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**IMPACT OF EXTRA INCOME ON LEISURE:  
 A THEORETICAL FRAMEWORK**

*This paper develops a conceptual framework to study leisure behavior change given an extra income change. The model of time allocation is analyzed to find the optimal leisure and consumption as well as the factors impacting leisure. The findings suggest that leisure time can either rise or fall given an extra wage increase. The leisure lover is more willing to allocate more time for leisure when extra wages are reduced as compared with the consumption lover. The degree of substitutability between leisure and consumption strengthens the negative response of leisure time as extra wage changes.*

*Keywords: leisure; extra income; consumption.*

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**ВПЛИВ ДОДАТКОВОГО ПРИБУТКУ НА ДОЗВІЛЛЯ:  
 ТЕОРЕТИЧНІ ЗАСАДИ ДОСЛІДЖЕННЯ**

*У статті розроблено та представлено теоретичну основу для дослідження того, як змінюється дозвілля при зміні прибутків. Модель розподілу часу проаналізовано для опису оптимального розподілу часу на роботу та на дозвілля, а також для виявлення факторів, що впливають на дозвілля. Результати аналізу дають змогу припустити, що зі збільшенням додаткового прибутку час, виділений на дозвілля, може як збільшуватись, так і зменшуватись. При зменшенні ж доходів споживач, орієнтований на активні форми дозвілля, буде все одно витрачати більше часу на дозвілля, порівняно зі споживачем, що надає перевагу покупкам як формі дозвілля. Ступінь взаємозамінності дозвілля та споживання посилює негативний відгук часу дозвілля на зміни в додаткових заробітках.*

*Ключові слова: дозвілля; додатковий прибуток; споживання.*

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Сіріван Саксірірутай, Пірія Фолфірул  
**ВЛИЯНИЕ ДОПОЛНИТЕЛЬНОГО ДОХОДА НА ДОСУГ:  
 ТЕОРЕТИЧЕСКАЯ ОСНОВА ИССЛЕДОВАНИЯ**

*В статье разработана и представлена теоретическая основа для исследования того, как меняется досуг при изменении доходов. Модель распределения времени проанализирована для описания оптимального распределения времени на работу и досуг и для выявления факторов, влияющих на досуг. Результаты анализа дают основания предположить, что с ростом дополнительного заработка время, отведённое на досуг, может как увеличиваться, так и уменьшаться. При уменьшении же доходов потребитель, ориентированный на активные формы досуга, будет всё равно тратить больше времени на досуг, по сравнению с потребителем, предпочитающим покупки как форму досуга. Степень взаимозаменяемости досуга и потребления усиливает негативный отклик времени досуга на изменения в дополнительных заработках.*

*Ключевые слова: досуг; дополнительный доход; потребление.*

**Introduction.** Leisure is a type of activities relevant to individual time allocation, as presented in economic theory, which states that individual's utility is optimized by maximizing leisure and consumption under wage and time constraints. Leisure consists of activities carried out in different environments when time is elastic and there

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is no competition pressure or earning profit condition. As leisure is an indispensable element in time allocation and according to the layman, it is almost impossible for an individual to enjoy leisure through a surrogate (Gronau, 1976); inclusion of leisure activities as one part of economy does contribute to obtaining the total measure of "welfare".

Empirical works on leisure and time allocation included G. Becker's (1965) and R. Gronau (1986) who studied time allocation both for leisure and work. J. Owen (1971) stated the importance of leisure as a critical factor in time allocation for other activities. There is a number of different ways to define leisure time, for instance, leisure as a residual of work (Fischer, 2001; Kumar, 2005; Chen and Chevalier, 2007). To measure leisure price, a large number of studies focused on how leisure is related to wage and hours of work. J. Owen (1971) found a negative relationship of these factors, whereas W. Barnett (1979) additionally confirmed an unequal complementarities if leisure was measured in different types of goods, durable and non-durable ones.

