**International Journal of Independent Research Studies**
*Vol. 14, No. 5, 33-46, 2025*
*ISSN(E) 2226-4817*
*DOI: 10.55220/2304-6953.v14i5.827*


# The Economic Value of Personal Time: Toward a Grounded Theory

**Jorge Monray**

*Institute for American Universities, American College of the Mediterranean, USA.*

**Abstract**

The concept of time economics has been widely debated in the economic and finance literature, associating these ideas mostly with the dynamics of compound interest rates, opportunity cost theories, or the value of time related to delays in public or private travel time. Nevertheless, the literature has not adequately addressed the measurement of the economic value of time (EVT), considering qualitatively crucial issues such as the age of the individual, financial situation, health, or the perception of the value of free time, among others. This paper presents a mathematical equation that measures in monetary units the real value of "free time" for an individual. This custom-calculated formula integrates six dimensions that are interrelated: opportunity cost, personal financial pressure, age, the family burden factor, the subjective valuation of free time, and perceived health.

**Keywords:** Economic equation, Economic value of time, Lifetime cost, Mathematics applied to economics, Microeconomic principles, Monetary value, Opportunity cost, Quality of life, Time cost, Time economics, Work–life balance.

## 1. Literature Review on Time Economics and Work-Life Balance

The economic valuation of time is a topic within economic analysis that seeks to quantify the value of time expended on various activities. This literature review synthesizes the current research in this area, emphasizing methodologies for valuation, implications for public policy, challenges in implementation, and connections with work–life balance. A nuanced understanding of time's economic value can significantly impact decision-making in various fields.

The concept of putting a "value on time" stems from its intrinsic nature as a scarce commodity. It is particularly essential in healthcare settings where patients and carers spend considerable periods of time on health-related activities, the effects of which may affect the overall economic value of healthcare interventions. Jowsey et al. (2012) discuss the importance of valuing the time spent on health-related activities by suggesting that such a valuation affects not only individual health pathways but also broader public health discourse and policy. To this end, neglecting to assign an economic value to time can lead to biased estimation of the demand for healthcare and subsequent policy recommendations (van den Berg et al., 2017)

### *1.1. Methodologies for Valuing Time*

There are several methods of economic valuation of time that can be categorized primarily into revealed preference methods and contingent valuation methods. The opportunity-cost method and replacement-cost method are the most widely used revealed preference methods, and contingent valuation has been used in numerous economic appraisals, particularly in the field of informal care (Oliva et al., 2023; Berg et al., 2004). Each method possesses strengths as well as weaknesses in terms of capturing the economic effect of the time incurred.

In their analysis (Oliva et al., 2023), examine determinants of willingness to pay and accept in the context of informal care, illustrating the practical application of these methodologies. They highlight the essential role of understanding economic behavior when assessing the time that caregivers invest, which often goes unrecognized in traditional economic evaluations. Meanwhile, others critique various valuation methods, arguing for a comprehensive framework that integrates multiple approaches to accurately value time's economic significance (Tranmer et al.2005, 449--459).

### *1.2. Value of Patient Time in Health Economics*

Acknowledging the value of time for patients is part and parcel of streamlining healthcare delivery models. The time invested by patients in seeking care, waiting for, or traveling to appointments has significant economic repercussions. The authors refer to the disregard of these aspects as distorting the elasticity of demand measures for healthcare services, making policy planning ineffective (Berg et al. 2017, 36-45). Knowing the exact value of time not only helps in healthcare spending decisions but also in the refinement of service delivery, which translates to better patient outcomes.

The literature also highlights the importance of incorporating patient time evaluations into economic assessments. Some researchers believe that patient time costs need to be routinely monitored in cost-effectiveness

analyses to better understand healthcare service use (Ross et al. 2021, 446-480). This incorporation allows a broader perspective of costs in health economic models, which can directly influence funding and resource strategy allocation.

### *1.3. The Contributions of Gary Becker*

(Becker 1965, 493–517) presents a marriage time trade-off between housework and paid work. Becker proposed a household production function in which purchased goods are converted into commodities such as meals that generate utility.

### *1.4. Directions for Future Research in Time Valuation*

Research needs to advance to a multidisciplinary study design incorporating behavioral economics, sociology, and healthcare management. Only such a holistic perspective can yield insight into socioeconomic determinants of time valuation, i.e., how different populations may differently value time investment (Berg et al. 2017, 182--190). Research methodologies also need to evolve to be capable of handling the complexities surrounding informal care time in an appropriate manner. Emerging approaches such as the use of machine learning algorithms and data analytics have the potential to increase precision in time valuations. Additionally, the ongoing development of contingent valuation methods across a range of fields, from environmental economics to health, can provide new knowledge, especially as conventional valuation approaches are questioned for their sufficiency in terms of capturing time intricacies (Oliva et al., 2023; Verbooy et al., 2018).

In conclusion, the economic valuation of time presents a complex yet vital field of inquiry that holds significant implications for public policy, healthcare delivery, and economic analyses. Understanding and effectively measuring the monetary value of time used in health-related contexts is necessary for accurate evaluations and policy recommendations. Despite methodological challenges and issues surrounding the ethical implications of assigning value to time, a robust framework that incorporates both theoretical insights and empirical evidence can pave the way for informed decision-making in healthcare economic evaluations.

### *1.5. Work–Life Balance*

Work–life balance (WLB) has recently become an important topic in organizational behavior research. It reflects the needs of today's work environments and the lifestyles of individuals. WLB involves finding a way to balance professional, personal, and family responsibilities. This balance is essential for managing the different roles a person takes on. Research consistently points to the importance of maintaining good work–life balance for promoting employee well-being, job satisfaction, and organizational performance. (Rodríguez-Modroño and López-Igual 2021, 3239) noted that a healthy work–life balance positively affects individuals' well-being. This is especially true for teleworkers who juggle family responsibilities and work commitments. The study highlights that flexible working arrangements can lead to improved work intensity and better quality of working time, which promotes a healthier work–life balance. Additionally, Aziz and Vinodhini (2021) argue that employees' desire for career growth and personal fulfillment emphasizes the need for WLB, claiming that balance is vital for overall development.

Bhende et al. (2020, 256--265) also reported that work practices that support WLB significantly reduce stress and enhance job quality. They conclude that when organizations encourage balance, employees feel more in control of their work environment. This results in higher job satisfaction and better performance. This highlights the dual benefits of WLB programs—boosting employee morale and improving organizational results.

### *1.6. Role of Technology in Work–Life Balance*

Mobile information technology devices (MITDs) significantly shape work–life relations. (Adisa et al., 2017) argued that while these technologies support flexibility and remote work, they also threaten to blur the boundaries between work and home life. This can improve or worsen work–life balance, depending on management. This contradiction highlights the need for careful integration of technology in the workplace to enhance employee experience and reduce the stress of constant connectivity.

In terms of telecommuting, (Bhat et al., 2022) suggested that remote work can make employees more aware of work–life conflict. Companies need to focus on how to best support employees in this new environment. While many benefits exist in telecommuting, conflicts between work and family can worsen in remote settings.

Demographic factors also affect how employees experience work–life balance. (Uddin, 2022) noted significant differences in work–life balance perceptions and challenges among various demographic groups, especially with respect to gender and cultural context. Women often face more work–life balance issues due to societal expectations and workplace cultures. This confirms the need for tailored work–life balance policies that address these differences. Other authors as (Lexén et al., 2020), reported that increased domestic responsibilities typically affect women's work–life balance, increasing their risk of stress and mental health issues.

Additionally, (Mazerolle et al., 2018) identified specific professions where achieving work–life balance is particularly challenging. They stated that the stresses tied to work–life balance in athletic training can contribute to burnout and job dissatisfaction among practitioners.

Such sector-specific insights are crucial for developing effective work–life balance policies that consider the unique challenges faced by different occupational groups.

Effective work–life balance programs can provide major benefits for organizations, such as improved productivity and employee retention. (Ganiyu et al., 2020) reported that implementing formal work–life balance programs is necessary to maintain healthy work–life balance. This not only makes employees happier but also boosts overall organizational performance in the manufacturing sector. Furthermore, robust work–life balance programs help attract and retain quality workers, as employees increasingly seek organizations that prioritize their well-being.

Creating work–life balance policies that cater to different employee needs can also promote inclusiveness at work. (Shaikh & Chandio, 2024) highlighted the critical role of organizational commitment to work-life balance programs in improving employee engagement and organizational performance. They argued that effective policies lead to more

productive and harmonious workplaces. This view is echoed by (Fan et al., 2021) who propose a multidimensional model of work–life balance support mechanisms that can foster positive organizational culture and employee resilience.

In conclusion, the academic understanding of work–life balance reflects its complex nature, shaped by the interactions of individual, organizational, and societal factors. Maintaining balance is a continuous challenge for many workers, especially those in high-pressure jobs or during times of change, such as the COVID-19 pandemic. As companies recognize the need to support work–life balance, they must consider the various issues facing employees and develop targeted initiatives that enhance overall well-being, engagement, and productivity.

The ongoing shifts in work settings necessitate continual testing and implementation of work–life balance policies to effectively meet the evolving needs of the workforce.

