ESSAYS ON LEISURE OF THE THAI PEOPLE

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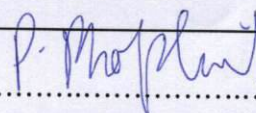
A Dissertation Submitted in Partial

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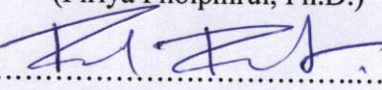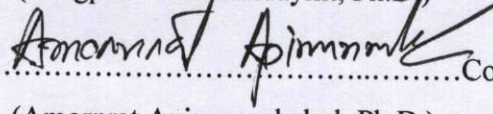
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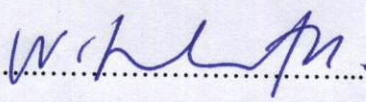
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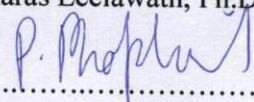
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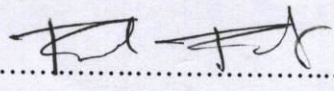
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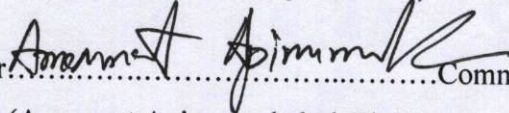
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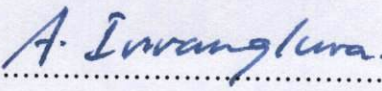
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ABSTRACT

Title of Dissertation	Essays on Leisure of the Thai People
Author	Miss Siriwan Saksiriruthai
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This is a collection of essays on the leisure of the Thai people. The first essay, The Impact of Extra Income on Leisure: A Theoretical Foundation, develops the conceptual framework for exploring the individual's leisure time allocation when his or her wages change. In the study, an individual's income, as a part of budget constraints, is separated into two types, permanent and extra income. Permanent income is given for a fixed work time (for instance, a fixed monthly salary), while the extra income (for instance, overtime and bonus) depends on the length of work time. A model of time allocation is then analyzed for optimal leisure and consumption. Additionally, the paper proceeds to analyze the factors influencing the substitution effect, the income effect, and the total effect of leisure time allocation given a change in extra wages, as well as explores how people, with a variety of leisure/consumption preference respond dissimilarly to leisure time allocation. The results suggest that the magnitudes of those effects rely on the importance of leisure in an individual's utility. In total, leisure time can either rise or fall in response to extra wage increase, depending on the individual's utility function. A leisure lover is likely to allocate more time for leisure when an extra wage is reduced than will a consumption lover. The higher the degree of substitutability between leisure and consumption, the greater the magnitude of changes in an extra wage will be on leisure time use.

Essay two, Is Leisure A Normal Good for the Thai People?, aims to explore, empirically, Thai people's behavior regarding time use by employing Time Use Survey and Labor Force Survey to find the determinants of leisure time allocation, as well as the relationship between leisure time use and the individual's income. Leisure is divided into

four different measures, from the narrowest to the broadest. Narrowly defined as time spent for direct enjoyment, leisure is distinctively consumed by university graduates more than by lower-educated people by more than 10%, whereas single spend more leisure time than those of other statuses. However, how educational level and marital status affect leisure time use becomes unclear when leisure is more broadly defined as the residual of work. Thai people in the agricultural sector engage in more leisure time than others. During a week, Thai people enjoy leisure time the most on Sunday, while allocating the least leisure time to Monday. In addition, this study reveals the existence of a gender gap, where males have priority in terms of work choice. This means that males can choose to work in the market only while females are more likely to be responsible for non-market work, for example, housework and home production than males. Female wage workers take substantially less time for leisure, but a longer time for housework. The estimation of leisure time allocation in response to wage change among the Thais significantly indicates that people allocate more time for leisure in response to an increase in their hourly wage. This finding signifies that leisure is a normal good for the Thai people.

In order to examine whether leisure, which is usually considered unproductive in relation to economic growth, positively impacts an individual's wage in the labor market, Essay 3, Does Leisure Contribute to Wage Improvement of the Thai People?, aims to explore whether leisure activities can be correlated with wage improvement. The study categorizes leisure into seven types which theoretically provide a positive impact on wage change: computer use, media use, recreation, sport and exercise, sleeping and personal care, social participation and volunteer activities, and finally, learning during leisure time. The findings indicate that media use and recreation evidently contribute to the wage increase, while leisure time use for social participation and volunteer activities is negatively related to wage change. However, the study does not offer conclusions regarding how leisure activities such as computer use, sleep and personal care, as well as sport and exercise, influence wage change. The study extends the ideas in essay two by further examining how leisure time is affected by an individual's wage and income. The results indicate a positive relationship between leisure time and wage, confirming that leisure is a normal good for the Thai people.

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EXECUTIVE SUMMARY

Among the activities in an individual's time use, leisure is an indispensable element in time allocation. Nevertheless, from the past, leisure was simply categorized as a kind of non-work activity, even if it is true that leisure is significantly different from other activities, for instance, housework and home production. For years, people have tended to focus more on work hours than on leisure, even though leisure psychologically plays a critical role in human life. Numerous concepts of leisure have been developed[1]. This collection of essays emphasizes an individual's leisure time allocation. The empirical research further explores this issue regarding the Thai people as to whether leisure is a normal good as well as whether leisure contributes to wage improvement.

Essay 1 Impact of Extra Income on Leisure: A Theoretical Foundation

An individual's time use is usually focused on market activities, as it creates monetary valuation, which directly boosts economic growth. However, besides market activities, each person gains utility from non-market activities and time use. While the consumption of goods and service increase has to be obtained by exchanging goods and services with money or other market benefits, which can usually be obtained from working in the market, leisure is an activity only driven by time for enjoyment and increases utility. Considered unnecessary for generating economic growth, leisure is an activity that raises an individual's utility and welfare, which mainly require time for achieving utility maximization. This paper emphasizes the individual's time use for leisure under the condition that time allocation is divided into leisure for utility maximization and work for receiving income for consumption. Wages can be divided

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[1] For example, Jeffery Gobbi defined leisure as a life which is released from the outer pressure of civilization and substance environment, which can be, for example, routine work, and is relatively free, whereas De Grazia pointed out that leisure is a quality of feeling. Explanations of leisure in Chinese and English languages concluded that leisure means living a life of ease.

into two types, permanent and extra wages. A permanent wage is a certain amount of earning in a range of time, for instance, a monthly salary. An extra wage is the earning directly related to the length of work time, for example, overtime. Based on the microeconomic theory of time allocation, a model for the optimization of leisure and consumption under the assumption of these two types of an individual's wage, permanent and extra wage, is developed for this study As a permanent job limits work time to only a fixed number of hours, a rise in wage does not alter time for work and hence leaves leisure time unchanged. The objectives of this study include finding how each person adjusts his or her leisure time in response to a change in extra wage. Also, the research divides people into consumption lovers and leisure lovers. Whether extra income enhances or deteriorates leisure time depends on the individual's preference. A leisure lover is relatively more responsive regarding leisure time consumption when there is a change in extra wages than a consumption lover. The degree of substitutability between leisure and consumption plays a key role in strengthening the negative response of leisure time as an extra wage changes.

Essay 2 Is Leisure a Normal Good for the Thai People?

Traditional economic theory generally promotes increasing income for the maximization of an individual's utility, as well as macroeconomic growth and welfare, while leisure is not a topic of interest to economists, as it does not enhance income or increase economic growth. The paper focuses on the definition of leisure time according to various measures[2], from the narrowest, time consuming activities in the pursuit of direct enjoyment, to the broadest, the residual of work and how leisure plays a critical role in raising an individual's utility, leading to a rise in happiness and welfare. Using Time Use Survey and Labor Force Survey data, this study emphasizes how Thai people allocate their leisure time in response to their wage, the opportunity cost of leisure, rise and fall. This study, using a variety of definitions of leisure, yields the finding that people

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[2] Based on Aguiar, Mark and Hurst, Erik. 2007. Measuring Trends in Leisure: The Allocation of Time over Five Decades. **Quarterly Journal of Economics.** 122 (2): 969-1006.

increase their leisure time in response to hourly wage increases, indicating that leisure is a normal good for Thai people. Moreover, the result also reveals the significance of a gender gap between males and females, implying that there exists a social structure whereby men have the opportunity to choose to work in the market while females, even while working in the market, are responsible, to devote time for housework and home production. Therefore, females obviously consume a substantially less leisure time[3].

Essay 3 Does Leisure Contribute to an Increase in the Wages of the Thai People?

Each person spends hours per day for leisure as the residual of work[4] in a variety of activities. This study aims to explore whether these leisure activities contribute to an increase in wage. These activities include computer use, media use, personal care, recreation, sport and exercise, social participation and volunteering activities, and learning. Computer use leisure includes computer use activities for non-work purposes as well as Internet use, whereas media use activities include reading, watching TV, VDO, DVD and VCDs, listening to the radio and music, and library visiting. Those activities improve wages by boosting computer skills, and knowledge and psychological benefits. Sleeping, eating, and self-caring are on the list of personal care activities that fulfill physical needs as well as improve physical and mental health. Recreation includes activities such as playing games, sightseeing, and cultural site visits which not only improve knowledge but also yield happiness from the recreational time spent. All kinds of sport activities and exercise, both indoor and outdoor, listed in the group of sport and exercise clearly benefit physical one's condition and health, including mental condition. Social participation and volunteering increase interpersonal relationships and social connections. Learning in one's free time for skill and career development raises the usefulness of time use, which could improve knowledge and skills. Using the Time Use

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[3] This corresponds to Beblo, Miriam and Robledo, Julio R. 2008. The Wage Gap and the Leisure Gap for Double Earner Couples. **Journal of Population Economics.** 21: 281-304.

[4] Market work, housework and home production

Survey and Labor Force Survey, a number of activities were found to significantly influence an individual's wage change. Leisure time for media use and recreation were positively correlated with wage rise or fall, while time for social participation and volunteering were negatively correlated with wage change. Whether leisure activities such as learning, computer use, and personal care contribute to Thai people's wage rise or fall could not be concluded according to this study. Since wage is found to be endogenous to leisure, this essay further re-investigates how wage influences leisure time use. The results confirm that leisure is a normal good for the Thai people.

Policy Implications

Studies of leisure disclose information on the individual's time allocation behavior as well as the factors influencing the individual's leisure time. Moreover, the finding whether some specific leisure activities improve one's wages provides a valuable link of leisure time use to the labor market, which reveals that the benefit of leisure is not only utility increase. Leisure time spending can increase an individual's wage and welfare growth simultaneously.

As each person responds dissimilarly to a change in extra wages, findings on how these wages influence leisure time would be helpful to the leisure industry. These findings imply that for wage workers, the greater extra wage that each worker receives could increase leisure time use. Additionally, the higher preferences for leisure, the greater the leisure time he or she is likely to engage in. A person with high unearned income, for example rents and financial interests, tends to consume greater leisure given the equal change in extra wages. This illustrates the relationship of time allocation to leisure, as it implies that stimulation of an individual's preferences regarding leisure activities by applying market and business strategies enhances the individual's demand for leisure. Promoting the leisure of people with higher unearned income, for instance, the retired and landlords, tends to create more leisure time than with individuals at other statuses.

The results from exploring the factors influencing leisure time indicate how people of different socio-demographic characteristics re-allocate leisure time in response to wage changes. Information on when during each week a person devotes time to leisure reveals that Sunday, the day when people spend relatively longer on leisure time, is a good choice for businesses to offer leisure activities and related products. The finding that singles take the longest leisure time compared with those of other status implies that leisure products segmented for singles are likely to generate more growth because of the higher tendency of leisure consumption of these individuals.

The government could promote some specific leisure activities in order to improve an individual's productivity and wage, which would also yield a welfare increase. In terms of mental improvement, promoting time allocation for recreational activities, for example developing more recreational parks and promoting recreational activities in communities, would not only bring about an individual's happiness from leisure, but also would increase labor productivity, which would increase one's wages as a consequence. The government's support of media use, especially for people in rural areas that are provided a substantially lower chance of media access, increases the chance of enjoying this activity group. This support is highly advantageous because media use contributes to the development of knowledge and productivity. This finding could also be used to obtain information for promoting related leisure products.

Further Studies and Future Research

This dissertation on the leisure of the Thai people provides a conceptual framework for the analysis of time use for utility maximization under the situation of both time and income constraints. The distinction of the study is that it divides wages into permanent and extra wages. Then, empirical investigation explores whether leisure is a normal good and further determines whether leisure activities, of various types, improve wages. The research reveals information on Thai people's behavior of leisure and time use, and the factors influencing leisure time, especially among the Thai people.

Focusing on Thai people's leisure time by employing the Time Use Survey and Labor Force Survey, this study still has the problem of limitations in data. It is not certainly indicated whether the wages presented in the Labor Force Survey, especially for wage workers, are permanent or extra wages, leaving the types of wages individuals earn inconclusive. Therefore, types of income should be more clearly defined in the data in order to make the empirical study of the impact of permanent and extra income on leisure time possible. As labor productivity plays a key role in an individual's wage, there should be additional variables for studying how leisure affects labor productivity, which influences wages and welfare as a consequence.

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ESSAY 1

IMPACT OF EXTRA INCOME ON LEISURE:
A THEORETICAL FOUNDATION

1.1 Abstract

Leisure is an indispensable element in an individual's time allocation, influencing utility maximization under budget constraints. This paper develops a conceptual framework to study leisure behavior change given an extra income change. An individual's wage, as a part of budget constraint, is separated into two types, permanent wage (for example, fixed monthly salary) and extra wage (for example, overtime and bonus). Then the model of time allocation is analyzed in order to find the optimal leisure and consumption as well as the factors impacting leisure. Moreover, the paper proceeds to analyze the substitution effect, income effect, and total effect. The finding suggests that leisure time can either rise or fall given an extra wage increase, for example, overtime wage rate change, impacting a positive change on leisure price possibly causing either a positive or negative change in leisure time. The leisure lover is more willing to allocate more time for leisure when extra wages are reduced compared with the consumption lover. The degree of substitutability between leisure and consumption strengthens the negative response of leisure time as an extra wage changes.

Keywords: Leisure, Extra income, Extra wage

1.2 Introduction

Leisure is a type of activities that increases and is relevant to an individual's time allocation, as presented in economic theory, which states that an individual's utility is optimized by maximizing leisure and consumption under wage and time constraints. Not only has the correlation between consumption and wage been affirmed since wages are a source of income for consumption, but economists have also found that leisure and wage rates evolve along one's life span (Becker, 1990 quoted in Albelo and Serrano, 1998: 9). Empirical research provides information on the individual's utility maximization condition under different constraints, based on the issues studied (for example, Barnett (1979: 544-536), Alderman and Sahn (1993: 875-883), and Kumar (2005: 4-22)). So far, the income constraints studied in earlier works mostly related to current income, even in reality, individuals could earn different types of income. Some people's earning varies according to the length of work time, called extra income, while some persons' income is fixed, called permanent income. Persons that earn different types of income possibly choose leisure time differently in response to wage or income change. This paper fills the research gap by exploring leisure time alteration when permanent and extra income change.

As mentioned, there is still no research on the impact of wage change on leisure time allocation in the situation where individuals earn both permanent and extra income. Whether people who earn a higher proportion of permanent income spend significantly more time on leisure or vice versa, compared with those earning extra income, has not been explored. In this paper, an economic model is constructed by separating an individual's earned income into extra and permanent income. Since permanent income is generally a fixed amount of money given in a certain range of time, while extra income of each earner varies depending on the conditions, such as work time and job characteristics, the work and leisure behaviors of those different types of earners are possibly dependent of the type income. Hence, this paper explores the possible relationship between leisure and permanent income as well as leisure and extra income. The study further finds the determinants of leisure time in a theoretical framework as it represents the factors influencing an individual's decisions regarding leisure time consumption.

There are two types of activities for which each person devotes time, economic and non-economic. Leisure, included in the latter type, consists of the activities that are carried out in different environments when time is elastic and there is no pressure of competition or of earning profit condition. Because of the exclusion of leisure from economic progress measures, it is not integrated as a part of GDP and GNP measures. 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, 1976a: 6); the inclusion of leisure activities as one part of the economy does contribute to obtaining a total measure of the "welfare" of people in the economy. Greenberg (1997: 413) has proved the existence of bias in cost-benefit analysis, a crucial part of net social benefits, when leisure cost was not included in the cost-benefit estimates. This implies that leisure is an inevitable part of economic analysis.

One of the earliest empirical works on leisure and time allocation study was Becker's (1965: 493-517) theory of the allocation of time. The model assumes that utility could be gained directly by combining time and market goods to produce consumption goods under two constraints, time and income. Gronau (1986: 282-288) elaborated on non-economic activities by separating leisure from work at home. For this, leisure plays a critical role in determining labor supply and it is detailed that leisure activities could take place elsewhere. Therefore, it is possible to enjoy leisure even during one's work time, so called "on-the-job leisure." Studies supporting the importance of leisure include Yamada, Yamada, and Kang (1999: 41-42), who pointed out that for each person, economic rationality is a critical factor in determining leisure time and time allocation for other activities. The studies of leisure and time allocation indicate the existence of the relationship of these factors. This reflects the use of time as a scarce resource for leisure and other activities determining the relative prices of goods and services.

For years, empirical research has revealed the importance of leisure in economic analysis and how leisure relates to wages and income. Focusing on the demand for leisure, Owen (1971: 69) found that leisure time was associated with real hourly wages, supporting the backward-bending supply curve of labor theory, and elaborated on leisure by separating leisure from market recreation, i.e. travelling, indicating that leisure includes activities that a person need not pay a direct cost for, i.e. napping and playing at home, not necessarily outdoor activities. The way to define leisure is more realistic than

some other empirical studies, which merely describe leisure as the residual of total hours of work (for instance, Fischer (2001: 249-269), Kumar (2005: 4-15) and Chen and Chevalier (2007: 353-356)). Alderman and Sahn (1993: 875-883) further found that a large share of transferred income would be allocated to leisure rather than other goods by analyzing large own-price elasticity of leisure in a developing country. This implies that if the price of leisure rises, leisure time falls at a higher proportion. This finding contradicts that of Owen (1971: 65-66), which declared that the price of leisure, as measured by wage, and income, provided slightly inverse changes to leisure. However, how leisure time changes in response to the price of goods changes also depends on which category of goods is used for estimation, as Barnett (1979: 544-536) argued that the interactions between goods and leisure by separating goods into different categories, i.e. durable and non-durable, suggested unequal complementarities between leisure and those goods. Hence, optimization of leisure for utility maximization has to be explored simultaneously with other activities by using the model of time allocation to find the optimal leisure time and other activities under the constraints that each person confronts.

The studies above provide a variety of aspects of leisure and how leisure relates to different goods and income. However, the income employed in those studies includes only current income, while there exists a research gap in the investigation of the relationship between leisure and permanent and extra income separately. 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 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, which is 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 an individual's decisions for maximizing utility. Moreover, substitution, income, and total effect of leisure changes in response to permanent and extra wage changes are analyzed before the conclusion.

1.3 Theoretical Framework

Leisure is an activity that plays a key role in determining time allocation subject to an individual's preferences and labor supply. The distinction of the model is that it separates two types of earning, permanent and extra income, in order to explore the impact of each type of revenue on an individual's leisure, work, and time allocation. Since the level of extra income relies on an 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 the setting of work hours, taxation, and encouraging leisure to increase people's welfare.
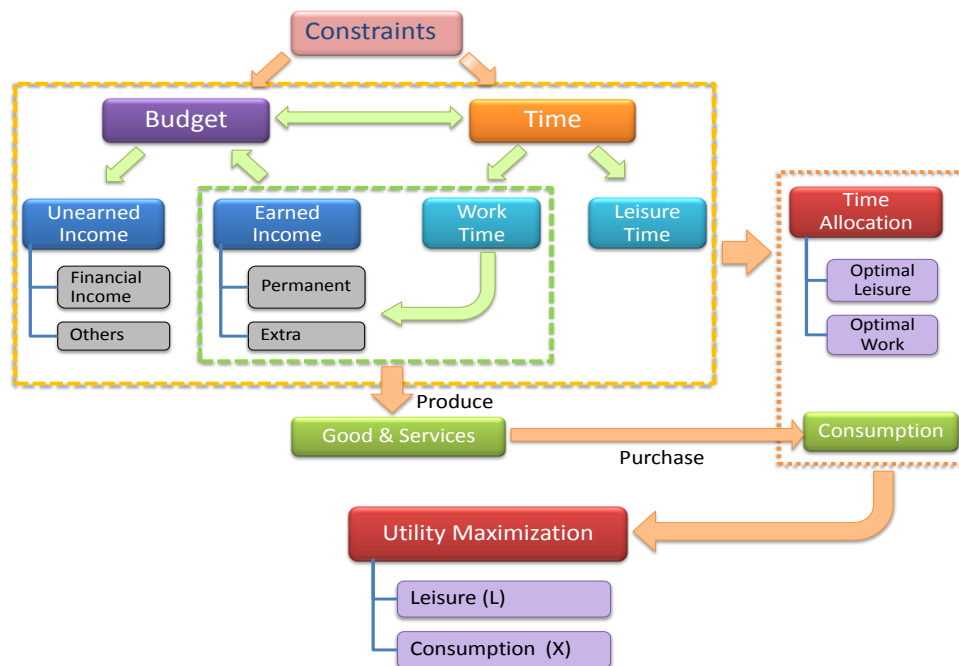
Figure 1.1 Conceptual Framework for Essay 1

The conceptual framework of this paper is illustrated in Figure 1.1. 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 or her budget and time resources for optimal leisure time and consumption. The level of each activity's optimization relies on the individual's 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 the 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.

1.4 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: 10). The consumption function, C, can be defined as

$$C \quad = \quad f(X, L)$$

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

$$(1) \quad U \quad = \quad \begin{cases} \alpha \dfrac{X^{\delta}}{\delta} + (1-\alpha)\dfrac{L^{\delta}}{\delta} & \text{if } \delta \neq 0 \\[4mm] & \quad \quad \quad \quad \quad \quad 0 \leq \alpha \leq 1, \delta < 1 \\[4mm] [\alpha lnX + (1-\alpha)lnL], & \text{if } \delta = 0 \end{cases}$$

where δ is correlated to substitution parameter, σ by $\sigma = \dfrac{1}{1-\delta}$. 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 α denotes consumption preference in the utility function,

while ($1-\alpha$) provides the importance of leisure in the individual's utility. A leisure lover has relatively larger size of ($1-\alpha$), while consumption lovers tend to enjoy high proportion of α. Each person receives mainly two types of revenue, earned income (V_M) gained from working in the market and unearned income (V_N); then the total earnings for an individual (V) become

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

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:

(3) $\qquad\qquad\qquad\qquad a \quad = \quad a_T + a_P$

$\qquad\qquad$ where $\qquad a_T \quad \geq \quad 0$

$\qquad\qquad\qquad\qquad a_P \quad = \quad a_P^{Min} + a_P^A \qquad , \qquad a_P^{Min} > 0$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad a_P^A \geq \ 0$

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 or she is free to allocate additional work time for a permanent job, a_P^A. Revenue earned from the market can be divided into permanent income ($w_P a_P$) and extra income ($w_T a_T$). It is calculated from wages and time of work. Each person can choose his or 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

(4) $\qquad\qquad\qquad V_M \quad = \quad w_T a_T + w_P a_P^{Min} + (0)\, a_P^A$

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

Each person devotes time for market work and leisure. Assuming no savings, the 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 follows:

(5) $\qquad\qquad\qquad w_T a_T + w_P a_P + V_N = X$

where X denotes the value of consumption goods. Besides income constraints, an individual also confronts restrictions in time available. Time is spent in working for permanent and extra income and leisure, yielding time constraints.

(6) $$a_T + a_P + L = \tau$$

where τ 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

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

An individual's sources of income consist of those from the market and non-market. Leisure, a time-consuming activity, provides no earning. Utility from leisure cannot be gained unless that person does that leisure activity himself or herself.

