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Gender and Time Dimensions of Informal Workers' Well-being: Evidence from Thailand

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Abstract

The paper theoretically and empirically explores the relationship between work intensity and well-being. It first develops a well-being composite index that takes into account not only money based income, but also those aspects of individual capabilities and functioning that are not necessarily acquired through market participation such as the person's educational attainment and work intensity. The study focuses on two categories of informal home-based workers: 1) those who are self-employed and work in their own business and 2) those who are paid by others and work as subcontracted homeworkers. Using time use data collected among these workers, the paper demonstrates how time use patterns can serve as crucial indicators of quality of life. Empirical tests are then conducted to examine the effect of time and work intensity aspects on the well-being of homebased workers, majority of whom have low wage rates and/or work with no labor protection. For women workers, combining both paid market work and unpaid domestic work has become a necessity, creating a higher incidence of work intensity, and hence lower quality of life than among men homebased workers. We also found that the well-being level of self employed workers to be better than subcontracted workers. The well-being index developed in the paper provides a useful indicator for use by policymakers, researchers and advocacy groups in the way that it allows for comparability and for identifying those who need the most assistance. A better understanding of the factors that promote or lower well-being can enable policymakers to target vulnerable individuals or households. It also helps them to design more effective programs and economic and social policies that enhance the well-being of these individuals.

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I. Introduction

Economists typically view individual and social welfare as directly associated with the production of marketed goods and services. In fact, they commonly measure well-being with proxies such as incomes and consumption that are primarily based on the person's access to material goods and services. In recent years, however, a broader notion of well-being beyond that of income or consumption has evolved in economics.[1] Sen (1993), Folbre (1997), Pollak and Wachter (1985), Juster and Stafford (1985, 1991), Beneria (2003) and MacDonald et al (2005), among others, have argued that discourses on well-being should take into account civil and political rights, freedoms to do and be, and time allocation. It also brought about increased efforts to supplant the GDP per capita indicator, with a more comprehensive index of welfare such as the Human Development Index (HDI), Gender-Related Development Index (GDI), Process Well Being (PWB), Index of Social Well-being and the Levy Institute Measure of Wellbeing (LIMEW). (UNDP 2006, Dasgupta 2001, Juster and Dow 1985, Wolff and Zacharias (2003).

While these indices acknowledge the importance of income in determining well-being through its effect on consumption level, bargaining power (especially within the household) and social status, they also take into account other determinants including life expectancy and longevity, access to social services, gender equity, and civil and political rights. For example, education and knowledge acquisition enhances a person's capabilities and well-being through its impact on nutrition and health, personal development, and increased productivity. For the most part however, these welfare indicators – with the exception of LIMEW and PWB - do not explicitly take into account time use dimensions. Engagement in work- whether production for own consumption or for the market, constitutes an essential part of day-to-day living, so that the manner in which a person performs these activities may be as important as income and consumption data in determining the quality of life (UNDP 1995). We explore in this paper how time use convey crucial information about the lives of informal sector workers examine the relationship between the individual well-being index of individuals (WBI_i) and the inverse work intensity index (k_i). In particular, we focus on homebased workers who represent a growing segment of the working population in developing countries and are likely

[1] The economists' interest on individual well-being has been aided by the development of the so- called capability approach by Sen. Well-being, in this case, is seen in term of a person's ability to do valuable acts or reach valuable states of being (Sen 1985, 1992, 1993).

to be both "time-poor" and "money-poor" in order to illustrate the importance of expanding the notion of well-being.

We develop a well-being index (WBI) that takes into account not only what earned income can buy, but also those aspects of individual capabilities and functioning that are not necessarily acquired through the market nor solely the result of market participation. Hence, it takes into account three determinants namely: personal income (or access to material goods and services), educational level, and quality of work time. The latter focuses on the incidence of work intensity which involves two dimensions of time use namely, the length of the (paid and unpaid) working day and overlapping activities, defined here as the simultaneous performance of two or more work activities. Using time use data collected in 2002 among 110 home-based workers in urban, low income communities in Thailand, we hope to illustrate how time use patterns can provide important indicators regarding the quality of life among these workers.[2]

Hence, our paper differs from previous studies on well-being in three respects. First, we explore the relationship between work intensity and well-being in an analytical framework. Our model shows that while increase in work hours and performance of multiple activities may lead to overall increase in output – both home produced goods and services e.g. cooked meals, childminding, etc and goods for the market e.g. food for sale, shirts, etc, these can be accompanied by a deterioration in health due stress, lack of sleep, etc and a decline in output quality e.g burnt food, defect in shirts, etc. Hence, an increase in output and/or income resulting from higher work intensity yields contradictory effects on well being in terms of adverse health effect and positive income and consumption effect. Second, we provide a methodology for incorporating work intensity incidence in the measure of individual's quality of life called well-being index (WBI), in addition to income and education. Using time use data, we estimate the length and quality of work time spent by Thai homebased workers by taking into account overlapping work activities. Thirdly, we use regression analyses to examine the relationship between individual well being indicator and inverse work intensity. The significance of this approach will be justified in the body of the paper.

Our paper is organized as follows. Section 2 develops a theoretical model of well-being which explores the varied channels through which income, education and the incidence

[2] They include shopkeepers, market vendors, laundry washers, skilled trade workers such as auto mechanic and electricians, and subcontracted homeworkers who work in the informal sector.

of work intensity affect a person's well being. In section 3, we briefly discuss our homebased workers sample in the context of urban informal sector growth in Thailand and their time use pattern. We then construct in section 4 an individual well-being measure that includes time-use component, and then perform regression tests to examine the determinants of individual well-being, particularly the incidence of work intensity. A summary of the main points and policy consideration concludes the paper.

II. Analytical Framework

1. *Determinants of Well-being*

Assume a household that is comprised of a working adult member *i* who makes decisions on household resource allocation, and dependent *j*. The working adult's well-being depends on his/her consumption of goods and services, state of health and self esteem. It also depends upon the well-being of other household members. That is, a rise in the well-being component of a dependent member directly enhance the well-being of the altruistic, adult member. The well-being of individual i in household *n* can be expressed simply as:

$$W_{in} = W(C_{in}, H_{in}, S_{in}, W_{jn}) \quad (1)$$

where

W_{in} = The well-being of a working individual *i* in household *n*;

C_{in} = Consumption of goods and services, both produced at home and purchased in the market;

H_{in} = State of health including physical, emotional, and mental aspects;

S_{in} = Self-esteem i.e., the individual's attitude toward himself/herself; and

W_{jn} = Well-being of dependent member *j* in household *n*.

For simplicity, the household subscript, *n*, is dropped in the subsequent discussion. Now, the well-being of the dependent member *j*, W_{jn} is defined in terms of his/her consumption as well as health status, or

$$W_j = W\left(C_j, H_j\right) \quad (2)$$

where C_j refers to the goods and services consumed by dependent *j* that are either produced at home or purchased in the market by working adult *i*; and H_j is the health status of dependent *j*

Substituting equation (2) into equation (1), we rewrite the well-being function of working adult i as:

$$W_i = W(C_i, H_i, S_i, C_j, H_j) \qquad (3)$$

The consumption of both working adult member i, C_i and that of the dependents are determined by level of earned income, y_i and the incidence of work intensity, k_i

$$C_i = c(y_i, k_i) \qquad ; \frac{\partial C_i}{\partial y_i} \geq 0 \text{ and } \frac{\partial C_i}{\partial k_i} \geq 0 \qquad (4)$$

$$C_j = C_j(y_i, k_i); \qquad where \ \frac{\partial C_j}{\partial y_i} > 0 \ and \ \frac{\partial C_j}{\partial k_i} > 0$$

where y_i refers to the income of individual *i*; and k_i is the incidence of work intensity experienced by individual i, measured by the length of time that he/she performs two work activities simultaneously. An increase in earned income increases the ability to purchase goods and services, or to buy production inputs for home production so that the first partial derivative of C_j with respect to income is positive.[3] The incidence of work intensity affects consumption in two ways. First, work intensity indirectly affect the consumption of individuals through the income effect.[4] Second, by putting more effort (physical, mental, and time) into the production process, overall productivity tends to increase, leading to an increase in consumption. The consumption of dependent member, C_j, is affected not only by the income (of the household) but also by the incidence of work intensity of working individual *i*. Higher incomes and work intensity of the altruist working adult enable the dependent(s) to have greater access to food, education, and so forth. The increased work intensity of the adult is also likely to adversely affect the quality of home produced goods such as cooked meals, etc. when these are prepared in combination with other work activities.

The health status of adult i, H_i, is determined by the personal income, y_i the incidence of work intensity, k_i, and the given level of education, edu_i. This is expressed as:

$$H_i = h(y_i, k_i, edu_i) \qquad (5)$$

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[3] This might not be true in some cases however. An altruist's consumption of goods and services may not increase at all when his/her income rises. This occurs if the altruist prefer to transfer the increase in his/her income to the dependent members.

[4] It is possible that the altruist will work harder or work more intensively in order to allocate *all* of the extra goods and services produced to the dependent members in the household.

$$\frac{\partial H_i}{\partial y_i} > 0 \ , \ \frac{\partial H_i}{\partial k_i} < 0, \ \frac{\partial H_i}{\partial edu_i} > 0 \qquad (6)$$

The partial derivatives state that individual i, at any given time, is endowed with a given state of "health" and that this can be enhanced by income through the increased consumption of food (in terms of calorie consumption or calorie intake) and better access to health services. Likewise, education positively affects a person's health in terms of better nutrition knowledge, greater self-esteem, enhanced ability to make informed decisions and so forth. A person's state of health, on the other hand, is harmed by increased incidence or prolonged periods of work intensity. That is, an individual is likely to be stressed or affected by health problems when s/he regularly performs overlapped work activities under time pressure.