The economic value of time measurement is essential, as it impacts areas such as public transport, investment choices, and economic modeling. The economic value of time (EVT) is typically defined as the monetary worth of time in economic efforts and decisions. This overview draws on various literature sources to discuss methods and factors in EVT measurement.

One major way to quantify EVT is by assessing travel time, known as the value of travel time savings (VTTS). VTTS is important for transport policy analysis, as monetary values are placed on saved time to determine the value of transport improvements. These analyses account for travel time and its uncertainty, making time savings invaluable when estimating potential economic benefits in urban transport (Nordström et al., 2019), Wardman et al., 2016). Such studies often include meta-analyses that compile evidence from multiple sources to provide comprehensive EVT estimates, showing how values differ across geographical and temporal contexts (Wardman et al. 2016; Daly & Hess, 2019).

Another complex aspect of assigning a monetary value to time is the "time value of money" (TVM). This principle states that money now holds more value than the same amount in the future because it can earn interest. This concept is prominent in various economic frameworks where time is seen as a key factor influencing investment and consumer choices (Zendania & Setyani, 2022); (Ilyas, 2017). In Islamic finance, the focus shifts to the "economic value of time," emphasizing economic benefits over merely enjoying the money value of time, thereby integrating ethical and cultural considerations. (Hamza & Jedidia, 2017).

The literature indicates that free time can be evaluated on the basis of several factors, each of which are linked to individual well-being, productivity, and personal growth. Below are key factors that affect how free time is valued, supported by scholarly references.

(Chen et al., 2025) emphasize the importance of personal growth and self-reflection. The literature suggests that using leisure time constructively, especially through extracurricular activities, promotes self-awareness and moral development among college students. Engagement in leisure activities significantly supports both physical health and mental well-being. Productive leisure activities enhance creativity, resilience, and overall health (Cui et al., 2019). Therefore, people should prioritize leisure to foster physical and mental wellness.

Achieving good work–life balance is crucial for the effective management of leisure time. A proper mix of work and leisure increases individual productivity and national welfare, according to (Wang & Jiang, 2023). This balance is essential since too much work focus can diminish personal satisfaction and lead to burnout.

Leisure activities can foster social networking and relationship-building, thereby promoting social integration. Higher education levels often correlate with increased engagement in various leisure activities that enhance cultural capital and social interaction (Gutiérrez & Calero, 2020). Thus, leisure time is vital for strengthening social connections and participation.

Cultural values emphasizing efficiency and productivity can influence attitudes toward free time. The modern focus on maximizing time use encourages people to engage in useful activities during their leisure. This belief can create social pressures that positively or negatively shape attitudes toward free time (Verbakel, 2012).

Demographic attributes such as gender, marital status, and education level significantly affect how individuals manage their leisure time. Empirical studies have shown that these demographic variables influence how people value and derive satisfaction from leisure activities, highlighting the importance of personal circumstances in assessing free time (Büyükakgül, 2022).

Psychological values of benevolence, universalism, and hedonism are positively related to resilience and overall well-being (Fukasawa et al,. 2020). Spending free time on activities aligned with these values greatly contributes to mental health, indicating the need to appreciate personal leisure.

Economic factors and income levels dictate people's ability to enjoy leisure. Research shows that personal income strongly influences perceptions of time value, particularly with respect to leisure (Mahmudah et al. 2016). Economic security allows access to enjoyable activities, enhancing the overall value of downtime.

In summary, measuring the economic value of time involves a wide range of methods, applications, and perspectives. From transport issues to ambulance services and agricultural practices, time must be adequately valued and managed to maximize economic gains.

### *1.7. Grounded Theory and Qualitative Data Analysis*

#### *1.7.1. Theoretical Foundation*

An initial approximation to the EVPT should be based using multidisciplinary approach. This should be based on three main theoretical frameworks:

1. Opportunity cost theory developed by Marshall in 1890 where time is conceived as a scarce resource, and its value depends on the best alternative use that could be given to it.
2. Welfare economics (Pigou, 1920; Sen, 1987): introduces the notion of subjective utility, recognizing that well-being is not limited to income, but includes quality of life, health, and social relationships.
3. Psychology of time and life satisfaction (Csikszentmihalyi, 1990; Kahneman, 2011): they highlight the importance of individual perception of time and its impact on happiness and motivation.

Based on these principles, the subsequent formula EVPT will integrate objective dimensions (income, hours worked, debts, assets, age) and subjective dimensions (valuation of free time, self-perceived health), generating a hybrid metric with economic and existential validity.

The first step of the research is to collect data and evidences from different sources in a multidisciplinary way using and inductive research method. The inductive research method is used primarily in qualitative research to generate theories from specific observations, and in other fields like social sciences and economics, when there is no existing theoretical framework as it is the case here. It is useful when studying this novel topic, for exploratory research, or to find patterns in data before forming hypotheses. The economic value of personal time an abstract unknown field that can be constructed through observation and interpretation of data obtained from Google (generic, not scholar) and Scilit repository.

### *1.7.2. Qualitative Data Analysis: Data Collection in Scilit Repository Based On Most Cited Authors*

Due to the fact that the topic is already unstructured, multidisciplinar and due to its lack or specific literature, it can be evaluated under different perspectives as economics, psychology or behavioral sciences.

A search using Scilit Repository has been executed to find direct and peripheral research related to the most cited authors on the topic. These are Becker, Becker and Mulligan, Bowen, Kahneman, Diamond and Hauman, Heliwell, and Steptoe.

### *1.7.3. Qualitative Data Analysis: Data collection on Google Scholar*

Due to the fact that the topic is already unstructured and abstract and can be evaluated under different perspectives as economics, psychology or behavioral a Google Scholar Search has been executed using the term "economic evaluation of time". The filters applied are: years 2015-2025, journal articles, language English leading to a total of 159 articles. Articles 1-74 are chosen due to their relevance while the rest are discarded.

**Table 1.** Distribution of codes obtained in the QDA research. (Data Format).

| Category | Code | Count | % Codes | Cases | % Cases |
|---|---|---|---|---|---|
| Psychology | Subjective Evaluation | 30 | 22.10% | 3 | 33.30% |
| Psychology | Physiological Impacts/Consequences | 1 | 0.70% | 1 | 11.10% |
| Psychology | Socialization | 3 | 2.20% | 1 | 11.10% |
| Psychology | Happiness | 11 | 8.10% | 1 | 11.10% |
| Psychology | Status | 1 | 0.70% | 1 | 11.10% |
| Psychology | Productivity | 6 | 4.40% | 1 | 11.10% |
| Psychology | Interpersonal Interactions | 1 | 0.70% | 1 | 11.10% |
| Opportunity Cost | Opportunity Cost. Time Work Pref | 26 | 19.10% | 3 | 33.30% |
| Opportunity Cost | Payment System | 1 | 0.70% | 1 | 11.10% |
| Opportunity Cost | Balance | 1 | 0.70% | 1 | 11.10% |
| Health | Health Observation | 19 | 14.00% | 3 | 33.30% |
| Family | Family Dependency and Roles | 21 | 15.40% | 2 | 22.20% |
| Demand of Time | Age | 12 | 8.80% | 2 | 22.20% |
| Demand of Time | Time Discount | 2 | 1.50% | 1 | 11.10% |
| Demand of Time | Time at work | 1 | 0.70% | 1 | 11.10% |

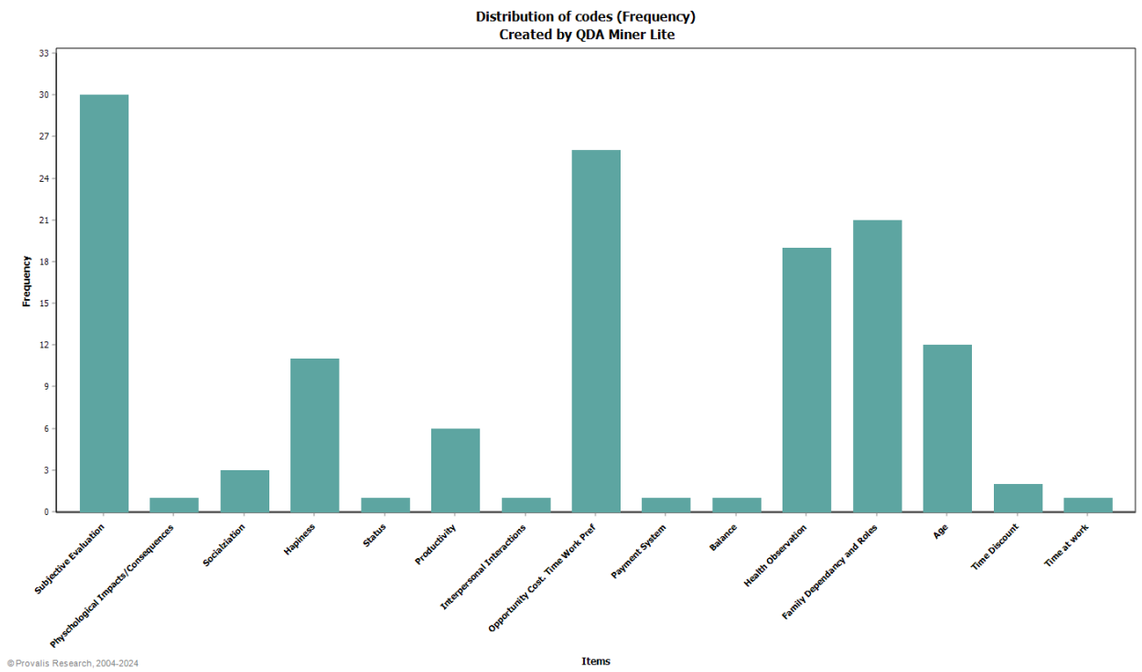


**Figure 1.** Distribution of Codes obtained in the QDA Research.

## 2. Determination of Time Value and Quality Time and Justification of the Six Variables Used in the Formation

Under the rational assumption that quality relates (≡) to value, the quality of time (quality-time) should be related to the value of time and vice versa. Assuming the word "value" to be "economic value", it is possible to start

articulating literature research oriented to the factors that involve and determine the possible economic value of time outside work.