Economists have found that leisure and wage rates evolve along one's life span (Becker, 1990 as quoted in Albelo and Serrano, 1998). Utility could be increased by maximizing leisure time, subject to income constraint calculated by using wage rates and working hours. Income constraints studied in earlier works are mostly related to current income, even in reality, individuals could earn different types of income, permanent and extra income. Even though wage or earning has been found to relate to many factors, including time devoted to other activities in, for instance, leisure and work, so far in the literature, the relationship between permanent and extra income and behavior regarding time allocation in leisure activities has not been explored as well.

This paper fills the research gap by exploring leisure time alteration when permanent and extra income change and further investigates the possible relationship between leisure and permanent income as well as leisure and extra income. Moreover, the study also aims at finding the determinants of leisure time in a theoretical framework as it represents the factors influencing individual's decisions regarding leisure time consumption. Then this paper develops a theoretical framework for an individual's leisure, time allocation, and consumption profile and their possible relationship with permanent and extra income.

The paper is organized as follows: consumption and time allocation, as illustrated in the theoretical framework. Then a mathematical model is presented to investigate optimal leisure and consumption and the roles of permanent and extra income in individual decisions on maximizing utility. Moreover, substitution, income, and total effect of leisure changes in response to permanent and extra wage changes are analyzed before the conclusion.

**Theoretical framework.** Leisure is an activity playing a key role in determining time allocation subject to individual preferences and labor supply. The distinction of the model is that it separates two types of earning, permanent and extra, in order to explore the impact of each type of revenue on individual's leisure, work, and the related time allocation. Since the level of extra income relies on individual's work time, while a permanent income increase does not require any changes in work hours, an individual's optimal leisure and work time possibly differ depending on which income type has changed. The study provides policy implications in terms of setting work hours, taxation, and encouraging leisure to increase welfare.

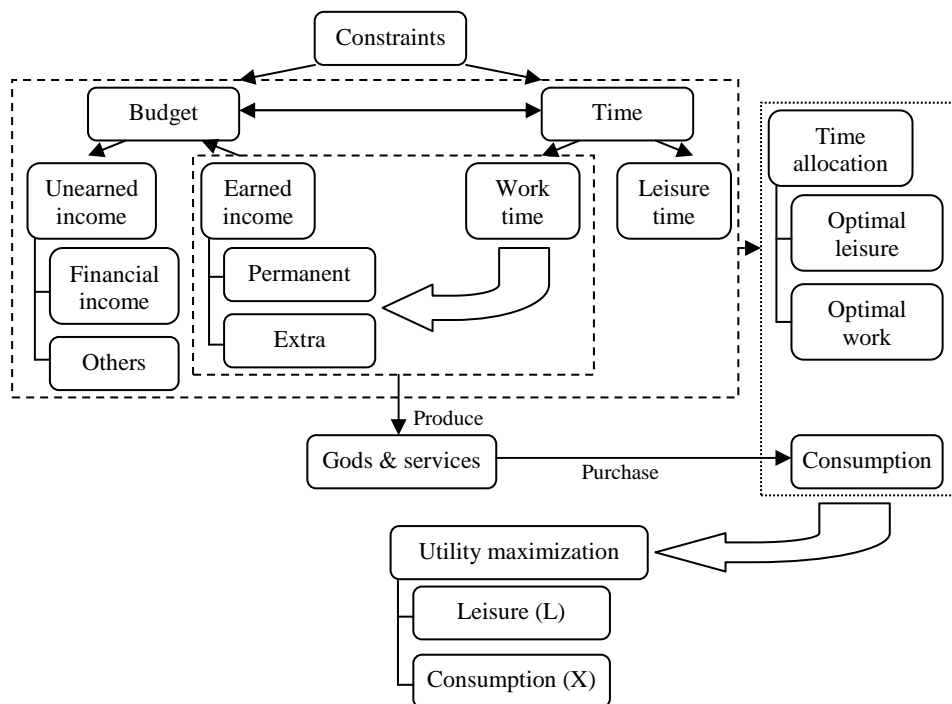


Figure 1. **Conceptual framework**, authors'

The conceptual framework of this paper is illustrated in Figure 1. There are two constraints faced by individuals, income and time, of which sources include work and non-work. Permanent and extra income are the two elements of earned income, whereas earnings from financial assets, rents, and others are categorized under unearned income. Each person spends time mainly for leisure and work, then combines his/her budget and time resources for optimal leisure time and consumption. The level of each activity's optimization relies on individual preference expressed in the utility function. This conceptual framework affirms the possible relationship of extra and permanent income and leisure.