The incidence of work intensity, *k*, is related to the length of time spent in simultaneously performed work activities. We therefore define *k* as follows:

$$k_i = xk\left(L^*_{mi}, L^*_{hi}\right) \qquad (7)$$

$$\frac{\partial k_i}{\partial L^*_{mi}} > 0 \ ; \ \frac{\partial k_i}{\partial L^*_{hi}} > 0 \qquad (8)$$

$$\frac{\partial^2 k_i}{\partial L^{*\,2}_{mi}} > 0 \ ; \ \frac{\partial^2 k_i}{\partial L^{*\,2}_{hi}} > 0 \qquad (9)$$

where x is a scalar that denotes a composite index of the pertinent characteristics or the nature of the activities combined. It is large if the activities that are performed require a considerable amount of attention or energy required. Therefore, the level of work intensity is high if both the main and secondary work activities require constant attention.
For example, doing active childcare (e.g. an active three year old) and cooking likely leads to high *k* and hence, high work intensity, compared to minding a sleeping child and gardening. The variables, L^*_{mi} and L^*_{hi} refer to the time spent in market paid work and unpaid domestic work respectively in combination with another activity by the working individual *i*. The first order partial derivative shows that the longer the time a person spends in performing two tasks simultaneously, the greater is the intensification of work time occurs. The second-order partial derivative is positive, indicating that the incidence of work intensity progresses at an increasing rate (Floro and Hungerford 2001).

The third well-being component namely self-esteem and social status, S_i, refers to the working individual's attitude toward himself/herself, and his status in the

community/society at large and in this model, we highlight the effect of personal income and education.

$$S_i = s\left(y_i, edu_i\right) \tag{10}$$

$$\frac{\partial S_i}{\partial y_i} > 0, \ \frac{\partial S_i}{\partial edu_i} > 0 \tag{11}$$

As noted above, both education and personal income are positively related to the self-esteem and social status of the individual.

The last well-being component of individual *i* refers to the health status of dependent member j. The health status of dependent member, H_j, is also a function of the individual income and the given level of education of individual *i*. The dependent member' health status would depend on the choices and decisions made by working member *i*. The type of food prepared, hygiene, use of medication during illness and so forth is influenced by the individual *i*'s educational level as well as earnings.

$$H_j = H_j\left(y_i, edu_i\right); \quad where \ \frac{\partial H_j}{\partial y_i} > 0 \ and \ \frac{\partial H_j}{\partial edu_i} > 0 \tag{12}$$

In summary, we obtain the following individual well-being function:

$$Max \ W_i = W\left[c\left(y_i, k_i\right), h\left(y_i, k_i, edu_i\right), s\left(y_i, edu_i\right), c_j\left(y_i, k_i\right), h_j\left(y_i, edu_i\right)\right]$$
$$Subject \ to \tag{13}$$
$$P_m C_i = Y_i = A_i + w_i(T_i - L_{hi} - L_{hi}^* - L_{si})$$

$$\frac{\partial W_i}{\partial y_i} > 0 \ ; \ \frac{\partial W_i}{\partial edu_i} > 0 \ ; \ \frac{\partial W_i}{\partial k_i} > or < 0 \tag{14}$$

Note that the effect of the incidence of work intensity, k_i, on individual well-being is ambiguous, depending on whether or not the income (positive) effect is greater than the health (negative) effect.

The preceding discussion on the relationship between individual well-being and the different determinants is illustrated in Figure 1. The well-being of the independent working household member depends on his/her constituents of well-being, $C_i, H_i, S_i,$ and that of his/her the dependent's namely, C_j, H_j. These constituents are determined by income, education and incidence of work intensity. Both income and education are positively associated with the different constituents of well-being constituents. The well-being effect of

work intensity, however, can be either positive or negative depending on the size of the income and health effects.

[Figure 1 about here]

III. Urban Informal Sector and Homebased Work in Thailand

1. *Macroeconomic Context*

Until the late nineties, Thailand was considered as one of the emerging Asian economies with its annual growth rate reaching 13.3 percent in 1988. [5] 8.5 percent in In May 1997, the country faced one of its most severe economic crises when its economy sharply contracted with widespread business collapses, massive run on banks, huge outflows of capital and dramatic rise in job losses (Krongkaew 2001, Montes 1998). Thailand's GDP growth rate hit bottom at -10.5% in 1998, and inflation rate rose to 8.1 percent in the same year. Several studies showed that the poor endured the brunt of the crisis, as their wages, profits, and employment fell more than those in higher income groups. The official head-count poverty ratio increased from 11.4% in 1996 to 13% in 1998 and 15.9% in 1999 (World Bank 2000).

Although there are no reliable longitudinal data on informal sector employment, it is likely that informal sector employment has grown since the financial crisis with many who lost their jobs or whose incomes declined found means to survive by working in the informal economy. ILO estimates that for the 1994-2000 period, informal employment comprised 51 percent of non-agricultural employment in Thailand (ILO 2002). According to the National Statistic Office, more than 20 million workers are in the informal economy, thus representing nearly two thirds of Thai labor force(Thailand, National Statistics Office 2000). The same survey shows that approximately three hundred thousand workers are considered as homeworkers, majority of whom women. [6] About 55,000 of them live in metropolitan Bangkok area, with many performing tasks in the global production chain such as ready to

[5] Thailand was described in a 1993 World Bank report on 'economic miracle' as a model for economic development (Lauridsen 1998)

[6] Non-governmental organizations including HomeNet and WIEGO argue that government surveys tend to underestimate the number of homeworkers in Thailand since many do not reveal their homework status (Lazo 2001, Homenet 2001). HomeNet estimates that at least nine hundred thousand laborers work as homeworkers/contracted workers in Thailand informal sector (HomeNet 2001).

wear clothes stitching, shoe-assembling, artificial flower making, needlework, jewelry cutting, etc.

2. Data Collection Methodology

Our study is based on a 2002 sample survey of 359 individuals (heads and spouses) in three urban poor districts of Bangkok metropolitan area namely, Udomsuk (so called Thanin), Nomklao, and Nawamin (or Samakkee Pattana). [7] These communities were selected to provide representative sample of urban poor neighborhoods in Bangkok.[8] For the most part, these households live on illegally occupied lands. Interviews covered both couples and single-parent headed households. The survey employed multiple (2-3) visits and contained questions on demographic characteristics, terms of employment, credit, savings, sources of household income and household decision making with respect to financial matters. [9]

We focus our investigation on a sub-sample of 110 households that participated in the time allocation module. The time use data collection method employed took into account the developing country context and certain characteristics of our survey respondents including their non-clock based concept of time, their low literacy rates and their severe time constraint.[10] Therefore, a modified method was developed so that cost and efficiency were not compromised. Time use questionnaires were designed so that they are both easy to understand and less time consuming to complete. Hence, a simplified time use diary format

[7] The questionnaire contains information on household income, housing, credit, savings, and household decisionmaking. A community module was also administered to gather information on housing and access to social services such as electricity, water, transportation, health facilities, and schools.

[8] The selection of communities were made to reflect the diversity of urban poor communities in terms of size, proximity to commercial areas, length of existence, and strength of social networks/community organizations. It also took into account the presence of local contacts such as community leaders and researchers in the areas. The 170 households in the sample were then selected in a purposive manner: one of every six households in a neighborhood roster or mapping such that it has at least one member engaged in informal sector work, whether as piecerate homeworker or as self-employed.

[9] Pretests of the survey instrument revealed that couples were reluctant to respond when both were present. On some responses the husband answered for the wife. Therefore, the heads and spouses were separated during interviews. This often involved repeated household visits.

[10] Home-based worker respondents tend to base their days around routine activities rather than on a watch or clock. For example, when asked "what time do you start working?", a typical answer by a homeworker would be "after I drop my children at school," or "after I have finished my breakfast". In addition, a proportion of our sample are illiterate so that diary or recall methods are not appropriate or are prone to serious errors. In addition, homebased workers, unlike most salaried workers, do not have regular or well-defined work patterns. They work whenever they can work or when they get work from the contractor. Respondents may work every day for a week, and then do nothing for two weeks before getting another job contract. Finally home-based workers tend to have busy lives They typically combine paid market work with unpaid household work. For instance, a home-based grocery store owner might cook dinner while waiting to serve customers. Hence, the time use data collection method was designed to capture both the main activity and the secondary activity.

was used in combination with the recall method.[11] Direct observation by the respondent's family or relatives was also utilized whenever respondents are either illiterate or too busy. The so called "circle of trust" approach asks the assistance of respondent's household members such as older sons or daughters to conduct a direct observation method. The trusted observer can also utilize the recall method during those times that he/she is unable to be with the respondent.

3. Characteristics of the Survey Respondents

Table 1 presents the characteristics of the households in the sample. Roughly 70 percent of the households had at least one dependent member living in the household.[12] Sixty-six (65) percent of the households have children aged 14 or younger, and thirty (30) percent have children aged 4 or younger. Their presence may be one reason why the adults enter the labor market as home-based workers.

[Table 1 about here.]

Household size are generally small with an average of 3.81 members.[13] The majority (95.5 percent) live in separate building structures (houses) but no one had land ownership rights and only 52 percent of households pay rent to landlords. Nearly all households have access to electricity and piped water. Reflecting inadequate infrastructure and public services, roughly 30 percent of the households had no access to a public sewerage system. The average monthly household income of our sample (14,499 Thai baht, or $345 equivalent) is somewhat higher than the national average which was 12,185 baht (Thailand, National Statistical Office 2001). It was however slightly more than half the average monthly household income for Bangkok, 24,690 baht or $588.

About 84 percent of our respondents are female home-based workers. Table 2 shows the average age of women and men respondents were 41 and 45 years, respectively.

[11] A shortened and simplified time use diary is given to the home-based worker respondents on the first interview session. The interviewer also explained the *concept of time*, and related definitions such as which kinds of activity are considered work, leisure, etc, to the survey respondents. They gave detailed instruction and orientation to the respondents. The interviewers need to be sure that survey respondents clearly understand all definitions and concepts to ensure consistency across the sample. During the next visit, a short recall interview with the respondent is conducted to ensure that the time use diary has been filled out correctly. During this session, the interviewer can add any missing information that was not given. This multi-visit approach also affords the interviewers an opportunity to know the survey respondents better and to gain their confidence over time. These steps were taken to reduce errors or biases in the data collected.

[12] Dependents were defined as people 15 or younger, unemployed, or with disabilities.

[13] This is consistent with the average household size collected by the Thailand National Statistical Office in the Household Socio-Economic Survey of 2001, with an average of 3.6 persons per household.

There is marked gender disparity in educational attainment. About 13 percent of females had no schooling, with only 17 percent continuing beyond primary school. In contrast, 95 percent of males had some education and 42 percent had primary schooling and higher. On average women only had 4.7 years in school, compared to 6.4 year among men.

[Table 2 about here.]