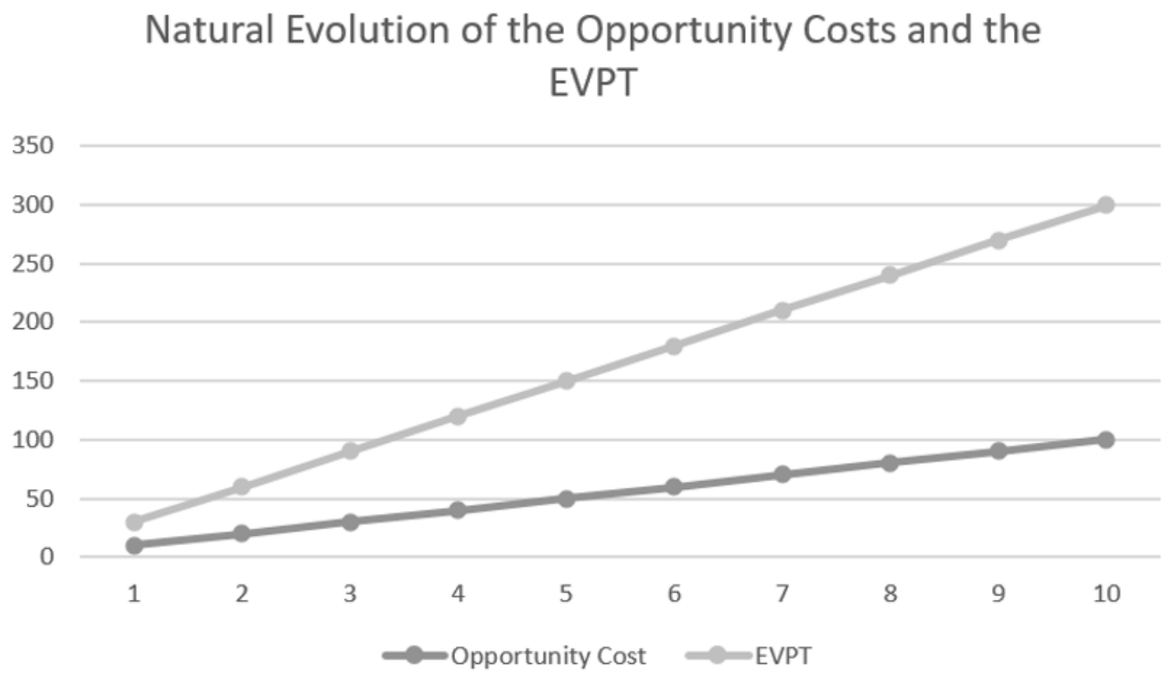


**Figure 2.** Natural Evolution of the Opportunity Costs and the EVPT, Source: own elaboration.

*2.1. Considered Variable #1: Opportunity Cost*

The main starting point is a Foundational work in economics: time has value because of opportunity costs (Becker, 1965). The main idea is that every hour spent on one activity is an hour not spent on another; quality time depends on alignment with priorities and values. This is the reason why the proposed model in this paper includes subjective valuations as well. The consideration of the opportunity cost to prepare for the evaluation of personal time should play a crucial role. Initially, the first philosophical question arises: Is time "inside life" or is life "inside time"? Lifetime is divided into free time and work time. The time that someone is enjoying as "free time" cannot be used as "working time" and vice versa; also, a great part of what that person is or represents in some societies is associated with their lifestyle and income, so consequently, personal income and opportunity cost play a key role here, which cannot be discarded. The opportunity cost of an individual will operate as a starting point to determine and guide his or her personal free time because it would be unreasonable in line with the actual economic literature to fully isolate the concept of the economic value of personal time. From a more theoretical perspective, it could make sense to disconnect the opportunity cost from the EVPT value, since the first one is determined by market realities and constraints, and the second one is determined by life sequence and other objective and subjective factors that affect the individual and change during its lifetime. Nevertheless, from a practical perspective of calculation, the economic value of personal time (EVPT) navigates in parallel with the opportunity cost, understanding that people tend to value their life and their free time according to their income and that their level of income can also contribute to "buy time easier" in the form of services, which would decrease the demand of time in some cases, for example, in the need of time of dependents or the limitations associated with age or health, as an example. (See Figure 1).

*2.2. Considered Variable #2: Financial Situation of the Person*

The financial situation of a person directly affects their opportunity cost because opportunity cost is essentially the value of the next best alternative predetermined, and a person's available resources, income, and liquidity determine which alternatives are feasible and how costly they are. Therefore, opportunity cost can be represented by the value of the best forgone alternative when making a choice (Becker, 1965). If someone has limited financial resources, the set of alternatives they can afford shrinks, so the cost of choosing one option over another changes. Becker develops the idea that both time and money are scarce resources and that individual allocation decisions reflect opportunity costs influenced by personal constraints. A pleasant financial situation can contribute to decreasing the need for low-paid work, whereas an adverse financial situation will contribute to accepting low-paid jobs, decreasing the opportunity cost.

Income and the cost of time are also essential for understanding the implications of an individual's financial situation for their opportunity costs. For workers, the opportunity cost of leisure is related to the wage rate. People with higher income have higher hourly earnings, so taking time off (e.g., for vacation, shopping, or education) has a higher monetary cost. Conversely, lower-income individuals may face lower financial opportunity costs but may face other nonmonetary costs according to (Ghez & Becker, 1975). The former authors show that the value of time and trade-offs between work and leisure are functions of earnings, which are directly linked to financial position, affecting this directly to the perceptions of the needs of work–life balance (WLB).

From a microeconomic perspective, the budget constraints theory shapes choices related to time as well. As the budget constrains the combination of goods or services that a consumer can afford, given a limited income and conditioned by the prices of those goods, we could assume "time as a product" with a certain "price/economic value". This defines the boundary of choice, illustrating what combinations of items are attainable and which are not, forcing consumers to make trade-offs to stay within their financial means. Each person's financial constraints restrict their feasible set of choices related to purchasing goods or the allocation time. The opportunity cost is context dependent:

choosing one activity may "cost" more or less, depending on available cash or credit. For example, a wealthy student may attend an expensive professional course because they can afford it; a low-income student may decline it — their opportunity cost includes the actual monetary payment plus lost wages according to (Varian, 2010). Varian discusses how budget constraints determine which consumption bundles are feasible and how scarcity shapes opportunity cost.

Liquidity and risk preferences in any individual are related to the fact that personal finances also influence risk tolerance and risk. A person with strong financial security may accept projects with uncertain returns (higher opportunity costs if they fail), whereas financially constrained individuals may avoid them, lowering perceived opportunity costs. This also ties to intertemporal choice, where present financial scarcity increases the subjective cost of delaying gratification. (Thaler, 1981) shows how liquidity constraints and financial status influence discounting behavior and the valuation of choices over time.

### *2.3. Considered Variable #3: Subjective Valuation of Time*

Economic and social sciences acknowledge subjective value. Many decisions, especially in economics, management, and psychology, are not completely objective. People assign personal utility or subjective value to outcomes. Modern economic models subjective preferences in specific ways; for example, a) utility functions are inherently subjective, and b) time valuation, health economics, quality-adjusted life years (QALYs), and contingent valuation methods depend on individual perceptions (Kahneman & Tversky, 1979). These authors show that subjective perceptions of gain and loss shape decision-making and can be thoroughly analyzed.

Subjective valuations are measurable and scientifically valid. Methods such as Likert scales, willingness-to-pay surveys, conjoint analysis, and time-use diaries turn subjective perceptions into quantitative data suitable for statistical analysis. Peer-reviewed studies are increasingly combining psychological, behavioral, and subjective measures to understand real-world decisions (Diamond & Hausman, 1994) illustrating how subjective monetary valuations can be scientifically gathered and studied.

Subjective value highlights dimensions that objective metrics overlook. Objective measures, such as market price, time spent, and calories, do not always capture emotional satisfaction, perceived quality of life, or social or cultural significance. Adding subjective measures improves the external validity and relevance of the research, as stated by (Kahneman & Tversky, 1979) who presented a robust methodology for including subjective well-being in empirical research.

Subjective valuations meet high research standards. They provide insights into human perception and behavior, presenting academic rigor because they can be statistically analyzed, controlled for confounding factors, and compared with objective data. They also present relevance; corporate policies and business decisions often depend on how individuals perceive value rather than solely on what is objectively measurable. These statements have been demonstrated by (Hulten & Ramey, 2019), who asserted that subjective time valuation offers additional insights beyond traditional economic metrics.

