sleep;
x_2 – for personal care;
x_3 – for work;
x_4 –for study;
x_5 – for housework;
x_6 – family care;
x_7 – for leisure (in the narrow sense);
x_8 – for travel;
x_9 – other activities.

Other variables:
x_{10} – level of happiness (in points);
x_{11} – level of satisfaction with job (paid) and work-related activities (in points);
x_{12} – level of life satisfaction (in points);
x_{13} – currently received monthly net income (MNI; in euros);
x_{14} – desirable monthly net income (DMNI; in euros);
x_{15} – number of children in the family;
μ_i – membership function of the *"i"* time allocation area;
a_i – a minimum time allocation recommendation, specified by the experts, for the *"i"* time allocation area, where a person balances work and life, and feels happy;
b_i– the most appropriate time allocation recommendation, specified by the experts, for the *"i"* time allocation area, where a person balances work and life, and feels happy;
c_i – a maximum time allocation recommendation, specified by the experts, for the *"i"* time allocation area, where a person balances work and life, and feels happy.

The following objectives (sorted from the most important to the least important) are identified:

The first objective is to maximize job satisfaction level and life satisfaction level.The second objective is to minimize time allocated for work. The third objective is to maximize time allocated for family care. To maximize time allocated for sleep. The fourth objective is to maximize time allocated for leisure (in the narrow sense).The fifth objective is to maximize time allocated for study. The membership functions describing the objectives (for time allocation areas of sleep, work, study, family care, leisure (in the narrow sense)) are drawn up. The expression of mathematical model is provided.

The first priority:

$$\max x_{11}, \tag{4}$$

$$\max x_{12}, \tag{5}$$

The second priority:

$$\min x_3, \tag{6}$$

$$\mu_3(x_3) = \max\left(\min\left(\frac{x_3 - 280}{63}, \frac{520 - x_3}{177}\right), 0\right). \tag{7}$$

The third priority:

$$\min x_6, \tag{8}$$

$$\mu_6(x_6) = \max\left(\min\left(\frac{x_6 - 60}{106}, \frac{570 - x_6}{404}\right), 0\right), \tag{9}$$

$$\max x_1, \tag{10}$$

$$\mu_1(x_1) = \max\left(\min\left(\frac{x_1 - 390}{69}, \frac{540 - x_1}{81}\right), 0\right). \tag{11}$$

The fourth priority:

$$\max x_7, \tag{12}$$

$$\mu_7(x_7) = \max\left(\min\left(\frac{x_7 - 47}{25}, \frac{175 - x_7}{103}\right), 0\right). \tag{13}$$

The fifth priority:

$$\max x_4, \tag{14}$$

$$\mu_4(x_4) = \max\left(\min\left(\frac{x_4 - 50}{20}, \frac{160 - x_4}{90}\right), 0\right). \tag{15}$$

The model includes *constraints* of six groups (the order is presented randomly). First, the constraints indicating possible fluctuation range of the relevant variable:

$$\alpha_i \leq x_i \leq \beta_i, i = 2; 5; 8; 9; 10; 11; 12; 13; 14. \tag{16}$$

where α_i is the lower value of the relevant criteria, over which an employed person would balance work and life, and feel happy, β_i is the upper value of the relevant criteria, under which an employed person would balance work and private life, and feel happy.

Second, a constraint of the level of happiness:

$$x_{10} = \frac{x_{11} + x_{12}}{2}. \tag{17}$$

Third, constraints of MNI and number of children in the family:

$$x_{11} = 10 - \frac{(x_{14} - x_{13})}{100}, \tag{18}$$

$$x_{15} \leq 4 \tag{19}$$

$$30x_{15} \leq x_6 \leq 570, \tag{20}$$

$$\frac{x_{13}}{x_{15}} \geq 169. \quad (21)$$

Fourth, a constraint of working time:

$$x_3 \leq 720. \quad (22)$$

Fifth, constraints of interferences of the traditional work–rest cycle, and time allocated for work and life:

$$x_2 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 \geq 480, \quad (23)$$

$$x_1 + x_2 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 \geq x_3. \quad (24)$$

Sixth, constraints of negative values and time of day:

$$x_j \geq 0,\ j = \overline{1,9}, \quad (25)$$

$$x \in \mathbb{Z}, j = 15, \quad (26)$$

$$\sum_{i=1}^{n} x_j = 1440,\ j = \overline{1,9}. \quad (27)$$

The mathematical model has been developed in order to provide recommendations on how self-employed persons in Lithuania should adjust their time allocation to optimally allocate time and feel being a happy self-employed person.