The workers in our sample were either self-employed or contracted (casual or short-term) worker.[14] Three-fourths of the contracted workers work in the textile/garment industry, assemblying parts of clothing and/or shoes. Majority of the self-employed workers are engaged as grocery store owners, food vendors, etc. Only 35 percent of female self-employed workers earned monthly incomes of 8,000 baht or higher, compared to 50 percent of male self-employed workers. These workers earned nearly 64 percent more than wage-contracted respondents did on a monthly basis

4. *Pattern of Time Allocation among Homebased Workers*

The long working hours of respondents can be seen clearly in Table 3. About 47 percent of all respondents spent more than 9 hours per day on income generating activities.. In general, women worked fewer hours than men, both in wage-contracted and self-employment types of work. The difference is small however, for self-employed workers, but much larger for wage-contracted workers. Women workers, on average, spent about 10 percent less time than men in paid work, at 8.97 and 9.93 hours, respectively. More than 30 percent of wage-contracted workers spent 9 hours or more per day in paid work, compared to 60 percent of self-employed respondents. This result is consistent with the findings of other studies on home-based workers in Mexico, the Philippines, India, Sri Lanka, Brazil, Bangladesh, Pakistan, and Thailand which pointed out their long work hours (Bajaj 1999; ILO 2002a; Pongsapich 1992; Praparpun, Boonmathya, and Leechanavanichpan, 1999; Lavinas et al. 1999).

[Table 3 about here.]

Respondents who worked more than 12 hours per day were mostly self-employed, and tended to own a home-based grocery store.[15] Those respondents recorded their primary activity as

[14] Casual workers are workers who have an explicit or implicit contract of employment which is not expected to continue for more than a short period, whose duration is to be determined by national circumstances. Workers in short-term employment are workers who hold explicit or implicit contracts of employment which are expected to last longer than the period used to define "casual workers" (ILO 2001)

[15] These respondents would open their home-based stores almost immediately after waking up, and would close just a few minutes/hours before going to bed. Their reported working hours was beyond 12 hours per day.

labor market work even as they mind their home-based stores without helping any customers. Minding the store often overlapped with other secondary activities such as watching TV, reading, cooking, cleaning, etc.

Table 4 shows the allocation of time of all respondents. Self-employed workers, on average, spent more time on market work (589 minutes plus 93 minutes) compared to wage-contracted workers (487 minutes plus 34 minutes) in both primary and secondary activities respectively. Primary labor market work activities accounted for almost 41 percent of self-employed workers' day, and 34 percent for wage-contracted workers. Wage-contracted and self-employed workers in the sub-sample seem to allocate roughly the same proportion of their total primary time to leisure activities, about 11 percent and 12 percent, respectively. However, wage-contracted workers spent 36 percent more time than self-employed workers on overlapped leisure activities.

[Table 4 about here]

The mean time spent on paid work as a primary activity is approximately 9 hours a day. However, by taking secondary market work activities into account, the time spent rises by 13 percent to 11 hours on average as shown in Table 5. For example, wage-contracted workers tend to perform overlapped subcontracted work with a primary activity such as watching tv. If overlapped or secondary market work activities were not taken into account, the overall time spent on labor market work would be underestimated.

On average, all respondents spent almost 2 hours a day on domestic work (primary activity only) such as food preparation, dish washing, house cleaning, laundry and ironing, house maintenance, and so on. Respondents spent an average of 53 minutes on childcare tasks. However, this number doubles when secondary activity time on childcare is counted. It is noteworthy that respondents with household members, six years or younger, spent approximately 500 minutes a day on childcare activities (both primary and overlapped). Most childcare activities were reported as secondary activities; often times, overlapped with primary work activities. Respondents spent an average of 200 minutes on all unpaid work activities including domestic work, childcare and shopping. Respondents in our Thailand subsample, therefore, allocate 52 percent of their 24-hour time period to work activities, both paid and unpaid. [16]

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[16] In contrast, a sub-sample of Australians from the 1992 National Australian Time Use Survey spent only 35 percent of their available time on both paid and unpaid work activities (Floro and Miles 2003).

An average of 157 minutes a day was spent on leisure activities, which included mostly passive leisure (e.g., reading, watching television, listening to the radio, and communicating with others.) by all respondents. Passive leisure accounted for 90 percent of time spent on overall leisure activities. Only 3 percent of all respondents participated in active leisure activities such as sport and exercise. This may be a reflection of the time intensity of respondents.[17]

Table 5 shows that women engaged in market work activities to a lesser extent than men. Secondary work activities contribute an additional 28 percent of total work time under the first assumption, with the amount done by women (267 minutes per day on average, 35 percent of the total work time) more than double that done by men (138 minutes per day on average, 20 percent of the total work time). These differences in our sub-sample are striking, and indicate the inequality in the extent of overlapped work done by men and women. It is also interesting to note that women spent more than double the time that men did performing household work (216 more minutes under the first assumption, or 166 more minutes under the second assumption).

[Table 5 about here.]

Table 5 also shows that childcare is a domestic work activity that is often combined with other activities. When both primary and secondary childcare activities are taken into account, the original average time of 58.9 minutes spent by women in childcare increase to 153 minutes (assumption 1) or to 105.9 minutes (assumption 2), an increase of 160 percent and 80 percent respectively. Men's average total childcare time increased by 241 percent from 23.61 minutes to 80.55 minutes (assumption 1) or by 120 percent to 52.08 minutes (assumption 2). Childcare is another activity that reveals gender differences. Whether as a primary or overlapped activity, women spent more time caring for children than men.

Most unpaid household work activities were done as secondary activities, e.g., working on wage-contracted assignments and minding children simultaneously. Gender inequalities appear in the non-work activities as well. For instance, under assumption 2, men spent 18 percent more time than women on leisure activities, and 4 percent time more sleeping. Accounting for secondary activities stretched both men's and women's time spent on work and leisure beyond 24 hours. By performing overlapping activities, women stretched

[17] This illustrates that the home-based workers are generally both time and money poor. This is in contrast to the results from the 1992 National Australian Time Use Survey, where Australians spent almost double that –16.5% or 235 minutes– on leisure activities (Floro and Miles 2003)

their time by 593 minutes (41 percent increase) using the first assumption, and 297 minutes (21 percent increase) using the second assumption.

Men, on the other hand, stretched their time by 32 percent (assumption 1), and 16 percent (assumption 2). (See Table 6) This suggests that there is an underestimation of the amount of unpaid labor used in the non-market production of goods and services when secondary activities are omitted. Also, women have a greater tendency to combine one or more activity per unit of time and carry a higher work burden than men. This is because women have already been assigned their job functionality (by norm and/or culture) to be in charge of household unpaid work. Hence, women often stretch their time beyond 24 hours in order to accommodate both labor market and unpaid household work.

IV. Empirical Analysis

1. Calculation of Individual Well Being Index

The composite well-being index (WBI) calculation involves several steps which are discussed in detail in Appendix A. Each of the well-being component indices namely, personal income index (*y*), the inverse work intensity index (*k*), and the level of educational attainment index (*edu*) is calculated using the methodology applied in the construction of the Human Development Index. Hence, the education component index ranges from zero to one, with the higher index value indicating a higher level of educational attainment.

Income is treated in this paper as a means to attain human development, not an end by itself. Given how income for poor households, even with little income, can achieve a lot in well-being, we use the logarithm of income. In other words, the personal income component index of individual *j* is calculated as income increases, its value is adjusted downwards. We also assumed that the past month's personal income reflects the normalized income earnings of the individual, taking implicitly into account the variations in earnings over a specified period of time. Values of the individual income component index also range from zero to one. The higher the value of the personal income component index, the higher is the level of individual well-being. Table 6 provides the values of the different components of the Well-being index.

Finally, we calculate the inverse incidence of work intensity index, in which a lower work intensity means a higher inverse incidence. This requires several steps and they are discussed in Appendix B. For purposes of this study, only the combinations involving unpleasant work are utilized in measuring work intensity. We based the classification using

Floro and Hungerford (2001) categories that are applied to Australian time use data, but with some modification in order to make them more appropriate to the Thailand context. In our analysis, unpleasant work time include time spent activities associated with market work, e.g., work at main job, travel and communication time, time spent in cleaning and maintaining work tools and work space. Both active and passive childcare activities such as physical care of children and playing with children are arbitrarily classified for purposes of this study as pleasant work, although this may not be the case for certain individuals. Other domestic work activities such as washing dishes, laundry and ironing, and house cleaning are classified as unpleasant work.

We next measure the time spent engaged in overlapped work (secondary) activities. Juster and Stafford (1991, 482) suggest that "the primary and secondary activities may be performed one at a time or sequentially rather than in parallel." They argue that what we observe as overlapped or secondary activities are actually just sequential switches between the various tasks. Floro and Hungerford (2001, 12) also argue that "overlapping of activities may just be frequent switches between activities and if the time grid were fine enough, the issue of secondary activities would then effectively disappear." [18] For this study, we adopt the assumption of parallel activities and measure the total time spent engaged in overlapping activities by the total number of minutes of the two activities together.

We also take into account the length of the working day in calculating the incidence of work intensity. The notion of the average working day has both social and biological attributes, and is measured here in relative terms. The length of the paid market working day in this study is bounded ultimately by the total number of hours in the day that the individual spends on paid market work. Some studies suggest that human physical, emotional, and intellectual capacities do not allow an endless extension of work effort in a given day (Green 2002). The biological and physiological needs of the body require some minimum renewal time such as sleep and personal care. Hence, the incidence of work intensity rises when the length of the working day exceeds a reasonable time, limited by those human capacities.

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[18] However, according to some psychologists like Ruthruff, Pashler and Klaassen (2001) and Meyer and Kieras (1997), these tasks actually could be performed in a parallel fashion. This, however, might create bottlenecks, which decrease the individual's overall ability or the attention paid to overlapping or secondary activities.[18] In their view, the time spent on the overlapped activity happens simultaneously with the primary activity, and it is counted as an extra hour (time) for the individual. Based on the sequential argument, there is no extra hour gained from performing overlapped activity.

In order to be consistent with other component indices, the work intensity component index is computed as an inverse so that the value of the index gives the same result patterns as other component indices. When the value of the index moves toward zero, this indicates a high level of work intensity. The higher the inverse work intensity index value, the higher the level of individual well being will be. In other words, a high value (closer to one) in the index indicates reduced or minimal intensification of the work day and corresponds to a higher level of individual well-being. The logarithm form is utilized in our calculation of the inverse work intensity index in order to capture the fact that the incidence of work intensity increases at an increasing rate when individuals perform extended periods of overlapped work activities and/or lengthen their work day.