Examples can be found in leading journals such as Health Economics: QALYs and willingness-to-pay (subjective health valuations) are frequently published in The Lancet, Health Economics, and the Journal of Health Economics. Behavioral economics are also represented in subjective risk perception and happiness measures appearing in the American Economic Review and the Journal of Economic Behavior & Organization. Management and psychology use them as well as research on employee satisfaction, perceived workload, and time-use quality, as they are featured in the Journal of Management and the Journal of Applied Psychology.

The subjective time perception states that the main idea is that it is not just about how much time people have but how they perceive it. According to (Levine, 1997), time pressure diminishes the quality of time, whereas mindful engagement enhances it. The author approaches temporal cognition, which involves psychological studies on how people perceive and value time.

### *2.4. Considered variable #4. The Inclusion of Family or Dependents*

Families and family members play crucial roles in people's lives. The flow and engagement approach presents a basic idea that states that the quality of time tends to be maximized when individuals are deeply engaged. The flow represents a mental situation of complete absorption in an activity where a person is fully focused, involved, and energized, often leading to a loss of self-consciousness and a distorted sense of time according to (Csikszentmihalyi, 1990), who demonstrates that meaningful, challenging activity enhances time quality.

The theories supporting the importance of family engagement in the context of quality time are varied. The idea that humans are born with an innate need to form strong emotional bonds with caregivers (usually family). Additionally, the dimension of implication must be taken into consideration because secure attachment with family during childhood establishes emotional stability, social competence, and resilience throughout life. Research has shown that positive family engagement leads to better emotional regulation and life satisfaction, whereas disrupted family bonds contribute to a greater risk of anxiety, depression, and social maladjustment (Bowlby 1969). In his research, Bowlby's initial work demonstrated that family connections shape the core of emotional and social development, making family a dimension that cannot be ignored in the EVPT formulation.

The theory of family systems (Bowen 1978) states that the family functions and operates as an emotional unit. Individual behavior is deeply interconnected with family relationships. Engagement in family roles is not optional, many individuals are influenced by family dynamics, and healthy engagement fosters identity, emotional support, and problem-solving skills. This research shows that participation in family activities strengthens psychological well-being and life satisfaction and that dysfunctional family interactions can increase stress, social isolation, and poor decision-making. Bowen noted that family is a central point of personal development, responsibility, and emotional regulation.

According to (Carstensen et al., 1999), and its socioemotional selectivity theory, the main approach is that as people perceive time as limited (especially with age), they prioritize emotionally meaningful relationships, primarily family relationships, over peripheral social connections. The implications are that individuals inherently consider family engagement to be the most valuable and satisfying use of time. The researcher provided evidence that older adults spend more time with close family and derive greater well-being from family interactions than from casual

acquaintances and that emotional satisfaction from family relationships outweighs professional or social engagements in importance. It is possible that, across psychological, social, and developmental theories, family consistently emerges as the most important form of engagement for an individual, both for emotional health and life satisfaction, which is strong enough to be included in the dimensions of the EVPT equation.

### *2.5. Considered Variable #5: Age of the Person.*

Younger people tend to value future income more, whereas older people may place greater value on present time because their remaining lifetime is shorter. This economic perspective is based on the remaining lifetime limit.

This approach matches the concept of time discounting (Becker & Mulligan, 1997, 729–758), where the research shows how the life cycle and personal expectations about longevity affect time preferences. From a psychological perspective, socioemotional selectivity theory tells us that as people age, we tend to perceive time as more limited, which leads them to prioritize emotionally meaningful activities rather than material or future-oriented goals. Consequently, we can state that older adults value time more for emotional satisfaction. Taking this into the field of microeconomics and the interactions between supply and demand of time, we can assume that less remaining time of life will increase the value of time. This increase in this value of time will also be affected by the perceived future scarcity of time and the approach of time to the limit. The dimension age is multiplied by the value of the EVPT formula.

Older adults often report greater satisfaction with the time they spend in social and leisure activities, even if their objective productivity decreases (Helliwell & Aknin,2018). Additionally, there are implications for happiness and social capital because the contribution of social and leisure activities across ages, as stated in some social indicator studies, shows how the quality of time increases with age when individuals are invested in relationships.

### *2.6. Variable #6. Health*

Resting, sleeping, and leisure time quality directly affect productivity and well-being, as stated by several studies (Steptoe et al., 2015), where the authors show that well-being and health are tied to how people use/rest their time. Linking these findings with the proposed equation EVPT, we can say that good health will lead to better use of their time from a psychological perspective. Nevertheless, from a purely microeconomic perspective on the basis of supply and demand principles, poor health results in less available quality time, and motivated by bad health, increase the economic value of personal time. For example, some people who have poor health and stay in bed 3 days each week have less available time to enjoy life, making their available time less and increasing its value due to the scarcity of this factor (health) and consequently its economic value.

For older people, time is valued not only in hours but also in quality-adjusted life years (quality-adjusted life years (QALYs), meaning that an hour in good health is worth more than an hour in poor health according to (Dolan & White, 2007), where they explain how health status, which often declines with age, changes the valuation of time. The research of Dolan and White inspired the research presented here, which revealed that health works as a factor in the economic value of personal time and that, backed up as well by the budget restraint theory, there is maximum health, which tends to decrease with age.

Additionally, research has focused on behavioral changes such as patience/impatience and saving vs spending time (short-term versus long-term gratifications), where young people are more willing to "spend" time for future payoffs; older adults tend to prefer immediate, meaningful uses of time. (Read & Read, 2004), argue that discount rates decrease with age and that older adults become more "present-focused."

## 3. The Process of Formulation

The recommended equation represents a "valid approximation" under the specified conditions but has limitations inherent to the premises used. This idea does not claim to explain all phenomena or give a true completion of reality but rather serves as a simplified model that captures the primary tendencies of a phenomenon.

The formula assumes the importance of subjective assumptions from each person. Each person is different and consequently has different magnitudes. Some of the dimensions of EVPT are represented by objective data, and others are represented by subjective data.

- Factual data (objective dimensions): Age, financial pressure, opportunity cost,
- Qualitative Perceptions (Subjective Dimensions): Family workload, the subjective valuation of free time, and health

### *3.1. The Formula is Based on an Applied Research Approach*

The philosophy of science, developed by Karl Popper or Thomas Kuhn, acknowledges that theoretical frameworks and paradigms affect what scientists regard as valid or important. This "subjective" factor cannot be eliminated, but science tries to minimize bias through reproducibility, falsifiability, and open peer discussion.

While the scientific process seeks to be objective through empirical testing and reproducibility, there are aspects of subjectivity in the research process that cannot be avoided and are even desired. Expert judgment often involves the selection of variables, the use of an analytical method, and the interpretation of doubts or incomplete findings. The application of the subjective importance of time in the EVPT equation is expert judgment (nobody is a better expert of the perceived value of their work/free time than that of individuals themselves).

In sciences such as psychology, anthropology, and ecology, the qualitative judgment of trained observations is an essential component of knowledge creation. These personal inputs, however, are constrained by methodological openness, objective criteria, and independent testability. Under this system of things, subjectivity does not undermine scientific rigor; in contrast, it enhances empirical evidence by integrating contextual insight and domain specialization to allow more subtle and precise inferences.

Subjective views are part of the equation that is acceptable to science, typically under the rigorous conditions presented here. Science is aware that certain aspects of research necessarily have to do with human interpretation (as

it is time important), especially in instances where observation, perception (the scenario applicable here), and context consciousness form the central part.

Judgment and self-judgment are always involved in interpreting data. Even in so-called "hard" science, raw data do not speak for themselves. These are decisions made on the basis of expert opinion, theoretical or anecdotal history, and sometimes personal experience or intuition. While all this is subjective, it is not arbitrary; individuals' perceptions of orientation toward family or free time may be partially preconceived, but they are based on experience, emotion and evidence.

Some disciplines rely on qualitative data derived from researchers' or research participants' interpretations, such as anthropology and psychology. Judgment or subjective observation is involved in the qualitative approach. The most important aspect is that it is replicable, transparent, and systematic.

## 4. The Equation Justification

This equation mathematically assesses the economic value measured in monetary units of each individual's time per hour. It was initially inspired by microeconomic aspects since some of its variables and dimensions are measured subjectively by the individual. This subjective quality must be preserved for the model to be correct. Each individual is different, but each individual lives under unique conditions, and these conditions also change over the course of life, just as the result of their equation will change, that is, their economic value of personal time (EVPT).