Besides the analysis of the allocation of time and goods under the condition of two types of earned income, based on the model, the paper also explores the impact of extra wage change on leisure time use by considering how leisure alters, both in direction and magnitude, when wage changes.

**Optimal leisure and consumption.** In the model, each person's consumption for utility maximization is based on two commodities, leisure ( $L$ ) and goods ( $X$ ). There are two types of restrictions confronted by individuals, income and time. For the consumption function, the constant elasticity of substitution (CES) is assumed as the utility function. The CES utility function is more general and proved quite useful for illustrating the degree of substitutability present in leisure and other activity relationships (Albelo and Serrano, 1998). The consumption function,  $C$ , can be defined as  $C = f(X, L)$ , where  $X$  denotes the quantity of the consumption of goods and services, while  $L$  is time devoted to leisure. The CES utility function for individuals becomes

$$U = \begin{cases} \alpha \frac{X^\delta}{\delta} + (1-\alpha) \frac{L^\delta}{\delta} & \text{if } \delta \neq 0 \\ 0 \leq \alpha \leq 1, \delta < 1 & \\ [\alpha \ln X + (1-\alpha) \ln L], & \text{if } \delta = 0 \end{cases}, \quad (1)$$

where  $\delta$  is correlated to substitution parameter,  $\sigma$  by  $\sigma = 1 / (1 - \delta)$ . When  $\delta = 0$ ,  $\sigma = 1$ , which corresponds to the Cobb-Douglas case, whereas when  $\delta = -\infty$ ,  $\sigma = 0$ , it refers to the case of fixed proportion. Assuming that there are two types of activities that influence an individual's utility, the  $\alpha$  denotes consumption preference in the utility function, while  $(1 - \alpha)$  provides the importance of leisure in individual's utility. A leisure lover has relatively larger size of  $(1 - \alpha)$ , while consumption lovers tend to enjoy high proportion of  $\alpha$ . Each person receives mainly two types of revenue, earned income ( $V_M$ ) gained from work and unearned income ( $V_N$ ); the total earnings for an individual ( $V$ ) thus are

$$V = V_M + V_N. \quad (2)$$

The model provides only two ways to earn market income, working for extra and permanent income. Therefore, total work time,  $a$ , consists of the time an individual devotes to work for his or her extra income,  $a_T$ , and time to work for the permanent income,  $a_p$ , which is divided into two parts, the required work time for permanent income,  $a_p^{Min}$ , and additional work time for permanent income,  $a_p^A$ , as follows:

$$a = a_T + a_p; \quad a_T \geq 0; \quad a_p = a_p^{Min} + a_p^A; \quad a_p^{Min} > 0; \quad a_p^A \geq 0, \quad (3)$$

where  $a_p$  denotes the positive work time for permanent income. A permanent job earner is required to allocate at least a number of positive fixed work hours,  $a_p^{Min}$ , while he/she is free to allocate additional work time for a permanent job,  $a_p^A$ . Each person can choose his/her working hours to earn extra income and work a number of fixed hours. Total market income,  $V_M$ , obtained from those two types of income is

$$V_M = w_T a_T + w_p a_p^{Min} + (0) a_p^A. \quad (4)$$

At the same time, an individual might earn from other sources.  $V_N$  represents non-market earnings, composed of several types of revenue, for example, financial income, rents, dividends etc.