The computation process of the well-being composite index for individual *j*, WBI_j, is presented in Equation (15).

$$WBI_j = \frac{\sum_i \left[I_{ij} \right]}{m}, \quad where \ 0 \le WBI_j \le 1 \qquad (15)$$

where WBI_j = The well-being index for individual *j*;

I_{ij} = The component/attribute indices of the individual well-being index; and

m = The number of components/attributes of individual well-being.

The value of the individual well-being index also has a range of zero to one. The higher the well-being index value, the better individual *j* is in terms of the *m* attributes of well-being.

The ability to compare well-being indices between individuals is based on the premise that individuals can make interpersonal utility comparisons, given the possibility of emotional connections that encourage empathy (England 2003). The latter point raises the possibility of translating between one's own and another person's metric for well-being in which case, comparisons of well-being between individuals is a reasonable exercise (See Appendix B). This is contrary to the argument in neoclassical theory that interpersonal utility comparisons are impossible.

2. Patterns of Individual Well-Being Index among Home Based Workers

Table 6 shows the estimated values of the well-being index (WBI) and its components for women and men. The estimated overall WBI for women (..30) is lower than that of men (.41) and this can be attributed to the consistently lower levels of education, income and higher work intensity (hence lower inverse of work intensity index) among women as shown by the

lower mean for each individual attribute. Figure 3 presents the kernel density distribution of the individual well-being index, with more women found at the lower end of the distribution than men.

[Table 6 about here.]

[Figure 3 about here.]

Table 7 shows how the estimated individual well-being index of self-employed homebased worker respondents compare with that of subcontracted homeworker respondents.[19] Overall, WBI of subcontracted workers is slightly lower than that of the self-employed. This may be explained by the fact that subcontracted homeworkers in our sample have lower levels of education and tend to earn less. On the other hand, the former seem to work less intensively compared to self-employed workers.

[Table 7 about here.]

Our well-being estimations show that men respondents in both types of employment have higher well-being indices than women.[20] They also show that women score lower on every component index in both types of employment. While Table 7 indicated that self-employed workers generally had a higher quality of life than wage-contracted workers, this is not the case for self-employed female workers. A decomposition of the individual well-being indices reveals that the incidence of work intensity is much higher among self-employed women workers (0.164) than subcontracted women workers (0.297).[21] The latter, on the other hand, has the lowest personal income index.

3. Regression Tests and Results

Two tests are conducted in this section to examine the relationship between the individual well-being index of individuals (WBI_i) and the inverse work intensity index (k_i) and

[19] The median of the individual well-being index by employment type is 0.325 and 0.304, for self-employed worker respondents and wage-contracted worker respondents respectively.

[20] Note that the number of observations for male wage-contracted workers is only two.

[21] This is the number obtained from the inverse work intensity index.

to test the robustness of the results. Both the WBI_i and k_i are determined by the interplay of pertinent economic, demographic and social factors. These include social norms proxied by a gender variable, household lifecycle and composition indicated by the age of the individual and presence of young children and employment type. We also include a community dummy that captures community-level characteristics e.g. relative strength of community organizations and organized social networks.

Prevailing social and gender norms influence the household division of labour in which market work is still perceived to be men's primary role and that of household maintenance and childcare to be women's.. For women homebased workers, this create severe time pressure as they are confronted with a multiplicity of roles. In striving to meet their varied roles, many become adept at extending time through intensification of work by extending the work day and by doing two or more activities over prolonged periods. Demographic factors also influence the length and intensity of overlapped work activities. Persons in the ascendant phase of the household life cycle tend to experience increased time pressure, given the demands of their jobs and/or young children. An individual's employment type and job characteristics may also affect that person's demand for time. The extent to which a person is compelled to meet some employer or contractor's deadline can increase time pressure. On the other hand, the need to meet some level of subsistence may compel those who are self-employed to lengthen their work day. The role of social networks and mutual support mechanisms in the community in the allocation and organization of time needs to be taken into account as well for they can help alleviate the pressure on a person's time demand.

We estimate the following models using ordinary least squares regression analysis:

$$\text{MODEL 1: } WBI_i\left(y,k,edu\right) = x_{ij}\beta_j + e_i \tag{16}$$

$$\text{MODEL 2: } k_i = x_{ij}\beta_j + e_i \tag{17}$$

Or

$$WBI_i = \beta_1 + FEM_i\beta_2 + EMT_i\beta_3 + SS_i\beta_4 + ORG_i\beta_5 + DEP_i\beta_6 + AGE_i\beta_7 + AGE_i^2\beta_8 + e_i \tag{18}$$

$$k_i = \beta_1 + FEM_i\beta_2 + EMT_i\beta_3 + SS_i\beta_4 + ORG_i\beta_5 + DEP_i\beta_6 + AGE_i\beta_7 + AGE_i^2\beta_8 + e_i \tag{19}$$

where

WBI_i = estimated well-being index of individual *i*;

k_i = Inverse work intensity index of individual *i*;

FEM_i = Female dummy,

EMT_i = Subcontracted worker dummy (self-employed worker = 0),

SS_i = Social support dummy variable whereby receiving social support;

ORG_i = Organizational capacity of and level of services in the community where individual *i* resides dummy, where a high level of organization;

DEP_i = Presence of dependent members in the household dummy;

AGE_i = The age of individual *i*; and

AGE_i^2 =Age square of individual *i*.

The regression results for model are given in Table 8. Given the small sample size, we conduct a test on the residuals to see if they are distributed normally. Our test results indicated that the *p*-values for the *t*-tests and *F*-test in our analysis are valid and accurate.[22] The model was also tested for heteroskedasticity, although by utilizing the robust standard errors, our model would still be valid even in the presence of heteroskedasticity.[23] A regression specification error test indicates the non-existence of model specification error.[24]

[Table 8 about here.]

Table 8 shows that the model explains roughly 28 percent of the variation in WBI. The gender coefficient indicates that well-being drops significantly if the individual is female. This significant difference between the estimated well-being of men and women respondents can be explained by the prevailing social norms and customary attitude regarding

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22 The *p*-value from Shapiro-Wilk *W* test is based on the assumption that the distribution is normal; therefore, a very large *p*-value (.81), indicates that we cannot reject the hypothesis that the residual is normally distributed. We also conducted a standardized normal probability (P-P) plot and a plot of the quantiles of a variable against the quantiles of a normal distribution, and the plots show no indications of non-normality in residuals.

23 The Cook-Weisberg test for heteroskedasticity using fitted values of well-being index indicates the problem of heteroskedasticity in the model.

24 A model specification error can occur when one or more relevant variables are omitted from the model or one or more irrelevant variables are included in the model. If relevant variables are omitted from the model, the common variance they share with included variables may be wrongly attributed to those variables, and the error term is inflated. On the other hand, if irrelevant variables are included in the model, the common variance they share with included variables may be wrongly attributed to them.

women's role and status in Thai society.[25] Although the role of Thai women has never been solely restricted to the household or domestic sphere, their labor market activities in the informal sector tend to be limited to labor intensive tasks requiring little or no skills –such as food processing, sewing clothing, and so on (Praparpun, Boonmathya, and Leechanavanichpan 1999). Their socially ascribed primary role is to raise children and care for the family, so that higher education is sometimes perceived as unnecessary for girls and daughters especially in households facing severe income constraints. (Pramualratana, Havanon, and Knodel 1985; Thailand, National Commission on Women's Affairs, Office of the Prime Minister 1995a; and Yoddumnern-Attig, Bencha et al. 1992). This translates into low levels of educational attainment for many girls in low income households; hence, we find our women respondents to have completed compulsory primary education or less.[26] Women also earn relatively lower earnings and higher level of work intensity compared to men which explains their lower well-being index. Although both head and spouses typically are engaged in paid market work, the men would rest immediately after their day's work while the women would immediately clean up their workplace at home, put the working tools away, and at the same time, prepare the evening meal.[27]

The results in Table 8 also show that access to social support and community networks strongly influences a person's well-being. This may be explained by the fact that social support and community insurance schemes often enable an informal sector worker to have access low-interest credit from relatives and friends, participate in skills training, and so forth. Individual well-being is also likely to be influenced by the community provisioning of services. Although the three communities all had access to water, electricity, and public transportation, there are important differences as well. For example, more than 85 percent of the people living in Udomsuk had no access to a sewage system in 2002.[28] The Udomsuk community is also more distant from the main roads and has inadequate public transportation

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25 The males are traditionally breadwinners and the heads of the family, while women care for the home, the children, and the family.

26 The problem of low educational attainment among Thai women workers is also raised by Lazo (1992), UNDP (2003), Praparpun, Boonmathya, and Leechanavanichpan (1999), Thailand, National Commission on Women's Affairs, Office of the Prime Minister (1995b), and National Statistical Office Thailand (1999).

27 This lower level of earnings and higher level of work intensity for female home-based workers is not only observed in Thailand, but also in other Asian countries. Bajaj (1999, 39) indicates that "female wages were found to be 66 percent of male wages in the garment industry in Bangladesh."

28 While less than 30 percent of individual in Nawamin community have no access to public sewage system and less than 1 percent in the case of people who live in Nomklao community.

services compared to Nomklao and Nawamin. The latter communities have more active community organizations and support groups, such as home-based workers organizations, saving clubs, women groups, and occupational groups. [29] The statistical significance of the community organization dummy suggests that well-organized and supportive communities help improve the well-being of their residents by enhancing their bargaining power with contractors or manufacturers, developing innovative savings and credit facilities such as savings clubs and labor groups, and mobilizing residents to demand better access to infrastructure, social services and support from the government and other institutions (Thailand, HomeNet 1999, ESCAP 2001). [30]

The coefficients of age and the household structure show that the well-being of the individual tend to increase with age and decline in the presence of dependent members but these are not statistically significant. This is not surprising given the purposive sampling method of our survey data.

We next examine the likely effect of individual, household and community factors on the intensity of work experienced by the individual as measured by the inverse work intensity index). The OLS regression results are given in Table 9. It can be seen that the inverse work intensity index drops significantly for women respondents which supports the results of the well-being regression analysis. That is, women's health and well-being tend to deteriorate when there is a high incidence of work intensity. The positive sign of the employment type coefficient indicates that subcontracted workers have lower incidence of work intensity compared to self-employed workers. Although both wage-contracted workers and self-employed workers among urban, low income households tend to have long working days and to overlap their tasks, the latter are more likely to be faced with a higher incidence of work intensity since they work longer hours (especially those who run grocery stores in their homes), and they are more likely to perform overlapped paid market work and unpaid domestic work.