Utility maximization subject to constraint is written as follows:

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

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

In order to solve for L* and X*, the Lagrangian function (Z) is applied as follows:

(8)

$$Z = \alpha \frac{X^{\delta}}{\delta} + (1-\alpha)\frac{L^{\delta}}{\delta} + \lambda\{w_T(\tau - a_P^{Min} - a_P^A - L) + w_P a_P^{Min} + (0)a_P^A + V_N - X\} = 0$$

Taking the first-order condition yields:

$$(1-\alpha)L^{\delta-1} - \lambda = 0$$

(9) $$\alpha X^{\delta-1} - \lambda w_T = 0$$

$$w_T(\tau - a_P^{Min} - a_P^A - L) + w_P a_P^{Min} + (0)a_P^A - X = 0$$

The leisure-consumption ratio, or marginal rate of substitution between leisure and goods consumption, is obtained from $\dfrac{\partial Z/\partial L}{\partial Z/\partial X}$. It is the rate at which an individual is willing to trade leisure for consumption of goods and services while remaining equally well off. The results are represented below:

(10) $$\frac{L}{X} = \left(\frac{\alpha w_T}{1-\alpha}\right)^{\frac{1}{\delta-1}}$$

Then solving for L^* and X^* to obtain the leisure and consumption of goods and services:

$$(11) \qquad X = \left(\frac{1-\alpha}{\alpha w_T}\right)^{\frac{1}{\delta-1}} L$$

Substituting X in (11) into $\frac{\partial L}{\partial \lambda}$ in (8), optimal leisure (L^*) and consumption (X^*) are:

$$(12) \qquad L^* = \frac{w_T(\tau - a_P^{Min} - a_P^A) + w_P a_P^{Min} + (0)a_P^A + V_N}{w_T + \left(\frac{1-\alpha}{\alpha w_T}\right)^{\frac{1}{\delta-1}}}$$

The level of the optimal leisure depends not only on an individual's share of leisure preference $(1-\alpha)$ and consumption (α), but also on the value of earnings gained from work (V_M) and non-work (V_N). Note that an extra wage increase partly crowds out the positive effect of the enhancement of earnings from the market. The demand for leisure depends not only on the wages determined by the market (w_T and w_P), but also gains from the length of time each person is required to devote to a permanent job, a_P^{Min}. Additional work time for a permanent job, a_P^A, also negatively influences optimal leisure. Additionally, non-labor income (V_N) and an individual's preferences in consumption (the value of α and $(1-\alpha)$) also influence decisions regarding optimal time allocation. The demand for leisure, as stated above, yields the optimal consumption, X^*

$$(13) \qquad X^* = \frac{w_T(\tau - a_P^{Min} - a_P^A) + w_P a_P^{Min} + (0)a_P^A + V_N}{1 + w_T\left(\frac{\alpha w_T}{1-\alpha}\right)^{\frac{1}{\delta-1}}}$$

From the value of X^* above, the optimal consumption is determined by the proportion of share of leisure $(1-\alpha)$ and consumption (α) in an individual's 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 income, for instance earnings from interests and equity share, he or she tends to increase consumption.

Expression (12) and Expression (13) show that changes in permanent and extra wage 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 the 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 or her working hours (a_T) for higher revenue.

1.5 Impact of an Extra Wage Change on Leisure Time

The concept of categorizing income was supported by Gilbert and Pfouts (1958: quoted in Fan (1972): 481), who explored the responsiveness of hours of work with respect to change in wage rate. They estimated the impact of a wage increase on work effort, which is comparable to extra wage. According to the study, how wage change impacts an 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 wages obtained from permanent income (w_P). Estimating the effect of changes in leisure if there is a movement of income level under the utility maximization hypothesis can be represented by:

$$\frac{\partial L}{\partial w_i} = \text{Substitution Effect} + \text{Income Effect}$$

$$\frac{\partial L}{\partial w_i} = \frac{\partial L}{\partial w_i}\bigg| U = \text{Constant} + a_i \, \frac{\partial L}{\partial V_N}$$

where $i = T, P$. Total effect on? leisure from the wage change can be categorized into impact of substitution and income change. The substitution effect is obtained from differentiating compensated leisure demand with respect to wages earned from extra income and permanent income, while income effect confirms the reaction to leisure at the time of the individual's income shift.

$$(14) \qquad \frac{\partial L^c}{\partial w_T} = \frac{1}{\delta} \left[\frac{\delta U}{\alpha \left(\frac{1-\alpha}{\alpha w_T} \right)^{\frac{\delta}{\delta-1}} + (1-\alpha)} \right]^{\frac{1-\delta}{\delta}} \left[\frac{\left(\frac{\alpha \delta U}{w_T} \right) \left(\frac{\delta}{\delta-1} \right) \left(\frac{1-\alpha}{\alpha w_T} \right)^{\frac{\delta}{\delta-1}}}{\left(\left(\frac{1-\alpha}{\alpha w_T} \right)^{\frac{\delta}{\delta-1}} + (1-\alpha) \right)^2} \right]$$

Expression (14) reports the negativity of substitution effect, as could be noticed from δ, given $\delta < 1$. The magnitude of the effect also mainly depends on the individual's shares of leisure $(1-\alpha)$, share of consumption (α), and extra wage (w_T). The higher the share of leisure, the stronger is the substitution effect. A person that favors consumption provides a weaker substitution effect. From Figure 1.2, on the substitution effect, it can be seen that an increase in extra wage impacts the reduction of leisure from L^* to L^B.

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

$$(15) \qquad a_T \frac{\partial L}{\partial V_N} = \left[\frac{1}{w_T + \left(\frac{1-\alpha}{\alpha w_T} \right)^{\frac{1}{\delta-1}}} \right] a_T$$

Expression (15) indicates a positive relationship between unearned income and leisure. It implies that if non-labor income rises, a person prefers to increase his or her leisure. Both extra wage and work time for an extra job influence income effect. The longer work time for extra income (a_T), the greater the income effect will be, while extra wage works in the opposite direction since the increasing (decreasing) earning given equal unit of time induces (reduces) leisure time use. Additionally, Expression (15) suggests that the leisure lover enjoys a larger income effect. As illustrated in Figure 1.2, income effect moves leisure from L^B to L^{**}.

Total effect is the summation of substitution and income effect, as written in Expression (16).

(16)

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

Expression (16) reveals the influence of extra wage (w_T) and share of leisure time in utility (1-α) on leisure hours. Expression (16) does not clearly indicate whether the total effect becomes positive or negative. Therefore, an individual can either decrease his or her leisure time in response to an extra wage increase $\left(\frac{\partial L}{\partial w_T} < 0\right)$ or enhance his or her leisure time when the extra wage rises$\left(\frac{\partial L}{\partial w_T} > 0\right)$. This is illustrated in Figure 1.2: as wage for extra income increases, given the constant level of utility of U_1, leisure falls from L^* to L^B. Therefore, the substitution effect impacts the movement leftward from A to B. While income effect shifts leisure to the right hand side, increasing leisure from L^B to L^{**}, it causes the change from B to C. In Figure 1.2a, considering the hours of work for extra wages, an increase in an extra wage inversely impacts the individual's work time. Therefore, an increase in extra wage induces work time for extra income but diminishes leisure time, while Figure 1.2b illustrates the positive impact on leisure time change in response to the rise in extra wage. This enormous positive income effect crowds out the negative impact of the substitution effect and finally provides the total effect of leisure time change when extra wage rises or falls.

Total effect is the sum of the substitution and income effect. From Expression (16), total effect could be either positive or negative, while the substitution effect in (14) is negative. The income effect illustrated in (15) shows the positive direction of leisure change in the alteration in non-labor income. The huge income effect dominates the substitution effect, giving a positive total effect, as shown in Figure 1.2b, while the relatively smaller income effect, compared with the magnitude of the substitution effect,

provides a negative total effect, as presented in Figure 1.2a. This finding corresponds with that found in Fan (1972: 478-482), indicating that the direction of change in leisure time when an extra wage changes is undetermined.
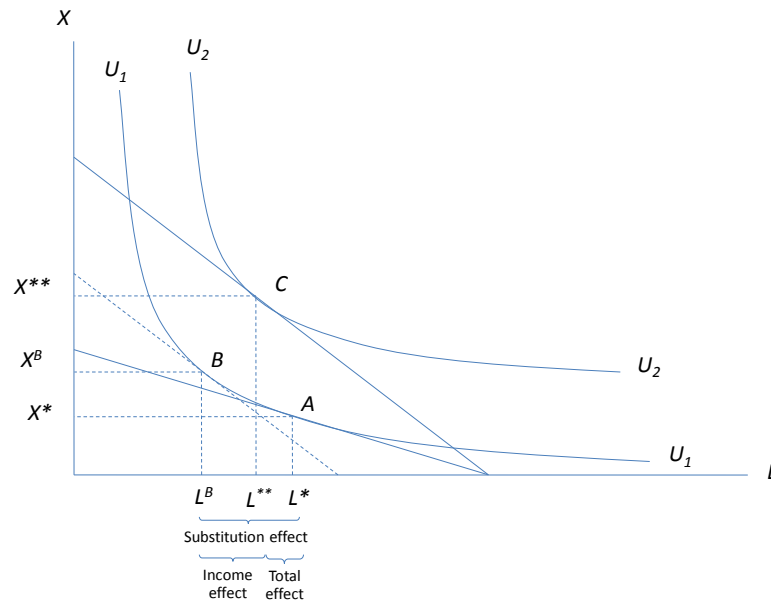
(a) Negative total effect of leisure in response to a rise in an extra wage
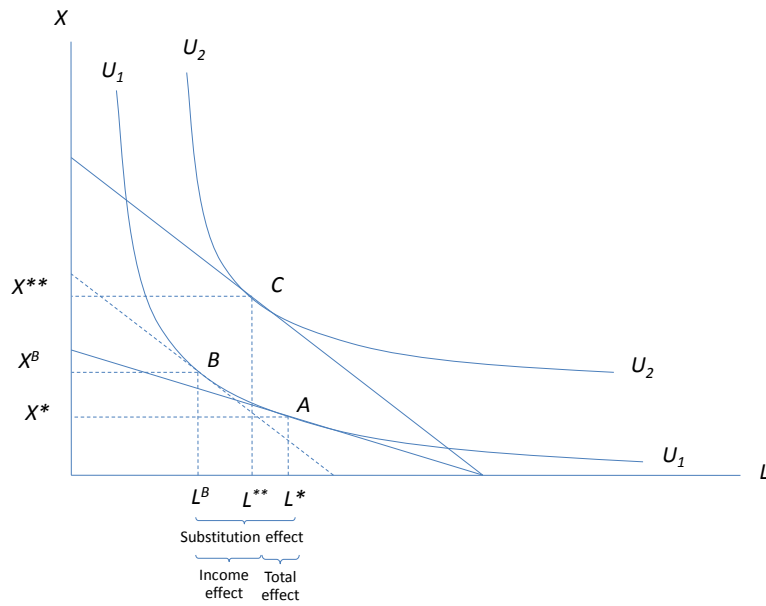
(b) Positive total effect of leisure in response to a rise in an extra wage

Figure 1.2 Substitution, Income, and Total Effects for an Increase in an Extra Wage
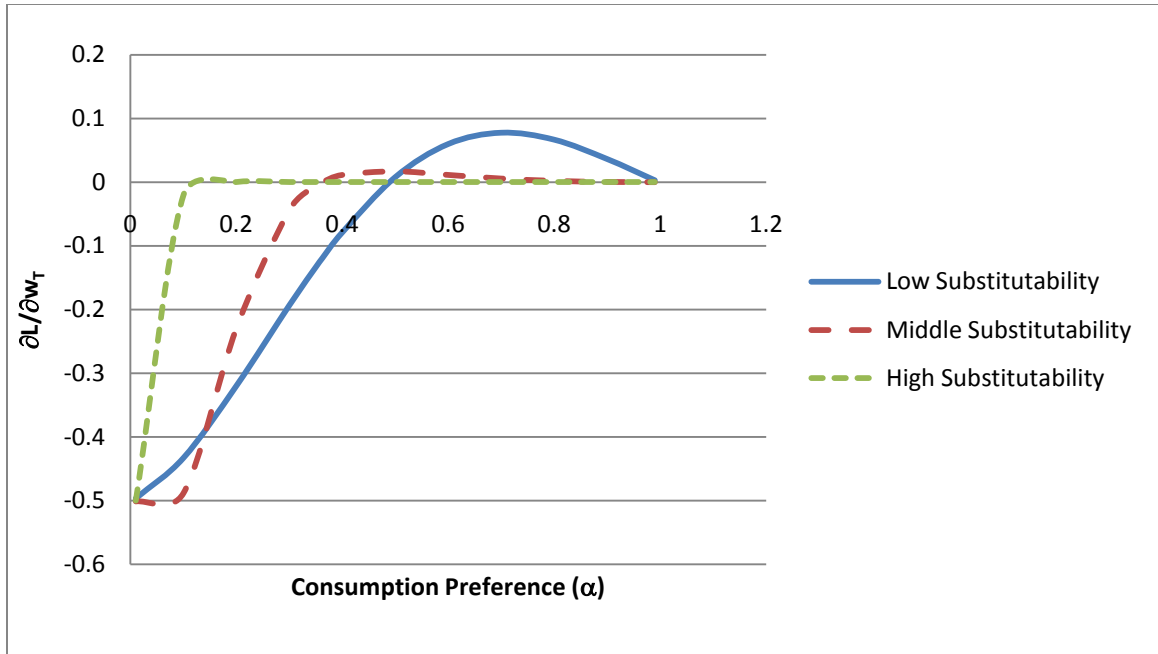
Figure 1.3 Total Effect of Change in Leisure Given an Extra Wage Change in Various Leisure/Consumption Preferences

Figure 1.3 plots the total effect of leisure time change in response to an extra wage change, $\dfrac{\partial L}{\partial w_T}$, reflecting an individual's leisure time allocation behavior at various levels of leisure/consumption preference by conditioning on the δ, which corresponds to substitution parameter, σ. The greater the value of δ, the more likely is 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 an extra wage increase, except for the leisure lover who possesses a very high proportion of leisure in utility function. When leisure and consumption are less substitutable, the individual is more likely to inversely change his or her leisure time given a change in an extra wage, as can be seen from the higher value of α yields a more negative value of $\dfrac{\partial L}{\partial w_T}$.

For a person preferring leisure more than consumption (low value of α), $\dfrac{\partial L}{\partial w_T}$ is highly negative. This implies that a fall in extra wage causes a greater change in a rise in leisure time ($\dfrac{\partial L}{\partial w_T} < 0$). On the other hand, a consumption lover, an individual with a higher value of α, is less negatively responsive ($\dfrac{\partial L}{\partial w_T} < 0$), or even responds positively ($\dfrac{\partial L}{\partial w_T} > 0$), to an increase or decrease in extra wage. For example, when there is a fall in extra income, a consumption lover with a moderate degree of α is likely to increase comparatively less leisure time, compared with a leisure lover, when ($\dfrac{\partial L}{\partial w_T} < 0$). For a consumption lover with a higher value of α, he or she would even decrease his or her leisure time when his or her extra wage fall, or ($\dfrac{\partial L}{\partial w_T} > 0$). Therefore, a leisure lover inversely responds to an increase or decrease in an extra wage, while a lower degree of consumption lover reacts less negatively when there is an increase in extra wage. However, a person with high preference for consumption tends to positively alter his or her leisure time.

The simulation indicates that the leisure lover (person whose α is comparatively low) is more willing to increase his or her time for leisure as extra wage falls—ceteris paribus—while the consumption lover pays more attention to leisure time only when his or her extra wage rises. Furthermore, as leisure and consumption are more substitutable (δ is close to 1), a leisure lover tends to allocate more time for leisure in response to a decrease in extra wage rate and vice versa.

As seen in the two models, it is assumed that a person gains utility by consuming only leisure and goods. Therefore, this paper compares two types of people, a leisure lover (person with ($1-\alpha$) > α) and a consumption lover (person with α > $1-\alpha$). The comparisons 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,

1.5.1 Proposition 1: Share of leisure ($1-\alpha$) > Share of consumption (α)

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

1.5.1.1 Income Effect of Extra Income Change on Leisure $\left(a_T \dfrac{\partial L}{\partial V_N} \right)$

The income effect describes the changes of leisure in response to revenue change only. As the share of leisure ($1-\alpha$) is one of the variables that appear in Expression (15), income effect is higher for a leisure lover than for a consumption lover. Notice that the greater the extra wage (w_T) of the worker, the smaller is the impact of income change on leisure. This is possibly because a low extra wage takes a smaller proportion of the whole amount of earnings, given the equal amounts of work time for permanent income and an 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 an extra wage change. In total, Expression (15) indicates a positive income effect.

1.5.1.2 Substitution Effect of Extra Income Change on Leisure $\left(\dfrac{\partial L^c}{\partial w_T} \right)$

From Expression (14), it can be seen that the substitution effect depends on the individual's shares of leisure ($1-\alpha$) and consumption (α) and extra wage (w_T). The 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. Expression (14) 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. Expression (15), 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 or her leisure than a person that loves to consume goods and services.

1.5.1.3 Total Effect of Extra Income Change on Leisure $\left(\dfrac{\partial L}{\partial w_T} \right)$

From the analysis of Expression (16), the total effect of leisure change in response to an extra wage change can be either positive or negative. The variables impacting total effect of extra income change on leisure, as shown in Expression (16), include the extra wage rate itself (w_T), permanent income ($w_P a_P$), unearned income, as well as the share of leisure (1-α) and consumption (α) in an individual's utility function. The higher permanent income a leisure lover earns, the larger is the magnitude of leisure change that is received in return. This implies that a greater amount of 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 or 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.

1.5.2 Proposition 2: Share of consumption (α) > Share of leisure (1-α)

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 Expression (12), 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:

1.5.2.1 Income Effect of Extra Income Change on Leisure $\left(a_T \dfrac{\partial L}{\partial V_N} \right)$

As mentioned above, a consumption lover is likely to react less responsively than a leisure lover does when non-labor income changes due to the lower value of share of leisure in the utility function (1-α). In this case, according to Expression (15), the level of the income effect depends on the length of work time for permanent income and extra wage. A person spending a shorter time working for permanent income tends to absorb the effect of revenue change more easily. In addition, if that person does not earn a high rate of 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 compared with that of a leisure lover.

1.5.2.2 Substitution Effect for Extra Income Change on Leisure $\left(\dfrac{\partial L^c}{\partial w_T} \right)$

As mentioned previously, the magnitude of substitution effect for a consumption lover is higher than that of a leisure lover, as a consumption lover has a greater value of α. What impacts the substitution effect includes extra wage rate as well as share of preference in consumption (*α*) and share of leisure (*1-α*). From Expression (14), it can be expected that a person that comparably prefers to consume tends to change leisure in the opposite direction in response to extra income than a leisure lover does. In addition, 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) since Expression (14) illustrates the negative change of the substitution effect in response to an extra wage change (*w_T*).

1.5.2.3 Total Effect of Extra Income Change on Leisure $\left(\dfrac{\partial L}{\partial w_T} \right)$

Since total effect of extra income change on leisure is also dependent on share of leisure (*1-α*) and share of consumption (*α*), as shown in Expression (16), a consumption lover is likely to engage in less leisure time when his or her extra wage increases. For this type of person, a rise in an 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. Additionally, a consumption lover whose permanent income and extra wage are higher is more responsive to extra income fluctuation. On the other hand, the higher share of consumption (α), 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 a 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. The higher value of extra wage is likely to lessen the substitution effect, whereas a consumption lover is less enthusiastic for a change in extra wage. The income effect

reports a positive change of leisure in response to non-labor income change. Considering the effect in total, a wage increase raises the price of leisure, so an individual chooses to reduce leisure time and raise his or her work hours for extra income. At the same time, the income rise boosts leisure demand, causing leisure time enhancement. Finally, whether a rise in the extra income increases leisure time truly depends on the individual's utility and preferences. The finding in this paper is supported by the results in Barnett (1975: 551) and Kumar (2005: 22), and can also be associated with Owen (1971: 69); they reported an increase in leisure time as the wage increased. Meanwhile, the result agrees with the theoretical analysis in Fan (1972: 478-482), 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 the leisure lover has already taken comparatively more leisure time; then he or she is willing to dedicate the larger stock, compared to that of a consumption lover, of leisure time to work for more extra income. The higher leisure price when an extra wage increases explains the behavior of leisure time reduction and vice versa.

1.6 Conclusion

Even though leisure is an activity that plays a critical role in an individual's time allocation, 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 development of the definition of leisure has provided a more elaborate measure of leisure as well as leisure in the behavioral model of time allocation.

This paper develops a conceptual framework to study the relationships between types of individuals' income and leisure by diversifying earnings into permanent income (for example, fixed monthly salary) and extra income (for example, overtime and bonus). This aims not only to investigate such relationships, but also to explore the factors influencing changes in the size of the effects. 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 are a number of factors influencing 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 an 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 the individual's utility and preference. A leisure lover is more likely to spend more time on leisure when an extra wage is reduced compared with a consumption lover. The more the substitutability of leisure and consumption, the more negative the responsiveness of leisure time allocation when an extra wage increases, especially for a leisure lover.

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ESSAY 2

IS LEISURE A NORMAL GOOD FOR THE THAI PEOPLE?

2.1 Abstract

This paper estimates empirical models mainly to find the impact of wage and income change on Thai people's leisure time, as well as the determinants of leisure time, in order to understand how individuals with different socio-economic characteristics allocate time for leisure. Leisure time is divided into four measures, from leisure as merely an activity yielding direct enjoyment to leisure as the residual of work. Using Thailand's Time Use Survey and Labor Force Survey, the estimation of leisure time in response to wage change among people significantly indicates that people positively increase their leisure time in response to an increase in hourly wage. This result reveals that for Thai people, leisure is a normal good. A social structure in which males "make the first move" indicates that there exists a social structure whereby men have the opportunity to choose to work in the market while females are responsible for housework and home production, even they also have to work in the market. This gender gap is confirmed by the shorter leisure time and longer time for housework for females. Among the seven days of a week, people spend unequal leisure time, indicating that there exist leisure gaps among the days of a week for Thais.

Keywords: leisure, wage, income, normal goods, Thailand

2.2 Introduction

Among the activities listed in an individual's time use, leisure takes a substantial proportion as it is physically necessary as well as mentally improves activities. This kind of non-market time is valuable to study since it helps understand the behavior of the market economy by recognizing how time is allocated away from the market. Currently, research on leisure is not emphasized very much compared with work time studies, as it is believed that leisure is merely an unproductive time-consuming activity. However, according to theory of utility maximization, individuals maximize utility by consuming goods, services, and leisure time. Previous research focused on market work time and labor supply much more than on leisure. As people normally spend approximately 8 hours a day on market work and the rest, about 16 hours on non-market activities, including leisure[1], studies on leisure could reveal patterns of time use of people. In addition, combined with demographic information, a comparison of leisure time use across different groups is also possible.

The relationship between leisure and wages has been explored since the theory relating time allocation decisions to wage does not provide a clear prediction. The reason is that much research work has confirmed the relationship between leisure time and wages in terms of both wage increase or decrease, causing leisure time change and vice versa. A lot of those studies have linked their findings to the labor supply issues, which are strongly related to leisure and time use. Empirical works that illustrate how wage is related to leisure include Owen (1971: 56-76), Gronau (1977: 1116-1117) and Yamada, Yamada and Kang (1999: 48). The findings varied because of differences in the time studied and the characteristics of the observations.

As individuals allocate their time mainly for leisure and work in order to maximize utility, the length of work time affects people's leisure time. Owen (1971: 68) confirmed that workers supply larger quantities of labor in response to a higher wage when the wage is relatively low, but when the wage reaches a relatively high level, further increases in the wage entice workers to reduce the quantity supplied. The supply

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[1] According to the Labour Protection Law 1988, Chapter 2, Section 3: One working day must not exceed 8 hours. This corresponds to the labor laws of other countries, for example, the USA, the UK and Australia.

curve thus bends back on itself, the so-called backward-bending supply curve. This implies that leisure and wage could be both positively correlated with each other. While Gronau (1977: 1116-1117) has argued that a wage increase merely creates labor supply by reducing work at home, the effect on leisure was indeterminate. Labor supply depends on the decisions that maximize utility, either to spend a portion of the higher wage to buy more leisure time, and thus work less, or to offer more time for work and take less time for leisure. Therefore, ideas concerning how a change in wage impacts leisure time are still not conclusive.

Not only does wage possibly impact labor, previous research using data from many countries support the idea that some other factors obviously influence leisure time. Substantial evidence has shown that gender characteristics dissimilarity leaded to unequal leisure time between males and females. Comparing the two genders, Gronau (1977: 1116-1117) found that employed women had less leisure since they also spent more time to work at home than males did for both Americans and Israelis. This result contradicted that in Yamada *et al.* (1999: 48), which found a negative relationship between wage change and time for some leisure activities, including childcare, medical care, and time for radio and TV, by estimating leisure activity elasticities with respect to male's and female's own wages in Japan. However, the results correspond with the work of Beblo and Robledo (2008: 290-291), indicating that men enjoyed more leisure time than women in Germany. Additionally, a leisure gap between genders (from examining couples) was found to be determined by their wage gap. Schettkat (2003: 4) also confirmed that both American and German women apparently spent less leisure time than men. The study in many developed countries signifies that there exists a leisure time gap between the genders.