Each person devotes time for market work and leisure. Assuming no savings, budget constraints for each person indicate that wage earnings plus unearned income, which consists of financial income and others, should be equal to consumption of goods and services in each period, expressed as:

$$w_T a_T + w_p a_p + V_N = X, \quad (5)$$

where  $X$  denotes the value of consumption goods. For each person, time is spent in working for permanent and extra income and leisure, yielding time constraints.

$$a_T + a_p + L = \tau, \quad (6)$$

where  $\tau$  is available time. Then we substitute time constraint into budget constraint, as illustrated in (7). This implies that when a portion of work time is endogenous,

earnings can be traded for time and time for money at the margin. Income constraints, as denoted by  $S$ , become:

$$S = w_T(\tau - a_P^{Min} - a_P^A - L) + w_P a_P^{Min} - (0)a_P^A + V_N - X. \quad (7)$$

Individual sources of income consist of market and non-market ones. Leisure, a time-consuming activity, provides no earning. Utility from leisure cannot be gained unless a person does leisure activity himself/herself.

Utility maximization subject to constraint is written as follows:

$$\text{Max } \alpha \frac{X^\delta}{\delta} + (1-\alpha) \frac{L^\delta}{\delta};$$

$$\text{s.t. } S = w_T(\tau - a_P^{Min} - a_P^A - L) + w_P a_P^{Min} - (0)a_P^A + V_N - X.$$

We find that optimal leisure ( $L^*$ ) and consumption ( $X^*$ ) are:

$$L^* = \frac{w_T(\tau - a_P^{Min} - a_P^A) + w_P a_P^{Min} + (0)a_P^A + V_N}{w_T + \left(\frac{1-\alpha}{\alpha w_T}\right)^{\frac{1}{\delta-1}}}. \quad (8)$$

The demand for leisure, as stated above, yields the optimal consumption,  $X^*$

$$X^* = \frac{w_T(\tau - a_P^{Min} - a_P^A) + w_P a_P^{Min} + (0)a_P^A + V_N}{1 + w_T \left(\frac{\alpha w_T}{1-\alpha}\right)^{\frac{1}{\delta-1}}}. \quad (9)$$

From the value of  $X^*$  above, the optimal consumption is determined by the share of leisure ( $1 - \alpha$ ) and consumption ( $\alpha$ ) in an individual preference, as well as wages and time of work for the two types of earnings. Moreover, unearned income also impacts optimal consumption. For a person with substantial unearned income ( $V_N$ ), including financial one, for instance, earnings from interests and equity share, he/she tends to increase consumption.

(8) and (9) show that changes in permanent and extra wages affect both leisure ( $L$ ) and consumption ( $X$ ). When permanent wage rises, for instance, a monthly salary increase, it causes positive changes to both leisure and consumption of goods and services. On the other hand, an extra wage increase, for example, higher rate of overtime per hour, certainly brings about the rise of consumption, while the extra wage increase partly crowds out the enhancement of leisure since the rise of extra wage induces an individual to increase his/her working hours ( $a_T$ ) for the sake of higher revenue. Additionally, non-labor income ( $V_N$ ) and individual's preferences in consumption (the value of  $\alpha$  and  $(1 - \alpha)$ ) also influence decisions regarding optimal time allocation.

**Impact of extra wage change on leisure time.** The concept of categorizing income was supported by (Gilbert and Pfouts, 1958) as quoted in (Fan, 1972), who explored the responsiveness of hours of work with respect to wage rate change. They estimated the impact of wage increase on work effort, which is comparable to extra wage. According to that study, how wage change impacts individual's work hours depended on the magnitude of substitution and income effects. In this model, there are two types of wages, those from extra income ( $w_T$ ) and those obtained from permanent income ( $w_P$ ).

$$\frac{\partial L^c}{\partial w_T} = \frac{1}{\delta} \left[ \frac{\delta U}{\alpha \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{\delta}{\delta-1}} + (1-\alpha)} \right]^{\frac{1-\delta}{\delta}} \left[ \frac{\left( \frac{\alpha \delta U}{w_T} \right) \left( \frac{\delta}{\delta-1} \right) \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{\delta}{\delta-1}}}{\left( \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{\delta}{\delta-1}} + (1-\alpha) \right)^2} \right]. \quad (10)$$

Total effect on leisure from wage change can be categorized into impact of substitution and income change, as presented in (10). The substitution effect reports the negativity of substitution effect, as could be noted from  $\delta$ , given  $\delta < 1$ . The magnitude of the effect mainly depends on individual's shares of leisure ( $1 - \alpha$ ), of consumption ( $\alpha$ ), and extra wage ( $w_T$ ). The higher is the share of leisure, the stronger is the substitution effect. A person that favors consumption has a weaker substitution effect.