[29] The saving clubs of these two communities were so well organized that the residents had even collectively negotiated with the land owners to rent the land instead of illegally occupying the area; thereby reducing the associated uncertainty and risk of being forced out. Further, these two communities were able to obtain support from government organizations such as the Community Development Office and the House Associations and Training Center for Urban Poor Development for training and employment assistance.

[30] The saving clubs of these two communities were so well organized that the residents were able to collectively negotiate with the landowners to rent the land instead of illegally occupying the area. This reduces the associated uncertainty and risk of eviction. Furthermore, these two communities were able to obtain support from government organizations such as the Community Development Office and the House Associations and Training Center for Urban Poor Development for training and employment assistance.

[Table 9 about here.]

Another interesting finding is that the individual's incidence of work intensity increases (reduction in the inverse work intensity index) when a dependent member is present in the household, which is also consistent with the results of the well-being regression analysis in Table 10. This increase in work intensity mainly results from multitasking, especially in performing childcare activities.[31]

V. Concluding Remarks

This study highlights the fact that time use convey crucial information about individuals' well-being that conventional well-being measures do not. The time and work intensity aspects (derived from time spent on market work and on overlapped work activities) affect individual well-being in many ways, including work productivity, mental and physical health. An analytical framework is provided to explore the varied channels through which these determinants, along with education and income, affect individual wellbeing. A well-being index that incorporates these dimensions of time use is then constructed. We empirically examine the relationship between well-being and incidence of work intensity among home-based workers in Bangkok, Thailand, majority of whom have low wage rates and/or work with no labor protection. For women workers, combining both paid market work and unpaid domestic work became a necessity, creating a higher incidence of work intensity. In collecting time use data among these workers, a simplified time use diary method and a circle of trust observation method are employed for ther are deemed to be more appropriate than standard diary or recall methods.

We then demonstrated, using OLS regression tests, that the effects of overlapped activities on the pattern of time allocation between men and women are substantial. Omission of overlapping activities results in a serious underestimation of economic contributions of individuals, especially in non-market production. Our results also indicate that the time use patterns of our home-based worker respondents varied significantly by gender and employment. For instance, with overlapping activities included, men spent only half of the total time that women spent on household work, and self employed workers spend roughly 30 percent more time on paid market work than contracted-workers. Further, the average work

[31] This result corresponds to the Floro and Hungerford (2001) argument that childcare increase work intensity.

day of our survey respondents was 9-10 hours. Women also earned less than men for the same hours of work.

The well-being index developed in this paper provides a useful indicator for use by policymakers, researchers and advocacy groups in the way that it allows for comparability and for identifying those who need the most assistance A better understanding of the factors that promote or lower well-being can enable policymakers to target vulnerable individuals or households. It also helps them to design more effective programs and economic and social policies that enhance the well-being of these individuals.

Our regression analyses provide some interesting findings. First, an individual's well-being is found to be significantly and negatively related to gender. Women home-based workers tended to have a lower quality of life than men. This difference can be partly explained by prevalent social norms and gender roles so that women are expected to do most household chores even though they also needed to work for pay. Hence, women end up spending their time more intensively by working long days and multi-tasking. We also found that the well-being level of self employed workers was better than subcontracted workers. Finally, we find that workers in our sub-sample who resided in well organized and supportive communities had a higher well-being level.

Despite their significant economic contribution, the quality of life for many low-income workers, especially home-based women workers, remain low. The government has began to acknowledge informal sector workers' contribution in the Thailand's Eighth National Development Plan. Nevertheless, specific laws and regulations that protect home-based workers' rights and social policies that enhance their welfare have yet to be made and enforced. Unfortunately, the scarcity of relevant data reinforces the lack of understanding by Thai policymakers about the lives and work situations of these workers. Policymakers will likely continue to ignore these urgent concerns unless time and work intensity data analysis is included in policy formulations and evaluations.

Table 1: Selected Characteristics of Subsample Household

Household Type	Total	Percentage
Couples only	4	3.6
Couples + dependents[1]	58	52.7
Couples + dependents + non-dependents[2]	12	10.9
Couples + non-dependents	19	17.3
Female headed[3]	2	1.9
Female headed + dependents	3	2.7
Female headed + non-dependents	8	7.3
Female headed + dependents + non-dependents	4	3.6
Total	**110**	**100.0**
Household with children 0-4 years old	33	30.00
Household with children 5-14 years old	40	36.36
Rest of the household	37	33.64
Total	**110**	**100.00**
Average household size	3.81	-
Geographic Location (sub sample sites)		
Udomsuk (Thanin) community site	14	12.7
Nomklao community site	50	45.5
Nawamin (Samukkee Patana) community site	46	41.8
Total	**110**	**100.00**
Monthly Household Income[4] (in baht)		
0 - 5,000	1	0.91
5,001 - 8,000	11	10.00
8,001 - 11,000	25	22.73
11,001 - 13,000	28	25.45
13,001 - 15,000	13	12.73
15,001 - 18,000	11	10.00
18,001 - 21,000	4	3.64
21,001 - 25,000	6	5.45
25,001 - 30,000	5	3.64
30,001 and more	6	5.45
Total	**110**	**100.00**
Average Household Income (baht)	14,499	

Notea:

1. All children under 15 years, not in the labor force, and disabled household members are considered dependents.
2. Non-dependent household members are classified as the household members who are 15 years old and older and/or in the labor force.
3. This is the household in which the household head is female. The marital status of the household head can be either married, divorced, widowed, or single.
4. . This refers to gross regular income measured in Thai baht from all sources, including informal wage and salaries, business, government pension, grants/transfer money from any organizations and other sources. These incomes are calculated on a monthly basis. The current exchange rate is 42 baht per 1 US dollar.

Table 2:

Selected Characteristics of Individual Respondents

	Women		Men		Total	
Age	**Number**	**%**	**Number**	**%**	**Number**	**%**
15-24	1	1.1	1	5.6	2	1.8
25-34	25	27.2	2	11.1	27	24.5
35-44	29	31.5	6	33.3	35	31.8
45-54	31	33.7	3	16.7	34	30.9
55-64	3	3.3	5	27.8	8	7.3
65 and above	3	3.3	1	5.6	4	3.6
Total	**92**	**100.0**	**18**	**100.0**	**110**	**100.0**
Average age (years)	41.3		44.9		41.9	
Highest Educational Attainment						
Bachelor degree or higher	0	0	0	0	0	0
Certificate of diploma	0	0	1	5.6	1	0.9
Secondary school	1	1.09	1	5.6	2	1.8
Grade 9	15	16.3	5	27.8	20	18.3
Primary school	21	22.9	3	16.7	24	21.8
Grade 4	43	46.8	7	38.9	50	45.4
Not attending school	12	13	1	5.6	13	11.8
Total	**92**	**100**	**18**	**100**	**110**	**100**
Average years of schooling	4.7		6.4		5.0	

Table 3:
Mean Hours per Day in Primary Market Work Activity Only),
by Employment Type and Sex

	Contracted Worker[1]		Self-Employed[2]		Total	
Hours Work per Day (hour)	**Number**	**%**	**Number**	**%**	**Number**	**%**
Women						
0 – 4	2	4.65	0	0.00	2	2.17
4 – 7	12	27.91	10	20.41	22	23.91
7 – 9	15	34.88	11	22.45	26	28.26
9 – 12	12	27.91	17	34.69	29	31.52
12 or more	2	4.65	11	22.45	13	14.13
Total	**43**	**100.00**	**49**	**100.00**	**92**	**100.00**
Women's average working hour	8.06		9.77		8.97	
Men						
0 – 4	0	0.00	0	0.00	0	0.00
4 – 7	0	0.00	0	0.00	0	0.00
7 – 9	1	50.00	7	43.75	8	44.44
9 – 12	1	50.00	6	37.50	7	38.89
12 or more[3]	0	0.00	3	18.75	3	16.67
Total	**2**	**100.00**	**16**	**100.00**	**18**	**100.00**
Men's average working hour	9.50		9.98		9.93	
All Respondents						
0 – 4	2	4.44	0	0.00	2	1.82
4 – 7	12	26.67	10	15.38	22	20.00
7 – 9	16	35.56	18	27.69	34	30.91
9 – 12	13	28.89	23	35.38	36	32.73
12 or more	2	4.44	14	21.54	16	14.55
Total	**45**	**100.00**	**65**	**100.00**	**110**	**100.00**
Average working hour per person	8.12		9.82		9.13	

Note:
1. This group refers to those who produce a product or provide a service to a contractor or an employer, and select their own work place.
2. This refers to the self-employed workers who work in their homes. They include: food venders, small grocery stores owner, barbers, beauty salon worker, bike repair shop mechanic, etc.
3. Most of the individuals who work more than 12 hours per day are grocery store owners. Time spent on paid work was counted immediately after they got up and opened their store front until they closed their store front. This might take up to 15 hours.

