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ARE PERCEPTIONS REALITY?

A LOOK AT SUBJECTIVE WELL-BEING IN EAST TIMOR

By

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Bachelor of Science, University of Wisconsin – Eau Claire, Eau Claire, WI, 2010

Thesis

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Are Perceptions Reality? A Look at Subjective Well-Being in East Timor

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**Abstract:** Subjective well-being has been of growing interest over the past several years for multiple reasons. One reason is that this model gives an idea of the importance of the determinants (education, employment, etc.) of individual life satisfaction. But the question arises, does the relative importance of each explanatory variable in the subjective well-being model match the relative importance of individual's perceptions of the most important factors to increase overall life satisfaction? For example, if the model suggests that employment status is the most important factor for improving subjective well-being do people perceive this to be true as well? This study attempts to answer this question using data from the 2001 Timor-Leste Living Standards Measurement Survey (TLSS). The survey asked respondents what is most important for improving life satisfaction with eleven variables to choose from. This is the measure of perceptions of life satisfaction and it is ranked in order of importance. The subjective well-being models are estimated using OLS and ordered logit models. Explanatory variables are categorized similarly to the perceptions measure. These coefficients are standardized and ranked according to importance. This is the empirical measure. Kendall's Coefficient of Concordance is calculated to statistically show the degree of association between the perceptive measures and empirical measures. Main results show that there is a statistically significant difference between the relative importance of the empirical measures of subjective well-being and perceptions of subjective well-being.

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## 1. Introduction

Research in the field of subjective well-being, an individual's evaluation of his or her own life satisfaction, has been an important topic over the past several years for a variety of reasons. It challenges the common usage of income as a proxy for measuring overall utility. Subjective well-being also captures concepts, such as the importance of social interaction, that are not always explained by traditional monetary indicators. Lastly, subjective well-being creates a model that is meant to identify the most important aspects of individual life satisfaction which can help determine the most effective public policy. But what if these empirical determinants of life satisfaction estimated from the model do not match the individuals' perceptions of what they believe is the most important for improving their overall well-being? What if the model identifies income as the most important aspect for improving individual's standard of living but people perceive that their health care is the most important to them? This may lead to ignoring necessary improvements in health care but emphasizing the benefits of increased income. While this paper does not attempt to explain the many possible consequences of such actions, it does raise the question of whether or not the explanatory variables in the subjective well-being model affect subjective well-being as much (or as little) as we perceive that they do.

Economic studies in the field of subjective well-being typically examine the role of one determinant of subjective well-being on overall life satisfaction. For example, how does an individual's health affect their overall well-being? Are age and gender an influence in life satisfaction? Can money truly buy happiness? While the literature does discuss which determinants tend to be the greatest sources of increased subjective well-being, it does not address whether or not these line up with our perceptions. In fact, perceptions in the literature are, for the most part, limited to determining whether it is best to use an objective measure or a subjective measure for a specific variable when creating the model. For example, subjective

measures of health tend to be more accurate in predicting subjective well-being than empirical measures because of people's abilities to adapt to situations. Relative income is another topic where perceptions play an important role. When determining relative income many economists use age, education, geography, and ethnicity as the reference group – who people compare themselves to. However, studies find that using people's perceptions of relative income play a significantly larger role in subjective well-being than their empirical measures of relative income. After determining that perceptible measures matter for certain individual explanatory variables, it is the next natural step to look at perceptions in regard to the entire model.

The data used in this study is from the Timor-Leste Living Standards Measurement Survey (TLSS). The TLSS is a household survey taken between August and November of 2001. It is one of the three collections of datasets taken during this time for the purpose of understanding living conditions in East Timor in order to “promote rapid, equitable and sustainable growth and to reduce poverty” (World Bank, 2005, p. 1). The TLSS consists of thirteen sections consisting of topics such as: education, health, expenditures, farming and livestock, and so on. The final section in the survey is on subjective well-being in which multiple questions are used for this study.

The dependent variable for the model comes from the question “Are you satisfied with your life in general at the present time?” Answers are given on a five point scale from very dissatisfied to very satisfied. This will be used as the measure of subjective well-being for the model. In addition, the survey also includes the questions: “What is most important for improving your living standards?” and “What is most important for improving living standards in East Timor?” with possible answers selected from education, employment, health care, housing, access to land, demand for products, infrastructure, safety, political participation, and status in community. This is the measure for people's perceptions of what improves subjective well-

being. In creating the model, the independent variables have been chosen by replicating the previous literature and then categorized according to which response from the survey the variable best represents. Therefore, instead of having one or two variables of interest, there are eight categories of interest: employment, health care, education, housing, demand for products, infrastructure, status in community, and political participation.