3. Main Results of the Research and Discussion

For the self-employed, the most important areas of time allocation are work (34.9%), family care (27.1%), and sleep (19.8%), see Table 1.

Table 1. Ranking of time allocation areas of self-employed persons in Lithuania according to importance

Priority	Rank	Self-employed persons
Work	1	34.9%
Family care	1	27.1%
Sleep	1	19.8%
Personal care	4	20.4%
Housework	5	19.2%
Leisure (in narrow sense)	6	23.3%
Travel	7	48.1%
Study	8	74.4%
Other activities	9	99.5%

Note: 1 is the most important area of time allocation; 9 is the least important area of time allocation. Percentages are presented for each time allocation area separately (indicating the most frequently chosen answer option), so the total exceeds 100%.

Source: compiled by the author based on survey data.

Nevertheless, the most important is work. However, the experts indicated that the work–life balance is essential. According to them, the work–life balance is a situation that is achieved when a person feels harmony between two main areas of life – work and life. In terms of time, the work–life balance is based on a harmonious and proportionate synergy of three components: eight hours for sleep, eight hours for work, eight hours for life. Moreover, the need for the work–life balance is also identified by other scientists such as Richert-Kaźmierska, Stankiewicz (2016), Shouman et al. (2022) and others.

In the definition of happiness by experts, a comprehensive life satisfaction, which is achieved under the balance of work and life, frequently becomes the central axis. It was found that the majority of experts (43.8%) and self-employed persons in Lithuania (29.9%) were happy indicating the value of 9 points (respectively 30.4%; 31.0%) and were satisfied with work and personal life. Men are relatively more satisfied with their work than women. On the other hand, women are more satisfied with their life than men. The results of the happiness economics mostly concur with previous studies.

According to the data of UNECE (2020), it has been found that 12 European countries may be divided into three groups. First, countries where dominates European culture, in terms of time allocation (predominates time allocated for life): Belgium, Norway, Finland, and Estonia. Second, countries where a work–life balance potentially exists: Sweden, Italy, Spain, and Poland. Third, countries where the US culture prevails, in terms of time allocation (workaholism): Latvia, Lithuania, Bulgaria, and France.

Evaluating the content of time allocation and interferences with the happiness economics it was found out that, in 2019 in Lithuania, self-employed persons allocated on average 77.5% time of day for life, and 22.5% for work (see Figure 1).

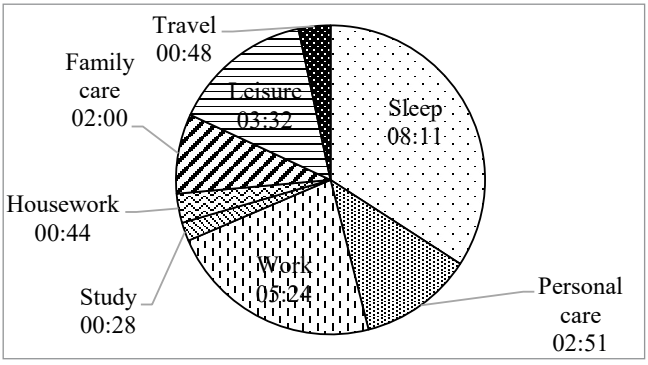

Fig. 1. The structure of time allocation of day of self-employed persons in Lithuania in 2019

Source: compiled by the author based on time diary data.

Notes: "leisure" is used in the narrow sense. No time is allocated for other activities. Tolerance of 00:02 hours is allowed due to rounding.

However, the time allotted for work (05:24 hours) is in line with the experts' recommendations [04:40 to 08:40 hours]. An interesting fact is that women allocate more time

of day for work, and men for life (women's time for work is 05:27 hours, for life 18:30 hours; men's time for work is 05:21 hours, for life 18:35 hours; tolerance of 00:04 hours is allowed due to rounding).