Table 4:

Average Time Allocation in All Activities, by Employment Type (Minute per Day)

Primary Activities	Contracted[1]		Self-Employed[2]		Total average[3] (min. per day)	Percentage Distribution
	Mean	%	Mean	%		
Primary Work Activities						
Labor Market Work[5]	**487.44**	**33.85**	**589.23**	**40.92**	**547.59**	**38.03**
Household work						
Domestic[6]	142.11	9.87	92.31	6.41	112.68	7.83
Childcare[7]	64.11	4.45	45.53	3.16	53.14	3.69
Shopping[8]	45.56	3.16	27.15	1.89	34.68	2.41
Sub-total	**251.78**	**17.48**	**164.99**	**11.46**	**200.5**	**13.92**
Primary Non-Work Activities						
Leisure Activities[9]	**154.55**	**10.73**	**159.38**	**11.07**	**157.41**	**10.93**
Other Activities						
Personal care[10]	142.67	9.91	139.15	9.66	140.59	9.76
Sleeping	403.56	28.03	387.25	26.89	393.91	27.35
Sub-total	**546.23**	**48.67**	**526.40**	**36.56**	**534.50**	**37.12**
Total	**1440**	**100.00**	**1440**	**100.00**	**1440**	**100.00**
Overlapped Activities[11]						
Overlapped Work Activities						
Labor Market Work	**34.44**	**5.68**	**93.23**	**18.07**	**69.18**	**12.08**
Household work						
Domestic	78.89	13.01	81.92	15.88	80.68	14.09
Childcare	109.27	18.02	73.31	14.21	88.02	15.37
Shopping	9.33	1.54	6.92	1.34	7.91	1.38
Sub-total	**197.49**	**32.56**	**162.15**	**31.43**	**176.61**	**30.84**
Overlapped Non-work Activities						
Leisure Activities	**349.33**	**57.60**	**256.35**	**49.69**	**294.39**	**51.41**
Other Activities						
Personal care	25.22	4.16	37.54	7.28	32.5	5.68
Sleeping	0	0.00	0	0.00	0	0.00
Sub-total	**25.22**	**4.16**	**4.15842**	**0.81**	**32.5**	**5.68**
Total	**606.48**	**100.00**	**515.888**	**100.00**	**572.68**	**100.00**

Notes:

1. This group refers to wage-contracted workers who produce a product or provide a service to contractors or employers.
2. This refers to the self-employed workers who use their home as a base for their business e.g., food venders, small grocery stores, barber shops, beauty saloons, bike repair shops, etc.
3. Mean time (simple average) spent on all economic activities by all participants in a 24-hour period.
5. Time spent by the survey respondents on paid market work including relevant travel time.
6. This includes food preparation and cooking, dish washing, laundry, ironing, clothes care, house cleaning, other housework, home maintenance, household management, transporting adult household members, and travel associated with any of the above activities.
7. This includes physical care and minding of own and other children, care for sick or disable child, teaching own and other children, playing with own and other children, and travel associated with children.
8. This includes purchasing goods and services, and travel associated with purchasing goods and services.
9. This includes mostly passive leisure such as reading, watching TV, listening to the radio, and communicating with others. In addition, active leisure included as exercising. Social life and entertainment, including visiting friends/family/kin, are also included in this category.
10. This includes personal care such as bathing, dressing, and eating.
11. Includes all reported minutes in secondary and tertiary activities at equal weight as the primary activities.

Table 5: Comparison of Varied Measures of Time Use, by Men and Women Home-Based Workers (Minutes per Day)

Activities	Primary only	Overlapped Only	Primary and Overlapped[1]	Deflated Overlapped Only	Primary and Deflated Overlapped[2]
			Women		
Labor Market Work[3]	**538.15**	**74.13**	**612.28**	**37.07**	**575.22**
Household work[3]					
Domestic	122.93	89.68	212.61	44.84	167.77
Childcare	58.91	94.1	153.01	47.05	105.96
Shopping	37.88	8.91	46.79	4.46	42.34
Sub-total	**219.73**	**192.68**	**412.41**	**96.35**	**316.07**
Leisure Activities[3]	**151.9**	**293.42**	**445.32**	**146.71**	**298.61**
Other Activities[3]					
Personal care	139.02	32.94	171.96	16.47	155.49
Sleeping	391.2	0	391.2	0.00	391.20
Sub-total	**530.22**	**32.94**	**563.16**	**16.47**	**546.69**
Total	**1440**	**593.17**	**2033.17**	**296.59**	**1736.58**
Change			593.17		296.58
			Men		
Activities	**Primary only**	**Overlapped Only**	**Primary and Overlapped[1]**	**Deflated Overlapped Only**	**Primary and Deflated Overlapped[2]**
Labor Market Work[3]	**595.83**	**43.89**	**639.72**	**21.945**	**617.78**
Household work[3]					
Domestic	60.28	34.72	95	17.36	77.64
Childcare	23.61	56.94	80.55	28.47	52.08
Shopping	18.33	2.78	21.11	1.39	19.72
Sub-total	**102.22**	**94.44**	**196.66**	**47.22**	**149.44**
Leisure Activities[3]	**185.56**	**299.33**	**484.89**	**149.665**	**335.23**
Other Activities[3]					
Personal care	148.61	30.28	178.89	**15.14**	163.75
Sleeping	407.78	0	407.78	**0**	407.78
Sub-total	**556.39**	**30.28**	**586.67**	**15.14**	**571.53**
Total	**1440**	**467.94**	**1907.94**	**233.97**	**1673.97**
Change			467.94		233.97

Notes:

1. This is the sum of time (in minutes) spent in each activity, whether primary or overlapped. Primary and overlapped activities are given equal weight.

2. In summing the total time spent in each activity, overlapped activities are given half (0.50) the weight of primary activities. This is based on the alternative assumption that individuals focus less energy and/or attention on those activities that are considered secondary and/or tertiary (overlapped).

3. See notes to this variables in Table 4

Table 6: Individual Well-Being Index and Component Indices, by Sex

	Women	Men
Individual Well-Being Index[1]		
Mean	0.302	0.411
Std. Deviation	0.072	0.120
Minimum/Maximum	0.102/0.455	0.167/0.640
Decomposition of Well-Being Index		
1) Educational Attainment Index[2]		
Mean	0.296	0.403
Std. Deviation	0.161	0.220
Minimum/Maximum	0.000/0.750	0.000/0.875
2) Personal Income Index[3]		
Mean	0.384	0.516
Std. Deviation	0.153	0.169
Minimum/Maximum	0.000/0.732	0.234/0.999
3) Inverse Work Intensity Index[4]		
Mean	0.226	0.315
Std. Deviation	0.167	0.155
Minimum/Maximum	0.010/0.601	0.101/0.555

Note: Full details on these calculations can be found in Appendix a.

1. The individual well-being index is calculated as

$$WBI_j = \frac{\sum_i [I_{ij}]}{m}, \quad where\ 0 \le WBI_j \le 1\ and\ I_i = edu, y, k$$

2. The educational attainment component index is calculated as

$$edu_j = \frac{\left(X_{edu,j} - \min_j \left\{X_{edu,j}\right\}\right)}{\left(\max_j \left\{X_{edu,j}\right\} - \min_j \left\{X_{edu,j}\right\}\right)}$$

3. The personal income component index is calculated as

$$y_j = \frac{\left(\log\left\{X_{y,j}\right\} - \log\left\{\min_j \left\{X_{y,j}\right\}\right\}\right)}{\left(\log\left\{\max_j \left\{X_{y,j}\right\}\right\} - \log\left\{\min_j \left\{X_{y,j}\right\}\right\}\right)}$$

4. The inverse work intensity component index is calculated as

$$k_j = 1 - \frac{1}{2}\left\{\frac{\left(\log\left\{X_{wd,j}\right\} - \log\left\{\min_j \left\{X_{wd,j}\right\}\right\}\right)}{\left(\log\left\{\max_j \left\{X_{wd,j}\right\}\right\} - \log\left\{\min_j \left\{X_{wd,j}\right\}\right\}\right)} + \frac{\left(\log\left\{X_{ov,j}\right\} - \log\left\{\min_j \left\{X_{ov,j}\right\}\right\}\right)}{\left(\log\left\{\max_j \left\{X_{ov,j}\right\}\right\} - \log\left\{\min_j \left\{X_{ov,j}\right\}\right\}\right)}\right\}$$

Table 7: Individual Well-Being Index and Component Indices, by Employment Type

	Wage-Contracted (N=45)	Self-Employed (N=65)
Individual Well-Being Index[1]		
Mean	0.309	0.327
Std. Deviation	0.082	0.096
Minimum/Maximum	0.167/0.532	0.102/0.640
Decomposition of Well-Being Index		
1) Educational Attainment Index[2]		
Mean	0.297	0.324
Std. Deviation	0.170	0.179
Minimum/Maximum	0.000/0.563	0.000/0.875
2) Personal Income Index[3]		
Mean	0.328	0.460
Std. Deviation	0.166	0.136
Minimum/Maximum	0.000/0.732	0.167/0.999
3) Inverse Work Intensity Index[4]		
Mean	0.302	0.198
Std. Deviation	0.191	0.135
Minimum/Maximum	0.010/0.601	0.047/0.592

Table 8:
Coefficients Estimates from OLS, Model 1

Well-Being Index	Coefficients	Robust Standard Errors
Constant	0.3264****	0.1096
SEX	-0.1221****	0.0295
EMT	0.0148	0.0166
SS	0.0301**	0.0167
ORG	0.0387**	0.0219
DEP	-0.0139	0.0156
AGE	0.0043	0.0049
AGE^2	-0.0000	0.0000
Number of observation	110	
F(7, 103)	4.31	
R^2	0.2828	

**** Significant at 1 percent level
*** Significant at 5 percent level
** Significant at 10 percent level
* Significant at 20 percent level

Table 9: Coefficients Estimates from OLS, Model 2

Inverse Work Intensity Index	Coefficients	Robust Standard Errors
Constant	0.6284	0.2475
SEX	-0.1515****	0.0427
EMT	0.1416****	0.0352
SS	0.0057	0.0268
ORG	0.0256	0.0491
DEP	-0.0438*	0.0307
AGE	0.0124	0.0124
AGE^2	-0.0001	0.0001
Number of observation	110	
F(7, 102)	4.720	
R^2	0.210	

**** Significant at 1 percent level
*** Significant at 5 percent level
** Significant at 10 percent level
* Significant at 20 percent level