Income effect represents changes in leisure with respect to non-labor income, resulting in a shift in earnings.

$$a_T \frac{\partial L}{\partial V_N} = \left[ \frac{1}{w_T + \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{1}{\delta-1}}} \right] a_T. \quad (11)$$

(11) indicates a positive relationship between unearned income and leisure. It implies that if non-labor income rises, a person prefers to increase his/her leisure. Both extra wage and work time for an extra job influence income effect. The longer is work time for extra income ( $a_T$ ), the greater will be the income effect, while extra wage works in the opposite direction since increasing (decreasing) earning given equal unit of time induces (reduces) leisure time use. Additionally, (11) suggests that a leisure lover enjoys larger income effect.

The total effect is the summation of substitution and income effect, as written in:

$$\frac{\partial L}{\partial w_T} = \frac{\left[ w_T + \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{1}{\delta-1}} (\tau - a_P^{Min} - a_P^A) - [w_P a_P^{Min} + (0)a_P^A + V_N] \left[ 1 - \frac{1}{w_T} \left( \frac{1}{\delta-1} \right) \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{1}{\delta-1}} \right]}{\left[ w_T + \left( \frac{1-\alpha}{\alpha w_T} \right)^{\frac{1}{\delta-1}} \right]^2}. \quad (12)$$

(12) does not clearly indicate whether the total effect becomes positive or negative. Therefore, an individual can either decrease his/her leisure time in response to extra wage increase  $\left( \frac{\partial L}{\partial w_T} < 0 \right)$  or enhance leisure time when extra wage rises

$$\left( \frac{\partial L}{\partial w_T} > 0 \right).$$

The total effect is the sum of substitution and income effect. From (12), total effect could be either positive, or negative. This finding corresponds with that in (Fan, 1972), indicating that the direction of change in leisure time when extra wage changes is undetermined.

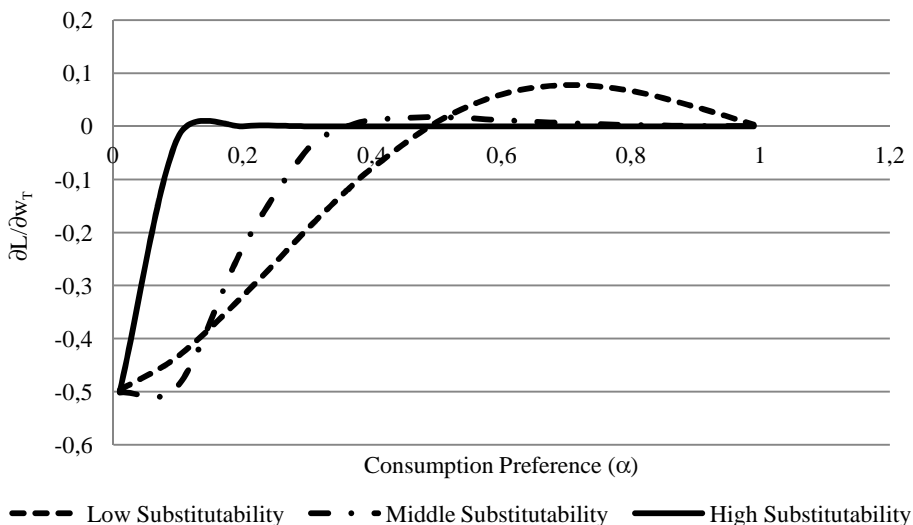


Figure 2. Total effect of change in leisure given an extra wage change in various leisure/consumption preferences, authors'

Figure 2 plots the total effect of leisure time change in response to extra wage change,  $\frac{\partial L}{\partial w_T}$ , reflecting an individual's leisure time allocation behavior at various levels of leisure/consumption preference by conditioning on  $\delta$ , which corresponds to the substitution parameter  $\sigma$ . The greater the value of  $\delta$ , the more likely would be the positive change on total effect. This means that when there is a higher degree of substitutability between leisure and consumption, an individual, especially leisure/consumption neutral, is more likely to allocate positive leisure time in response to extra wage increase.