Besides wage and gender, marital status is another factor causing individual differences in leisure time. Empirical studies have reported on the time use of leisure and other activities differently across time and countries. Gronau (1976: S209) found a lower leisure time among married Israelis than among singles, at about half an hour a day, since the married spent more than two hours working at home. This result was inconsistent with that of Aguiar and Hurst (2006: 32), which indicated lower hours of married men's leisure time but more leisure time enjoyment of married women than that of single women for Americans. The dissimilarity in leisure time use between individuals of

different marital status indicates the diversity of people's behavior in time allocation across countries. In addition, household heads were likely to allocate a greater share of time use for work, especially single household heads (Frase and Gornick, 2009: 4).

Empirical findings have also indicated the dissimilarity of leisure time use between people in diverse regions. Marsden, Reed, Kennedy, and Stinson (1982:1023) found that people in different regions significantly take dissimilar leisure time use for arts-related leisure activities. Supported by previous research work, their study revealed that personal, social, and environmental factors were associated with habitual physical activity leisure, for example, personal attention, social support, and availability of facilities (Molina-Garcia, Castillo and Pablos, 2009: 133-134).

Not only is marital status a factor influencing leisure time spending, but also educational attainment impacts people's devotion to leisure time differently. Gronau (1976: S209) has shown that leisure tends to increase with education since the educated people spend more time at work and less time at home, and the reduction in time spent on work exceeds the rise in market time. It was also indicated that the area in which individuals live also influences their time use due to dissimilar lifestyles. People in rural areas possibly do not enjoy as much leisure time as expected because they are burdened with home production and housework, which negatively affect time use for other activities, including market work and leisure (Ilahi, 2000: 17-21). Not only do individuals' socio-economic characteristics influence leisure time, but so does the day of the week surveyed. Aguiar and Hurst (2006: 27-28) indicated that this factor is necessary since there exist differences in activities and time use, especially regarding weekdays and weekends. This paper also includes this factor in the models in order to test which day of the week significantly impacts leisure time.

From the literature review of studies on the estimation of leisure time and other variables that possibly affect leisure, there is still no research on time allocation for leisure activities for the Thai people, or on how they change their leisure time in response to wage changes. Since people in different countries have different backgrounds in economy, life style, and culture, causing dissimilarities in behavior of time allocation as well as responses to wage changes regarding leisure, it is essential to fill the research gap by analyzing Thai people's time use behavior and allocation of time. The question of how

Thai people, with different characteristics, allocate time, especially for leisure activities as well as leisure behavior allocation, will be discussed.

This paper aims to examine how people change the amount of their leisure time as wage or income changes. As leisure has been defined differently among empirical works, this study separates leisure by types of activities and categorize them into four measures, based on Aguiar and Hurst (2006: 21-25), from the narrowest to the broadest. If people respond by allocating more leisure time for higher earning, this implies that leisure is a normal good. Another objective is to understand the behavior of the Thai people by finding out how time is allocated away for non-market purposes in order to maximize utility by employing a model estimation to find the determinants of leisure.

The structure of this paper is organized as follows; the next section explains leisure time according to different measures before an explanation of model specification and model estimation. This is followed by an empirical analysis of the determinants of leisure time in order to see how people, with a variety of socio-economic characteristics, adjust their leisure time in response to a wage change. This is then followed by the conclusion of this study.

2.3 Leisure: Definitions and Measures

The economic study of leisure was not strongly emphasized in the past, as researchers were more concerned with wage, work time, as well as time allocation. In early studies, leisure was not clearly defined, even if it was a topic widely mentioned in empirical works. The meaning of leisure was quite subjective[2] and difficult to define. For simplicity in economic analysis, many papers researching issues related to work and time allocation simply defined leisure as the residual of total hours of work.[3] However, this leisure definition neglects other non-market activities, leading to biases because besides

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[2] Many papers have defined leisure in various ways. According to Wilson (1980: 284), leisure referred to the activities that were neither static nor a fixed posture, while Neulinger (1984, quoted in Westland (1987: 228)) stated that leisure was the condition of perceived freedom. Westland (1987: 228) equated leisure with free time for doing something else. Soule (1957: 16) further elaborated leisure activities to be rest, idleness, play or recreation.

[3] See Fischer (2001: 249-269), Kumar (2005: 4-15) and Chen and Chevalier (2007: 353-356).

market work, an individual's time allocation is also devoted to housework and home production. A number of empirical studies have distinguished leisure from other non-work activities in an individual's time allocation[4], but most papers have not clearly indicated which activities were categorized as "leisure." To solve this problem and to provide more details on "leisure," the definition of leisure adapted from Aguiar and Hurst (2006: 21-25) is applied in this study. It illustrates the detailed list of activities and categorizes them into groups in order to define "leisure". This provides an alternative measure of leisure based on the degree of market substitutes. The most extreme measure defines leisure as an activity for which time input was essential in the sense that the activity itself provided enjoyment and utility, whereas the broadest measure defines leisure as the difference of total time available and market work time. These measures concurred with Ramey and Francis (2006: 8) in the sense that leisure was comprised of activities yielding high enjoyment.

The first measure of leisure, Leisure Measure 1, is the sum of time spent on "entertainment/social activities" and "active recreation." According to researchers, the activities mentioned provide direct enjoyment as well as not having close market substitutes. It could also be defined as pure leisure. The broader definition is provided in Measure 2, the activities giving direct utility, but also viewed as intermediate inputs. These include Leisure Measure 1 as well as time spent in sleeping, eating, and personal care. Leisure Measure 3 includes Leisure Measure 2, plus time spent in "primary" and "educational" childcare. The broadest measure is Leisure Measure 4, providing all residual work activities. The additional activities include time spent in education, civic and religious activities, caring for other adults and one's own medical care. The definitions and example lists for leisure activities in each measure are presented in Table 2.1.

As mentioned, this paper adapts the definitions of leisure and lists activities in each measure as stated in Aguiar and Hurst (2006: 21-25) because their definitions distinguish leisure in groups of activities, and this will benefit the analysis of how an individual allocates his or her time. In addition, focusing on activities for allocation of

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[4] For example, Yamada, Yamada, and Kang (1999: 47) divided allocation of time into market and specific non-market activities, for example, spending time with the radio and TV and sleeping.

time across market work, more elaborated leisure definitions lead to more accurate findings in behavior change across time in the empirical analysis.

Table 2.1 Leisure Activity Classification

Leisure Classification	Activities included
"Leisure Measure 1"	Summation of time spent on "entertainment/social activities relaxing and "active recreation" - Time use for culture, entertainment, and attending sport activities, for instance, watching movies and plays, attending concerts, going to the zoo, amusement parks, entertainment centers, visiting museums and cultural sights for entertainment purposes - Indoor and outdoor sports and recreation and exercising - Hobbies, games and free time activities - Media use unrelated to work and for learning purposes or instance, reading, listening to the radio or other voice media watching television and Internet use - Activities related to relaxation
"Leisure Measure 2"	Leisure Measure 1, plus time spent on sleeping, eating, and personal care
"Leisure Measure 3"	Leisure Measure 2, plus time spent on primary and educational childcare
"Leisure Measure 4"	Leisure Measure 3, plus time spent on education, civic and religious activities, caring for other adults as well as one's own medical care - Education, learning activities and training for instance, taking classes for degrees, personal interest courses, and homework - Participation in the community and volunteering - Social activities - Caring for other adults, one's own medical care and by others - Religious activities, for instance, praying, meditating and religious activity participation

Source: Aguiar and Hurst, 2007: 969-1006.

2.4 Model Specification

The study of leisure and determinants requires detailed data on types of activities, their time lengths, and socio-economic characteristics. In this study, data from Thailand's Time Use Survey 2001 and 2004 by the National Statistical Office (NSO) are applied to examine Thai people's determinants of leisure time. The cross-sectional data obtained are the combination of direct interview and self-completed questionnaires during the second week of August 2004. One problem is that the Time Use Survey did not provide wage or income data. Therefore, this study has to use individual's wage and income from the Labor Force Survey of August 2001 and 2004 by merging each pair of the two data sets, the Time Use Survey and Labor Force Survey, in order to obtain information on both individual's time use and earning.

Collected simultaneously, the Time Use Survey and Labor Force Survey focused on dissimilar sets of respondents' information. The Time Use Survey attempted to measure the numerous and diverse ways in which people used in the previous 24 hours, while the Labor Force Survey mainly emphasized wage, income, work, and employment status. The first set of data for 2001, with 51,807 observations, was detailed in time use and activities, whereas the latter, with 67,813 observations, provided fruitful data on wages and other gains from work. After merging the data, there were 51,172 observations for which time use and earning details were available. For 2004, there were 54,568 observations of the Time Use Survey to be merged with 67,083 observations of the Labor Force Survey in order to obtain the merged data with 7,177 observations. In order to avoid the problem of respondent's irregular activities or schedule, only the responses recorded as "usual scheduled" on the day interviewed were taken into the research.

The data from the Time Use Survey and Labor Force Survey employed in the regressions includes time for leisure, age, gender, marital status, education, hourly wages, status in the household (household head or member), respondent's area (municipal and non-municipal), occupation, industry, and firm's size. The details on how people with different socio-economic characteristics allocate their time for leisure are presented in Table 2.2 and Table 2.3 for 2001 and 2004, respectively.

Table 2.2 Descriptive Statistics of Leisure Time of the Thai People in 2001

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Gender					
Male					
Leisure Measure 1	22,003	264	198.75	0	1,220
Leisure Measure 2	22,003	929	223.31	90	1,440
Leisure Measure 3	22,003	939	225.68	90	1,440
Leisure Measure 4	22,003	979	245.48	90	1,440
Female					
Leisure Measure 1	25,939	240	173.26	0	1,139
Leisure Measure 2	25,939	896	224.41	206	1,440
Leisure Measure 3	25,939	928	235.17	206	1,440
Leisure Measure 4	25,939	969	251.03	206	1,440
Separated by Income Level					
Low Income Group					
Leisure Measure 1	3,083	215	147.02	0	1,220
Leisure Measure 2	3,083	856	174.92	290	1,440
Leisure Measure 3	3,083	870	179.22	290	1,440
Leisure Measure 4	3,083	884	185.42	290	1,440
Middle Income Group					
Leisure Measure 1	7,450	191	135.91	0	975
Leisure Measure 2	7,450	804	170.56	90	1,440
Leisure Measure 3	7,450	816	174.50	90	1,440
Leisure Measure 4	7,450	822	177.03	90	1,440

Table 2.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
High Income Group					
Leisure Measure 1	37,152	266	182.75	0	1,139
Leisure Measure 2	37,152	937	230.86	137	1,440
Leisure Measure 3	37,152	962	236.59	158	1,440
Leisure Measure 4	37,152	1,012	252.28	158	1,440
Separated by Educational Level					
No Education					
Leisure Measure 1	2,862	305	208.75	0	1,139
Leisure Measure 2	2,862	1,057	268.81	281	1,440
Leisure Measure 3	2,862	1,083	268.04	281	1,440
Leisure Measure 4	2,862	1,101	265.84	300	1,440
Primary School					
Leisure Measure 1	27,277	254	178.01	0	1,220
Leisure Measure 2	27,277	920	225.03	90	1,440
Leisure Measure 3	27,277	944	232.23	90	1,440
Leisure Measure 4	27,277	963	239.91	90	1,440
Secondary School					
Leisure Measure 1	7,044	244	171.16	0	1,004
Leisure Measure 2	7,044	891	207.05	260	1,440
Leisure Measure 3	7,044	908	212.64	260	1,440
Leisure Measure 4	7,044	1,042	264.04	260	1,440
High School					
Leisure Measure 1	2,650	244	167.07	0	1,080
Leisure Measure 2	2,650	875	198.39	165	1,440
Leisure Measure 3	2,650	892	201.26	165	1,440
Leisure Measure 4	2,650	996	254.30	165	1,440

Table 2.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
College					
Leisure Measure 1	3,952	229	154.72	0	1,091
Leisure Measure 2	3,952	841	195.75	224	1,440
Leisure Measure 3	3,952	858	200.74	224	1,440
Leisure Measure 4	3,952	869	206.06	224	1,440
Separated by Marital Status					
Single					
Leisure Measure 1	11,030	257	177.95	0	1,050
Leisure Measure 2	11,030	908	213.63	260	1,440
Leisure Measure 3	11,030	912	215.35	260	1,440
Leisure Measure 4	11,030	1,056	264.38	260	1,440
Married					
Leisure Measure 1	31,010	239	167.69	0	1,220
Leisure Measure 2	31,010	890	212.08	90	1,440
Leisure Measure 3	31,010	918	221.59	90	1,440
Leisure Measure 4	31,010	927	224.44	90	1,440
Divorced/ Separated and Others					
Leisure Measure 1	5,645	308	206.16	0	1,139
Leisure Measure 2	5,645	1,033	270.90	260	1,440
Leisure Measure 3	5,645	1,058	271.65	260	1,440
Leisure Measure 4	5,645	1,074	273.15	260	1,440
Separated by Age					
Age 15-24					
Leisure Measure 1	8,378	248	176	0	1,050
Leisure Measure 2	8,378	901	206.58	260	1,440
Leisure Measure 3	8,378	917	213.38	260	1,440
Leisure Measure 4	8,378	1,102	259.27	260	1,440

Table 2.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Age 25-44					
Leisure Measure 1	20,969	222	156.51	0	1,220
Leisure Measure 2	20,969	853	191.26	137	1,440
Leisure Measure 3	20,969	880	202.32	158	1,440
Leisure Measure 4	20,969	887	204.83	158	1,440
Age 45-60					
Leisure Measure 1	11,287	244	165.26	0	1,127
Leisure Measure 2	11,287	894	204.38	90	1,440
Leisure Measure 3	11,287	914	214.62	90	1,440
Leisure Measure 4	11,287	923	217.12	90	1,440
Age more than 60					
Leisure Measure 1	7,051	353	210.67	0	1,139
Leisure Measure 2	7,051	1,124	244.21	320	1,440
Leisure Measure 3	7,051	1,143	242.62	320	1,440
Leisure Measure 4	7,051	1,162	239.49	329	1,440
Separated by Area					
Municipal					
Leisure Measure 1	29,554	252	178.42	0	1,220
Leisure Measure 2	29,554	909	229.49	165	1,440
Leisure Measure 3	29,554	930	235.74	165	1,440
Leisure Measure 4	29,554	973	254.98	165	1,440
Non-municipal					
Leisure Measure 1	18,131	249	173.21	0	1,127
Leisure Measure 2	18,131	915	216.96	90	1,440
Leisure Measure 3	18,131	239	223.60	90	1,440
Leisure Measure 4	18,131	976	238.60	90	1,440

Table 2.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Size of the Firm Individuals Work for					
Large					
Leisure Measure 1	37,220	264	180.80	0	1,139
Leisure Measure 2	37,220	932	229.78	137	1,440
Leisure Measure 3	37,220	957	235.62	158	1,440
Leisure Measure 4	37,220	1,007	252.03	158	1,440
Small					
Leisure Measure 1	10,465	206	151.66	0	1,220
Leisure Measure 2	10,465	836	187.88	90	1,440
Leisure Measure 3	10,465	848	192.07	90	1,440
Leisure Measure 4	10,465	856	196.22	90	1,440
Separated by Industry					
Agricultural					
Leisure Measure 1	12,386	239	152.57	0	970
Leisure Measure 2	12,386	895	170.11	137	1,440
Leisure Measure 3	12,386	910	174.96	158	1,440
Leisure Measure 4	12,386	922	180.71	158	1,440
Manufacturing					
Leisure Measure 1	4,190	196	140.75	0	975
Leisure Measure 2	4,190	818	180.69	260	1,440
Leisure Measure 3	4,190	832	184.58	260	1,440
Leisure Measure 4	4,190	839	189.14	260	1,440
Service					
Leisure Measure 1	31,109	264	187.55	0	1,220
Leisure Measure 2	31,109	930	244.82	90	1,440
Leisure Measure 3	31,109	956	251.11	90	1,440
Leisure Measure 4	31,109	1,013	268.56	90	1,440

Table 2.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Occupation					
Professionals and Executives					
Leisure Measure 1	4,875	208	140.93	0	1,080
Leisure Measure 2	4,875	827	176.81	239	1,440
Leisure Measure 3	4,875	837	179.55	239	1,440
Leisure Measure 4	4,875	845	182.09	239	1,440
High-skilled and Machine Related Operators					
Leisure Measure 1	5,457	212	152.60	0	1,220
Leisure Measure 2	5,457	844	188.34	90	1,440
Leisure Measure 3	5,457	857	192.46	90	1,440
Leisure Measure 4	5,457	864	196.88	90	1,440
Technicians and Associate Professionals					
Leisure Measure 1	1,367	216	144.91	0	810
Leisure Measure 2	1,367	826	178.60	165	1,440
Leisure Measure 3	1,367	838	178.97	165	1,440
Leisure Measure 4	1,367	845	181.79	165	1,440
Clerk, Sales and Service Workers					
Leisure Measure 1	7,566	192	146.13	0	1,127
Leisure Measure 2	7,566	802	182.50	200	1,440
Leisure Measure 3	7,566	818	188.31	200	1,440
Leisure Measure 4	7,566	829	194.38	200	1,440
Skilled Agricultural Related Workers					
Leisure Measure 1	11,219	240	152.46	0	970
Leisure Measure 2	11,219	895	169.49	137	1,440
Leisure Measure 3	11,219	910	174.31	158	1,440
Leisure Measure 4	11,219	923	179.63	158	1,440

Table 2.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Low-skilled and Elementary Occupations					
Leisure Measure 1	3,609	203	145.35	0	1,000
Leisure Measure 2	3,609	830	183.41	232	1,440
Leisure Measure 3	3,609	841	187.51	232	1,440
Leisure Measure 4	3,609	850	194.85	232	1,440

Source: Author's calculation, using Time Use Survey 2001 and Labor Force Survey 2001 data.

Table 2.3 Descriptive Statistics of Leisure Time of the Thai People in 2004

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Gender					
Male					
Leisure Measure 1	3,754	167	113.63	0	830
Leisure Measure 2	3,754	807	148.66	230	1,440
Leisure Measure 3	3,754	808	149.16	230	1,440
Leisure Measure 4	3,754	850	159.29	230	1,440
Female					
Leisure Measure 1	3,423	144	104.11	0	780
Leisure Measure 2	3,423	763	137.78	230	1,440
Leisure Measure 3	3,423	765	138.13	230	1,440
Leisure Measure 4	3,423	797	150.55	260	1,440
Separated by Income Level					
Low Income Group					
Leisure Measure 1	1,639	182	127.59	0	810
Leisure Measure 2	1,639	847	167.08	310	1,440
Leisure Measure 3	1,639	850	169.13	310	1,440
Leisure Measure 4	1,639	910	205.52	310	1,440
Middle Income Group					
Leisure Measure 1	4,783	163	123.77	0	840
Leisure Measure 2	4,783	803	171.21	130	1,440
Leisure Measure 3	4,783	805	171.70	130	1,440
Leisure Measure 4	4,783	851	195.59	130	1,440

Table 2.3 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
High Income Group					
Leisure Measure 1	1,643	201	136.30	0	1,020
Leisure Measure 2	1,643	822	178.36	310	1,440
Leisure Measure 3	1,643	825	177.84	310	1,440
Leisure Measure 4	1,643	874	202.16	310	1,440
Separated by Educational Level					
No Education					
Leisure Measure 1	338	148	111.66	0	780
Leisure Measure 2	338	818	150.44	380	1,440
Leisure Measure 3	338	820	152.90	380	1,440
Leisure Measure 4	338	865	169.15	440	1,440
Primary School					
Leisure Measure 1	2,741	147	106.10	0	830
Leisure Measure 2	2,741	789	142.43	230	1,440
Leisure Measure 3	2,741	790	143.34	230	1,440
Leisure Measure 4	2,741	827	157.93	230	1,440
Secondary School					
Leisure Measure 1	953	144	103.90	0	660
Leisure Measure 2	953	783	144.82	260	1,440
Leisure Measure 3	953	784	145.12	260	1,440
Leisure Measure 4	953	822	157.61	260	1,440
High School					
Leisure Measure 1	587	173	117.55	0	780
Leisure Measure 2	587	794	158.59	300	1,440
Leisure Measure 3	587	795	158.44	300	1,440
Leisure Measure 4	587	835	168.13	300	1,440

Table 2.3 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
College					
Leisure Measure 1	1,650	176	114.14	0	830
Leisure Measure 2	1,650	780	145.64	310	1,440
Leisure Measure 3	1,650	783	145.12	310	1,440
Leisure Measure 4	1,650	820	155	310	1,440
Separated by Marital Status					
Single					
Leisure Measure 1	2,401	154	113.66	0	830
Leisure Measure 2	2,401	789	150.31	260	1,440
Leisure Measure 3	2,401	790	150.55	260	1,440
Leisure Measure 4	2,401	831	165.25	260	1,440
Married					
Leisure Measure 1	4,224	158	107.26	0	780
Leisure Measure 2	4,224	784	142.24	230	1,440
Leisure Measure 3	4,224	786	142.62	230	1,440
Leisure Measure 4	4,224	821	154.25	230	1,440
Divorced/Separated and Others					
Leisure Measure 1	552	146	111.46	0	700
Leisure Measure 2	552	781	145.23	130	1,430
Leisure Measure 3	552	785	146.15	130	1,430
Leisure Measure 4	552	825	159.28	350	1,430
Separated by Age					
Age 15-24					
Leisure Measure 1	1,244	145	110.46	0	760
Leisure Measure 2	1,244	785	154.66	260	1,440
Leisure Measure 3	1,244	784	154.71	260	1,440
Leisure Measure 4	1,244	828	168.52	260	1,440

Table 2.3 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Age 25-44					
Leisure Measure 1	3,608	155	109.54	0	830
Leisure Measure 2	3,608	781	144.80	130	1,440
Leisure Measure 3	3,608	782	144.99	130	1,440
Leisure Measure 4	3,608	815	153.39	310	1,440
Age 45-60					
Leisure Measure 1	2,128	164	110.30	0	780
Leisure Measure 2	2,128	791	138.62	230	1,440
Leisure Measure 3	2,128	793	139.53	230	1,440
Leisure Measure 4	2,128	833	153.70	230	1,440
Age more than 60					
Leisure Measure 1	197	161	98.53	0	600
Leisure Measure 2	197	828	153.21	380	1,440
Leisure Measure 3	197	828	153.21	380	1,440
Leisure Measure 4	197	880	179	480	1,440
Separated by Area					
Municipal					
Leisure Measure 1	4,959	159	111.73	0	830
Leisure Measure 2	4,959	787	146.69	130	1,440
Leisure Measure 3	4,959	789	146.79	130	1,440
Leisure Measure 4	4,959	824	157.56	310	1,440
Non-Municipal					
Leisure Measure 1	2,118	149	105.07	0	780
Leisure Measure 2	2,118	782	141.85	230	1,440
Leisure Measure 3	2,118	783	142.79	230	1,440
Leisure Measure 4	2,118	826	157.09	230	1,440

Table 2.3 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Size of the Firm Individuals Work for					
Large					
Leisure Measure 1	2,042	180	113.14	0	830
Leisure Measure 2	2,042	789	146.15	130	1,440
Leisure Measure 3	2,042	792	145.38	130	1,440
Leisure Measure 4	2,042	833	156.42	200	1,440
Small					
Leisure Measure 1	5,135	146	106.94	0	830
Leisure Measure 2	5,135	784	144.85	230	1,440
Leisure Measure 3	5,135	786	145.64	230	1,440
Leisure Measure 4	5,135	822	157.70	230	1,440
Separated by Industry					
Agricultural					
Leisure Measure 1	908	159	105.12	0	630
Leisure Measure 2	908	818	142.25	230	1,440
Leisure Measure 3	908	820	143.77	230	1,440
Leisure Measure 4	908	867	164.96	230	1,440
Manufacturing					
Leisure Measure 1	1,714	136	104.05	0	830
Leisure Measure 2	1,714	756	144.16	360	1,440
Leisure Measure 3	1,714	757	145.02	360	1,440
Leisure Measure 4	1,714	788	153.50	360	1,440
Service					
Leisure Measure 1	4,555	163	111.92	0	830
Leisure Measure 2	4,555	790	144.33	130	1,440
Leisure Measure 3	4,555	792	144.21	130	1,440
Leisure Measure 4	4,555	830	154.45	260	1,440

Table 2.3 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Occupation					
Professionals and Executives					
Leisure Measure 1	1,211	175	114.20	0	770
Leisure Measure 2	1,211	780	148.95	310	1,440
Leisure Measure 3	1,211	783	148.55	310	1,440
Leisure Measure 4	1,211	827	162.96	310	1,440
High-skilled and Machine Related Workers					
Leisure Measure 1	2,064	145	105.61	0	830
Leisure Measure 2	2,064	783	144.63	350	1,440
Leisure Measure 3	2,064	784	145.62	350	1,440
Leisure Measure 4	2,064	819	154.68	350	1,440
Technicians and Associate Professionals					
Leisure Measure 1	704	178	121.63	0	740
Leisure Measure 2	704	804	158.66	300	1,430
Leisure Measure 3	704	805	158.07	300	1,430
Leisure Measure 4	704	840	169.31	300	1,440
Clerk, Market Sales and Service Workers					
Leisure Measure 1	1,379	145	103.89	0	830
Leisure Measure 2	1,379	769	136.30	130	1,440
Leisure Measure 3	1,379	771	136.41	130	1,440
Leisure Measure 4	1,379	805	143.63	400	1,440
Skilled Agricultural Related Workers					
Leisure Measure 1	498	162	111.11	0	630
Leisure Measure 2	498	804	149.60	230	1,440
Leisure Measure 3	498	805	150.77	230	1,440
Leisure Measure 4	498	865	175.52	230	1,440

Table 2.3 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Low-skilled and Elementary Occupations					
Leisure Measure 1	1,320	152	106.92	0	780
Leisure Measure 2	1,320	796	140.29	260	1,440
Leisure Measure 3	1,320	797	140.97	260	1,440
Leisure Measure 4	1,320	829	152.91	260	1,440

Source: Author's calculation, using Time Use Survey 2004 and Labor Force Survey
2004 data.