The equation is based on the multiplication and addition of the components to be considered when economically valuing personal time. These six dimensions are as follows:

- Dimension 1. Opportunity cost factor (Co)
- Dimension 2. Personal Financial Pressure Factor (Ff)
- Dimension 3. Age Factor (Ea)
- Dimension 4. Family Burden Factor (CFf)
- Dimension 5. Subjective Valuation of Free Time (Ts∈)
- Dimension 6. Current Health, (Sa)

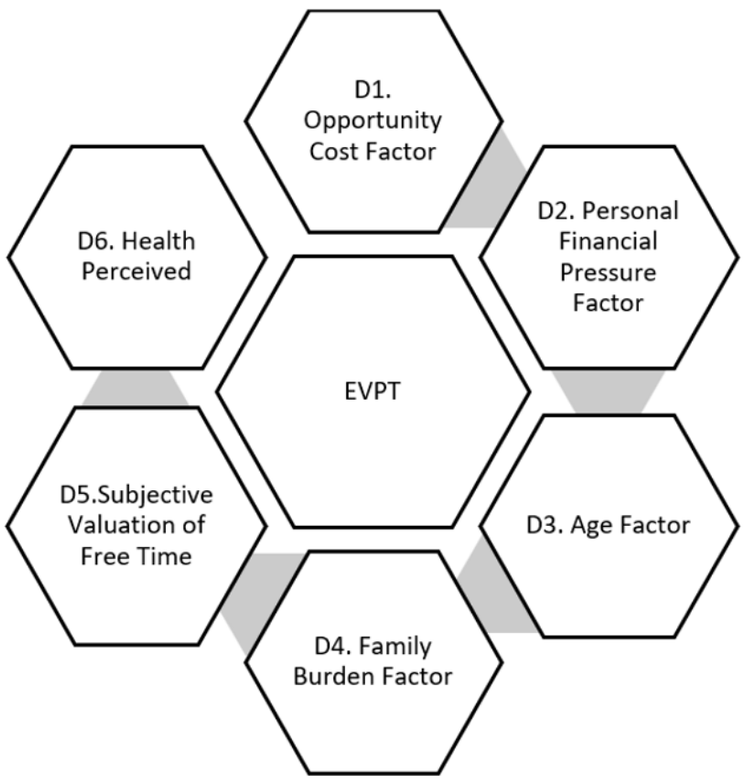


**Figure 3.** Goes here. Details of the dimensions in EVPT.

*Full Development of the Equation:*

$$EVPT=\left(\frac{Im}{Ht}+log10\left(1+\frac{Dp}{Pn+1}\right)\right) \text{ x } \left(\frac{Emax}{Emax-Ea+1}\right) \text{ x } (1 + 0.1 \text{ x Nd} + 0.2 \text{ x Rf}) \text{ x Ts x } \left(\frac{1}{Sa/100}\right) \quad (1)$$

*Dimension 1. Opportunity Cost (Co)*

$$Co=\frac{Im}{Ht} \quad (2)$$

Monthly income divided by hours worked.

- Meaning: This is the opportunity cost per hour. If a person earns €2,000 a month and works 160 hours, then each hour is worth €12.50.
- Reason for inclusion: This is the "market" basis of time, that is, how much an hour is worth according to what you earn selling it in the labor market.
- It is added to the next term because it is necessary to adjust the base/hour value by your financial situation (debt/net worth).

*Dimension 2. Personal Financial Pressure Factor (Ff)*

$$Ff=\log10\left(1+\frac{Dp}{Pn+1}\right) \quad (3)$$

where Dp = outstanding debt and Pn = net worth.

- Why use a logarithm? To ensure that the impact of debt does not grow uncontrollably, it will play a key role here. Logarithmic growth is smoother and avoids explosive results, which are normally used in financial formulas.
- For example, increasing debt from €10,000 to €20,000 does not double the emotional or economic impact; it increases it, but not linearly.
- Why add "1" in the denominator? To avoid division by zero if the net worth is zero.
- Why add this term to the opportunity cost (Co) = Im/Ht? Because financial pressure increases the value of each hour, not in real income terms but in emotional and life terms, you need to resolve your debt, so your time is worth more.

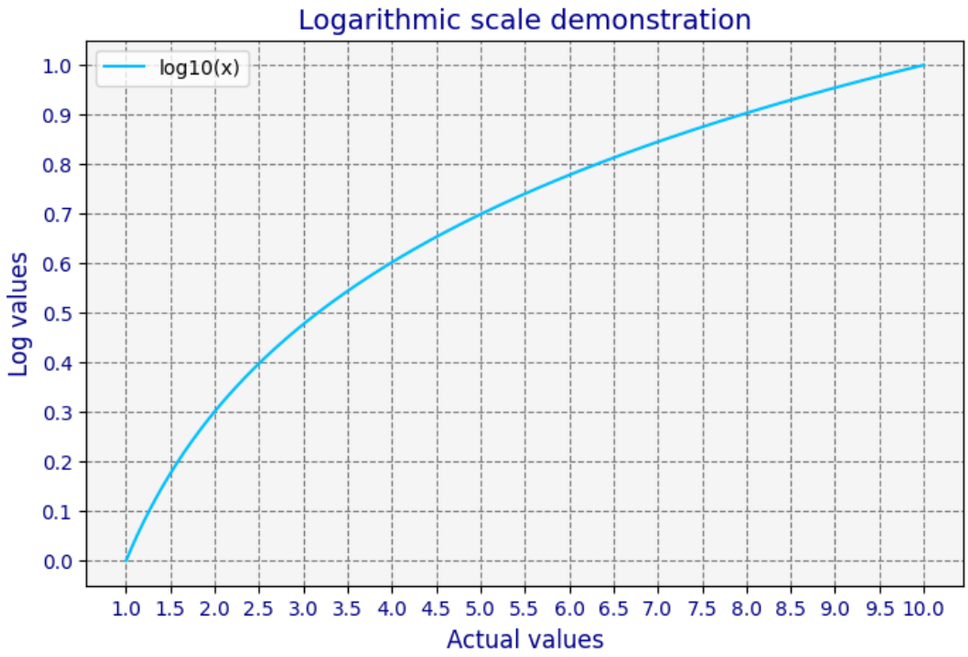


**Figure 4.** Logarithmic impact of the formulation. Source: Costa, L. da. (2024, May 7)

*Dimension 3. Age Factor*

$$Af= \left(\frac{Emax}{Emax-Ea+1}\right) \quad (4)$$

where Emax = the estimated maximum life expectancy (e.g., 80 years) and Ea = the current age.

- Meaning: The value of time increases as one ages. With fewer years remaining, each remaining hour becomes more valuable.
- Why this approach in the form? When Ea is small, the denominator is large, and the multiplier is close to 1. As Ea approaches Emax, the denominator decreases, and the multiplier increases, increasing the value of EVPT.
- Why multiply with the previous term? Because time becomes intrinsically more valuable with age, it does not "adds value" to the hour but rather amplifies it.

*Dimension 4. Family Burden Factor (CFf)*

$$CFf=(1+0.1\times Nd+0.2\times Rf), CFf = (1 + 0.1 \times Nd + 0.2 \times Rf) \quad (5)$$

where Nd = number of dependents (children, elderly, etc.) and Rf = family responsibility (0 = low, 1 = high).

- Each dependent variable increases the value of your hour by 10%.
- Responsibility in front of the dependents adds an extra 20%.
- Why multiply? Because time is more valuable when it affects others, a poorly invested hour can harm not only your finances but also those of your entire family.

*Dimension 5. Subjective Valuation of Free Time (Ts ∈ [0.5, 2.0])*

- Meaning: If you value your free time more than your working time, this factor reflects it.
- Example: if you consider your free time twice as valuable as your work time, then Ts = 2.
- The possible data range from 0 to 2. (close to 0= low, close to 1 = same importance worktime as free time, close to 2 or 2 means that free time is two times more important than work)
- Why multiply? Because it modifies the result according to your personal perception, it does not change any objective cost already calculated, but it reflects your subjective valuation of time.

*Dimension 6. Current Health (Sa/100)*

where Sa = health level as a percentage. See the example: 100% = perfect, 50% = reduced health by half, 20% = poor health.

Meaning: This variable has two possible interpretations due to a paradox:

a) *Assumption 1.* Good health increases the final economic value of personal time (EVPT). Initially, it was considered that time only has value if one can enjoy it (questionable assumption). If you are seriously ill, many valuable activities become unavailable, so when we take this approach to the math field, we see that this variable

should multiply because the value of time (VOT or EVPT) decreases proportionally with health. For example, if you have 70% health, your "usable" hour is worth only 70% of its potential. This first approach looks logical, although difficult to understand from an applied perspective, because illness reduces the availability of free time, limiting its offer; consequently, its price or value should tend to increase.

b) Assumption 2: Good health decreases the final economic value of personal time (EVPT). In this interpretation, we consider that individuals who present poor health tend to value their free or personal time. In those days of serious sickness, he or she will not be able to use their time, but in those days when the illness is not present, the value of time will increase owing to its natural scarcity, which is limited by the illness factor. This is the reason why, after many considerations and from a mathematical perspective, an inverse is applied $\left(\frac{1}{Sa/100}\right)$

Why are some terms added and others multiplied?

**Table 2.** Justification of math operations.

| Operation | Use in the formula | Mathematical and logical reasoning |
|---|---|---|
| Addition | (Im/Ht + log10(1 + Dp/(Pn+1))) | Adds two distinct sources of objective value: real income and financial pressure. |
| Multiplication | × (Emax/(Emax−Ea+1)) × (1 + 0.1 × Nd + 0.2 × Rf) × Ts × 1/(Sa/100) | Age, family, health, subjective valuation—used to amplify or reduce the base value according to personal factors that modify the impact of each hour. |

*Illustrative example:*

Imagine two people with the same income and working hours, but one:

- Has 3 children. This means that its *Nd* value is high.
- The person is 65 years old. This means that a high *Ea* value
- The person is seriously ill. This means a low *Sa value.*

The formula will multiply more in the three cases.