For a person preferring leisure to consumption (low value of  $\alpha$ ),  $\frac{\partial L}{\partial w_T}$ , is highly negative. This implies that a fall in extra wage causes a greater change in a rise in leisure time  $\left(\frac{\partial L}{\partial w_T} < 0\right)$ . For example, when there is a fall in extra income, a consumption lover with a moderate degree of  $\alpha$  is likely to increase comparatively less leisure time, as compared with a leisure lover, when  $\left(\frac{\partial L}{\partial w_T} < 0\right)$ . For a consumption lover has a higher value of  $\alpha$ , he/she would even decrease his or her leisure time when extra wage falls, or  $\left(\frac{\partial L}{\partial w_T} > 0\right)$ .



The simulation indicates that leisure lover (a person whose  $\alpha$  is comparatively low) is more willing to increase time on leisure as extra wage falls, while a consumption lover pays more attention to leisure time only when his/her extra wage rises. Furthermore, as leisure and consumption are more substitutable ( $\delta$  is close to 1), a leisure lover tends to allocate more time on leisure in response to a decrease in extra wage rate and vice versa.

Now this paper compares two types of people, a leisure lover (person with  $(1 - \alpha) > \alpha$ ) and a consumption lover (person with  $\alpha > 1 - \alpha$ ). The comparison of the substitution effects, the income effects as well as the total effects, when the share of leisure is greater than the share of consumption, are as follows:

**Proposition 1:** share of leisure  $(1 - \alpha) >$  share of consumption  $(\alpha)$ .

This case is for an individual preferring leisure to consumption, implying a higher share of leisure in his/her utility function. The effects of changes in both types of wages on leisure change are represented as follows:

1. Income effect of extra income change on leisure  $\left( a_T \frac{\partial L}{\partial V_N} \right)$ .

As the share of leisure  $(1 - \alpha)$  is one of the variables that appear in (12), income effect is higher for a leisure lover than for a consumption lover. Note that the greater is the extra wage ( $w_T$ ), the smaller is the impact of income change on leisure. This is possibly because low extra wage takes a smaller proportion of the whole amount of earnings, given the equal amounts of work time for permanent income and individual's share of leisure and consumption.

For a leisure lover, the value of income effect is simply higher than for a consumption lover. The person with lower extra income tends to be more affected by extra wage change. In total, (11) indicates a positive income effect.

2. Substitution effect of extra income change on leisure  $\left( \frac{\partial L^e}{\partial w_T} \right)$ .

From (10) it can be seen that the substitution effect depends on individual's shares of leisure  $(1 - \alpha)$  and consumption  $(\alpha)$  and extra wage ( $w_T$ ). Greater share of leisure preference  $(1 - \alpha)$  could provide a more negative substitution effect. Furthermore, an extra wage ( $w_T$ ) increase (decrease) simply weakens (strengthens) the substitution effect. In comparison, a leisure lover tends to obtain a higher substitution effect than a consumption lover does. (10) indicates that an increase in extra wage ( $w_T$ ) could make a leisure lover and consumption lover less willing to give up additional extra wages. (11), the substitution effect of leisure alterations on changes in extra wage implies that an individual preferring leisure is likely to be less responsive to extra wage decreases (increases) by increasing (decreasing) his/her leisure than a person that loves to consume goods and services.

3. Total effect of extra income change on leisure  $\left( \frac{\partial L}{\partial w_T} \right)$ .

From the analysis of (12), the total effect of leisure change in response to extra wage change can be either positive, or negative. Greater permanent income causes a leisure time increase. On the other hand, more extra income is likely to reduce the magnitude of leisure change. The more an individual prefers leisure, the higher will



be his/her responsiveness of leisure deviation when extra wage changes. In total, it is not indicated whether the total effect is positive or negative since it depends on the utility function, which represents each person's preference.