Table 2.2 and 2.3 illustrate the amount of time for Leisure Measure 1-4 of Thai people separated by different socio-economic characteristics in 2001 and 2004. The data suggest that even with less amount of time in the latter year, males still took longer leisure time per day in all measures than females did. One reason explaining the finding is that females devote more time to housework and home production.[5] This corresponds to Beblo and Robledo's (2008: 300) explanation of the social structure in which males "make the first move," implying that males have an opportunity to choose to work in the market only while females are responsible to work both in the market and do housework and home production. Hence, females corresponded to non-market work, especially housework. Considering the Thai's leisure time at different ages classified by worker groups, as in Forbes, Barker and Turner (2010: 37), it is not surprising that the old, in their retired years, took the longest leisure time, while those aged 25-44 spent the shortest time because this group provided greater enthusiasm for market work. Separated by marital status, the married seemed to set aside less time for leisure than singles for Leisure Measure 1, which gave direct enjoyment, since the married were likely to have more burdens with the market, non-market work, and childcare. Notice that when leisure includes childcare, Leisure Measure 3, it appears that the married took longer leisure time than singles in 2001, though the first group provided less amount of leisure time in the narrower measure, Leisure Measure 1, when time for childcare as not included. Even though it was anticipated that those living in municipal and non-municipal areas possibly allocate time dissimilarly, the time spent for leisure in each measure was not so different according to the data. Nevertheless, the leisure time gaps for leisure were wider for the broader leisure measures.

The classification of income group is as follows; the low income group included people whose income was in Percentile 1-20; the middle income group ranged from Percentile 21-80; and those in Percentile 81-100 were categorized the high income group. According to the data, workers in the middle income group consumed the least amount of

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[5] According to Time Use Survey 2004, females spent approximately 250 minutes per day for housework and home production, while males allocated merely 207 minutes for those activities, and in 2001 females dedicated 201 minutes, compared with 149 minutes per day, compared to males for those non-market activities. The finding corresponded to much empirical research, for example, Ilahi (2000: 6-7), Schettkat (2003: 7) and Aguiar and Hurst (2006: 45-46).

leisure time, whereas those that earned comparatively low income had the longest leisure time compared with others. This indicates that the lowest earners are possibly less enthusiastic for more work time or the job positions for this group of people were not provided. The result is supported by the descriptive statistics of Thai people's leisure time according to education if the higher educational level group earning a higher income is assumed.

Data for both two years indicate that people working in large size firms, with greater than 200 employees, evidently consumed more leisure time than those employed by smaller size firms. It is possible that the latter group was responsible for more types of duties in practice. Furthermore, among the three industries, those working in the manufacturing sector spent the least time for leisure in all measures, while employees in the agriculture industry devoted the greatest amount of time for leisure and non-work activities.

From the descriptive data, how leisure time, individual's wage, and other socio-economic characteristics are related could not be clearly concluded. In the next section, estimation of leisure in a variety measures in different model specifications using socio-economic characteristics is elaborated to find the determinants of leisure, using the Time Use Survey and Labor force Survey.

2.5 Model Estimation

The study focuses on the behavior of Thai people's time use for leisure, the non-market activity that raises an individual's utility and welfare. As mentioned, empirical evidence confirms that wage and some socio-economic characteristics, for instance, gender and marital status, as well as the influence of the day of the week, did impact each person's leisure time. By employing Thailand's Time Use Survey and Labor Force Survey 2001 and 2004, regressions for the factors influencing leisure time were estimated by using the least square for each leisure measure. Besides hourly wage and monthly income, the variables employed include age, square of age, education dummies—separated into no education, primary, secondary, high school and college graduates, marital status—as divided into single, married, and others, household head dummy, area—municipal and non-municipal, occupation—as divided into professionals and

executives, technicians, high-skilled and machine related workers, sales, services and clerk, agricultural related and low skilled workers, the industry that each person is working for—agricultural, manufacturing and service, firm size of employments—large for those of at least 100 employees, and small for the firm employing fewer than 100 workers, and day of the week dummies as fixed effect because these factors also impacted an individual's leisure and time allocation, as mentioned previously. Since this study focuses on the exploration of the relationship between leisure time and monthly income as well as hourly wage, only the wage workers whose wage and income data are observed are included in the estimations.

The regression analysis is mainly divided into two different estimation functions. The first model aims to find how leisure adjusts in response to the increase or decrease in hourly wage and monthly income. Thus, the estimated regression function takes the form as follows:

(1) $\qquad Leisure_{ij} = \alpha_A + \beta_1 wage_i + \beta_2\, monthly\; income_i + \varphi_A S_i + \rho_A D_i + \mu_i$

where $i = 1,\dots$ n and $j = 1,\dots,4$. $Leisure_{ij}$ denotes leisure time in minutes; $wage_i$ and $monthly\; income_i$ represent hourly wage and monthly income respectively. S refers to other socio-economic demographic variables, consisting of gender, age, age^2, education dummies, marital status, area, occupation, industry and firm size dummy, and D represents day of the week. Model (2), presenting percentage of leisure time change in response to percentage change in hourly wage and monthly income and other socio-economic characteristics, is formally presented as follows:

(2) $\qquad ln\,[Leisure_{ij}] = \alpha_B + \lambda_1 ln[wage_i] + \lambda_2\,[monthly\; income_i] + \varphi_B S_i + \rho_B D_i + \varepsilon_i$

This indicates how a percentage change in hourly wage and other variables influences leisure time changes. The parameters estimated from those different model specifications are displayed in Table 2.4 and Table 2.5. Table 2.4 presents the estimates of Leisure Measure 1-4, whereas Table 2.5 provides the regression results of changes in Leisure Measure 1-4. The findings are presented in the next section.

2.6 Empirical Analysis

Comparing leisure time between the two genders, females use less leisure time than males for all income earners. Females consume less leisure time in narrow measures (Measure 1)—about 29 minutes a day or 14.5 hours per month. As leisure includes personal care (Leisure Measure 2), the leisure gap between the two genders expands to 32 minutes per day, or greater than 16 hours a month, which equals the result of the regression for leisure as a residual of work (Leisure Measure 4). However, when childcare is included in the leisure activity list, Leisure Measure 3, the leisure gap for the two genders is approximately 29 minutes a day.

The dissimilarity in leisure time between people of different educational levels was also found in the regressions. The distinction of leisure time allocation is reflected in the result for Leisure Measure 1 estimation. The university graduates take relatively the longest leisure time, more than 4 hours a month, compared with the uneducated group, whereas high school graduates consume leisure time for direct enjoyment at about 3 hours longer per month. The estimations for leisure gaps in broader measures for various educational level earners could not confirm the differences of the leisure time of those people. The estimation also reveals the unequal amount of leisure time for people of different marital status. With 99% confidence, the married consume 10 minutes per day or 5 hours a month less for leisure compared with singles for leisure time pursuing direct enjoyment, Leisure Measure 1, whereas people of marital status other than single or married took 4.5 hours less a month for the same leisure measure.

Not only do education and marital status influence leisure time allocation, but also status in the household indicates leisure time use. Estimation for all measures of leisure indicates that the household head significantly consumes more leisure time than other members. Each month the household head allocates more time for leisure giving direct enjoyment or Leisure Measure 1 than others by almost 3 hours. When leisure is in more broadly measure, the leisure gaps between the two groups are expanded to 25-26 minutes a day or 12.5-13 hours per month. The longer leisure time as a residual of work implies that household heads have a shorter market work and non-market work time in total. The result from the exploration of household head's gender reveals that there are in total more than 16,662 observations of male household heads, while there are only 7,162 female

household heads. As mentioned, the study found that males substantially consume greater leisure time in all measures than females. A high proportion of male household heads is one of the factors explaining the longer time length of leisure of these individuals.

The regression cannot find a substantial difference in leisure time allocation among people in different occupations. Taking elementary occupation, for example, low-skilled workers, only clerks, and sales and service workers significantly take time for Leisure Measure 1, more than 12 minutes a day or 6 hours a month greater, while for other measures of leisure, high-skilled machine-related workers consume apparently take more leisure time at about 11-15 minutes a day or 5.5-7.5 hours a month. Among the three industries, people working in agricultural-related industries consume comparatively greater leisure time than those working in manufacturing or the service industry. The broader the measure of leisure, the wider are the leisure gaps among people in different industries. Manufacturing industry workers take 25-87 minutes daily or 2.5-43 hours monthly less leisure time than those in the agricultural industry, while workers in the service sector spend less than 11-51 minutes per day on leisure or 5.5-25.5 hours per month less. The result of the regression also reveals that the size of the firm that each worker is working in influences leisure time. People working in small firms, whose size is fewer than 200 employees, substantially spend less time for leisure. The gap of leisure for direct enjoyment, Leisure Measure 1, is nearly 18 minutes a day or 9 hours a month. When leisure time includes time for personal care activities, Leisure Measure 2, time for childcare, Leisure Measure 3, and activities excluding work, or Leisure Measure 4, the leisure gaps are not so different.

Among the 7 days of the week, it is not surprising that people take the longest leisure time on Sunday. The differences in leisure time between Sunday and other days are substantial, especially when compared with the magnitudes of other socio-economic characteristic effects. It appears that people do not allocate the least time for leisure on Monday, but on Thursday. Evidently, people consume leisure less than on Sunday by at least almost 58 minutes a day when leisure is defined narrowly. When leisure is defined as the residual of work, there is more than a one hour and a half per day gap between Thursday and Sunday.

Comparing the two years used for estimation, 2001 and 2004, the findings indicate that Thai people spend less leisure time in all measures. Thai people consume

less leisure time for direct enjoyment at approximately 25 minutes a day or 12.5 hours a month, whereas the time as a residual of work is reduced by more than 1 hour a day in the latter year. This indicates a dramatic reduction in leisure time on the broadest measure of leisure in the latter year[6].

Consider how leisure time changes in response to an individual's time change, the slightly adverse effect on leisure time in all measures except Leisure Measure 2. A one thousand baht increase for monthly income reduces only a few minutes on Leisure Measure 1 and deteriorates to 7-8 minutes on Leisure Measure 3 and Leisure Measure 4, respectively. The negative relationship, even in tiny sizes, implies that Thai people are more willing to dedicate leisure time to work as income, the summation of wage, overtime, average bonus per month, and other money income rises. From the robust test, overtime was found to be strongly and negatively related to leisure time use, while bonus received provided an inverse impact on leisure in some measures and other money income provided a tiny positive effect on leisure. As monthly income represents the combination of various types of earnings, the inverse effect on leisure comes from income other than wage. Therefore, wage is the factor that more clearly explains whether leisure is a normal good.

The regression result indicates a positive relationship between hourly wage and leisure time. The broader measure of leisure time, the greater is the magnitude of the effect. A one baht increase of hourly wage creates 29 minutes of time for leisure as the activities providing direct enjoyment in a week, or almost 2 hours in a month. When leisure includes time for sleeping, eating and personal care, the rise in response to one baht of hourly wage increases to 45 minutes a week or 8 hours a month. For the two broadest measures of leisure time, the same amount of increase of hourly wage rises to approximately 45-55 minutes of leisure time. The findings on the relationship between each measure of leisure and hourly wage indicate a significant positive correlation, implying that Thai people are willing to devote more time to leisure as their wage per hour rises.

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[6] Average time for Leisure Measure 3 in 2001 and 2004 are 909 and 825 minutes or 15 and, 13 hours and 45 minutes per day respectively.

Estimation of log [Leisure Time] confirms the leisure gap between men and women. When all groups of the observations were regressed, it was seen that females spend less time for Leisure Measure 1 by 19.5%. When the leisure measures include more activities as those defined in Leisure Measure 2, Leisure Measure 3, and Leisure Measure 4, the differences of the two genders in leisure time are around 5.4-5.8%. The leisure gap is also reflected among people differently educated. The university graduates take a longer time for pure leisure at around 13%, while it was also confirmed that high school graduates spend time for the same type of leisure, Leisure Measure 1, at about 10.5%, compared with the uneducated group. Leisure time in the broader measures, Leisure Measure 3 and Leisure Measure 4, of the higher educated people are about 1.1%-1.4% more than the uneducated group.

The estimation for Leisure Measure 1 confirms only leisure time differences among the single, the married, and those of other marital status of high income workers. The married allocate less time to leisure pursuing direct enjoyment at about 10%, while singles spend a greater length of time than those of other status at for around 30%. Leisure gaps become smaller as broader leisure measures are estimated. When leisure time is defined to include time for personal care and sleeping, as with Leisure Measure 2, the finding indicates that the married allocate the shortest leisure time, at 2.43% less, while people of other status consume only 1.86% less.

Among workers in different occupations, professionals significantly take less pure leisure time at approximately 15% lower than low-skilled workers, while clerks and service workers allocate less time for Leisure Measure 1 at around 12%. As with the other findings, leisure gaps appear smaller when broader measures are taken into consideration. For example, for leisure as the residual of work, Leisure Measure 4, professionals spend more non-work time at around 1.8%, whereas high-skilled workers and technicians allocate time for leisure at 2.2%-2.6% more than low-skilled workers. People working in the manufacturing industry appear to spend less time on leisure in all measures than those in the agricultural sector at around 6% and a shorter length of time than workers in the service sector by about 2%. Additionally, manufacturing sector workers allocate less time for Leisure Measure 2-4 than those in the agricultural sector at around 7%, while workers in the service sector spend time for the same types of leisure at

around 3% less. The empirical result confirms that workers in the agricultural sector comparatively spend more leisure time than others.

The exploration as to whether firm size influences a worker's leisure time indicates that those working in large firms consume more leisure time generating direct enjoyment, Leisure Measure 1, at around 7%, while allocating comparatively less leisure time for broader measures. The broader the leisure measure, the narrower is the leisure time gap, even with little difference. Workers in smaller size firms take less time spent for Leisure Measure 2-4 at about 1.7%-1.9%. The finding from the study reveals that Thai people in municipal and non-municipal areas consume leisure time differently. For leisure pursuing direct enjoyment, Leisure Measure 1, workers in municipal areas appear to spend 5.9% greater leisure time. The gaps reduce to 1.3%-1.7% as broader leisure measures are estimated.

The fixed effect of the days of the week confirms the significant relationship between leisure time change and day dummies as the variables are estimated. The leisure gaps are not the widest on Monday or Sunday, but on Thursday and Sunday, with 21.9% for Leisure Measure 1 and 13.4%-13.6% for Leisure Measure 2 and Leisure Measure 3, while the gap is highest on Friday when leisure is defined as a residual of work, at 14%. Differences in leisure time on weekdays appear to be not so high. Again, the empirical findings confirm that leisure time is likely to be the lowest on either Thursday or Friday, not Monday.

The empirical findings also suggest that age only slight affects leisure time change. A ten-year increase deteriorates leisure time by approximately 2.3%-2.5% for Leisure Measure 2 and Leisure Measure 3, respectively. The impact is the highest for Leisure Measure 4, which shows about 3.2% in response to a ten-year increase of age. The evidence from the leisure time change regression confirms the decreasing trend of leisure time from 2001 to 2004. People spend less time for leisure as the activities pursuing direct enjoyment, Leisure Measure 1, at around 55.5%. However, for leisure in broader measures, the leisure time gaps appear to be about 1.3%-2.2% narrower.

The rise in income per month provides a negative effect on leisure time change. Time for Leisure Measure 1 is the most affected by income increase, with a 44.8% inverse change in leisure time. Leisure Measure 4 or non-work time is the most influenced by monthly income change, as presented by a 14.2% inverse change. A one

percentage increase in monthly income causes a fall in Leisure Measure 2-4 at around 11-14%. Similarly, a negative relationship between leisure time change and income change as caused by income other than wage. Hence, to explore whether leisure is a normal good, how leisure time changes in response to wage per hour increase or decrease could be better used for interpretation. Considering the relationship between leisure time change and hourly wage change, a one percent of hourly wage increase enhances time for Leisure Measure 1 by approximately 44.7%. Again, leisure gaps become narrower as leisure is defined in broader measures. A percent upward change in hourly wage raises leisure time by approximately 9.66%-11.8%. Like the results obtained from regressing leisure time and hourly wage, the findings confirm a positive relationship between percentage change in both leisure time and hourly wage, which implies that leisure is a normal good for the Thai people.

Table 2.4 Estimation of Leisure Time, Pooling Data of 2001 and 2004

Independent Variables	Leisure Time (Minutes)			
	Leisure Measure 1	Leisure Measure 2	Leisure Measure 3	Leisure Measure 4
Hourly wage	4.22***	6.40***	6.62***	7.80***
	(0.38)	(0.71)	(0.72)	(0.73)
Monthly income	-0.004***	-0.007***	-0.007***	-0.009***
	(0.0003)	(0.0006)	(0.0006)	(0.0006)
Age	0.15	-1.84**	-2.07**	-3.01***
	(0.47)	(0.88)	(0.89)	(0.91)
Age^2	-0.00002	0.03***	0.028***	0.04***
	(0.006)	(0.01)	(0.011)	(0.01)
Female (Male as the reference)	-29.55***	-32.21***	-29.16***	-31.94***
	(2.05)	(3.80)	(3.86)	(3.93)
Education (No education as the reference)				
Primary School	-2.32	0.06	-0.60	-1.43
	(2.82)	(5.25)	(5.33)	(5.43)
Secondary School	-4.56	-11.20*	-12.08**	-11.09*
	(3.26)	(6.07)	(6.16)	(6.27)
High School	6.90*	-7.90	-5.16	-0.67
	(3.96)	(7.37)	(7.48)	(7.62)
College Graduate	8.41**	-7.43	-4.07	-6.08
	(3.91)	(7.27)	(7.38)	(7.51)
Marital Status (Single as the reference)				
Married	-10.89***	-8.14*	4.35	-0.72
	(2.32)	(4.31)	(4.37)	(4.45)
Divorced/Separated and Others	-9.35**	-9.00	1.41	-1.87
	(4.07)	(7.56)	(7.67)	(7.81)
Area (Rural as the reference)	5.64***	12.94***	12.92***	9.33**
	(2.05)	(3.82)	(3.88)	(3.94)

Table 2.4 (Continued)

Independent Variables	Leisure Time (Minutes)			
	Leisure Measure 1	Leisure Measure 2	Leisure Measure 3	Leisure Measure 4
Household Head (Non-household head as the reference)	5.95***	26.05***	24.80***	26.11***
	(2.09)	(3.89)	(3.95)	(4.02)
Year 2004 (Year 2001 as the reference)	-24.84***	47.14***	39.63***	70.48***
	(1.93)	(3.60)	(3.65)	(3.72)
Day (Sunday as the reference)				
Monday	-54.23***	-83.07***	-82.91***	-90.79***
	(3.99)	(7.41)	(7.52)	(7.66)
Tuesday	-45.46***	-58.89***	-59.81***	-68.83***
	(3.83)	(7.11)	(7.22)	(7.35)
Wednesday	-54.59***	-70.37***	-71.56***	-79.59***
	(3.78)	(7.03)	(7.14)	(7.27)
Thursday	-58.63***	-85.04***	-87.40***	-92.58***
	(3.87)	(7.19)	(7.30)	(7.44)
Friday	-56.17***	-79.38***	-81.03***	-89.07***
	(3.76)	(6.98)	(7.09)	(7.21)
Saturday	-22.08***	-29.78***	-30.83***	-33.78***
	(3.88)	(7.22)	(7.33)	(7.46)
Firm size: large (Small as the reference)	17.69***	14.47***	14.70***	15.16***
	(2.67)	(4.97)	(5.04)	(5.13)
Occupation (Elementary as the reference)				
Professionals and executives	-5.97	12.52	12.48	23.08**
	(4.69)	(8.72)	(8.85)	(9.01)
Technicians	1.70	9.08	8.96	11.50
	(4.23)	(7.86)	(7.98)	(8.12)
Sales, services, and clerk	-12.64***	-6.87	-5.56	-2.86
	(3.30)	(6.14)	(6.23)	(6.34)
Skilled and machinery related	-0.82	11.54**	13.04**	15.01***
	(2.99)	(5.56)	(5.64)	(5.75)
Agricultural related	16.91***	7.27	8.69	20.07**
	(4.43)	(8.24)	(8.36)	(8.51)

Table 2.4 (Continued)

Independent Variables	Leisure Time (Minutes)			
	Leisure Measure 1	Leisure Measure 2	Leisure Measure 3	Leisure Measure 4
Industry (Agricultural is the reference)				
Manufacturing	-25.17***	-78.76***	-82.66***	-87.47***
	(4.41)	*(8.20)*	*(8.33)*	*(8.48)*
Service	-11.24***	-48.09***	-49.83***	-51.26***
	(3.97)	*(7.39)*	*(7.50)*	*(7.63)*
Constant	247.4***	889.8***	902.2***	939.6***
	(9.79)	*(18.19)*	*(18.47)*	*(18.80)*
Observations	22,357	22,357	22,357	22,357
R-squared	0.06	0.047	0.044	0.059

Note: Standard errors in parentheses and *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2.5 Estimation of log (Leisure Time), Pooling Data of 2001 and 2004

Independent Variables	log (Leisure Time)			
	log (Leisure Measure 1)	log (Leisure Measure 2)	log (Leisure Measure 3)	log (Leisure Measure 4)
log [Hourly wage]	0.45***	0.097***	0.10***	0.118***
	(0.02)	*(0.005)*	*(0.005)*	*(0.005)*
log [Monthly income]	-0.45***	-0.113***	-0.12***	-0.142***
	(0.02)	*(0.005)*	*(0.005)*	*(0.005)*
Age	0.005	-0.002***	-0.003***	-0.003***
	(0.004)	*(0.0009)*	*(0.0009)*	*(0.0009)*
Age^2	-0.00003	0.00003***	0.00003***	0.00004***
	(0.0005)	*(0.00001)*	*(0.00001)*	*(0.00001)*
Female (Male as the reference)	-0.195***	-0.058***	-0.05***	-0.058***
	(0.017)	*(0.004)*	*(0.004)*	*(0.004)*
Education (No education as the reference)				
Primary School	-0.028	-0.003	-0.005	-0.006
	(0.024)	*(0.005)*	*(0.005)*	*(0.005)*
Secondary School	-0.03	-0.004	-0.005	-0.004
	(0.027)	*(0.006)*	*(0.006)*	*(0.006)*
High School	0.105***	0.003	0.007	0.01
	(0.03)	*(0.007)*	*(0.007)*	*(0.007)*
College Graduate	0.132***	0.009	0.014*	0.012*
	(0.033)	*(0.007)*	*(0.007)*	*(0.007)*
Marital Status (Single as the reference)				
Married	-0.03	-0.024***	-0.008*	-0.014***
	(0.019)	*(0.004)*	*(0.004)*	*(0.004)*
Divorced/Separated and Others	-0.05	-0.019**	-0.005	-0.008
	(0.03)	*(0.008)*	*(0.008)*	*(0.008)*
Area (Rural as the reference)	0.059***	0.017***	0.017***	0.013***
	(0.017)	*(0.004)*	*(0.004)*	*(0.004)*

Table 2.5 (Continued)

Independent Variables	log (Leisure Time)			
	log (Leisure Measure 1)	log (Leisure Measure 2)	log (Leisure Measure 3)	log (Leisure Measure 4)
Household Head (Non-household head as the reference)	-0.01 (0.017)	0.003 (0.004)	0.001 (0.004)	0.003 (0.004)
Year 2004 (Year 2001 as the reference)	-0.56*** (0.016)	-0.013*** (0.004)	-0.02*** (0.004)	0.017*** (0.004)
Day (Sunday as the reference)				
Monday	-0.17*** (0.034)	-0.126*** (0.007)	-0.125*** (0.008)	-0.132*** (0.008)
Tuesday	-0.17*** (0.032)	-0.11*** (0.007)	-0.114*** (0.007)	-0.12*** (0.007)
Wednesday	-0.19*** (0.032)	-0.125*** (0.007)	-0.126*** (0.007)	-0.13*** (0.007)
Thursday	-0.22*** (0.033)	-0.134*** (0.007)	-0.136*** (0.007)	-0.14*** (0.007)
Friday	-0.18*** (0.032)	-0.132*** (0.007)	-0.134*** (0.007)	-0.14*** (0.007)
Saturday	-0.076** (0.033)	-0.075*** (0.007)	-0.06*** (0.007)	-0.08*** (0.007)
Firm size: large (Small as the reference)	0.071*** (0.023)	-0.02*** (0.005)	-0.019*** (0.005)	-0.017*** (0.005)
Occupation (Elementary as the reference)				
Professionals and executives	-0.15*** (0.039)	0.003 (0.009)	0.003 (0.009)	0.018** (0.009)
Technicians	-0.017 (0.036)	0.02** (0.008)	0.022*** (0.008)	0.027*** (0.008)

Table 2.5 (Continued)

Independent Variables	log (Leisure Time)			
	log (Leisure Measure 1)	log (Leisure Measure 2)	log (Leisure Measure 3)	log (Leisure Measure 4)
Sales, services, and clerk	-0.12***	-0.012*	-0.009	-0.003
	(0.028)	(0.006)	(0.006)	(0.006)
Skilled and machinery related	0.004	0.017***	0.019***	0.022***
	(0.025)	(0.006)	(0.006)	(0.006)
Agricultural related	0.027	0.0009	0.003	0.015*
	(0.036)	(0.008)	(0.008)	(0.008)
Industry (Agricultural is the reference)				
Manufacturing	-0.13***	-0.066***	-0.067***	-0.07***
	(0.037)	(0.008)	(0.008)	(0.008)
Service	-0.034	-0.03***	-0.03***	-0.026***
	(0.033)	(0.007)	(0.007)	(0.007)
Constant	8.49***	7.71***	7.77***	7.97***
	(0.18)	(0.04)	(0.04)	(0.04)
Observations	20,262	21,011	21,012	21,012
R-squared	0.117	0.075	0.076	0.087

Note: Standard errors in parentheses and *** $p<0.01$, ** $p<0.05$, * $p<0.1$

2.7 Conclusion

This study mainly examines how Thai people change their allocation of time to leisure in response to wage and income change. Also, the determinants of leisure time using Thailand's Time Use Survey, together with Labor Force Survey data, are explored. Leisure time regressed is divided into four measures, Leisure 1-4, from the narrowest to the broadest.