### *4.1. Comments on the Paradox Generated by the Data Related to the Number of Hours at Work*

The formula is that the individual considers the real number of hours worked each month for an employer, not only the number of hours that appear in the contract.

The cost of the number of work hours is expressed as the opportunity cost ($C_o$). All the possible results of EVPT will be linked to $C_o$, so more money is allocated at work, which always results in higher EVPT (because the time at work is more expensive, and consequently, this value increases the slope of the total value of time for the individual). (This is shown in Figure 1). What happens when the individual takes work home, and this is not rewarded? This changes the slope of the graph representation.

To calculate the impact of the work from home not rewarded (WFHNR) correctly and considering the EVPT equation, the initial result must be considered. Assuming a value of $C_{o=}$ 15$/h for someone who is supposed to work monthly for 160 hours, there is a VEPT of $2XC_o$, s = 30$/h. Given that the person works a total of 260 h per month, adding 100 extra hours as WFHNR will be expressed in the following chart:

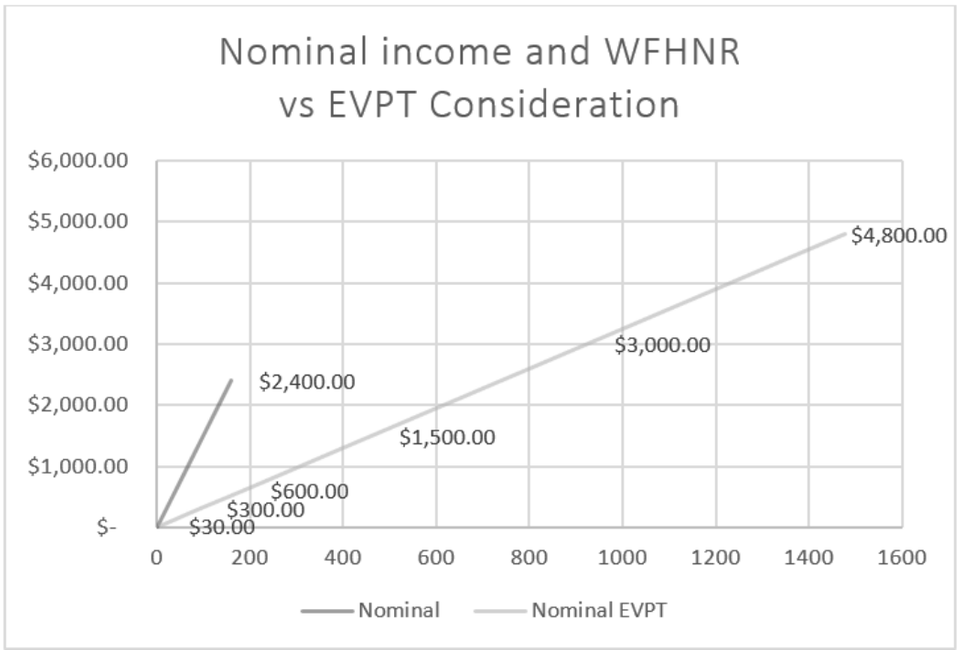


**Figure 5.** Goes here. Illustration of the Chart Nominal Income Versus WFHNR and EVPT Consideration.

Each extra hour not rewarded has an opportunity cost for the company of $15, so the savings for the company are $15/h × 100 h = $1500 monthly. On the other hand, the cost for the employee is significantly higher considering that his/her EVPT is now its Co, (Co = EVPT) represented by 30$/h (financial situation adjustment not included). The real cost paid for the employee for those 100 extra hours in a situation of WFHNR is 3000 $ monthly. Importantly, the WFHNR status reduces the real EVPT because the number of real working hours is greater. This demonstrates the exponential cost for employees in industries with jobs that require WFHNR.

## 5. Conclusions on the Equation

This formula is a model; it does not seek to find an absolute truth. Nevertheless, the benefits of making people aware of the importance of their time by understanding the economic value expressed in monetary units of their time can be considerable. Translating abstract ideas to numbers is one of the fundamental processes that scientists, businesspeople, and even laypeople seek when making decisions.

### *5.1. The EVPT Formula Provides Clarity and Precision*

Assigning a number and an economic magnitude to the value of personal time increases clarity and precision because abstract concepts represented by adverbs such as "big," "fast," or "significant" can be ambiguous terms. They can be assigned specific meanings via a number. For example, "sales increased significantly" is an abstract number, as it does not offer clarity since it is a word that describes a value. It would be more precise to say, "sales increased by 27% compared to the same quarter last year." Similar issues occur when the importance of free time or personal time is analyzed; most speakers and researchers state the importance of free time on the basis of adverbs, but this approach is not accurate and does not apply directly to each individual. This formula does.

### *5.2. The EVPT Formula is Able to Apply Comparability among Industries, Departments, Ages, Genders, etc.*

Indeed, a number or numerical factor enables you to compare things that would likely otherwise remain abstract. For example, how do we assess or compare employee satisfaction between departments? For example, if employee satisfaction is measured at the department level on a scale of 1-10, we can compare employee satisfaction scores/yearly averages across departments. The EVPT value of 5X versus the Opportunity Cost means that the individual sells time at 100% value (1X) working for the company but buys time at 500% value (5X) when not at work.

### *5.3. The EVPT Formula Monitors Change Over Time*

Even if the equation is a static picture of the value of time at a given point, a longitudinal analysis can be applied, visualizing changes over time and exploring new insights. Abstract variables, such as growth, progress, or improvement, are difficult to assess without numbers. The ability to compare before/after, plot trends, and forecast data is accomplished through the use of numbers. The same occurs with the economic valuation of personal time year after year.

### *5.4. The EVPT Formula Supports Decisions*

Numbers allow for a rational basis for making decisions and reducing reliance on vague impressions. For example, when weighing the merits of two very different projects, a manager should be able to evaluate the ROI percentages rather than simply relying upon "gut feeling." The EVPT equation can offer HR managers an easy-to-understand picture of the effort that any employee is putting into the work, not only on the work itself while in the company but also on their efforts to work extra time at home, travel, etc. This knowledge could help HR departments allocate extra time, travel assignments or remote work among others. HR departments can identify people in need of personal time, whereas others require worktime. An in-depth knowledge of these factors, when aggregated and individually considered, will contribute to identifying the work–life balance of a company.

### *5.5. The EVPT Equation Will Support Corporate Communication*

Numbers allow abstract ideas to travel across audiences and condense complexity into something digestible. Policymakers, C-level executives, investors, and the public will be more convinced of the viability of a project from quantified evidence as opposed to claiming that something is viable in an abstract way.

The numbers have the power of visualization. Once we understand that these abstract values can be assigned numeric representations, we can visualize them (charts, graphs, dashboards, etc.). Visualization makes it easier for patterns/trends/correlations and anomalies to be identifiable; these things may otherwise remain hidden in raw text. It is essential in the areas of HR, economics, business management and decision-making processes.

### *5.6. EVPT Presents Better Accountability and Standardization*

The numbers allow benchmarks, targets, and KPIs to be set. By assigning a numeric representation to a value, we can apply standardization that can confer accountability where there was prior uncertainty. In the case of abstract values such as "impact", "efficiency, or "time value", the process of measuring these variables leads to a numeric representation that provides an agreed-upon awareness of the value assigned to the abstract values combined with the values, thus providing the capacity for accountability.

### *5.7. Visualization of the EVPT Value Can Lead Indirectly to Better Productivity.*

Adding a numerical price/cost to each hour of free time will contribute to a prioritization skill where people will learn to focus on high-value tasks instead of wasting effort on low-impact activities. Additionally, people reduce procrastination because they are aware that "time is money," creating an urgency to act promptly.

Additionally, being aware of time at work, for example, can make individuals work faster or better, contributing to more output per hour. When time is valued, people tend to look for efficiencies and eliminate bottlenecks.

### *5.8. The Economic and Financial Benefits*

A higher return on labor because maximizing productive minutes translates to more revenue or savings per unit of time. The opportunity cost awareness provides an understanding of the idea that "what is *not* done today cannot be done in the future".

### *5.9. Increased Motivation for Life*

People increase their motivation and engagement in life and free time. When people are aware of the cost/hour of their free time, they can develop a sense of ownership. When people view their time as valuable, they treat it like a personal asset tends to increase their self-respect, and valuing one's own time leads to a stronger professional identity.

People aware of the economic value of personal time contribute to organizations with cultural and organizational advantages due to their time-respecting culture, e.g., meetings start and end on time, and deadlines are honored. They can also contribute to better client relationships; respecting time builds trust and reliability in business relationships. Additionally, teams that value time work more efficiently as the organization grows.

Finally, the most important benefit is personal well-being. It is believed that through work–life balance (WLB), individuals can recognize that the value of time helps protect personal and family time. This will lead them to situations of less stress and more room for personal growth and happiness.