**Proposition 2:** share of consumption ( $\alpha$ ) > share of leisure ( $1 - \alpha$ ).

Since each person provides dissimilar preferences and behaviors regarding both consumption and leisure, the optimal level of leisure and consumption also varies. The optimal level, as seen in (8), of leisure ( $L$ ) for a consumption lover is certainly lower than for a leisure lover. In this case, the effects of permanent and extra income change on leisure are analyzed as follows:

1. Income effect of extra income change on leisure  $\left( a_{\tau} \frac{\partial L}{\partial V_N} \right)$ .

According to (11), level of the income effect depends on the length of work time for permanent income and extra wage. A person spending less time working for permanent income tends to absorb the effect of revenue change more easily. In addition, if that person does not earn high extra wage, the income effect of revenue change on leisure would be even larger. The positive income effect for the consumption addicted tends to be smaller as compared with that of a leisure lover.

2. Substitution effect for extra income change on leisure  $\left( \frac{\partial L^c}{\partial w_{\tau}} \right)$ .

From (10), a person that comparably prefers consuming tends to change leisure in the opposite direction in response to extra income than a leisure lover does. For both people preferring to consume or engage in leisure, if higher extra income, for example, overtime, is offered, they tend to spend less time on leisure (and possibly work more).

3. Total effect of extra income change on leisure  $\left( \frac{\partial L}{\partial w_{\tau}} \right)$ .

For a consumption lover, a rise in extra wage is more likely to negatively impact leisure. On the other hand, a consumption lover can either positively, or inversely change leisure time allocation given a change in extra wage. Moreover, a consumption lover whose permanent income and extra wage are higher is more responsive to extra income fluctuation. The higher is the share of consumption ( $\alpha$ ), the smaller is the amount of leisure change in response to extra wage change.

The analysis of extra wage change on leisure indicates the possibility of both positive and negative relationship between change in income and leisure time adjustment. The substitution effect causes an inverse alteration of leisure given an extra wage change. Higher extra wage is likely to lessen the substitution effect. The income effect reports a positive change of leisure in response to non-labor income change. In total, whether a rise in extra income increases leisure time truly depends on individual's utility and preferences. The finding in this paper is supported by the results in W. Barnett (1975) and A. Kumar (2005), and can also be associated with J. Owen (1971); they reported an increase in leisure time as the wage increased. The result also agrees with the theoretical analysis in L.-S. Fan (1972), who found that the direction of change in leisure time was undetermined when the wage rate changes.

The result of the total effect analysis demonstrates that a leisure lover prefers leisure responses inversely, whereas a consumption lover is less responsive to change

in leisure when extra wage rises or falls. It is possible that leisure lover has already taken comparatively more leisure time; then he/she is willing to dedicate larger stock, as compared to that of a consumption lover, of leisure time to work for more extra income. Higher leisure price when extra wage increases explains the behavior of leisure time reduction and vice versa.

**Conclusion.** Even though leisure is an activity that plays a critical role in individual time allocation, the empirical research has only recently focused on leisure and its importance to the economy. At the beginning of the study of time allocation, work time, yielding labor supply, was the factor highlighted, while leisure time was simply defined as time spent away from work. The paper explores how time devoted to leisure changes in response to a rise or fall in permanent wage and extra wage. The findings reveal that there is a number of factors influencing the total effect, substitution, and income effect of leisure change given wage changes. Unearned income enhances the magnitude of the total effect of leisure time change, while extra wage increase can both raise and reduce the total effect on leisure. Whether leisure rises or falls totally in response to extra wage change depends on individual's utility and preferences. A leisure lover is more likely to spend more time on leisure when extra wage is reduced compared with a consumption lover. The more is the substitutability of leisure and consumption, the more negative is the responsiveness of leisure time allocation when extra wage increases, especially for a leisure lover.

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