Comparing the two genders, males obviously allocate more leisure time in all measures. This is possibly influenced by the culture, where men could choose to only work in the market while women are responsible for housework, even though Thai women these days also allocate time for market work. Besides this, level of education significantly impacts leisure time in the narrowest measure or Leisure Measure 1, according to the results. High school and university graduates evidently engage in this type of leisure at around 10% and above compared to the uneducated group. Pure leisure is also consumed the greatest amount of time by the singles. People living in municipal areas are likely to take more leisure time in all measures. Sunday is the day during which Thai people spend longest leisure time, and is more inelastic for leisure time change, while the day people allocate the shortest leisure time to is Thursday. Moreover, workers in large firms with hundreds of employees tend to consume relatively more leisure time, while those in the manufacturing industry tend to spend the least time for leisure compared with people in the service and agricultural sectors.

The data indicate that people reduce their leisure time in all measures in response to monthly income change. When wage or income changes, people adjust their time for Leisure Measure 1 more than time for leisure in other measures. The reason explaining such a negative relationship is that monthly income is composed of income other than wage, for example, overtime and bonus, which are found to be inversely related to leisure time. Therefore, wage per hour is a better factor for analyzing whether leisure is a normal good. When the relationship between leisure time and hourly wage is estimated, an increase in hourly wage substantially and significantly induces people to engage leisure time in all measures, whereas a percentage change in hourly wage also provides a positive percentage change in leisure time. The result of the study strongly confirms that leisure is a normal good for the Thai people.

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ESSAY 3

DOES LEISURE CONTRIBUTE TO AN INCREASE IN THE WAGES OF THE THAI PEOPLE?

3.1 Abstract

It is generally believed that skills and productivity leading to wage change are developed by some non-leisure activities, for example, education, training, and work. This paper examines whether labor productivity could be improved by consuming leisure. The findings reveal that some leisure activities do affect wage change. Wage reduction could be caused by increases in leisure time use for social participation and volunteer activities. Media use and recreation activities are also found to enhance hourly wages. However, this study could not conclude how computer use in leisure, learning during leisure time, sleep and personal care, as well as sport and exercise impact wage changes. Further exploration of the influence of hourly wage on leisure time indicates a positive relationship, confirming that leisure is a normal good for the Thai people.

Keywords: leisure, wage, leisure activities, Thailand

3.2 Introduction

The time that people spend on activities can mainly be divided into work and non-work. Empirical research has mainly emphasized work time studies since work provides economic benefit by creating earnings, consumption, and economic growth; although a proportion of time use for non-work activities, leisure time is substantially greater. Leisure benefits by fulfilling physical and psychological needs by driving an individual's utility. Generally, leisure is classified as time spent away from work that creates an individual's utility. The gain mentioned for leisure includes mostly the enhancement of preferences and welfare without consideration of whether the activities help increase an individual's wage and income by boosting productivity, as they are the determinants of the rise in living standards (Artige and Nicolini, 2006: 2-7). Benzion and Epstein (n.d., 10) indicated that deferring leisure was caused by productivity improvement efforts, leading to wage inducement. Workers substitute leisure in the present to invest efforts for productivity increases and more wages received. However, some empirical evidence has claimed that leisure activities themselves cause both physical and mental improvement (for example, World Health Organization, 2003: 2-3, Bernaards, Jans, Van den Heuvel, Hendriksen, Houtman and Bongers, 2006: 13-15), enabling positive wage changes.

As there are various leisure activities for individuals to choose from for utility maximization, it raises the question of whether leisure time use for some of those activities could help raise wages. These activities include computer use, media use, personal care, sport and exercise, recreation, learning in leisure time and social participation and volunteer activities. The computer plays a key role in enhancing productivity at the workplace (for instance, Lehr and Lichtenbreg, 1996: 1-31 and Maliranta and Rouvinen, 2006: 605-616). Personal care develops physical appearance and is proved to be positively correlated with wages since beauty is a factor causing discrimination in labor market (Harmermesh and Biddle, 1993: 26 and Gergaud and Gensburgh, n.d.: 3-4), and healthiness boosts an individual's productivity, which improves wages. Physical activities by playing sports and exercising generate good health as well as improved physical and mental condition (Nana, Sanderson and Goodchild, 2002: 29-30 and World Health Organization, 2003: 4-6), whereas learning brings about higher skills and knowledge, thus yielding better performance and labor productivity

(Desy and Tessaring, 2001: 8-16). Social participation and volunteer activities create social networks, which consequently increases performance of the connected works and yields rises in wages (Ioannides and Sortevent, 2006: 270-273 and Bandiera, Barankay and Rasul, 2009: 1073-1078). Until now, whether these leisure time activities improve an individual's wages has not been explored. This paper fills the research gap by examining how leisure time activities promote labor productivity as the main objective. The findings could be applied to human development issues by encouraging productive leisure activities in order to raise labor productivity and wages.

This paper is organized as follows; previous findings on how leisure activities are related to wage changes as well as a conceptual framework are reported in the next section, followed by an explanation of each leisure activity in detail before model specification and estimation are offered. The author then presents an empirical analysis of wage change separated by leisure activity in order to find out how wage change is affected by leisure activity, as well as how different characteristics of individuals impact wages. If it is found that the leisure activities influence wage change, the study further explores how hourly wages and monthly income impact leisure time and whether leisure is a normal good for the Thai people before the paper's conclusion and policy implications.

3.3 Impact of Leisure on Wages

3.3.1 Conceptual Framework

This paper aims to investigate how leisure time influences wage changes. According to Mincer's model, an individual's earning is influenced by human capital characteristics, which could be obtained from education and experience. To allow for different returns across various types of education, a series of education dummy variables is applied as well as potential experience. The model employs a vector of control variables, signifying demographic characteristics that potentially influence wages. The distinction of the model presented in this paper is that leisure time is included in the model as a factor influencing wage changes. The wage model specification is expressed as follows:

$$ln\ w_i = \alpha_i + \beta_1 S_i + \beta_2 e_i + \beta_3 e_i^2 + \beta_4 D_i + \varepsilon_i$$

where w_i represents an individual i's wage rate; S_i is education dummies; e_i is measure of experience, which is included as a proxy of human capital accumulation after formal schooling, whereas D_i represents socio-demographic variables; and ε_i is the error term. Leisure time use possibly contributes to psychological improvement, leading to enhancement as well as knowledge and skill increases, and positively affects productivity and wage enhancement.

Generally, leisure time activities are believed to provide merely utility, without considering whether they are markedly related to wage change. Some activities categorized as leisure are reported to contribute to wage change, for example, computer use evidently generates higher labor productivity and an increase in wages (Brynjolfsson, 1998: 11 and Revilla E. and Ruiz G., 2008: 163-173). This paper explores whether an individual's leisure activities contribute to the development of skills and knowledge that will improve an individual's productivity and consequently lead to a wage increase. Figure 3.1 presents the conceptual framework illustrating how various leisure activities are related to a rise in wages.
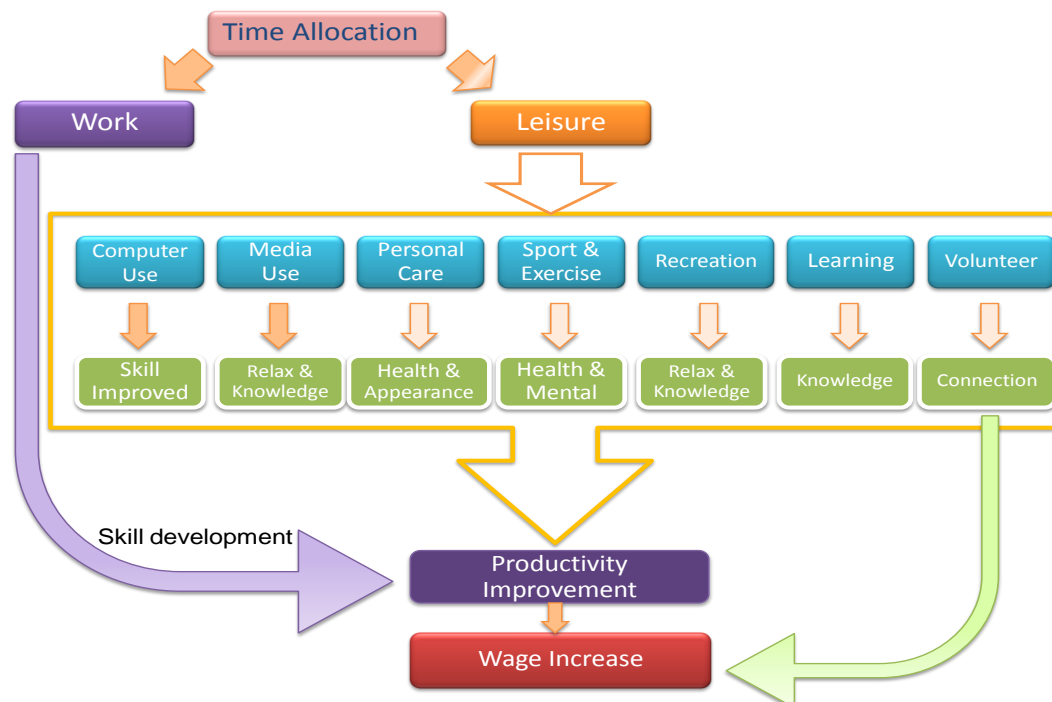
Figure 3.1 Conceptual Framework for Essay 3

As seen in Figure 3.1, an individual's time allocation is devoted mainly to two kinds of activities, work and leisure. Work activities include market work and home production and housework, while leisure time activities are divided into 7 types: computer use, mass media use, personal care, sport and exercise, recreational activities, learning and social participation, and volunteer activities. Experience with time allocated for work, together with leisure activities, lead to the development of an individual's skills and productivity, which consequently enhance one's wages.

Among the leisure activities, computer use directly contributes to technology-related skills development, while leisure time spent on the mass media through reading, watching, and listening provide mental relaxation and sometimes it enhances knowledge. Personal care improves not only health, but also one's appearance, which is proved to be a factor contributing to wage increases (Hamermesh and Biddle, 1993: 13-20). Sport and exercise develop one's physical condition, improve health, as well as reduce the risk of illness. People spending time on recreational activities not only improve their knowledge through learning and enjoying the activities, for example, sightseeing for cultural sites and joining events, but enjoy these activities which yield psychological improvement. Learning during leisure time for skill development as well as for the purpose of fulfilling psychological needs causes the enhancement of knowledge and individuals' skills. Even social participation and volunteer activities during leisure time enable the creation of social networks and skills development. A detailed list of each type of leisure activity is presented in Section 3.4.

3.3.2 Computer Use Leisure and Wage Change

The greatest increase in productivity has historically been associated with a particular class of technology, and computer technology has advanced at an exponential rate of growth for decades (Brynjolfsson: 1998: 2-13). Similarly, computer technology also positively enhances labor productivity, as proven by a large amount of economic literature investigating the impact of computers on labor productivity (for example Lehr and Lichtenbreg (1996: 1-31), Krueger (1993: 33-60), U.S. Department of Labor (1996: Paragraph 8-14), Maliranta and Rouvinen (2006: 605-616)). They agree that use of the computer helps to enhance labor productivity, as evidenced by the growth of the firm and economic development. Brynjolfsson (1998: 11) revealed that computers take part in

productivity increases as they are an essential component of a broader system of work in the organization, and computer skills are highly valued in the workplace—workers using computers earned 13% more than those that did not use computers at all (Green, 1998, quoted in Dolton and Pelkonen, 2007: 3) This corresponded to the work of Lehr and Lichtenbreg (1996: 19), who agreed that computer usage appeared to contribute positively to productivity growth. Liu, Tsou Hammitt (2004: 48-50) suggested that highly-paid workers were more likely to use computers, which positively and directly affected wages caused by productivity enhancement.

Evidence confirms the positive impact of activities related to computer technology on productivity, including the findings of the efficient combination of technology use with labor. However, how computer use in leisure time, which certainly provides utility, contributes to labor productivity change, especially in developing countries, is still in question and needs further investigation.

3.3.3 Media Use and Wage Change

Leisure time for media use includes time devoted to leisure reading, watching television, VDOs, VCDs and DVDs, and listening to the radio and music. Reading books contributes to both knowledge improvement and mental development. Time use for leisure reading depends on socio-economic characteristics as well as the whole leisure time available (Greaney, 1980: 347-352). Empirical literature has suggested that the content of television has four broad types of impacts on people, including knowledge and cognitive skills. Therefore, television as a learning medium has also been used for knowledge improving purposes. Moeller (1996: 1-9) has indicated that some television programs could crucially contribute to knowledge base of the viewers, including work, learning, and cultural knowledge. Listening to music in leisure time enhances happiness as well as relieves mental stretch. Gardiner (2000: 84-86) studied the interactions between music and learning and found the development of thinking skills. In addition, listening to music induces social, emotional and personal development.

From empirical studies, it can be seen that media use during leisure time can bring about mental relaxation, skills, and knowledge. So far, there has been no research on how media use during leisure time correlates with wage changes. As Thai people devote 14-

16% of leisure time for media use, exploration of the impact of this type of leisure becomes important for analyzing time use.

3.3.4 Personal Care and Wage Change

Composing time for personal care, sleeping, and eating, personal care is a group of necessary activities for individuals that contributes to the both physical and mental health. Moreover, an individual's appearance could also be improved with an appropriate level of personal care. The empirical literature reveals the existence of the link between wage and appearance. Hamermesh and Biddle (1993: 5-12) found that a person with an above-average appearance tended to earn 5% more than an average looking person, while a below-average person received wages of approximately 9% less. They gave possible reasons for a premium for beauty and a penalty for ugliness; first, the employer discriminates against the unattractive; second, productivity could be created from discrimination of the appearance; lastly, the unattractive group's inability to achieve a wage gain by moving to occupations dominated by attractive workers. Appearance could affect confidence and communication, which increase productivity as a consequence. Gergaud and Ginsburgh (2010: 4) found that physical beauty has even a larger positive effect on income among celebrities. Gao and Smyth (2009: 13-17) agreed that people that are taller, one of the indications of physical appearance, significantly earned more wages. Moreover, one's height increased the chances for teens to participate in social activities, which in turn, helped to improve skills, enhance productivity, and increased wages. The wage differentials confirm that personal care for a good appearance positively correlated with an individual's wage. Therefore, how time use for these personal care activities is related to wage changes is investigated in Section 3.5.

3.3.5 Sport and Exercise, Recreation, and Wage Change

Recreation serves a critical role in most people's lives by satisfying physical and mental needs. Some recreational activities, for example, visiting museums or cultural sites, not only provides enjoyment, but also knowledge and creativity while for some people it provides improvement in physical health as well as cognitive function—improving memory, and increasing awareness and alertness, which contribute to productivity and potentially lead to wage increases. Recreational activities, for instance,

playing games, can even enhance creative and other forms of critical thought (Mitchell and Savill-Smith, 2004: 19). Another type of recreational activity that evidently improves physical ability, leisure sports, is freeform, voluntary, and a non-competitive activity, aiming to regulate the mental state of people (Min and Jin, 2010: 99). Sport activities provide direct enjoyment by boosting an individual's capabilities and contributing to people's better health. From empirical investigation, it can be seen that enhancing participation in sport and exercise reduces health care costs to both individuals and society by improving health and preventing diseases (World Health Organization: 2003, 1-6). Nana et al. (2002: 29-30) found a positive relationship between physical activity and health, as shown by the reduction of the problems of disease, high blood pressure, and cholesterol. Therefore, sport and physical activities also provide one of the most cost-effective forms of preventative medicine. Empirical research has also confirmed that with improved physical condition and health, physical activities increased productivity (Nana et al., 2002: 29-30, United Nations, 2005: 1-8 and Trigonis, Matsouka, Costa and Tzetzis, 2008: 6-11). Furthermore, the introduction of sport and exercise programs in companies have been found to be beneficial to workers by inducing creativity and productivity, as evidenced by the company's production growth, increasing profits, and improved workers' performance (Trigonis et al., 2008: 1-11) This indicates that leisure time use by playing sports and exercise potentially helps one to maintain good physical condition and productivity in the long term.

3.3.6 Leisure Learning Activities and Wage Change

It has long been realized that learning is a source of labor productivity growth, as it is a way to improve human capital, which positively impacts innovation and technological progress. Technology advancement has reduced work hours and increased leisure time (Aguiar and Hurst, 2007: 977-987). As productivity growth has played a key role in obtaining higher wages, workers realize how important training and retraining are in order to improve skills and boost productivity and earnings. Furthermore, technological progress has introduced alternative ways of acquiring knowledge, including learning during leisure time. Characterized as informal learning, learning during leisure time also enhances one's skills, leading to better performance and labor productivity

increases (Descy and Tessaring, 2001: 8-16). This indicates the substantial impact of learning on productivity progress.

3.3.7 Social Participation, Volunteer Activities, and Wage Change

Social participation and volunteer activities create connections among people in the society and the community, which is empirically related to the rise of the opportunity to be employed for workers. The issue of how relations and social preferences matter in terms of economic behavior has been discussed, since there exists the idea that human relations affect behavior in the workplace (Bandiera et al., 2009: 1047). Though unequal earnings among workers could be explained by individual characteristics, for instance, age, gender, and education, there are some additional factors that can cause unequal earnings. Previous studies have revealed that social networks possibly explain the salient characteristics of the labor market (for example, Ioannides and Loury, 2004: 1056-1093 and Ioannides and Soetevent, 2006: 270-274). Ioannides and Soetevent (2006: 270-273) showed that on average workers that were better connected socially experienced not only a lower unemployment rate, but also received higher wages. Bandiera et al. (2009: 1068-1070) found that social connection enhanced productivity and the performance of workers, leading to the chance of wage increases. Therefore, time use for social participation and volunteer activities, contributing to creation of social connection, is possibly correlated with wage changes, as shown in section 3.5.

3.4 Leisure Activities and Model Specification

This paper focuses on the individual's time use for leisure activities by exploring whether they contribute to wage improvement. Computer use leisure includes time using computer technology for reading, media use, and Internet surfing, which in turn improve computer use skills. Sport and exercise leisure is comprised of time used for playing indoor and outdoor sports, exercise, and yoga, for example. Those activities are beneficial by developing one's physical condition and health. Learning during one's leisure time is believed to be an activity for human capital accumulation for higher productivity. Learning in leisure excludes education and homework for a higher degree. Leisure time for mass media use activities includes time for reading books, watching television, and

listening to the radio and music, and visiting the library. Leisure time for personal care includes time for sleeping and eating. Social participation activities and volunteer activities as a kind of leisure comprise community services, helping other households' non-market activities, informal group meetings in the community, and volunteering with organizations. The last group of leisure activities in this study, recreation, includes time for arts, music, plays, hobbies, and playing games, as well as time for cultural sightseeing, entertainment shows, and sports events. Table 3.1 presents a detailed list of these productive leisure activities with examples.

Table 3.1 List of Leisure Activities that Potentially Improve Wages

Types of Leisure Activities	Activities included
Computer Use	- Computer use for entertainment and media purposes - Computer technology for reading, watching and listening to radio - Computer use for media - Internet surfing - Data uploads and downloads for entertainment
Mass Media Use	- Reading, watching TV, VDO, VCD and DVD - Listening to music and radio - Visiting the library - Other mass media use for entertainment
Personal Care	- Sleep and related activities - Eating and drinking - Personal hygiene and health
Sport and Exercise	- Walking and jogging for exercise - Biking, skating, and skateboarding - Aerobics, yoga, weightlifting and other fitness programs - Sports with a ball as the equipment, for instance, golf, tennis, table tennis, badminton football, basketball, volleyball, etc. - Marine sports, winter sports, and horse riding - Other sports and exercise-related activities
Recreational Activities	- Arts, music, hobbies, and related courses - Playing games - Spectator sports, exhibitions, museums, cinema, theatre, concerts, and other performances and events - Other recreational activities

Table 3.1 (Continued)

Types of Leisure Activities	Activities included
Learning	- Additional study, non-formal courses during free time - Self-learning depending on individual's interest, opportunity, potential, and readiness - Training for learning and career development
Social Participation	- Participating in cultural activities, weddings, funerals births and other celebrations - Socializing at home and outside the home - Community organized construction and repairs - Community organized work - Volunteering for an organization (which does not involve working directly for individuals) - Volunteer work through organizations extended directly to individuals and groups - Participation in meetings of local and informal groups, tribes, professional associations, unions, and fraternal and political organizations - Involvement in civic and related responsibilities, for example, rallies - Informal help to other households

Note: This list of the activities was obtained from the Time Use Survey 2001 and 2004
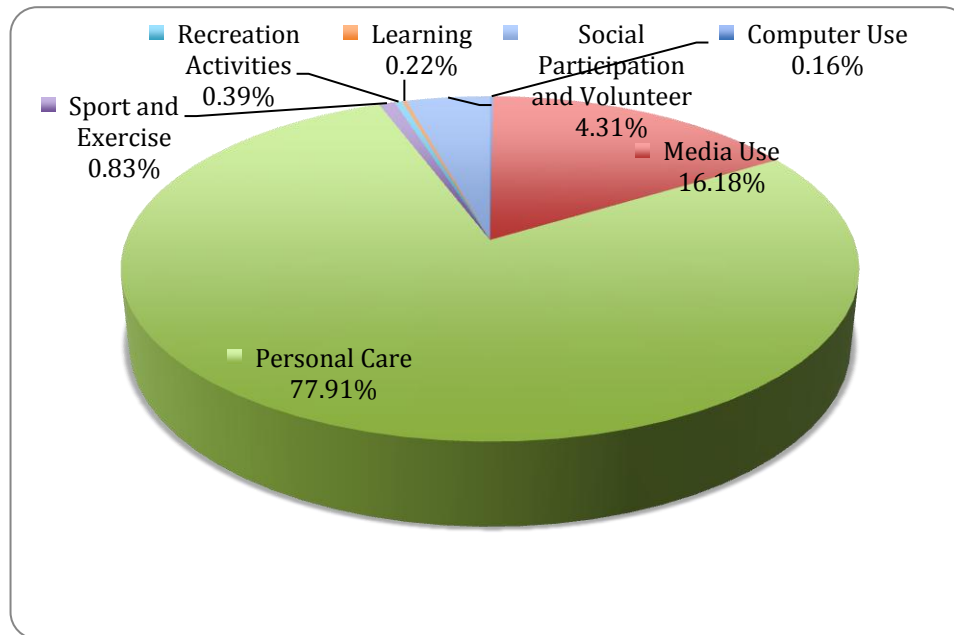
Figure 3.2 Percentage of Time for Leisure Activities of the Thai People
Source: Author's calculation, using Time Use Survey 2004 data.