Sleep is the most important area of time allocation in life (in terms of time allocated). This is especially noticeable between the ages of 15 and 24: the average time of day allocated for sleep differs between those aged 15 to 24 years and older self-employed persons ($p < 0.05$). Thus, self-employed persons in Lithuania allocate on average 08:11 hours per day for sleep and this meets experts' recommendations [06:30 to 09:00 hours]. However, men sleep longer (08:14 hours) than women (08:06 hours).

An average of 02:51 hours per day is allocated for personal care. According to experts, it is enough time to this area of time allocation (recommendation is [01:15 to 03:15] hours).

An average of 00:28 hours per day is allocated for study. According to experts, this duration of time is too short (recommendation is [00:50 to 02:40] hours). Although there are no differences of time allocation between men and women in terms of time allocated for study.

An average of 00:44 hours per day is allocated for housework. According to experts, the time allocated to this area of time allocation falls within the recommended range of [00:30 to 03:10] hours. Although there are minimal differences between the genders (men: 00:43 hours, and women: 00:45 hours).

Self-employed persons potentially underestimate the importance of time spent for family care (02:00 hours). However, time allocated for caring for the family meets the recommendation presented by the experts [01:00 to 09:30 hours]. It is logical that women spend relatively more time on family care (02:12 hours) than men (01:52 hours).

Self-employed persons allocate too much time for leisure (in the narrow sense; 03:32 hours). The time allocated for this area of time allocation exceeds the limits recommended by the experts [00:47 to 02:55 hours]. Men spend more time on this area of time allocation (03:36 hours) than women (03:24 hours).

Self-employed people allocate enough time for travel (00:44 hours) compared to expert recommendations [00:18 to 00:52 hours]. Relatively more time for travel is spent by men (00:50 hours) than by women (00:45 hours).

Self-employed persons do not allocate time for other activities. This situation contradicts to the recommendations [00:05–01:25 hours] provided by experts.

While examining the links of time allocation areas with happiness, it has been found that there are statistically significant connections, with 95% probability, between the level of happiness and the average time of day spent for sleep ($p<0.05$), family care ($p<0.05$), and for leisure (in the narrow sense; $p<0.05$). However, negative correlations have been found between happiness and the average time per day spent on sleeping (Pearson correlation coefficient $\rho = -0.098$), and leisure (in the narrow sense; Pearson correlation coefficient $\rho = -0.073$). A positive relationship has been identified between the level of happiness and the average time per day spent on family care (Pearson correlation coefficient $\rho = 0.222$).

After solving the concluded task of targeted programming, it was determined that self-employed persons in Lithuania, in order to feel happy, should allocate 63.9% of day time for life and 36.1% for work (see Figure 2).

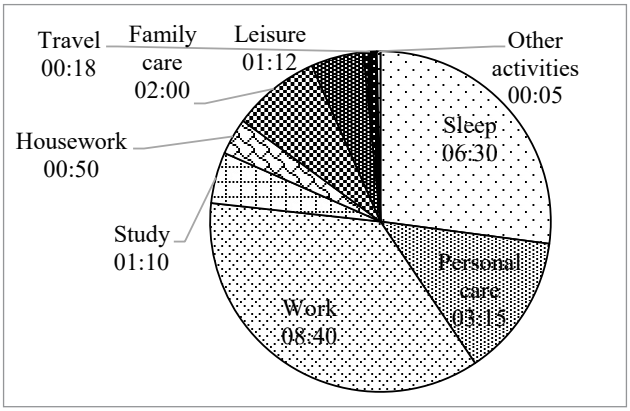

Fig. 2. Optimal day time allocation of self-employed persons in Lithuania, when the person feels happy

Source: compiled by the author.

Notes: "leisure" is used in the narrow sense.

A self-employed person would be happy (happiness level, job satisfaction level and life satisfaction level are equal to 9 points each). The MNI of this person would be 1,001 euros and the DMNI 1,011 euros. The number of children should be two.

The following recommendations are provided when comparing the factual and optimal time allocation of self-employed persons (recommended changes are indicated in the brackets). The following times should be reduced: the time of day allocated for sleep (01:41 hours), leisure (in the narrow sense; 02:20 hours), travel (00:30 hours), life (03:14 hours). The following times should be increased: the time of day allocated for personal care (00:24 hours), work (03:16 hours), study (00:42 hours), housework (00:06 hours), other activities (00:05 hours). The time allocated for family care should not be changed.