Figure 1: The Individual Well-Being Model under Time and Budget Constraints

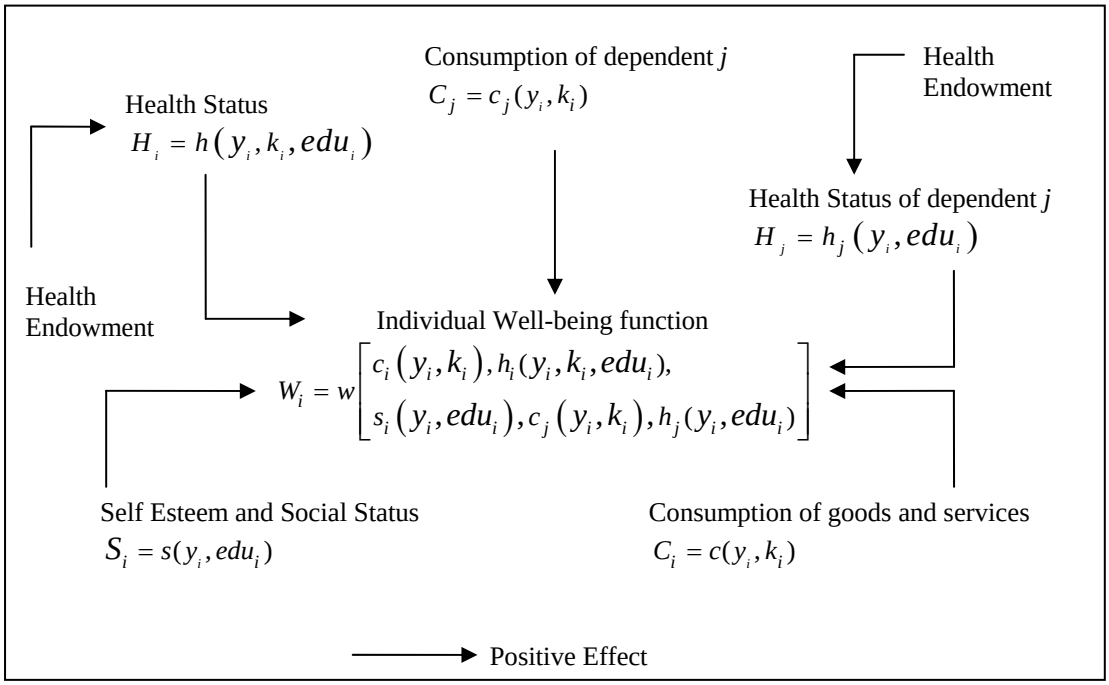


Figure2: Average Time Spending by Category on both Primary and Secondary Activity of All Survey Respondents

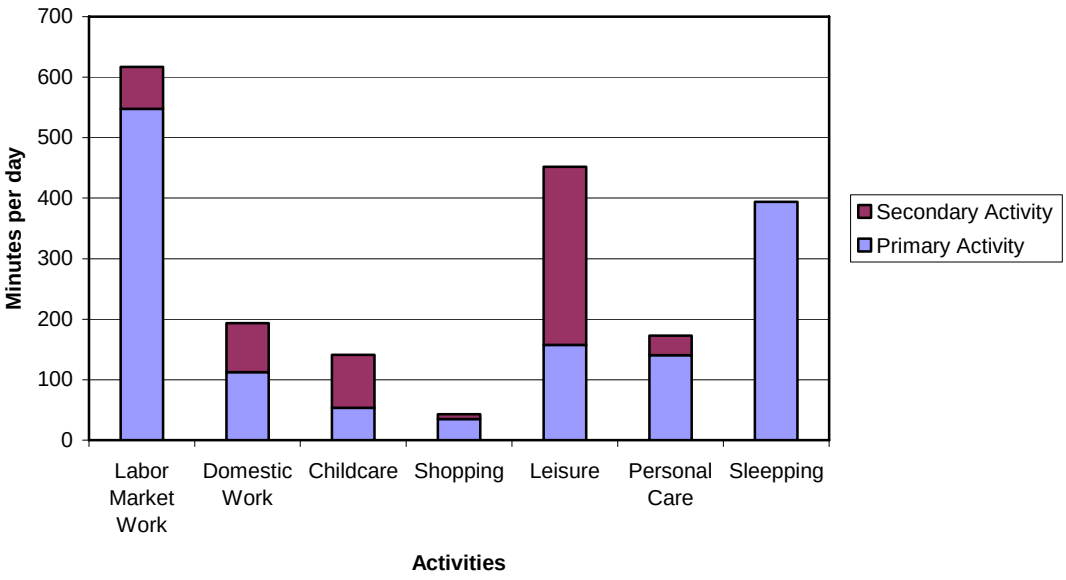
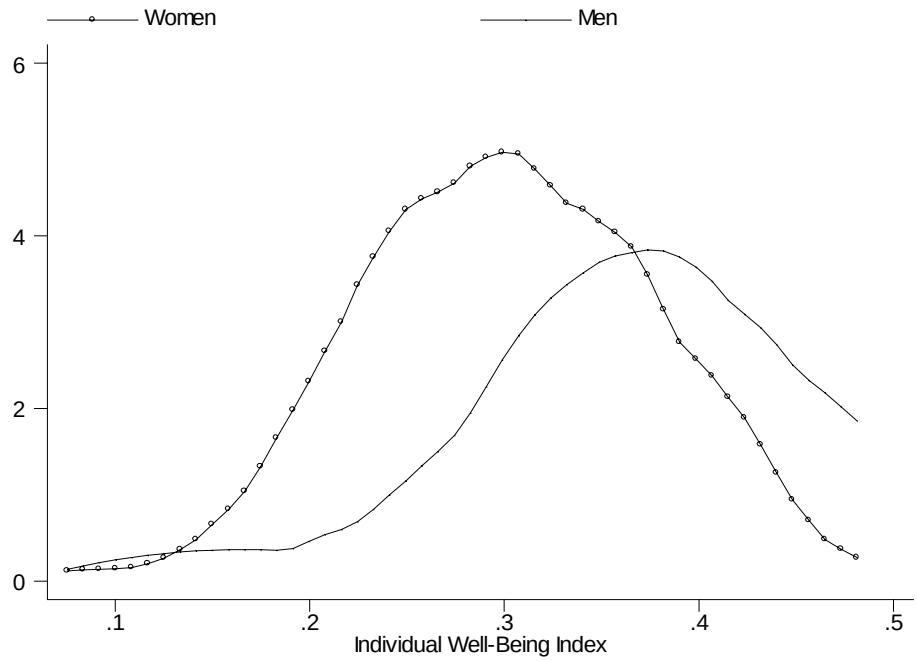


Figure 3: Kernel Density of Individual Well-Being Index, by Sex



Appendix A

Calculation of the Individual Well Being Index

In this section we explain the construction of the composite well-being index based on individual level information such as the level of education, personal income, and inverse incidence of work intensity.

Most of the quality of life indices based on the socio-economic components are strongly cardinal, i.e., they are scale invariant. For example, there is no difference between *two individuals, one earning $5,000 and the other $4,000, and two other individuals, one earning $4,000 and the other $3,000.* An individual with an inverse work intensity index of 9 is also considered strictly better than one with an inverse work intensity index of 7. This is not the case with ordinal measures. The incidence of the work intensity index and the level of educational attainment index are strictly ordinal. Since the composite well-being index combines both cardinal and ordinal indices together, we adopt the "Borda Rule" used in other studies in order to properly rank the well-being of each individual and yield its normative significance (Dasgupta 1999, 2001; UNDP 2002). (See Appendix B). For our purposes, we first assume the cardinality assumption for well-being index calculation. Then, the cardinality assumption will be relaxed and the ordinal aggregate approach will be used so that a more accurate well-being ranking system is obtained.

First, we calculate each of the well-being component indices. These include personal income index (*y*), the inverse work intensity index (*k*), and the level of educational attainment index (*edu*). The methodology used in this case is derived from the construction of the Human Development Index. Let the quality of life of an individual be assessed on the basis of *M* attributes (indexed by *i*), and there are *N* individuals in the economy (indexed by *j*). Let X_{ij} be the index of attribute *i* for person *j*. The index of attribute *i* for individual *j*, I_{ij} is then calculated as

$$I_{ij} = \frac{\left(X_{ij} - \min_j \left\{X_{ij}\right\}\right)}{\left(\max_j \left\{X_{ij}\right\} - \min_j \left\{X_{ij}\right\}\right)} \tag{20}$$

In the case of education, the level educational attainment component index for individual *j*, edu_j, is calculated as,

$$edu_j = \frac{\left(X_{edu,j} - \min_j \left\{X_{edu,j}\right\}\right)}{\left(\max_j \left\{X_{edu,j}\right\} - \min_j \left\{X_{edu,j}\right\}\right)} \tag{21}$$

where edu_j = The level of education attainment component index for individual *j*;

$X_{edu,j}$ = The current level of educational attainment of individual *j*;

$\min_j \{X_{edu,j}\}$ = The minimum values for the level of educational attainment for a given individual, indexed *j*, within the entire sample; and

$\max_j \{X_{edu,j}\}$ = The maximum values for the level of education attainment for a given individual, indexed *j*, within the entire sample.

The education component index ranges from zero to one, with the higher index value indicating a higher level of educational attainment. An individual's well-being also increases as the value of educational attainment attribute index increases towards one.

The personal income component index of individual *j* is calculated as income increases, its value is adjusted downwards. We also assumed that the past month's personal income reflects the normalized income earnings of the individual, taking implicitly into account the variations in earnings over a specified period of time. Hence, the calculation of the personal income component index is.

$$y_j = \frac{\left(\log\{X_{y,j}\} - \log\{\min_j \{X_{y,j}\}\}\right)}{\left(\log\{\max_j \{X_{y,j}\}\} - \log\{\min_j \{X_{y,j}\}\}\right)} \qquad (22)$$

where $\log\{X_{y,j}\}$ = The discounted current personal income of individual *j*;

$\log\{\min_j \{X_{y,j}\}\}$ = The minimum discounted values for the level of personal income for a given individual, indexed *j*, within the entire sample; and

$\log\{\max_j \{X_{y,j}\}\}$ = The maximum discounted value for the level of personal income for a given individual, indexed *j*, within the entire sample.

Values of the personal income component index also range from zero to one. The higher the value, the higher is the level of individual well-being.

Finally, we calculate the inverse incidence of work intensity index, in which a lower work intensity means a higher inverse incidence. This requires several steps. First, we classify the different overlapping work activities based on the classification developed by Floro and Hungerford (2001). Second, this component index need to take into consideration both the time spent on overlapped activities and the length of the working day.

Floro and Hungerford (2001) divided overlapping activities into four categories. These were pleasant work, unpleasant work, pleasant non-work, and unpleasant non-work. Work and non-work activities are classified based on whether or not that specific activity can be hired somebody to do it as an option of doing yourself. For instance, paid market work is counted as a work activity since one can pay someone to do it. Another example is childcare since if we do not want to do it, we can hire somebody to do it. On the other hand, non-work activity is the activity that no one can take your place – one needs to do that activity by oneself. For example, watching television (leisure activity) is categorized as non-work since it is an activity that we cannot hire someone to do it for us. The most common combinations, resulting from this classification process of overlapping activities are presented in table below.