Figure 3.2 illustrates the percentage of leisure time spent for each activity listed in Table 3.1. As personal care includes time for sleeping, it takes greater than 3/4 of all leisure time. Thai people spend time reading, watching TV, and listening to the radio at approximately 16% of all leisure time, which ranked the second highest proportion of leisure time use. From the proportion of computer use in leisure time in 2004, the percentage of time use for this activity was still low, whereas the proportion of time devoted to recreation and learning was less than one percent, especially when compared with time use for social participation and volunteer activities, at 3.14%. For Thai people, the average leisure time proportion[1] was 57.28% per day in 2004, which took more than a half a day. Hence, study whether the leisure activities influence wage increases indicates how leisure activities, which certainly drive utility, create labor productivity for the Thais.

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[1] Leisure time is defined as a residual of work time. Therefore it excludes market work, home production, and housework.

Collected by the National Statistical Office (NSO), the data sets applied in this study, the Time Use Survey 2004, provided the time length devoted to each person's activities during 24 consecutive hours, with a number of observations of 54,568. Time use for each activity is measured in minutes. Since an individual's productivity data were not provided in the Time Use Survey or other data sets, wage as the proxy of productivity in the Labor Force Survey, also provided by the National Statistical Office (NSO), was employed to examine how those specific leisure activities impact productivity. The Labor Force Survey was the only individual-level data set collected together with the Time Use Survey. After merging the two data sets for each year, there were 48,524 observations. The observations used in the study include those whose wage data were available. The data applied in this research work include time for leisure in computer use, sport and exercise, learning, mass media use, personal care, social participation, and volunteer and recreational activities. Moreover, individual data on hourly wage, age gender, marital status, education, status in the household (household's head or member), occupation and industry, and respondent's area (municipal and non-municipal) were also included. Table 3.2 details the descriptive statistics for average leisure time in different categories in minutes, divided by different socio-economic characteristics for the year 2004. They reflect the change of time use in these activities.

This paper focuses on the study of the relationship between leisure time use in seven groups of leisure activities and wage. According to many empirical studies, some leisure activities contribute to one's wage by enhancing labor productivity (for example, Lehr and Lichtenbreg (1996: 1-31), Krueger (1993: 33-60), Descy and Tessaring, 2001: 8-16). Comparing wage profile and productivity profile, Serneels (2005: 21-24) found that wage profiles did reflect productivity profiles on average. This corresponds to the marginal productivity theory, suggesting that highly productive workers are highly paid and less productive workers are less highly paid, as productivity causes real wage changes, and this supports the findings that labor productivity is positively related to real wages in the long run (Wakeford, 2004: 109-132 and Goh, 2009: 1-20). Goh and Wong (2010: 1-20) revealed the high responsiveness of wage to a change in productivity. This implies that productivity reflects wages. Hence, the link of wage and productivity, as well as the evidence of wage inducement of leisure activities presented in previous studies, confirms that leisure activities possibly contribute to wage changes of Thai people.

Table 3.2 Descriptive Statistics of Thai People's Specific Leisure Activities in 2004

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Separated by Gender					
Male					
Computer Use	3,754	98	72.55	20	370
Media Use	3,754	150	91.54	10	770
Personal Care	3,754	640	111.12	100	1,440
Sport and Exercise	3,754	80	42.59	10	420
Recreation	3,754	105	78.46	10	480
Learning	3,754	103	114.57	20	430
Social Participation and Volunteer Activities	3,754	85	86.73	10	1,060
Female					
Computer Use	3,423	85	47.22	10	210
Media Use	3,423	138	82.84	10	700
Personal Care	3,423	619	100.47	130	1,270
Sport and Exercise	3,423	68	38.71	10	250
Recreation	3,423	115	107.73	20	420
Learning	3,423	79	92.40	20	430
Social Participation and Volunteer Activities	3,423	67	76.21	10	790
Separated by Income Level					
Low Income Group					
Computer Use	1,449	66	32.09	40	110
Media Use	1,449	135	81.49	20	600
Personal Care	1,449	655	108.30	250	1,200
Sport and Exercise	1,449	79	39.38	10	210
Recreation	1,449	165	102.70	20	420
Learning	1,449	123	81.45	30	180
Social Participation and Volunteer Activities	1,449	101	117.21	10	1,060

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Middle Income Group					
Computer Use	4,311	94	67.94	10	370
Media Use	4,311	143	87.51	10	700
Personal Care	4,311	629	107.01	100	1,440
Sport and Exercise	4,311	79	37.84	10	250
Recreation	4,311	95	83.65	10	480
Learning	4,311	128	116.63	30	430
Social Participation and Volunteer Activities	4,311	71	71.93	10	590
High Income Group					
Computer Use	1,417	95	64.43	20	370
Media Use	1,417	155	92.62	10	770
Personal Care	1,417	606	97.99	240	1,090
Sport and Exercise	1,417	73	47	10	420
Recreation	1,417	103	81.49	10	390
Learning	1,417	61	87.52	20	430
Social Participation and Volunteer Activities	1,417	72	69.34	10	570
Separated by Educational Level					
No Education					
Computer Use	338	0	0	0	0
Media Use	338	127	77.87	20	440
Personal Care	338	670	109.75	380	1,180
Sport and Exercise	338	77	41.74	20	150
Recreation	338	158	150.23	50	420
Learning	338	0	0	0	0
Social Participation and Volunteer Activities	338	98	127.40	10	1,060

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Primary School					
Computer Use	2,741	53	15.28	40	70
Media Use	2,741	136	82.62	20	680
Personal Care	2,741	642	110.33	100	1,340
Sport and Exercise	2,741	75	38.72	10	210
Recreation	2,741	146	107.76	10	420
Learning	2,741	160	0	160	160
Social Participation and Volunteer Activities	2,741	81	87.89	10	790
Secondary School					
Computer Use	953	60	28.28	40	80
Media Use	953	143	85.58	10	660
Personal Care	953	639	111.17	210	1,440
Sport and Exercise	953	42	32.47	10	150
Recreation	953	115	91.09	30	390
Learning	953	120	0	120	120
Social Participation and Volunteer Activities	953	78	75.83	10	490
High School					
Computer Use	587	114	100.44	10	370
Media Use	587	155	93.56	20	660
Personal Care	587	622	103.82	170	1,310
Sport and Exercise	587	83	39.10	30	230
Recreation	587	89	100.29	10	480
Learning	587	143	193.11	30	430
Social Participation and Volunteer Activities	587	70	72.85	10	570

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
College					
Computer Use	1,650	92	59.95	20	370
Media Use	1,650	153	93.31	10	770
Personal Care	1,650	605	93.03	240	1,130
Sport and Exercise	1,650	78	47.20	10	420
Recreation	1,650	95	72.25	20	390
Learning	1,650	59	51.35	20	200
Social Participation and Volunteer Activities	1,650	72	72.30	10	590
Separated by Marital Status					
Single					
Computer Use	2,401	97	64.06	10	370
Media Use	2,401	148	90.14	10	770
Personal Care	2,401	636	109.28	100	1,440
Sport and Exercise	2,401	86	42.19	10	250
Recreation	2,401	107	84.47	10	480
Learning	2,401	119	89.39	30	330
Social Participation and Volunteer Activities	2,401	83	81.96	10	660
Married					
Computer Use	4,224	90	67	20	370
Media Use	4,224	143	86.67	10	700
Personal Care	4,224	626	104.72	170	1,340
Sport and Exercise	4,224	72	41.13	10	420
Recreation	4,224	108	98.08	10	420
Learning	4,224	80	108.61	20	430
Social Participation and Volunteer Activities	4,224	73	83.46	10	1,060

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Divorced/ Separated and Others					
Computer Use	552	87	58.88	30	180
Media Use	552	134	84.72	20	650
Personal Care	552	636	108.59	130	1,180
Sport and Exercise	552	63	35.74	20	220
Recreation	552	129	68.75	30	250
Learning	552	35	7.07	30	40
Social Participation and Volunteer Activities	552	80	79.90	10	560
Separated by Age					
Age 15-24					
Computer Use	1,244	89	52.68	10	200
Media Use	1,244	146	88	10	600
Personal Care	1,244	640	112.46	170	1,270
Sport and Exercise	1,244	83	40.11	10	210
Recreation	1,244	109	91	20	480
Learning	1,244	110	75	30	180
Social Participation and Volunteer Activities	1,244	82	86.20	10	590
Age 25-44					
Computer Use	3,608	89	61.17	30	370
Media Use	3,608	144	88.90	10	770
Personal Care	3,608	626	105.72	100	1,440
Sport and Exercise	3,608	81	40.72	10	250
Recreation	3,608	101	82.31	10	420
Learning	3,608	119	113.88	30	430
Social Participation and Volunteer Activities	3,608	72	75.09	10	660

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Age 45-60					
Computer Use	2,128	104	77.45	20	370
Media Use	2,128	144	86.83	10	660
Personal Care	2,128	627	102.23	210	1,340
Sport and Exercise	2,128	71	43.83	10	420
Recreation	2,128	130	107.59	20	420
Learning	2,128	63	91.20	20	430
Social Participation and Volunteer Activities	2,128	80	84.86	10	790
Age more than 60					
Computer Use	197	75	49.50	40	110
Media Use	197	131	71.62	20	540
Personal Care	197	667	121.47	320	1,180
Sport and Exercise	197	44	21.38	20	90
Recreation	197	0	0	0	0
Learning	197	0	0	0	0
Social Participation and Volunteer Activities	197	101	142.18	10	1,060
Separated by Area					
Municipal					
Computer Use	4,959	98	68.29	20	370
Media Use	4,959	147	89.68	10	770
Personal Care	4,959	628	106.13	100	1,440
Sport and Exercise	4,959	76	40.33	10	250
Recreation	4,959	112	95.95	10	480
Learning	4,959	87	100.42	20	430
Social Participation and Volunteer Activities	4,959	75	77.15	10	620

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Non-Municipal					
Computer Use	2,218	75	47.02	10	200
Media Use	2,218	136	82.49	20	650
Personal Care	2,218	633	107.77	170	1,200
Sport and Exercise	2,218	80	46.66	10	420
Recreation	2,218	92	55.98	20	210
Learning	2,218	93	107.36	20	430
Social Participation and Volunteer Activities	2,218	81	93.57	10	1,060
Employment Industry					
Agricultural					
Computer Use	908	370	0	370	370
Media Use	908	134	83.32	20	600
Personal Care	908	659	116.72	210	1,340
Sport and Exercise	908	76	29.64	10	130
Recreation	908	105	67.77	30	240
Learning	908	160	0	160	160
Social Participation and Volunteer Activities	908	99	115.59	10	1060
Manufacturing					
Computer Use	664	125	95.95	10	370
Media Use	664	140	87.25	10	700
Personal Care	664	621	104.09	100	1,440
Sport and Exercise	664	69	38.73	10	190
Recreation	664	123	106.99	30	480
Learning	664	100	28.28	80	120
Social Participation and Volunteer Activities	664	64	71.34	10	660

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Service					
Computer Use	1,633	88	54.85	20	330
Media Use	1,633	148	88.52	10	770
Personal Care	1,633	628	104.57	130	1,310
Sport and Exercise	1,633	79	43.25	10	420
Recreation	1,633	106	88.24	10	420
Learning	1,633	87	105.01	20	430
Social Participation and Volunteer Activities	1,633	78	78.14	10	660
Occupation					
Professionals and Managers					
Computer Use	1,211	88	61.59	20	370
Media Use	1,211	107	84.03	20	370
Personal Care	1,211	605	94.22	240	1,310
Sport and Exercise	1,211	72	47.49	10	420
Recreation	1,211	117	81.96	30	390
Learning	1,211	65	70.11	20	330
Social Participation and Volunteer Activities	1,211	79	79.79	10	590
Technicians					
Computer Use	704	106	56.55	10	240
Media Use	704	160	97.36	20	650
Personal Care	704	626	113.73	170	1,130
Sport and Exercise	704	80	42.09	20	230
Recreation	704	100	93.18	10	420
Learning	704	240	268.70	50	430
Social Participation and Volunteer Activities	704	72	72.23	10	470

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Agricultural Related					
Computer Use	498	0	0	0	0
Media Use	498	0	0	0	0
Personal Care	498	641	121.81	210	1,200
Sport and Exercise	498	75	27.97	10	130
Recreation	498	123	40.41	100	170
Learning	498	0	0	0	0
Social Participation and Volunteer Activities	498	116	140.10	10	1,060
Clerk, Customer Services and Sales Employees					
Computer Use	1,379	107	56.55	10	240
Media Use	1,379	141	81.63	20	770
Personal Care	1,379	624	105.76	130	1,210
Sport and Exercise	1,379	81	39.01	10	190
Recreation	1,379	98	92.59	20	420
Learning	1,379	148	161.62	30	430
Social Participation and Volunteer Activities	1,379	70	72.49	10	500
Skilled and Machinery Related Workers					
Computer Use	2,064	50	26.46	30	80
Media Use	2,064	142	87.08	10	700
Personal Care	2,064	638	103.59	100	1,440
Sport and Exercise	2,064	73	34.61	10	180
Recreation	2,064	127	111.14	10	480
Learning	2,064	150	42.43	120	180
Social Participation and Volunteer Activities	2,064	75	79.81	10	660

Table 3.2 (Continued)

	Number of Observations	Average Leisure per Day (Min.)	Standard Deviation	Min	Max
Total					
Computer Use	7,177	93	64.83	10	370
Media Use	7,177	144	87.73	10	770
Personal Care	7,177	630	106.66	100	1,440
Sport and Exercise	7,177	77	41.94	10	420
Recreation	7,177	108	89.23	10	480
Learning	7,177	89	101.85	20	430
Social Participation and Volunteer Activities	7,177	77	82.77	10	1,060

Source: Author's calculation, using Time Use Survey 2004 and Labor Force Survey 2004 data.

Table 3.2 illustrates the average time for each type of leisure activity. Comparing the two genders, males obviously consumed more leisure time for computer use than females. Computer use seemed to be a leisure activity for high income earners, as evidenced by the longest average computer use leisure time. However, the gap became smaller when time use for computer leisure reported a slight difference, between the middle and high income group in 2004. Furthermore, computer use activities were concentrated among the higher education groups, high school and university graduates. This confirmed that time for computer use activities was likely to be spent by the better-educated group, or high-skilled labor, who tended to receive more wages.

According to the data, people in municipal areas chose to devote their leisure time to using the computer more than those in non-municipal areas. Considering the Thai's leisure time at different ages classified by worker groups, as in Forbes, Barker and Turner (2010: 37), the average time of computer use for leisure was the highest, almost 2 hours a day, among those aged 45-60, while the younger working age people spent slightly shorter time. Nonetheless, the leisure time for computer for each age group appeared to be not so different. Again, the shorter mean time for leisure was confirmed for all age groups, except the oldest and the youngest. Only people in some occupations spent time for computer leisure since there were no people working in the agricultural field that took time for computer leisure at all, while there was only one worker in the agricultural industry that took this type of leisure activity.

Obviously, there was a slight fall in average time for sport and exercise. Even though the decrease in sport and exercise time for males was larger, females still provided less amount of leisure time for this group of activities, as evidenced by 98 minutes for males and 68 minutes for females. Among the three income groups, the low income group enjoyed the longest time for sport and exercise. The reason was possibly that playing sports and exercising could be enjoyable, both individually and in groups, and were activities with lower cost, while the high income group spent slightly shorter leisure time for sport and exercise than the middle income group. This indicated the preferences and behaviors in free time spent for physical improvement activities of people in different income groups. High income earners seemed to prefer play sports and doing exercise less than others, reflecting the possibility of less improvement in physical condition.

The descriptive statistics also revealed that males still consumed more leisure time in mass media use, reading, watching TV, listening to music and the radio, and visiting the library than females. However, leisure time use for this group of activities reduced approximately 20 minutes for both genders. The statistics also indicated that the time spent for enjoying mass media was longer for the higher income as well as higher educated groups. The high income group devoted more than 2 hours and a half per day to mass media leisure activities, while the low income group consumed media only 2 hours and 15 minutes; on the other hand, the high school and college graduates were the two groups that spent the longest mass media leisure hours. This indicates that the better educated and higher income groups seemed to consume more media, whereas municipal area dwellers also consumed more leisure time for this type of activities. Singles provided longer time for mass media, around 5 hours a day. However, the married still consumed more leisure time for mass media than people of other marital status, for example, divorced and separated people, but with a slight difference. Mass media use was more popular among the young, those less than 25 years old, while the old, whose age was above 60, even in the retied years, time spent receiving mass media information the shortest length of time. As leisure time for personal care included time for sleeping, the required human leisure activity, as well as eating, drinking, and personal hygiene and health, people mostly consumed more than 10 hours a day for this care. Among the three groups of earners, the low income group dedicated the longest time to sleeping, eating, drinking, and personal care compared with those of the middle and high income group, whereas the lower educated spent more time on personal care in their leisure. The explanation of the findings is that the lower income group, which was likely to be the lower-educated, worked shorter hours and took longer leisure time. Unlike the time used for other leisure activities, both genders consumed longer personal care leisure time in the latter year. It was unsurprising to find that the young and the old took more leisure time for personal care, especially people over 60, where the average personal care leisure time went up to greater than 11 hours a day. Due to the tendency toward more flexible time use for leisure, singles consumed slightly longer personal care leisure than the married, while those of other status seemed to enjoy their leisure time the least. It was also revealed that people in municipal areas consumed clearly less leisure time, as evidenced by the small differences in personal care leisure.

People in municipal areas consume less time for sport and exercise than those in municipal areas. Moreover, it was unsurprising to find that the singles allocated more time for these physical condition development activities than others since this group, which was likely to be younger, tended to enjoy sport and exercise more than the older individuals. This explanation was confirmed by the number of sport and exercise activities divided by age group. The young, aged 15-24, had the highest average time for sport and exercise in both years, 83 minutes, while those in their retired years enjoyed the least for these activities, 44 minutes per day.

Thai people seemed to enjoy recreational activities more than sport and exercise, as confirmed by the longer time used for recreation. Female's recreation time rose by more than 30 minutes and dominated the male's time for recreational activities. The lower educated people consumed longer hours for recreation than those that were high school educated and above by around 20 minutes. The married appear to enjoy slightly more recreation time than the singles, but less than people of other status at around 20 minutes a day. People aged more than 60, on the other hand, consumed more than 2 hours per day for recreational activities, which was greater than the young. The enhancement of recreation time was evidenced by the report that workers in municipal areas consumed less leisure time than the other group by 10 minutes.

Learning, as a kind of leisure time activity, including additional courses taken during one's free time for career development and knowledge improvement, leads to better skills and knowledge, which could increase one's wage as a consequence. From the descriptive statistics of average leisure time in learning, males not only preferred playing sport and exercising for developing their health and physical condition, but also on average spent longer time for the learning activities. In addition, the data indicated that the higher the level of education, the longer time spent for more learning, as evidenced by the average time for this group's activities separated by educational level. The findings from the descriptive statistics also indicated that the singles chose to allocate leisure time to these leisure activities for longer periods than the married and others. Learning time rose from 108 minutes to about 2 hours per day, while people of other status averagely spent no more than 1 hour and a half per day learning in their free time. This result corresponded with the reported data separated by age, as the two youngest groups consumed learning as their leisure for the longest time, at around two hours.

The descriptive statistics on computer use leisure indicated that the activity was enjoyed by the higher educated, the singles, and municipal area dwellers, whereas a computer use time gap between genders did exist. This implies that computers, as one of the technology advancement symbols, were popular among specific groups of Thais, while physical improvement activities were enjoyed by earners in lower the income group. Moreover, the younger and lower educated evidently allocated on average less time for the activities.

The average time for learning as a leisure activity indicated that the more educated tended to spend longer time for learning, which creates productivity-creating-activity, whereas the young were likely to allocate more free time to learning than the old. This was supported by the finding that the singles, who were likely to be comparatively younger than the married and those of other status, consumed the longest time for learning. People in the middle income group appeared to be the most enthusiastic for additional learning, as it was a source to improve skills and wage as a consequence.

It was reported that males consumed more time for social participation and volunteer activities at around 20 minutes per day or greater than 2 hours per week than females. Among Thai earners, those categorized in the low income group substantially spent the longest time for social dedication, 101 minutes, while the middle income group devoted the least time for these activities, 71 minutes daily, which was slightly less than the high income earners. The highest educated group spent less time for social participation and volunteer activities, as confirmed by the average time reported. These activities seemed to be the least enjoyable for the singles since they chose to consume the shortest amount of time for social participation and volunteer activities. Nevertheless, there were not so many time gaps between the time spent for the activities of the singles and that of people of other status. Still, the higher educated were likely to enjoy less time for social-related activities. In the retired years, people devoted more time to social participation and volunteer activities; the average leisure time for social activities among people above 60 was almost 120 minutes per day. Individuals living in non-municipal areas enjoyed social participation and volunteer activities more than the other group, as evidenced by the substantially wide gap of time spent, around half an hour per week.

However, how wage and time for those leisure activities as well as other socioeconomic characteristics are related could not be concluded by only considering the

descriptive data reported in Table 3.2. The next section presents an estimation of the impact of these specific leisure activities and other factors on wage change in order to find out how wage, the productivity proxy, is determined by using the Time Use Survey and Labor force Survey.

3.5 Does Leisure Contribute to an Increase in the Wages of the Thai People?

In the past, empirical research focused on time spent on work activities and did not emphasize leisure time, even though leisure created direct utility and each person allocated a substantial proportion of time for this non-work activity. Leisure has been considered unproductive compared to work as a market activity. This study explores whether leisure time activities, computer use, mass media use, personal care, sport and exercise, recreation, and learning, as well as social participation and volunteer, can cause an increase in wages. Empirical evidence supports that idea that productivity is a source of wage increase (World Health Organization, 2003: 2-3 and Bernaards et al, 2006: 13-15). Besides wage change and time devoted to each leisure activity, the variables employed in the study, including age measured in years, is applied to see how age affects wage and productivity change. Education dummies are divided into no education, primary school, secondary school, high school, and undergraduate level as skills necessary for each leisure activity. Therefore, it is possible that educational level impacts change in skills, productivity, and wage as a consequence. Marital status dummies are also included as well as gender, status in the household (household head and non-household head), and area (municipal and non-municipal area). Additionally, the models include dummies of occupations, divided by professionals, technicians, clerks, sales and services, and elementary or low-skilled related occupations. There are also a series of industry dummies, agricultural, manufacturing and service industry, as control variables in the models. The size of the workplace dummy is also used in the model, with a large company defined as having an employment size greater than 200, while those working with the workplace employing fewer than 200 people are categorized as smaller in size. As this study focuses on the exploration of the relationship between time for leisure activities and hourly wage, only the samples of which wage are observed are included in the regressions.

The regression analysis was separated into two different estimation functions. Both aimed to explore how each of the 7 types of leisure activities and others affects hourly wage. The first model, Model (A), takes the form of estimation as follows:

(A) $\quad ln\ wage_i = \alpha_i + \alpha_1 D_i + \alpha_2 e_i + \alpha_3 e_i^2 + \alpha_4 S_i + \alpha_5 L_i + \mu_i$

where $wage_i$ denotes an individual's hourly wage, D_i represents education dummies, e_i is the number of year experience, S_i represents socio-economic characteristics, and L_i denotes time dedicated to each specific leisure activity. The variable L_i is estimated in minutes.

(B) $\quad ln\ wage_i = \beta_0 + \beta_1 D_i + \beta_2 e_i + \beta_3 e_i^2 + \beta_4 S_i + \beta_5 L_i + \beta_6 R_i + \varepsilon_i$

Model (B) additionally includes the interaction terms of percentage of time for each of the 7 leisure activities and socio-demographic dummies, R_i, which includes gender, household head, area, and marital status. R_i is employed to estimate whether people with equal percentage of time consumption for each leisure activity earn differently or not. For example, if a man and a woman take an equal amount of leisure time for computer use, an R_i indicates how different the hourly wages of these two persons are. All of the empirical results are illustrated in Tables 3.3-3.6.