The following recommendations are provided when comparing other factual and optimal criteria of self-employed persons (recommended changes are indicated in the brackets). The happiness level, job satisfaction level and life satisfaction level should not be changed. MNI ([101–300] euros) and number of children (0 to 2) should be increased accordingly (or unchanged, in the case of the number of children). DMNI ([0–199] in euros) should be reduced, accordingly. It was determined that the results of the mathematical model usually concur with similar types of scientific studies.

The optimal time allocation by separate time allocation areas in twelve European countries is mixed in terms of similarity. On the other hand, when assessing the areas of time allocation of work and life, the majority of similarities are identified with Latvia. Possibly such a situation exists due to a similar geographical location, economic development, standard of living, and mentality of population, etc.

The World Happiness Report concluded by Helliwell et al. (2022) in 2019–2021 states that Finland is the happiest country. A comparison of the content of time allocation in this country with the optimal time allocation of self-employed persons in Lithuania, when a

person feels happy, it was revealed that in Finland dominates time spent on private life, and in Lithuania time spent on work.

To summarize, it can be stated that the results of the research do not contradict the logic of economic, mathematical, social nature.

It is emphasized that although this scientific article discusses the results of the 2019 study on self-employed persons, the main added value of this study is the creation of a mathematical tool that can be used to determine the latest time management recommendations for work and life in order to be happy. And this mathematical model can be applied not only to Lithuania but also to any other country, taking into account the relevant legal regulations.

Conclusions

From the literature review it was found out that the time of the employed population can be categorized into the following parts: work (paid) and life. The analysis of the economic nature of time allocation for work and life can be justified applying the work–leisure (work–life) model. Analyzing the economic phenomenon of happiness it was found out that according to the bottom-up theory, an self-employed person is happy when feels job satisfaction and life satisfaction. Finally, the link between time allocation for work and life and happiness was described. Having the work–leisure (work–life) model applied, it is possible to achieve an optimal work–leisure (work–life) combination, i.e. balance. An employed person, having the balance reached, should feel satisfaction with work and life, i.e. would be happy.

The aim of this empirical study is to model time allocation of the self-employed population in Lithuania for work and life, assessing the happiness economics. This aim is achieved by applying these methods: scientific literature analysis, survey, time diary, semistructured expert interview, comparative analysis, statistical data analysis, correlation analysis and target optimization, using priorities, Simplex, and fuzzy programming methods. The research sample (of self-employed persons in Lithuania) is adjusted, with 97% probability.

This research shows that self-employed persons in Lithuania spent 22.5% of day time on work, and 77.5% on life. Having mathematical modeling of time allocation for work and life of self-employed persons in Lithuania, assessing the economic phenomenon of happiness, accomplished, it has been found that 63.9% of day time should be allocated for life, and 36.1% for work. This person's job satisfaction level, life satisfaction level and happiness should be equal to 9 points. In this case, MNI would be 1001 euros and DMNI 1101 euros. The number of children should be two.

Having the analysis of Lithuanian factual data and the realized mathematical optimization model conducted, the following recommendations are provided. Time per day spent on sleeping, leisure (in the narrow sense), travel, and life should be reduced. The amount of DMNI should be reduced as well. Time per day allocated to personal care, work, study, housework, and other activities should be increased. In addition, the amount of MNI and

number of the children should be increased (or not changed, in the case of children). Time allocated for family care should not be changed. Happiness level, job satisfaction level and life satisfaction level should not be changed either.

Methodological limitations of the research that were identified: the duration, content and peculiarities of structure of the data collection from survey and the time diary; and applicability of the mathematical model. The research could be improved by adjusting the methodology in order to reduce the limitations.

The research may be continued by analyzing the phenomena of time allocation and happiness from various aspects. For example, the following could be analyzed: what kind of dependency exists between age and happiness; what are the causes and consequences of knowledge of happiness economics. In the context of time allocation, research could be conducted on nine areas of time allocation. The main attention could be paid to cause-and-effect analysis at the macroeconomic level. Additional consideration could be devoted to conducting an analogous study only choosing another base country and another population of research.

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