## 6. Appendix 1. Proof of Multivariate Induction Demonstration

Multivariate (double) induction on nonnegative integer variables $Nd$ and $Rf$. I start by defining the notation and the constant quantity as before; then, I test the formula for all pairs via induction over sum (a standard form of multiple induction: strong induction over the sum of the coordinates).$M(Nd, Rf) \in \mathbb{Z}^2_{\geq 0} s = Nd + Rf$

*6.1. Notation and Objects of the Test*

We define the constant

$$M = \left(\frac{Im}{Ht} + \log_{10}\left(1 + \frac{Dp}{Pn+1}\right)\right) \cdot \left(\frac{E_{\max}}{E_{\max} - E_a + 1}\right) \cdot Ts \cdot \frac{1}{Sa/100} \quad (1)$$

that does not depend on $NdRf$ Therefore, the formula to be demonstrated is, for everything $Nd, Rf \in \mathbb{Z}_{\geq 0}$,

$$P(Nd, Rf): \text{EVPT}(Nd, Rf) = M(1 + 0.1Nd + 0.2Rf). \quad (2)$$

(Note that the original expression makes $Nd$ and $Rf$ linearly enter the factor $(1 + 0.1Nd +$ 0.2 Rf); we use that linearity to build repercussions.)

*6.2. Algebraic Observations (Elementary Recurrences)*

From the algebraic definition of EVPT, one obtains immediately, for all $Nd, Rf$,

$$\text{EVPT}(Nd, Rf) - \text{EVPT}(Nd - 1, Rf) \quad (3)$$
$$= M(1 + 0.1Nd + 0.2Rf) - M(1 + 0.1(Nd - 1) + 0.2Rf) = 0.1M,$$

If $Nd \geq 1$ and analog if $Rf \geq 1$,

$$\text{EVPT}(Nd, Rf) - \text{EVPT}(Nd, Rf - 1) = 0.2M. \quad (4)$$

That is, increasing $Nd$ to 1 increases EVPT by $0.1M$; increasing $Rf$ by 1 increases EVPT in $0.2M$. These equalities are merely algebraic and constitute the basis of inductive relations.

*6.3. Strong Induction On$s = Nd + Rf$*

We prove that $P(Nd, Rf)$ is true for all pairs $(Nd, Rf)$ by induction on $s = Nd + Rf$. Base $s = 0$.

Then, $Nd = 0$ and $Rf = 0$. We calculate directly

$$\text{EVPT}(0,0) = M(1 + 0.1 \cdot 0 + 0.2 \cdot 0) = M \quad (5)$$

that matches the formula; then, $P(0,0)$ is true.

Inductive step. Suppose that for some $k \geq 0$, the proposition $P(a, b)$ is true for all pairs $(a, b)$ with $a, b \geq 0$ and $a + b \leq k$. We want to prove $P(Nd, Rf)$ for any pair $(Nd, Rf)$ with $Nd + Rf = k + 1$.

Let us take a pair $(Nd, Rf)$ con$Nd + Rf = k + 1$. There are two cases:

If $Nd \geq 1$, then $(Nd - 1) + Rf = k$. From the inductive hypothesis, we know that

$$\text{EVPT}(Nd - 1, Rf) = M(1 + 0.1(Nd - 1) + 0.2Rf) \quad (6)$$

Using the ratio of increment with (algebraic observation),$Nd$

$$\text{EVPT}(Nd, Rf) = \text{EVPT}(Nd - 1, Rf) + 0.1M = M(1 + 0.1(Nd - 1) + 0.2Rf) + 0.1M$$
$$= M(1 + 0.1Nd + 0.2Rf),$$

What exactly is $P(Nd, Rf)$?

- Si $Nd = 0$ then, necessarily $Rf \geq 1$ (because the sum is $k + 1$). In that case, $(0, Rf - 1)$ has a sum $k$, so by the inductive hypothesis

$$\text{EVPT}(0, Rf - 1) = M(1 + 0.1 \cdot 0 + 0.2(Rf - 1)).$$

Using the ratio of increase with $Rf$,

$$\text{EVPT}(0, Rf) = \text{EVPT}(0, Rf - 1) + 0.2M = M(1 + 0.2(Rf - 1)) + 0.2M \quad (7)$$
$$= M(1 + 0.2Rf)$$

,

which also matches the formula (given that $Nd = 0$).

In both subcases, we have tested $P(Nd, Rf)$. Therefore, by induction on $s$, the proposition $P(Nd, Rf)$ is true for all $Nd, Rf \in \mathbb{Z}_{\geq 0}$.

*6.4. Conclusion*

It is demonstrated by multivariate induction (strong induction on the sum of the variables) that for all $Nd, Rf \in \mathbb{Z}_{\geq 0}$ r

$$\mathrm{EVPT}(Nd, Rf) = M(1 + 0.1Nd + 0.2Rf) \tag{8}$$

with $M$ given above. This shows the overall validity of the closed expression and explains its incremental behavior with respect to each integer variable.

Using the inductive hypothesis, this is

$$\mathrm{EVPT}(k+1) = \mathrm{EVPT}(k) + 0.1M,$$

and therefore matches with the formula substituted in $n = k + 1$. Therefore, $P(k) \Rightarrow P(k+1)$. By mathematical induction, $P(n)$ is true for all whole numbers $n \geq 0$. That is, the closed expression

$$\mathrm{EVPT}(n) = M(1 + 0.1n + 0.2Rf)$$

is valid (and in terms of the original constants)

$$\mathrm{EVPT}(Nd) = \left(\frac{Im}{Ht} + \log_{10}\left(1 + \frac{Dp}{Pn+1}\right)\right) \cdot \left(\frac{E_{\max}}{E_{\max} - E_a + 1}\right) \cdot Ts \cdot \frac{1}{\frac{Sa}{100}} \cdot (1 + 0.1Nd + 0.2Rf) \tag{9}$$

Final remarks/interpretation

The induction here basically confirms that the dependence on $Nd$ is linear: every time Nd increases by 1, EVPT increases by a fixed amount.$0.1M$.

## References


Adisa, T. A., Gbadamosi, G., & Osabutey, E. L. C. (2017). What happened to the border? The role of mobile information technology devices on employees' work-life balance. *Personnel Review*, *46*(8), 1651–1671. https://doi.org/10.1108/pr-08-2016-0222

Aziz, A., & Vinodhini, Y. (2021). Work life balance of airhostess at airlines sector. In *Proceedings of the First International Conference on Computing, Communication and Control System, I3CAC 2021, 7–8 June 2021, Bharath University, Chennai, India*. https://doi.org/10.4108/eai.7-6-2021.2308608

Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, *75*(299), 493–517. https://doi.org/10.2307/2228949

Becker, G. S., & Mulligan, C. B. (1997). The endogenous determination of time preference. *The Quarterly Journal of Economics*, *112*(3), 729–758. https://doi.org/10.2307/2951254

Bhat, Z. H., Yousuf, U., & Saba, N. (2022). The implications of telecommuting on work-life balance: Effects on work engagement and work exhaustion. *Research Square*. https://doi.org/10.21203/rs.3.rs-1642674/v1

Bhende, P., Mekoth, N., Ingalhalli, V., & Reddy, Y. V. (2020). Quality of work life and work–life balance. *Journal of Human Values*, *26*(3), 256–265. https://doi.org/10.1177/0971685820939380

Bowen, M. (1978). *Family therapy in clinical practice*. Rowman & Littlefield Publishers.

Bowlby, J. (1969). *Attachment and loss* (Vol. 1). Basic Books.

Büyükakgül, Ü. C. (2022). The relationship between leisure time management and leisure time benefit: A study on private sector employees. *Journal of Human Sciences*, *19*(2), 202–207. https://doi.org/10.14687/jhs.v19i2.6281

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, *54*(3), 165–181. https://doi.org/10.1037/0003-066x.54.3.165

Chen, G., Liang, J., Xie, C., & Wang, K. (2025). The relationship between personal values and leisure-time exercise: A three-wave study. *PsyCh Journal*. https://doi.org/10.1002/pchj.70012

Chen, H.-Y., Yarnal, C., Hustad, J. T. P., & Sims, D. (2016). Take a selfie of life: A qualitative exploration of college students' self-reflections on free time use and personal values. *Journal of College and Character*, *17*(2), 101–115. https://doi.org/10.1080/2194587x.2016.1159226

Costa, L. da. (2024, May 7). Log scales | Briefer. *Briefer*. https://briefer.cloud/blog/posts/logarithms/

Csikszentmihalyi, M., & Csikzentmihaly, M. (1990). *Flow: The psychology of optimal experience* (Vol. 1990, p. 1). Harper & Row.

Cui, D., Wei, X., Wu, D., Cui, N., & Nijkamp, P. (2019). Leisure time and labor productivity: A new economic view rooted from sociological perspective. *Economics: The Open-Access, Open-Assessment E-Journal*, *13*(2019-36), 1–24. https://doi.org/10.5018/economics-ejournal.ja.2019-36

Dahham, J., Kremer, I., Hiligsmann, M., Hamdan, K., Nassereddine, A., Evers, S. M. A. A., & Rizk, R. (2022). Valuation of costs in health economics during financial and economic crises: A case study from Lebanon. *Applied Health Economics and Health Policy*. https://doi.org/10.1007/s40258-022-00769-2

Daly, A., & Hess, S. (2020). VTT or VTTS: A note on terminology for value of travel time work. *Transportation*, *47*(3), 1359–1364. https://doi.org/10.1007/s11116-018-9966-4

Diamond, P. A., & Hausman, J. A. (1994). Contingent valuation: Is some number better than no number? *Journal of Economic Perspectives*, *8*(4), 45–64. https://doi.org/10.1257/jep.8.4.45

Dolan, P., & White, M. P. (2007). How can measures of subjective well-being be used to inform public policy? *Perspectives on Psychological Science*, *2*(1), 71–85. https://doi.org/10.1111/j.1745-6916.2007.00030.x

Dong-Min Rieu, Lee, K., & Ahn, H.-H. (2013). The determination of the monetary expression of concrete labor time under the inconvertible credit money system. *Review of Radical Political Economics*, *46*(2), 190–198. https://doi.org/10.1177/0486613413497911

Fan, Y., Potočnik, K., & Chaudhry, S. (2021). A process-oriented, multilevel, multidimensional conceptual framework of work–life balance support: A multidisciplinary systematic literature review and future research agenda. *International Journal of Management Reviews*, *23*(4). https://doi.org/10.1111/ijmr.12254

Fernández-Gutiérrez, M., Gimenez, G., & Calero, J. (2020). Is the use of ICT in education leading to higher student outcomes? Analysis from the Spanish Autonomous Communities. *Computers & Education*, *157*, 103969.