Table 3.3 Estimation of log (Hourly Wage) Using Computer and Media Use as the Independent Variable in 2004

Independent Variables	log (Hourly Wage)			
	Computer Use		Media Use	
	Model (A)	Model (B)	Model (A)	Model (B)
Computer Use Leisure (Minutes)	0.0006	-0.0006	-	-
	(0.0004)	(0.001)		
Media Use Leisure (Minutes)	-	-	0.0003***	0.0002
			(0.00008)	(0.0002)
Female (Male as the reference)	-0.07***	-0.158	-0.07***	-0.155
	(0.02)	(0.19)	(0.02)	(0.19)
Education (No education as the reference)				
Primary School	-0.07	-0.07	-0.07	-0.07
	(0.06)	(0.06)	(0.06)	(0.06)
Secondary School	0.101***	0.104***	0.099**	0.103***
	(0.04)	(0.039)	(0.04)	(0.04)
High School	0.065*	0.07*	0.064*	0.07*
	(0.04)	(0.037)	(0.04)	(0.04)
College Graduate	0.147***	0.15***	0.15***	0.153***
	(0.04)	(0.04)	(0.04)	(0.04)
Municipal Area (Rural as the reference)	0.115***	-0.24	0.11***	-0.24
	(0.02)	(0.19)	(0.02)	(0.19)
Experience	-0.035***	-0.033***	-0.03***	-0.03***
	(0.009)	(0.009)	(0.009)	(0.009)
Experience^2	-0.0009***	-0.0009***	-0.0009***	-0.001***
	(0.00009)	(0.00009)	(0.00009)	(0.00009)
Marital Status (Single as the reference)				
Married	0.07***	0.295	0.063***	0.29
	(0.02)	(0.207)	(0.02)	(0.21)
Divorced/Separated and Others	-0.04	0.667*	-0.04	0.67*
	(0.04)	(0.37)	(0.04)	(0.37)

Table 3.3 (Continued)

Independent Variables	log (Hourly Wage)			
	Computer Use		**Media Use**	
	Model (A)	**Model (B)**	**Model (A)**	**Model (B)**
Age	0.05***	0.049***	0.049***	0.05***
	(0.01)	*(0.013)*	*(0.01)*	*(0.013)*
Age^2	0.0007***	0.0007***	0.0007***	0.0007***
	(0.0001)	*(0.0001)*	*(0.0001)*	*(0.0001)*
Household Head (Non-household	0.068***	0.111	0.068***	0.11
head as the reference)	*(0.02)*	*(0.21)*	*(0.02)*	*(0.21)*
Firm Size (Small as	0.22***	0.226***	0.215***	0.23***
the reference)	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*
Occupation (Low-skilled as the reference)				
Professionals and Managers	0.463***	0.467***	0.464***	0.47***
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*
Technicians	0.368***	0.367***	0.364***	0.37***
	(0.03)	*(0.029)*	*(0.03)*	*(0.029)*
Clerk, sales and services	0.257***	0.256***	0.255***	0.26***
	(0.03)	*(0.029)*	*(0.03)*	*(0.029)*
Industry (Agricultural is the reference)				
Manufacturing	0.05	0.052	0.04	0.053
	(0.10)	*(0.10)*	*(0.10)*	*(0.098)*
Service	-0.09	-0.083	-0.09	-0.083
	(0.09)	*(0.093)*	*(0.09)*	*(0.094)*
Percent of Computer Use Leisure	-	0.01	-	0.01
× Female		*(0.007)*		*(0.007)*
Percent of Media Use Leisure	-	0.002	-	0.0015
× Female		*(0.002)*		*(0.002)*

Table 3.3 (Continued)

Independent Variables	log (Hourly Wage)			
	Computer Use		Media Use	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Personal Care	-	0.004*	-	0.004*
× Female		*(0.002)*		*(0.002)*
Percent of Sport leisure	-	-0.002***	-	-0.002***
× Female		*(0.0009)*		*(0.0009)*
Percent of Recreation	-	0.006	-	0.006
× Female		*(0.007)*		*(0.007)*
Percent of Learning time	-	-0.004	-	-0.004
× Female		*(0.01)*		*(0.01)*
Percent of Volunteer	-	0.004	-	0.004
Activities × Female		*(0.003)*		*(0.003)*
Percent of Computer Use Leisure	-	0.0065	-	0.006
× Household Head		*(0.008)*		*(0.008)*
Percent of Media Use Leisure	-	-0.001	-	-0.002
× Household Head		*(0.003)*		*(0.003)*
Percent of Personal Care	-	0.0007	-	0.0007
× Household Head		*(0.002)*		*(0.002)*
Percent of Sport Leisure	-	-0.0007	-	-0.0007
× Household Head		*(0.001)*		*(0.001)*
Percent of Recreation	-	-0.005	-	-0.006
× Household Head		*(0.007)*		*(0.007)*
Percent of Learning	-	0.0009	-	0.001
× Household Head		*(0.012)*		*(0.01)*
Percent of Volunteer	-	-0.002	-	-0.002
Activities × Household Head		*(0.003)*		*(0.003)*
Percent of Computer Use	-	0.008	-	0.003
× Municipal Area		*(0.009)*		*(0.005)*

Table 3.3 (Continued)

Independent Variables	log (Hourly Wage)			
	Computer Use		Media Use	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Learning	-	-0.003	-	-0.003
× Marry		*(0.01)*		*(0.01)*
Percent of Volunteer Activities	-	-0.003	-	-0.003
× Marry		*(0.003)*		*(0.003)*
Percent of Computer Use Leisure	-	-0.003	-	-0.003
× Other Marital Status		*(0.019)*		*(0.02)*
Percent of Media Use Leisure	-	-0.005	-	-0.005
× Other Marital Status		*(0.005)*		*(0.005)*
Percent of Personal Care	-	-0.002	-	-0.002
× Other Marital Status		*(0.004)*		*(0.004)*
Percent of Sport Leisure	-	-0.004**	-	-0.004**
× Other Marital Status		*(0.002)*		*(0.002)*
Percent of Recreation	-	-0.012	-	-0.01
× Other Marital Status		*(0.015)*		*(0.02)*
Percent of Learning	-	-0.02	-	-0.02
× Other Marital Status		*(0.07)*		*(0.07)*
Percent of Volunteer Activities	-	0.002	-	0.002
× Other Marital Status		*(0.006)*		*(0.006)*
Constant	-0.417*	-0.40*	-0.419*	-0.42*
	(0.23)	*(0.23)*	*(0.23)*	*(0.23)*
Observations	3,651	3,651	3,651	3,651
R-squared	0.706	0.711	0.706	0.711

Note: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1

Table 3.4 Estimation of log (Hourly Wage) Using Sport and Exercise, and Recreation as the Independent Variable in 2004

Independent Variables	log (Hourly Wage)			
	Sport and Exercise		Recreation	
	Model (A)	Model (B)	Model (A)	Model (B)
Sport and Exercise (Minutes)	0.0001 *(0.0003)*	0.0002 *(0.0003)*	-	-
Recreation Time (Minutes)	-	-	0.0001 *(0.0003)*	0.0013* *(0.0008)*
Female (Male as the reference)	-0.074*** *(0.02)*	-0.15 *(0.19)*	-0.07*** *(0.02)*	-0.15 *(0.19)*
Education (No education as the reference)				
Primary School	-0.07 *(0.06)*	-0.07 *(0.06)*	-0.06 *(0.06)*	-0.07 *(0.06)*
Secondary School	0.101*** *(0.04)*	0.104*** *(0.04)*	0.102*** *(0.04)*	0.106*** *(0.04)*
High School	0.065* *(0.04)*	0.07* *(0.04)*	0.06* *(0.04)*	0.07* *(0.04)*
College Graduate	0.149*** *(0.04)*	0.152*** *(0.04)*	0.148*** *(0.04)*	0.151*** *(0.04)*
Municipal Area (Rural as the reference)	0.116*** *(0.02)*	-0.255 *(0.19)*	0.116*** *(0.02)*	-0.25 *(0.19)*
Experience	-0.036*** *(0.009)*	-0.033*** *(0.009)*	-0.036*** *(0.009)*	-0.033*** *(0.009)*
Experience^2	-0.0009*** *(0.00009)*	-0.001*** *(0.00009)*	-0.0009*** *(0.00009)*	-0.001*** *(0.00009)*
Marital Status (Single as the reference)				
Married	0.065*** *(0.02)*	0.30 *(0.21)*	0.0649*** *(0.02)*	0.30 *(0.21)*
Divorced/Separated and Others	-0.037 *(0.038)*	0.676* *(0.37)*	-0.04 *(0.04)*	0.657* *(0.37)*

Table 3.4 (Continued)

Independent Variables	log (Hourly Wage)			
	Sport		Recreation	
	Model (A)	Model (B)	Model (A)	Model (B)
Age	0.051***	0.049***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Age^2	0.0007***	0.0007***	0.0007***	0.0007***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Household Head (Non-household head as the reference)	0.067***	0.098	0.07***	0.12
	(0.02)	(0.21)	(0.02)	(0.21)
Firm size (Small as the reference)	0.219***	0.225***	0.22***	0.225***
	(0.02)	(0.02)	(0.02)	(0.02)
Occupation (Low-skilled as the reference)				
Professionals and Managers	0.46***	0.467***	0.463***	0.466***
	(0.03)	(0.03)	(0.03)	(0.03)
Technicians	0.368***	0.367***	0.367***	0.367***
	(0.03)	(0.03)	(0.03)	(0.03)
Clerk, sales and services	0.257***	0.256***	0.257***	0.256***
	(0.03)	(0.03)	(0.03)	(0.03)
Industry (Agricultural is the reference)				
Manufacturing	0.04	0.05	0.04	0.05
	(0.098)	(0.098)	(0.10)	(0.10)
Service	-0.09	-0.08	-0.09	-0.086
	(0.09)	(0.09)	(0.09)	(0.09)
Percent of Computer Use × Female	-	0.01	-	0.01
		(0.007)		(0.007)
Percent of Media Use Leisure × Female	-	0.002	-	0.002
		(0.002)		(0.002)

Table 3.4 (Continued)

Independent Variables	log (Hourly Wage)			
	Sport		Recreation	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Personal Care × Female	-	0.004* (0.002)	-	0.004* (0.002)
Percent of Sport Leisure × Female	-	-0.002*** (0.0009)	-	-0.002*** (0.0009)
Percent of Recreation × Female	-	0.006 (0.007)	-	0.00009 (0.008)
Percent of Learning Time × Female	-	-0.004 (0.01)	-	-0.004 (0.01)
Percent of Volunteer Activities × Female	-	0.004 (0.003)	-	0.004 (0.003)
Percent of Computer Use Leisure × Household Head	-	0.006 (0.008)	-	0.006 (0.008)
Percent of Media Use Leisure × Household Head	-	-0.001 (0.003)	-	-0.001 (0.003)
Percent of Personal Care × Household Head	-	0.0008 (0.002)	-	0.0006 (0.002)
Percent of Sport Leisure × Household Head	-	-0.0008 (0.001)	-	-0.0007 (0.001)
Percent of Recreation × Household Head	-	-0.005 (0.007)	-	-0.009 (0.007)
Percent of Learning × Household Head	-	0.001 (0.01)	-	0.001 (0.01)
Percent of Volunteer Activities × Household Head	-	-0.002 (0.003)	-	-0.002 (0.003)
Percent of Computer Use × Municipal Area	-	0.004 (0.005)	-	0.004 (0.005)

Table 3.4 (Continued)

Independent Variables	log (Hourly Wage)			
	Sport		Recreation	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Media Use Leisure × Municipal Area	-	0.006** *(0.002)*	-	0.006** *(0.002)*
Percent of Personal Care × Municipal Area	-	0.002 *(0.002)*	-	0.002 *(0.002)*
Percent of Sport Leisure × Municipal Area	-	0.002 *(0.001)*	-	0.002* *(0.001)*
Percent of Recreation × Municipal Area	-	0.008 *(0.007)*	-	-0.0008 *(0.008)*
Percent of Learning time × Municipal Area	-	0.005 *(0.01)*	-	0.005 *(0.01)*
Percent of Volunteer × Municipal Area	-	-0.003 *(0.003)*	-	-0.003 *(0.003)*
Percent of Computer Use Leisure × Marry	-	-0.002 *(0.008)*	-	-0.002 *(0.008)*
Percent of Media Use Leisure × Marry	-	-0.002 *(0.003)*	-	-0.002 *(0.003)*
Percent of Personal Care × Marry	-	-0.003 *(0.002)*	-	-0.003 *(0.002)*
Percent of Sport Leisure × Marry	-	0.0004 *(0.0009)*	-	0.0004 *(0.0009)*
Percent of Recreation × Marry	-	-0.009 *(0.007)*	-	-0.01 *(0.007)*

Table 3.4 (Continued)

Independent Variables	log (Hourly Wage)			
	Sport		Recreation	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Learning	-	-0.003	-	-0.003
× Marry		*(0.01)*		*(0.01)*
Percent of Volunteer	-	-0.003	-	-0.003
Activities × Marry		*(0.003)*		*(0.003)*
Percent of Computer Use	-	-0.003	-	-0.003
Leisure × Other Marital Status		*(0.02)*		*(0.02)*
Percent of Media Use Leisure	-	-0.005	-	-0.005
× Other Marital Status		*(0.005)*		*(0.005)*
Percent of Personal Care	-	-0.002	-	-0.002
× Other Marital Status		*(0.004)*		*(0.004)*
Percent of Sport Leisure	-	-0.004**	-	-0.005**
× Other Marital Status		*(0.002)*		*(0.002)*
Percent of Recreation	-	-0.01	-	-0.006
× Other Marital Status		*(0.015)*		*(0.016)*
Percent of Learning	-	-0.02	-	-0.02
× Other Marital Status		*(0.07)*		*(0.07)*
Percent of Volunteer Activities	-	0.002	-	0.002
× Other Marital Status		*(0.006)*		*(0.006)*
Constant	-0.416*	-0.40*	-0.42*	-0.42*
	(0.23)	*(0.23)*	*(0.23)*	*(0.23)*
Observations	3,651	3,651	3,651	3,651
R-squared	0.706	0.711	0.706	0.711

Note: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1

Table 3.5 Estimation of log (Hourly Wage) Using Personal Care and Social Participation and Volunteer Activities as the Independent Variable in 2004

Independent Variables	log (Hourly Wage)			
	Personal Care		Volunteer Activities	
	Model (A)	Model (B)	Model (A)	Model (B)
Personal care (Minutes)	0.00002	-0.0002	-	-
	(0.00008)	*(0.0002)*		
Social and Volunteer Activities (Minutes)	-	-	-0.0005***	-0.0006**
			(0.0001)	*(0.0003)*
Female (Male as the reference)	-0.075***	-0.16	-0.079***	-0.17
	(0.02)	*(0.19)*	*(0.02)*	*(0.19)*
Education (No education as the reference)				
Primary School	-0.07	-0.07	-0.07	-0.07
	(0.06)	*(0.06)*	*(0.06)*	*(0.06)*
Secondary School	0.101***	0.104***	0.105***	0.104***
	(0.04)	*(0.04)*	*(0.04)*	*(0.04)*
High School	0.065*	0.07*	0.07*	0.07*
	(0.04)	*(0.04)*	*(0.04)*	*(0.04)*
College Graduate	0.149***	0.152***	0.151***	0.153***
	(0.04)	*(0.04)*	*(0.04)*	*(0.04)*
Municipal Area (Rural as the reference)	0.116***	-0.22	0.115***	-0.24
	(0.02)	*(0.19)*	*(0.02)*	*(0.19)*
Experience	-0.036***	-0.03***	-0.035***	-0.03***
	(0.009)	*(0.009)*	*(0.009)*	*(0.009)*
Experience^2	-0.0009***	-0.001***	-0.0009***	-0.001***
	(0.00009)	*(0.00009)*	*(0.00009)*	*(0.00009)*
Marital Status (Single as the reference)				
Married	0.065***	0.29	0.06***	0.29
	(0.02)	*(0.21)*	*(0.02)*	*(0.21)*
Divorced/Separated and Others	-0.04	0.65*	-0.04	0.67*
	(0.04)	*(0.37)*	*(0.04)*	*(0.37)*

Table 3.5 (Continued)

Independent Variables	log (Hourly Wage)			
	Personal Care		Volunteer Activities	
	Model (A)	Model (B)	Model (A)	Model (B)
Age	0.05***	0.049***	0.05***	0.049***
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*
Age^2	0.0007***	0.0007***	0.0007***	0.0007***
	(0.0001)	*(0.0001)*	*(0.0001)*	*(0.0001)*
Household Head (Non-	0.067***	0.10	0.067***	0.12
household head as	*(0.02)*	*(0.21)*	*(0.02)*	*(0.21)*
the reference)				
Firm size (Small	0.22***	0.23***	0.22***	0.226***
as the reference)	*(0.02)*	*(0.02)*	*(0.02)*	*(0.022)*
Occupation (Low-skilled as the reference)				
Professionals and Managers	0.464***	0.47***	0.469***	0.468***
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*
Technicians	0.368***	0.37***	0.37***	0.368***
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*
Clerk, sales, and services	0.257***	0.26***	0.26***	0.258***
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*
Industry (Agricultural is the reference)				
Manufacturing	0.04	0.05	0.04	0.05
	(0.10)	*(0.10)*	*(0.10)*	*(0.098)*
Service	-0.09	-0.087	-0.10	-0.08
	(0.09)	*(0.09)*	*(0.09)*	*(0.09)*
Percent of Computer Use	-	0.01	-	0.01
Leisure × Female		*(0.007)*		*(0.007)*
Percent of Media Use	-	0.002	-	0.002
Leisure × Female		*(0.002)*		*(0.002)*

Table 3.5 (Continued)

Independent Variables	log (Hourly Wage)			
	Personal Care		Volunteer Activities	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Personal Care × Female	-	0.004* *(0.002)*	-	0.004* *(0.002)*
Percent of Sport Leisure × Female	-	-0.003*** *(0.0009)*	-	-0.002*** *(0.0009)*
Percent of Recreation × Female	-	0.006 *(0.007)*	-	0.006 *(0.007)*
Percent of Learning Time × Female	-	-0.004 *(0.01)*	-	-0.004 *(0.01)*
Percent of Volunteer Activities × Female	-	0.004 *(0.003)*	-	0.007** *(0.003)*
Percent of Computer Use Leisure × Household Head	-	0.006 *(0.008)*	-	0.006 *(0.008)*
Percent of Media Use Leisure × Household Head	-	-0.001 *(0.003)*	-	-0.001 *(0.003)*
Percent of Personal Care × Household Head	-	0.001 *(0.002)*	-	0.0007 *(0.002)*
Percent of Sport Leisure × Household Head	-	-0.0009 *(0.001)*	-	-0.0008 *(0.001)*
Percent of Recreation × Household Head	-	-0.005 *(0.007)*	-	-0.006 *(0.007)*
Percent of Learning × Household Head	-	0.001 *(0.01)*	-	0.0009 *(0.01)*
Percent of Volunteer Activities × Household Head	-	-0.002 *(0.003)*	-	-0.00001 *(0.003)*
Percent of Computer Use × Municipal Area	-	0.003 *(0.005)*	-	0.003 *(0.005)*
Percent of Media Use Leisure × Municipal Area	-	0.005** *(0.002)*	-	0.006** *(0.002)*

Table 3.5 (Continued)

Independent Variables	log (Hourly Wage)			
	Personal Care		Volunteer Activities	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Personal Care × Municipal Area	-	0.002 *(0.002)*	-	0.002 *(0.002)*
Percent of Sport Leisure × Municipal Area	-	0.0008 *(0.001)*	-	0.001 *(0.001)*
Percent of Recreation × Municipal Area	-	0.007 *(0.007)*	-	0.008 *(0.007)*
Percent of Learning time × Municipal Area	-	0.005 *(0.01)*	-	0.005 *(0.01)*
Percent of Volunteer × Municipal Area	-	-0.003 *(0.003)*	-	-0.00006 *(0.003)*
Percent of Computer Use Leisure × Marry	-	-0.002 *(0.008)*	-	-0.001 *(0.008)*
Percent of Media Use Leisure × Marry	-	-0.002 *(0.003)*	-	-0.002 *(0.003)*
Percent of Personal Care × Marry	-	-0.003 *(0.002)*	-	-0.003 *(0.002)*
Percent of Sport Leisure × Marry	-	0.0001 *(0.001)*	-	0.0003 *(0.0009)*
Percent of Recreation × Marry	-	-0.009 *(0.007)*	-	-0.009 *(0.007)*

Table 3.5 (Continued)

Independent Variables	log (Hourly Wage)			
	Personal Care		Volunteer Activities	
	Model (A)	Model (B)	Model (A)	Model (B)
Percent of Learning × Marry	-	-0.003	-	-0.003
		(0.01)		*(0.01)*
Percent of Volunteer Activities × Marry	-	-0.003	-	-0.001
		(0.003)		*(0.003)*
Percent of Computer Use Leisure × Other Marital Status	-	-0.003	-	-0.003
		(0.02)		*(0.02)*
Percent of Media Use Leisure × Other Marital Status	-	-0.005	-	-0.005
		(0.005)		*(0.005)*
Percent of Personal Care × Other Marital Status	-	-0.002	-	-0.002
		(0.004)		*(0.004)*
Percent of Sport Leisure × Other Marital Status	-	-0.005**	-	-0.004**
		(0.002)		*(0.002)*
Percent of Recreation × Other Marital Status	-	-0.02	-	-0.01
		(0.015)		*(0.02)*
Percent of Learning × Other Marital Status	-	-0.02	-	-0.02
		(0.07)		*(0.07)*
Percent of Volunteer Activities × Other Marital Status	-	0.002	-	0.002
		(0.006)		*(0.006)*
Constant	-0.43*	-0.27	-0.39*	-0.38
	(0.24)	*(0.26)*	*(0.23)*	*(0.23)*
Observations	3,651	3,651	3,651	3,651
R-squared	0.706	0.711	0.707	0.711

Note: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1

Table 3.6 Estimation of log (Hourly Wage) Using Learning during Leisure Time as the Independent Variable in 2004

Independent Variables	log (Hourly Wage)	
	Learning	
	Model (A)	Model (B)
Learning in Leisure Time (Minutes)	-0.0003	-0.001
	(0.0005)	*(0.002)*
Female (Male as the reference)	-0.075***	-0.16
	(0.02)	*(0.19)*
Education (No education as the reference)		
Primary School	-0.07	-0.07
	(0.06)	*(0.06)*
Secondary School	0.101***	0.104***
	(0.04)	*(0.04)*
High School	0.065*	0.07*
	(0.04)	*(0.04)*
College Graduate	0.148***	0.152***
	(0.04)	*(0.04)*
Municipal Area (Rural	0.116***	-0.24
as the reference)	*(0.02)*	*(0.19)*
Experience	-0.036***	-0.03***
	(0.009)	*(0.009)*
Experience^2	-0.0009***	-0.001***
	(0.00009)	*(0.00009)*
Marital Status (Single as the reference)		
Married	0.065***	0.30
	(0.02)	*(0.21)*
Divorced/Separated and Others	-0.04	0.666*
	(0.04)	*(0.37)*

Table 3.6 (Continued)

Independent Variables	log (Hourly Wage)	
	Learning	
	Model (A)	**Model (B)**
Age	0.05***	0.049***
	(0.01)	*(0.01)*
Age^2	0.0007***	0.0007***
	(0.0001)	*(0.0001)*
Household Head (Non-household	0.067***	0.11
head as the reference)	*(0.02)*	*(0.21)*
Size of the firm	0.22***	0.226***
(Small as the reference)	*(0.02)*	*(0.02)*
Occupation (Low-skilled as the reference)		
Professionals and Managers	0.464***	0.467***
	(0.03)	*(0.03)*
Technicians	0.368***	0.367***
	(0.03)	*(0.03)*
Clerk, sales, and services	0.257***	0.256***
	(0.03)	*(0.03)*
Industry (Agricultural is the reference)		
Manufacturing	0.04	0.05
	(0.10)	*(0.10)*
Service	-0.09	-0.08
	(0.09)	*(0.09)*
Percent of Computer Use Leisure × Female	-	0.01
		(0.007)
Percent of Media Use Leisure × Female	-	0.002
		(0.002)

Table 3.6 (Continued)

Independent Variables	log (Hourly Wage)	
	Learning	
	Model (A)	Model (B)
Percent of Personal Care × Female	-	0.004*
		(0.002)
Percent of Sport leisure × Female	-	-0.002***
		(0.0009)
Percent of Recreation × Female	-	0.006
		(0.007)
Percent of Learning time × Female	-	0.001
		(0.01)
Percent of Volunteer Activities × Female	-	0.004
		(0.003)
Percent of Computer Use Leisure × Household Head	-	0.006
		(0.008)
Percent of Media Use Leisure × Household Head	-	-0.001
		(0.003)
Percent of Personal Care × Household Head	-	0.0007
		(0.002)
Percent of Sport Leisure × Household Head	-	-0.0007
		(0.001)
Percent of Recreation × Household Head	-	-0.005
		(0.007)
Percent of Learning × Household Head	-	0.006
		(0.01)
Percent of Volunteer Activities × Household Head	-	-0.002
		(0.003)
Percent of Computer Use × Municipal Area	-	0.003
		(0.005)
Percent of Media Use Leisure × Municipal Area	-	0.006**
		(0.002)

Table 3.6 (Continued)

Independent Variables	log (Hourly Wage) Learning	
	Model (A)	**Model (B)**
Percent of Personal Care × Municipal Area	-	0.002 (0.002)
Percent of Sport Leisure × Municipal Area	-	0.002 (0.001)
Percent of Recreation × Municipal Area	-	0.008 (0.007)
Percent of Learning time × Municipal Area	-	0.01 (0.02)
Percent of Volunteer Activities × Municipal Area	-	-0.003 (0.003)
Percent of Computer Use Leisure × Marry	-	-0.002 (0.008)
Percent of Media Use Leisure × Marry	-	-0.003 (0.003)
Percent of Personal Care × Marry	-	-0.003 (0.002)
Percent of Sport Leisure × Marry	-	0.0004 (0.0009)
Percent of Recreation × Marry	-	-0.009 (0.007)
Percent of Learning × Marry	-	-0.001 (0.01)
Percent of Volunteer Activities × Marry	-	-0.003 (0.003)
Percent of Computer Use Leisure × Other Marital Statuses	-	-0.003 (0.02)
Percent of Media Use Leisure × Other Marital Statuses	-	-0.005 (0.005)

Table 3.6 (Continued)

Independent Variables	log (Hourly Wage)	
	Learning	
	Model (A)	Model (B)
Percent of Personal Care	-	-0.002
× Other Marital Statuses		(0.004)
Percent of Sport Leisure	-	-0.005**
× Other Marital Statuses		(0.002)
Percent of Recreation	-	-0.01
× Other Marital Statuses		(0.015)
Percent of Learning	-	-0.03
× Other Marital Statuses		(0.07)
Percent of Volunteer	-	0.002
× Other Marital Statuses		(0.006)
Constant	-0.41*	-0.40*
	(0.23)	(0.23)
Observations	3,651	3,651
R-squared	0.706	0.711

Note: Standard errors in parentheses and *** p<0.01, ** p<0.05, * p<0.1

3.5.1 Socio-Demographic Variables and Wage Change

The regression of the effect time use behavior in computer use leisure and other socio-economic characteristics by including data in 2004 illustrates the significant relationship between wage change and some other variables. Tables 3.3-3.6 present the determinants of wage change by using each of the 7 leisure activities and other control variables as in Model (A) and Model (B). The coefficients estimating how other variables affect hourly wage when comparing the two models are not so different. Most education dummies substantially affect wage change, especially for high school and college graduates. The regression reveals that an individual's wage is induced by 6-7% for high school graduates and approximately 15% more for university graduates compared with those that are not educated. Notice that the lower education dummy, primary school, receives a lower wage than the uneducated group. The reason is that those people are all categorized as low skilled labor and usually earn the same level of wage, the minimum level. One year of age increase raises the wage by approximately 5%, while experience provides a small negative effect on wage change, as a one year increase of experience reduces by around 3-3.5% of the wage change.