Classification of Overlapping Activities

	Primary Activity	**Secondary Activity**
A	Unpleasant work	Unpleasant work
B	Unpleasant work	Pleasant work
C	Pleasant non-work	Unpleasant work
D	Pleasant work	Unpleasant work
E	Unpleasant work	Pleasant non-work
F	Pleasant work	Pleasant non-work
G	Pleasant non-work	Pleasant non-work

Source: Floro and Hungerford (2001)

The overlapping combinations presented above refer to all forms of *time use* intensity, not all of which equate to *work intensity*. For purposes of this study, only the combinations involving unpleasant work are utilized in measuring work intensity. These include categories A (two unpleasant forms of work combined), B (unpleasant work combined with pleasant work), C (pleasant non-work combined with unpleasant work), and D (pleasant work combined with unpleasant work). While this classification is based on the work by Floro and Hungerford (2001) using Australian time use data, there are also subjective considerations in our classification process. In our analysis, unpleasant work time include time spent on all activities associated with labor market works, e.g., work at main job, travel and communication time and time associated with cleaning and maintaining work tools and work space. Both active and passive childcare activities such as physical care of children and

playing with children are arbitrarily classified for purposes of this study as pleasant works, although this may not be the case for certain individuals. Other domestic work activities such as washing dishes, laundry and ironing, and house cleaning are classified as unpleasant work.

We next measure the time spent engaged in overlapped work (secondary) activities. Juster and Stafford (1991, 482) suggest that "the primary and secondary activities may be performed one at a time or sequentially rather than in parallel." They argue that what we observe as overlapped or secondary activities are actually just sequential switches between the various tasks. Floro and Hungerford (2001, 12) also argue that "overlapping of activities may just be frequent switches between activities and if the time grid were fine enough, the issue of secondary activities would then effectively disappear." [32] For this study, we adopt the assumption of parallel activities and measure the total time spent engaged in overlapping activities by the total number of minutes of the two activities together.

To develop the inverse work intensity index, the amount of time spent on the overlapped activity (additional hours) is used. For example, one hour is added to category B classification when respondents spend an hour working on paid market work combined with household chores. Then, time spent on overlapping activities from all different categories of work intensity was added to get the total amount of time spent on the overlapping activities that classified as work intensity, given an equal weight. For example, let n_i is the number of minutes spent in overlapping activities category *i*, where *i* is the overlapping categories A, B, C, or D. In other words, the overlapped work activity index measures the time spent by individual *i* in doing any one of the following –A) unpleasant primary (paid or unpaid) work activities combined with unpleasant (paid or unpaid) work activities; B) unpleasant primary (paid or unpaid) work activities combined with pleasant (paid or unpaid) work activities; and C) pleasant primary non-work activities combined with unpleasant (paid or unpaid) work activities; and D) pleasant primary (paid or unpaid) work combined with unpleasant (paid or unpaid) work activities Then the total time spent of overlapping work activities is $\sum n_i$.

We also take into account the length of the working day in calculating the incidence of work intensity. The notion of the average working day has both social and

[32] However, according to some psychologists like Ruthruff, Pashler and Klaassen (2001) and Meyer and Kieras (1997), these tasks actually could be performed in a parallel fashion. This, however, might create bottlenecks, which decrease the individual's overall ability or the attention paid to overlapping or secondary activities.[32] In their view, the time spent on the overlapped activity happens simultaneously with the primary activity, and it is counted as an extra hour (time) for the individual. Based on the sequential argument, there is no extra hour gained from performing overlapped activity.

biological attributes, and is measured here in relative terms. The length of the paid market working day in this study is bounded ultimately by the total number of hours in the day that the individual spends on paid market work. Some studies suggest that human physical, emotional, and intellectual capacities do not allow an endless extension of work effort in a given day (Green 2002). The biological and physiological needs of the body require some minimum renewal time such as sleep and personal care. Hence, the incidence of work intensity rises when the length of the working day exceeds a reasonable time, limited by those human capacities.

To be consistent with other component indices, the work intensity component index is computed as an inverse so that the value of the index gives the same result patterns as other component indices. The higher the inverse work intensity index value, the higher the level of individual well being will be.[33] In other words, a high value in the index indicates reduced or minimal intensification of the work day and corresponds to a higher level of individual well-being. The logarithm form is utilized in our calculation of the inverse work intensity index in order to capture the fact that the incidence of work intensity increases at an increasing rate when individuals perform extended periods of overlapped work activities and/or lengthen their work day. The inverse work intensity component index is developed by taking an inverse of a simple average of the length of the paid market working day sub-component and the work-overlapped activity sub-component, with each given equal weight. Mathematically, the inverse incidence of work intensity index for individual *j* can be calculated as shown in Equation **Error! Reference source not found.**.

$$k_j = 1 - \frac{1}{2}\left\{ \frac{\left(\log\left\{X_{wd,j}\right\} - \log\left\{\min_j\left\{X_{wd,j}\right\}\right\}\right)}{\left(\log\left\{\max_j\left\{X_{wd,j}\right\}\right\} - \log\left\{\min_j\left\{X_{wd,j}\right\}\right\}\right)} + \frac{\left(\log\left\{X_{ov,j}\right\} - \log\left\{\min_j\left\{X_{ov,j}\right\}\right\}\right)}{\left(\log\left\{\max_j\left\{X_{ov,j}\right\}\right\} - \log\left\{\min_j\left\{X_{ov,j}\right\}\right\}\right)} \right\} \quad (23)$$

where $X_{wd,j}$ = The length of paid market working day (in minutes) of individual *j*;

$X_{ov,j}$ = The length of the overlapped (paid or unpaid) work activity (in minutes) of individual *j*;

$\min_j\left\{X_{wd,j}\right\}$ = The minimum values for the length of paid market working day for a given individual, indexed *j*, within the entire sample;

[33] The personal income component index and the level of education attainment index are represented in the way that a higher the value of the index, a better off the individual well-being is.

$\min_j \{X_{ov,j}\}$ = The minimum values for the overlapped (paid or unpaid) work activity performed, for a given individual, indexed *j*, within the entire sample;

$\max_j \{X_{wd,j}\}$ = The maximum values for the length of paid market working day for a given individual, indexed *j*, within the entire sample; and

$\max_j \{X_{ov,j}\}$ = The maximum values for the overlapped (paid or unpaid) work activity performed, for a given individual, indexed *j*, within the entire sample.

The inverse incidence of work intensity component index ranges from zero to one. When the value of the index moves toward zero, this indicates a high level of work intensity. A low level of work intensity is implied by an index value close to one. Hence, a high value in the work intensity component index indicates corresponds to a high level of individual well-being.

The computation process of the well-being composite index for individual *j*, WBI_j, is presented below:.

$$WBI_j = \frac{\sum_i \left[I_{ij} \right]}{m}, \quad where \ 0 \le WBI_j \le 1$$

where WBI_j = The well-being index for individual *j*;

I_{ij} = The component/attribute indices of the individual well-being index; and

m = The number of components/attributes of individual well-being.

The value of the individual well-being index also has a range of zero to one. The higher the well-being index value, the better individual *j* is in terms of the *m* attributes of well-being. Substituting the valused from the previous equations into the above equation, we derive the following individual well-being index (WBI)

$$WBI_j = \frac{1}{3}\left[\begin{array}{l} \dfrac{\left(\log\left\{X_{y,j}\right\} - \log\left\{\min_j\left\{X_{y,j}\right\}\right\}\right)}{\left(\log\left\{\max_j\left\{X_{y,j}\right\}\right\} - \log\left\{\min_j\left\{X_{y,j}\right\}\right\}\right)} \\ +1-\dfrac{1}{2}\left\{ \begin{array}{l} \dfrac{\left(\log\left\{X_{wd,j}\right\} - \log\left\{\min_j\left\{X_{wd,j}\right\}\right\}\right)}{\left(\log\left\{\max_j\left\{X_{wd,j}\right\}\right\} - \log\left\{\min_j\left\{X_{wd,j}\right\}\right\}\right)} \\ +\dfrac{\left(\log\left\{X_{ov,j}\right\} - \log\left\{\min_j\left\{X_{ov,j}\right\}\right\}\right)}{\left(\log\left\{\max_j\left\{X_{ov,j}\right\}\right\} - \log\left\{\min_j\left\{X_{ov,j}\right\}\right\}\right)} \end{array} \right\} \\ +\dfrac{\left(X_{edu,j} - \min_j\left\{X_{edu,j}\right\}\right)}{\left(\max_j\left\{X_{edu,j}\right\} - \min_j\left\{X_{edu,j}\right\}\right)} \end{array} \right] \qquad (24)$$

The maximum and minimum values for each well-being component required in our well-being index computation method are calculated based on the 2002 Bangkok urban poor home-based workers survey. All of the minimum and maximum values associated with well-being attributes . The poorest individuals from our survey earn only 1,000 baht, while the richest individuals make 60,000 baht per month. These numbers are used as the lowest and highest values in order to calculate the personal income attribute index. Similarly, for educational attainment, 0 implies an uneducated individual, while 16 refers to a college graduate. The length of the work day ranges from 1 minute to 920 minutes, while time spent in work related overlapped activities ranges from 1 to 620 minutes per day.

APPENDIX B:

COMPARISON AND (BORDA) RANKING OF INDIVIDUAL WELL-BEING.

The well-being index, *WBI* is based on three measurable determinants of well-being, and on the cardinality assumption. However, this kind of index (methodology in aggregation) lacks normative significance (Dasgupta 1993, 2001, UNDP 2002). One method of aggregation that yields normative significance is the so-called Borda rule (Dasgupta 1993, 1999 and UNDP 2002). The Borda rule provides "a method of rank-order scoring, the procedure being to award each alternative a point equal to its rank in each criterion of ranking, adding each alternative's scores to obtain its aggregate score, and then ranking alternatives on the basis of their aggregate score." [34] Hence, it invariably yields a complete ordering of alternatives, or a well-being index in our case.[35] By utilizing the Borda rule for our sample, we are able to find comparative ranking of each individual's welfare.

Generally, a higher individual well-being index score corresponds to a lower Borda well-being score. However, due to the complete ordering of alternatives, the respondent with the highest well-being index value will not necessarily yield the lowest Borda well-being aggregate score, or the highest well-being rank.. The Borda score/ranking is given to each component of *WBI* for each individual *i*, and then, the aggregated well-being score is obtained by adding all the scores. Then, the individual WBI is calculated by ranking all of the well-being scores. The lower the well-being score, the higher the well-being rank will be. The higher well-being rank refers to higher well-being for each individual.

[34] For example, suppose that a respondent earns the ranks of a, b, and c for his/her *WBI* component indices. In this case, his/her Borda well-being score is obtained by simply adding together all the component indices ranking.

[35] Dasgupta (1993) viewed it as a "social welfare function."

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