Fukasawa, M., Watanabe, K., Nishi, D., & Kawakami, N. (2020). Longitudinal association between adolescent work values and mental health and well-being in adulthood: A 23-year prospective cohort study. *Scientific Reports*, *10*(1). https://doi.org/10.1038/s41598-020-70507-y

Ganiyu, I. O., Derera, E., Atiku, S. O., & Fields, Z. (2020). Measuring the effectiveness of work–life balance strategies in the manufacturing sector. *SA Journal of Human Resource Management*, *18*, 1–10. https://doi.org/10.4102/sajhrm.v18i0.1216

Ghez, G. R., & Becker, G. S. (1975). *The allocation of time and goods over the life cycle*. Columbia University Press.

Hamza, H., & Jedidia, K. ben. (2017). Money time value and time preference in Islamic perspective. *Turkish Journal of Islamic Economics*, *4*(2), 19–35. https://doi.org/10.26414/tujise.2017.4.2.19-35

Helliwell, J. F., & Aknin, L. B. (2018). Expanding the social science of happiness. *Nature Human Behaviour*, *2*(4), 248–252. https://doi.org/10.1038/s41562-018-0308-5

Hulten, C. R., & Ramey, V. A. (2019). *Education, skills, and technical change: Implications for future US GDP growth*. University of Chicago Press.

Ilyas, R. (2017). Time value of money dalam perspektif hukum Islam. *AL-'ADALAH*, *14*(1), 157–172. https://doi.org/10.24042/adalah.v14i1.1991

Jowsey, T., Yen, L., & W, P. M. (2012). Time spent on health related activities associated with chronic illness: A scoping literature review. *BMC Public Health*, *12*(1), 1044. https://doi.org/10.1186/1471-2458-12-1044

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291. https://doi.org/10.2307/1914185

Kehinde, S., Moses, C., Borishade, T., Kehinde, O., Simon-ilogho, B., Kehinde, T., & Kehinde, K. (2023). A study of great resignation on work-life balance: Global perspective. *International Journal of Finance, Economics and Business, 2*(4), 280–300. https://doi.org/10.56225/ijfeb.v2i4.229

Levine, R. (1997). *A geography of time.* Oxford Oneworld Publications.

Lexén, A., Kåhlin, I., Erlandsson, L.-K., & Håkansson, C. (2020). Occupational health among Swedish occupational therapists: A cross-sectional study. *International Journal of Environmental Research and Public Health, 17*(10), 3379. https://doi.org/10.3390/ijerph17103379

Link to external site & Link to external site. (2023). Quality of work life: A unique motivational dynamic for oncology doctors in public health. *SA Journal of Industrial Psychology, 49*, 1–13. https://doi.org/10.4102/sajip.v49i0.2044

Maghfiroh, R. U. (2019). Konsep nilai waktu dari uang dalam sudut pandang ekonomi Islam. *El-Qist: Journal of Islamic Economics and Business, 9*(2), 186–195. https://doi.org/10.15642/elqist.2019.9.2.186-195

Mahmudah, A. M. H., Sarwono, D., Pramesty, R. I., & Rahina, P. S. (2016). Value of travel time for public transport passenger in urban and intercity trip. *Applied Mechanics and Materials, 845*, 408–415. https://doi.org/10.4028/www.scientific.net/amm.845.408

Mazerolle, S. M., Pitney, W. A., Goodman, A., Eason, C. M., Spak, S., Scriber, K. C., Voll, C. A., Detwiler, K., Rock, J., Cooper, L., & Simone, E. (2018). National Athletic Trainers' Association position statement: Facilitating work-life balance in athletic training practice settings. *Journal of Athletic Training, 53*(8), 796–811. https://doi.org/10.4085/1062-6050-51.11.02

Nordström, M., Hansson, S. O., & Hugosson, M. B. (2019). Let me save you some time… On valuing travelers' time in urban transportation. *Essays in Philosophy, 20*(2), 206–229. https://doi.org/10.7710/1526-0569.1640

Oliva, J., García-Mochón, L., José María Abellán-Perpiñán, & Mar, del. (2023). Determinants of the willingness to pay and willingness to accept in the valuation of informal care: The CUIDARSE study. *Applied Economic Analysis, 31*(93), 199–222. https://doi.org/10.1108/aea-02-2023-0044

Pigou, A. (2017). *The economics of welfare.* Routledge.

Read, D., & Read, N. L. (2004). Time discounting over the lifespan. *Organizational Behavior and Human Decision Processes, 94*(1), 22–32. https://doi.org/10.1016/j.obhdp.2004.01.002

Rodríguez-Modroño, P., & López-Igual, P. (2021). Job quality and work—life balance of teleworkers. *International Journal of Environmental Research and Public Health, 18*(6), 3239. https://doi.org/10.3390/ijerph18063239

Ross, I., Greco, G., Opondo, C., Adriano, Z., Nala, R., Brown, J., Dreibelbis, R., & Cumming, O. (2021). Measuring and valuing broader impacts in public health: Development of a sanitation-related quality of life instrument in Maputo, Mozambique. *Health Economics.* https://doi.org/10.1002/hec.4462

Shaikh, N., & Chandio, J. A. (2024). Work-life balance policies and organizational outcomes: A qualitative investigation. *Bulletin of Business and Economics (BBE), 13*(1), 1–16. https://doi.org/10.61506/01.00230

Steptoe, A., Deaton, A., & Stone, A. A. (2015). Subjective wellbeing, health, and ageing. *The Lancet, 385*(9968), 640–648. https://doi.org/10.1016/s0140-6736(13)61489-0

Thaler, R. (1981). Some empirical evidence on dynamic inconsistency. *Economics Letters, 8*(3), 201–207. https://doi.org/10.1016/0165-1765(81)90067-7

Tranmer, J. E., Guerriere, D. N., Ungar, W. J., & Coyte, P. C. (2005). Valuing patient and caregiver time. *PharmacoEconomics, 23*(5), 449–459. https://doi.org/10.2165/00019053-200523050-00005

Uddin, M. (2022). Antecedents, focus, and outcomes of work-life balance: A conceptual review. *IIUC Business Review, 9*(1), 27–46. https://doi.org/10.3329/iiucbr.v9i1.62182

Urwin, S., Van, B., Yiu Shing Lau, Rowland, C., Hanratty, B., & Grande, G. (2021). The monetary valuation of informal care to cancer decedents at end-of-life: Evidence from a national census survey. *Palliative Medicine, 35*(4), 750–758. https://doi.org/10.1177/0269216321989569

van den Berg, B., Brouwer, W. B. F., & Koopmanschap, M. A. (2004). Economic valuation of informal care. *The European Journal of Health Economics, 5*(1), 36–45. https://doi.org/10.1007/s10198-003-0189-y

van den Berg, B., Gafni, A., & Portrait, F. (2017). Attributing a monetary value to patients' time: A contingent valuation approach. *Social Science & Medicine, 179*, 182–190. https://doi.org/10.1016/j.socscimed.2017.02.025

Varian, H. R. (2010). *Intermediate microeconomics: A modern approach* (8th ed.). W. W. Norton & Co.

Verbakel, E. (2012). Leisure values of Europeans from 46 countries. *European Sociological Review, 29*(3), 669–682. https://doi.org/10.1093/esr/jcs046

Verbooy, K., Hoefman, R., van Exel, J., & Brouwer, W. (2018). Time is money: Investigating the value of leisure time and unpaid work. *Value in Health, 21*(12), 1428–1436. https://doi.org/10.1016/j.jval.2018.04.1828

Wang, Q., & Jiang, Y. (2023). Leisure time prediction and influencing factors analysis based on LightGBM and SHAP. *Mathematics, 11*(10), 2371. https://doi.org/10.3390/math11102371

Wardman, M., Chintakayala, V. P. K., & de Jong, G. (2016). Values of travel time in Europe: Review and meta-analysis. *Transportation Research Part A: Policy and Practice, 94*, 93–111. https://doi.org/10.1016/j.tra.2016.08.019

Zendania, A., & Setyani, K. (2022). Time value of money and economic value of time. *Fair Value: Jurnal Ilmiah Akuntansi dan Keuangan, 5*(5), 2419–2426. https://doi.org/10.32670/fairvalue.v5i5.2487