According to the regression model in (A) and (B), the earning gap between the married and singles is around 6.63-6.67%. Also, the models confirm the result with approximately 7% higher wages of heads of households. Earners in municipal areas receive 11.5% greater wages. Considering the relationship between wage change and occupation, professionals and technicians receive the highest wage per hour, about 46-47% greater than low-skilled related occupations, whereas clerks and salespersons earn 25-26% higher wages. The findings also confirm that the size of the firm matters, as evidenced by a 21-22% greater amount of wage for those working in large firms.

3.5.2 Leisure Time Activities and Wage Change

The result obtained from Table 3.3 signifies that, with the confidence level at 95%, a minute change of leisure time consumption of mass media creates a 0.03% change in wage. This implies that the mass media engaged in during free time through reading, watching TV, and listening to music and radio contribute to a positive change in wage per hour. On the other hand, computer use leisure is not significantly related to wage change. Although sport and exercise have been accepted to be physical and health improvement

activities, as well as widely recognized in terms of enjoyment, there are thousands of observations, out of approximately 20,000 people, allocating leisure time for sport and exercise. However, the relationship between wage per hour change and time for sport and exercise leisure presented in Table 3.4 is unclear, whereas the log (wage per hour) estimation using recreation obtained from Model (B) reveals the significance of the influence of time for recreation on hourly wage change. The findings indicate that one minute of recreation time use causes a 0.13% enhancement in wages, with a 90% level of confidence.

Comprising time for sleeping, eating and personal care, leisure time for personal care significantly indicates a negative relationship to wage per hour change. The results presented in Table 3.5 indicate an insignificant negative relationship. The result indicates that Thai people's time use for personal care does not contribute to a benefit from good appearance. In addition, the increase in time use for personal care possibly deteriorates wage by raising opportunity costs, reducing opportunity to work, and skill improvement for higher wages. Similarly, even though both social participation within the community and society develop interpersonal relationships, create a connection and contribute to wage increase (Ioannides and Sortevent, 2006: 270-273 and Bandiera et al., 2009: 1073-1078), the finding presented in Table 3.5 indicates a 0.05%-0.06% wage reduction in response to a one minute increase of time for social activities, as presented in Model (A) and Model (B). Hence, in this study, by employing the Time Use Survey and Labor Force Survey of Thailand, leisure time for social participation and volunteer activities is inversely correlated with hourly wage change with a small effect.

Besides time use for the leisure activities mentioned previously, some people choose to become involved in additional learning during their free time. Time for learning during leisure time does not include education for a higher degree or all further education - related learning and training. The activity of learning, even in leisure time, also aims to generate more skills and productivity. Whether learning as leisure significantly improves an individual's wage by applying Model (A) and Model (B) is examined and the results are presented in Table 3.6. The regressions, by including time for learning during leisure in the models estimated, indicate negative changes of wage in response to a change in learning during leisure time. Although the findings presented in the same table imply that individuals gain additional returns for a higher educational

level, especially for university graduates, the wage gaps compared with the uneducated range from 14% to 15% higher, so learning during leisure time in each model specification does not show a considerable impact. An inverse relationship between time for learning as leisure ratio and wage change is found, but insignificantly. Also, the result does not confirm wage differences among people with equal leisure time use for learning.

Some interaction terms in Model (B) also influence wage per hour. The regression result also indicates that when persons spend equal time for media use, those living in municipal areas receive a higher wage by 0.06%, except when leisure by media use is included in the regression, which provides only a 0.05% difference in wage received by earners in these areas. Moreover, people whose marital status other than single or married earn 0.4% less per hour, given equal time dedicated for sport leisure.

The interaction terms also reveal gender wage inequality. With equal time for sport activities in leisure, females receive a lower wage than males at around 0.2%-0.3%. With an equal amount of time use for personal care, females receive a greater hourly wage by 0.4%, with a 90% level of confidence. This implies that personal care activities are more beneficial to females than to males. The regression for ln (wage) using social activities and volunteer activities as an independent variable, as in Table 3.5, additionally indicates wage inequality among earners devoting time to society. Moreover, females receive higher hourly wages at around 0.7%, given the equal time contributed to social participation and volunteer activities, with a p-value of 0.1.

3.6 Is Leisure a Normal Good for the Thai People?—A Reinvestigation

The finding obtained from Essay 2, Is Leisure a Normal Good for the Thai People?, indicates that leisure is a normal good, as evidenced by the positive relationship between percentage change in leisure time and hourly wage, while the findings from the last section reveal that leisure time devoted to some activities significantly impacts wage change. This implies that wage is endogenous. Therefore, it is possible that the findings, as expressed in the last section and as regressed by the OLS estimates, are biased. In the section, an extension was conducted to find out whether leisure is really a normal good by re-estimating the impact of hourly wage change on percentage change of leisure time by employing instrumental variable (IV) estimates. Average wage by sub-district or

Tambol is applied as the instrumental variable, as wage is highly correlated with wage average wage, as evidenced by the correlation at 0.57. At the same time, average wage by Tambol and leisure time in all measures are lowly correlated, from 0.0002 to 0.06. Leisure is divided into four measures (Aguiar and Hurst, 2007: 983-987). Leisure Measure 1 refers to the summation of time spent on "entertainment/social activities/relaxing" and "active recreation." Those activities involve direct enjoyment, whereas Leisure Measure 2 includes Leisure Measure 1 as well as time allocated to sleeping, eating, and personal care, the activities providing direct utility, but also considered as intermediate inputs at the same time. The broader leisure measure, Leisure Measure 3, includes time for Leisure Measure 2 plus time dedicated for childcare. Finally, the broadest measure of leisure, Leisure Measure 4, is defined as the residual of total work or Leisure Measure 3, as well as time spent for education and civic and religious activities (going to church, volunteering, social club, etc.). The results of the IV estimates for Leisure Measure 1-4, compared with the OLS reports, are presented in Table 3.7 and Table 3.8.

Table 3.7 Least Square and Instrumental Variable Estimation for log (Leisure Measure 1) and log (Leisure Measure 2) in 2004

Independent Variables	log (Leisure Time) as the Dependent Variable			
	log (Leisure Measure 1)		log (Leisure Measure 2)	
	OLS Regression	IV Regression	OLS Regression	IV Regression
log (Hourly wage)	0.659***	6.27***	0.079***	0.94***
	(0.08)	(0.44)	(0.01)	(0.06)
log (Monthly income)	-0.67***	-5.22***	-0.08***	-0.78***
	(0.08)	(0.36)	(0.01)	(0.05)
Age	0.01	-0.03	-0.003	-0.01***
	(0.02)	(0.02)	(0.002)	(0.004)
Age^2	-00008	0.0002	0.00004	0.00002
	(0.0002)	(0.0003)	(0.00003)	(0.0004)
Female (Male as the reference)	-0.26***	-0.25***	-0.06***	-0.06***
	(0.05)	(0.08)	(0.007)	(0.01)
Education (No education as the reference)				
Primary School	-0.167*	0.54***	0.003	0.11***
	(0.10)	(0.16)	(0.01)	(0.02)
Secondary School	-0.07	-0.08	-0.002	-0.004
	(0.09)	(0.15)	(0.01)	(0.02)
High School	0.207**	-0.35**	0.01	-0.07***
	(0.09)	(0.15)	(0.01)	(0.02)
College Graduate	0.23***	0.47***	0.002	-0.11***
	(0.08)	(0.14)	(0.01)	(0.02)
Marital Status (Single as the reference)				
Married	0.156***	0.04	0.0008	-0.02
	(0.06)	(0.09)	(0.008)	(0.01)
Divorced/Separated and Others	-0.09	-0.19	-0.01	-0.03
	(0.11)	(0.17)	(0.015)	(0.02)

Table 3.7 (Continued)

Independent Variables	log (Leisure Time) as the Dependent Variable			
	log (Leisure Measure 1)		log (Leisure Measure 2)	
	OLS Regression	IV Regression	OLS Regression	IV Regression
Area (Rural as the reference)	-0.04 *(0.07)*	-0.13 *(0.095)*	0.012 *(0.008)*	-0.002 *(0.01)*
Household head (Non-household head as the reference)	-0.009 *(0.05)*	0.22*** *(0.086)*	-0.001 *(0.007)*	0.03*** *(0.01)*
Day (Sunday as the reference)				
Monday	-0.215** *(0.10)*	-0.20 *(0.16)*	-0.147*** *(0.01)*	-0.15*** *(0.02)*
Tuesday	-0.305*** *(0.10)*	-0.18 *(0.15)*	-0.155*** *(0.01)*	-0.14*** *(0.02)*
Wednesday	-0.344*** *(0.10)*	-0.37** *(0.15)*	-0.17*** *(0.01)*	-0.18*** *(0.02)*
Thursday	-0.375*** *(0.10)*	-0.27* *(0.16)*	-0.16*** *(0.01)*	-0.14*** *(0.02)*
Friday	-0.29*** *(0.10)*	-0.39*** *(0.15)*	-0.17*** *(0.01)*	-0.19*** *(0.02)*
Saturday	0.03 *(0.10)*	0.08 *(0.15)*	-0.043*** *(0.0136)*	-0.04 *(0.02)*
Firm size: large (Small as the reference)	0.14** *(0.07)*	-1.10*** *(0.14)*	0.001 *(0.009)*	-0.19*** *(0.02)*

Table 3.7 (Continued)

Independent Variables	log (Leisure Time) as the Dependent Variable			
	log (Leisure Measure 1)		log (Leisure Measure 2)	
	OLS Regression	IV Regression	OLS Regression	IV Regression
Occupation (Elementary as the reference)				
Professionals and executives	0.06	-1.04***	0.022*	-0.15***
	(0.09)	(0.16)	(0.01)	(0.02)
Technicians	0.21**	-0.43***	0.055***	-0.14**
	(0.08)	(0.14)	(0.01)	(0.02)
Sales, services and clerk	0.234***	-0.58***	0.03***	-0.09***
	(0.08)	(0.14)	(0.01)	(0.02)
Industry (Agricultural is the reference)				
Manufacturing	0.07	0.68	-0.08*	0.02
	(0.28)	(0.44)	(0.04)	(0.06)
Service	0.11	0.44	-0.02	0.03
	(0.27)	-0.42	-0.04	(0.06)
Constant	9.20***	43.08***	7.46***	12.68***
	(0.70)	(2.75)	(0.10)	(0.41)
Observations	3,657	3,651	3,657	3,651
R-squared	0.089		0.127	

Note: Standard errors in parentheses and *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3.8 Least Square and Instrumental Variable Estimation for log (Leisure Measure 3) and log (Leisure Measure 4) in 2004

	log (Leisure Time) as the Dependent Variable			
Independent Variables	**log (Leisure Measure 3)**		**log (Leisure Measure 4)**	
	OLS Regression	**IV Regression**	**OLS Regression**	**IV Regression**
log (Hourly wage)	0.082***	0.95***	0.078***	0.95***
	(0.01)	*(0.06)*	*(0.01)*	*(0.06)*
log (Monthly income)	-0.082***	-0.79***	-0.092***	-0.80***
	(0.01)	*(0.05)*	*(0.01)*	*(0.05)*
Age	-0.003	-0.009***	-0.002	-0.008**
	(0.002)	*(0.003)*	*(0.002)*	*(0.004)*
Age^2	0.00003	0.00002	0.00002	0.000006
	(0.00003)	*(0.00004)*	*(0.00003)*	*(0.00004)*
Female (Male as the	-0.056***	-0.05***	-0.062***	-0.06***
reference)	*(0.007)*	*(0.01)*	*(0.007)*	*(0.01)*
Education (No education as the reference)				
Primary School	0.004	0.11***	0.001	0.11***
	(0.01)	*(0.02)*	*(0.01)*	*(0.02)*
Secondary School	-0.003	-0.006	0.003	0.001
	(0.01)	*(0.02)*	*(0.01)*	*(0.02)*
High School	0.01	-0.08***	0.006	-0.08***
	(0.01)	*(0.02)*	*(0.01)*	*(0.02)*
College Graduate	0.002	-0.11***	-0.002	-0.11***
	(0.01)	*(0.02)*	*(0.01)*	*(0.02)*
Marital Status (Single as the reference)				
Married	0.004	-0.01	-0.0005	-0.02
	(0.008)	*(0.01)*	*(0.008)*	*(0.01)*
Divorced/Separated	-0.008	-0.02	0.005	-0.01
and Others	*(0.01)*	*(0.02)*	*(0.015)*	*(0.02)*

Table 3.8 (Continued)

Independent Variables	log (Leisure Time) as the Dependent Variable			
	log (Leisure Measure 3)		log (Leisure Measure 4)	
	OLS Regression	IV Regression	OLS Regression	IV Regression
Area (Rural as the reference)	0.01 *(0.008)*	-0.009 *(0.01)*	0.006 *(0.009)*	-0.008 *(0.01)*
Household Head (Non-household head as the reference)	-0.0003 *(0.007)*	0.036*** *(0.01)*	0.002 *(0.007)*	0.04*** *(0.01)*
Day (Sunday as the reference)				
Monday	-0.149*** *(0.01)*	-0.15*** *(0.02)*	-0.177*** *(0.01)*	-0.17*** *(0.02)*
Tuesday	-0.157*** *(0.01)*	-0.14*** *(0.02)*	-0.187*** *(0.01)*	-0.17*** *(0.02)*
Wednesday	-0.173*** *(0.01)*	-0.18*** *(0.02)*	-0.20*** *(0.01)*	-0.21*** *(0.02)*
Thursday	-0.16*** *(0.01)*	-0.14*** *(0.02)*	-0.18*** *(0.01)*	-0.16*** *(0.02)*
Friday	-0.176*** *(0.01)*	-0.19*** *(0.02)*	-0.199*** *(0.01)*	-0.21*** *(0.02)*
Saturday	-0.047*** *(0.01)*	0.04* *(0.02)*	-0.06*** *(0.01)*	-0.056** *(0.02)*
Firm's size: large (Small as the reference)	0.001 *(0.009)*	-0.19*** *(0.02)*	0.018* *(0.009)*	-0.18*** *(0.02)*

Table 3.8 (Continued)

Independent Variables	log (Leisure Time) as the Dependent Variable			
	log (Leisure Measure 3)		log (Leisure Measure 4)	
	OLS Regression	IV Regression	OLS Regression	IV Regression
Occupation (Elementary as the reference)				
Professionals and executives	0.021*	-0.15***	0.043***	-0.13***
	(0.01)	(0.02)	(0.01)	(0.02)
Technicians	0.055***	-0.04**	0.066***	-0.03**
	(0.01)	(0.02)	(0.01)	(0.02)
Sales, services, and clerk	0.029**	-0.096***	0.04***	-0.08
	(0.01)	(0.02)	(0.01)	(0.02)
Industry (Agricultural is the reference)				
Manufacturing	-0.076**	0.02	-0.079**	0.02
	(0.04)	(0.06)	(0.04)	(0.06)
Service	-0.02	0.03	-0.02	0.03
	(0.04)	(0.06)	(0.04)	(0.06)
Constant	7.48***	12.74***	7.60***	12.89***
	(0.10)	(0.41)	(0.10)	(0.41)
Observations	3,657	3,651	3,657	3,651
R-squared	0.130		0.155	

Note: Standard errors in parentheses and *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The result shows a greater magnitude when IV regression is applied. The Hausman test confirms the significant differences reported between the OLS and IV regression[2]. The gender gap remains unchanged, as considered from leisure in all measures. Males take approximately 25-26% longer time for Leisure Measure 1, while the leisure gaps in other measures are around 5-6%. Females' shorter daily leisure emphasizes the social structure in Thailand whereby males have the opportunity to choose to work in the market while females are responsible to devote time for housework and home production even those females also have to work in the market. Neither least square nor IV estimations confirm how marital status is related to leisure time use. On the other hand, higher level of education is found to affect leisure time use. These two groups appear to take comparatively longer leisure than the uneducated and lower educated. Again, the widest leisure gaps can be detected in the Leisure Measure 1 estimates, with 35% and 47% shorter daily leisure for the high school and university graduate, respectively, while leisure the gaps of leisure in other measures are only 7%-11%. The secondary school graduated are leisure lovers, compared with other groups, as evidenced by the significant report of 54% longer than the uneducated for Leisure Measure 1 and 11% greater for leisure in other measures, according to the IV regression. The social structure is also supported by the estimates of household heads. From the Time Use Survey, it was seen that there are 13,330 male household heads while there were only 6,551 females leading the household. The significantly longer leisure time of household heads also highlights gender leisure time inequality in Thailand.

The IV estimates also prove the negative relationship between age and leisure time change. A one year age increase reduces one percent or less for Leisure Measure 2-4. While the findings do not reveal how areas, (municipal and non-municipal), affect the leisure time, the impact of occupation on leisure time use is as shown in the result,. According to the detailed estimation in Tables 3.7-3.8, professionals and managers turns out to be the group that spend the shortest leisure time; these results are different from what was reported in the least square regression. Professionals and managers significantly take less leisure time, especially for Leisure Measure 1, at more than one hundred percent

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[2] The Hausman test results for Leisure Measure 1-4 are 442.58***, 543.09***, 558.21*** and 554.61*** respectively, indicating the significant differences between OLS and IV estimates.

higher compared with the unskilled workers, and approximately 13-15% less for the other measures of leisure. Technicians, clerks, sales and service employees consume 43% less pure leisure time. The results for the broader leisure measures change mostly indicate wider gaps among people in dissimilar occupations.

While occupation plays a significant role in leisure time, only the manufacturing industry is found to influence the allocation of time for Leisure Measures 2-4; however, the IV estimates do not confirm any significant relationship between leisure time and the industry each person is working in. Opposite the finding from the OLS regression, the IV estimation results report that employees in large firms clearly allocate less leisure time for Leisure Measure 1 at more than one hundred percent less, and for other measures of leisure, around 18-19%.

From the regressions of the days of a week, it is unsurprising to find that people spend the greatest amount of time for leisure on Sunday, and Saturday is the day individuals significantly take the second-longest time for Leisure Measure 3-4. The estimations clearly indicate leisure time differences among the days of the week. The IV estimates indicate that the day people take the least leisure time is Friday for pure leisure giving direct enjoyment, Leisure Measure 1, 39% less than Sunday, and other measures, 19-21% less, followed by Wednesday, with 18-37% less amount of leisure time than on Sunday.

The IV estimation indicates a much stronger magnitude of log (hourly wage) and log (monthly income) on log (leisure time). Whereas hourly wage is the average wage per hour received by wage earners, monthly income is the summation of wage, overtime, bonus, and other money income. People seem to be the most responsive to pure leisure time use, Leisure Measure 1. A one percent increase in hourly wage boosts leisure time by more than 600 percent. However, the impact is offset by the effect of monthly income change on leisure. A percentage of monthly income enhancement deteriorates Leisure Measure 1 at around 522 percent. For leisure in the broader measures, a one percent change in hourly wage leads to a 94-95% positive change. At the same time, a percent of the entire monthly income change reduces leisure time consumption by around 78-80%.

As monthly income is the total of an individual's earned income, wage and other types of income, the effect of monthly income on leisure is likely to be caused by a combination of the types of income other than wage. From the result from the robust test

for overtime, bonuses and other money income, leisure time is evidently and inversely related to overtime, while bonuses and other money income have only a tiny negative effect on leisure time use. In the regression models, monthly income is a control variable. Hourly wage reflects the price effect of leisure time, which can explain wage earner time use behavior more efficiently. Therefore, the positive impact of hourly wage change on leisure time change implies that leisure is a normal good for wage earners.

3.7 Conclusion and Policy Implications

In general, it is understood that wage is directly correlated with education and work experience. Additionally, there are some socio-economic characteristics that possibly contributing to wage. However, the activity that is generally recognized for physical and mental relaxation, such as leisure, has not been examined as to whether it could result in wage improvement. Besides the findings on the socio-economic characteristics that affect wage change, as well as wage gaps among people of different status, educational levels occupations, industries, and geographical zones. The study tests how time use for seven leisure activities is related to the wages of Thai people. Taking the highest proportion of leisure time, personal care provides a small negative impact on change of wage, indicating that a higher proportion of time use for media consumption and recreation provides an increase in hourly wage, while an increase in time for social participation and volunteer activities slightly reduces wage per hour. This implies that time consumption for this group of activities possibly raises the opportunity cost of time for work. Nevertheless, the study could not conclude how computer use, learning during leisure time, personal care, and sport and exercise impact one's wage.

The study further re-explores the determinant of leisure time by employing a IV regression using average wage by sub-district or Tambol as the IV. The findings report a positive relationship between leisure time and hourly wage, while leisure time use is inversely related to monthly income. The explanation of the negative effect of monthly income on leisure time is that monthly income is comprised of an individual's wage as well as other income such as overtime, bonus and others, which are evidently and negative correlated with leisure time use, while the relationship between wage and leisure time reports positive. This implies that the negative sign is caused by income other than

wage. Hence, that the rise in hourly wage leads to a greater amount of leisure time, as could be interpreted from the estimation results, confirms that leisure is a normal good for the Thai people.

This paper has proved that it is not necessary to substitute leisure time for wage improvement, but some leisure activities themselves can create a wage rise, and not just fulfill and individual's utility by generating enjoyment. Therefore, supporting productive leisure time helps raise Thai people's work efficiency, as well as develops their welfare through pleasure from leisure and the possibility of consumption gain through wage increases. For example, stimulating Thai people to read by promoting learning centers and by developing more recreational parks for increasing time for recreational activities is a potentially way to create channels to improve Thai workers' productivity and wages, which would not only provide economic benefits, but would also improve the utility and welfare of the Thai people.

Although this empirical study provides time use activity details, additional data are needed for an exploration of how leisure time use is correlated with wage. For example, details on the types of programs viewed by audiences are necessary for analyzing the relations of media time use and wage change. Additionally, more supporting evidence is needed, for example, an individual's expenditure for personal care activities, in order to see how they are related to wage.

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