Multiple regressions are estimated for this paper. The first regressions include full subjective well-being models, using both ordinary least squares (OLS) and ordered logit models. The purpose of these first regressions is to determine the best variables to represent each category. The next model uses only the necessary control variables in addition to the one variable representing each category. These coefficients are then standardized in order to compare the strength of each variable on overall life satisfaction. In addition, the answers from the survey about perceptions on what is best for improving living standards will be ranked in order of importance. Therefore the rankings between the perceptive measures (from the survey) and the empirical measures (from the restricted subjective well-being model) can be compared to determine differences and similarities.

The final step is to calculate Kendall's Coefficient of Concordance between the empirical results and perceptions. This is a measure of the degree of association among sets of ratings. Results suggest that perceptions and empirical measures for subjective well-being are statistically different.



## 2. Literature Review

The field of economics typically examines monetary measures when determining the economic well-being of a country. Measures of Gross Domestic Product (GDP) and GDP per capita dominate the concept of success in many countries. However, while GDP captures the value of all final goods and services, it does not consider the added cost of pollution, the overall wealth distribution, health, or general feelings of accomplishment. Therefore it is not always considered the best measure of overall well-being. Often other measures such as life expectancy, income distribution, and so on are considered. In recent years, the notion that GDP doesn't fully capture a society's overall well-being has led to a growing interest in a happiness indicator. This leads to the concept of subjective well-being as a measure of overall well-being as it includes other aspects of concern such as social relations, autonomy, and self-determination (Stutzer & Frey, 2010). These aggregate happiness measurements are gaining acceptance especially when used as a means to complement measures of national wealth.

The study of subjective well-being has many useful implications but specifically when determining public policy (Easterlin, 1995; Diener & Seligman, 2004; Kingdom & Knight, 2007; Stutzer & Frey, 2010). Using data from South Africa, Bookwalter and Dalenberg (2004) concluded most of the important determinants of subjective well-being in South Africa have a public goods component. For example, they found that for the poor, transportation and housing are the necessary means for improving subjective well-being; for the wealthy it is sanitation, water, energy, education and health that are most beneficial. Therefore by tracking changes in the determinants of subjective well-being, specifically the ones with the public goods component, the government may have a better understanding of the importance of certain policies for their specific population for improving life satisfaction.

Public policy does not have similar effects on all determinants of well-being. There are a variety of channels that are affected by policy changes. For example it may affect productivity differently than it affects income. While the effects may be positive through some channels, it is possible to be negative through others. Because of this, the study of subjective well-being allows the possibility of determining net effects of policy (Helliwell, 2003).

The study of subjective well-being is necessary as it brings new ideas to other well-known economic debates. For example, the tradeoff between unemployment and inflation is a common concept in the field of economics. Both are found to be significantly negative in the subjective well-being model (Graham & Pettinato, 2001). Di Tella, MacCullough, and Oswald (2001, p. 340) modeled unemployment and inflation in a model for subjective well-being for twelve European countries and the United States and concluded that people would be willing to make a tradeoff of one percentage point of decreased unemployment for a 1.7 percentage point increase in inflation.

Another example of a common debate is between public choice theories and theories of optimal regulation. For example, many public choice theories predict that government activity is influenced largely by special interest groups. This raises a concern as the theory assumes governments tend to ignore the best distribution of private and public resources. With the model for subjective well-being, these theories can be directly challenged by looking at optimal public policies in the model compared with actual results of policy (Stutzer & Frey, 2010).

But what led to the study of subjective well-being? Originally, the study of subjective well-being was left to psychologists. However, it took years of studying negative emotions before the interest in subjective well-being began. For every one article published about positive states, 17 were published about negative states (Diener, Suh, Lucas & Smith, 1999). Over time, researchers determined that positive affect, defined as moods and emotions, is just as

important to study as negative affect leading researchers to study the entire range of well-being. Although it was as early as 1974 that Easterlin reported his findings on the paradox of income on well-being (Easterlin, 1974), it wasn't until the 1990s that the growing interest in empirical studies of well-being began to gain popularity.

Standard economic theory suggests that individual utility is based on observed choices and these observed choices and observed behaviors provide all of the information needed to explain individuals' preferences. This idea is known as the Theory of Revealed Preferences. With this, subjective approaches to measure utility have been disregarded as unscientific because unlike revealed preferences, there is no way to objectively measure preferences (Frey and Stutzer, 2002). Over the years social scientists have begun to challenge these theories.

The greatest challenge to empirical measures of utility is that the assumptions for the Revealed Preference Theory do not always seem to hold. For example, this theory assumes that consumers act rationally. It does not account for the actions of habits or addictions. Frey, Benesch, and Stutzer (2007) directly challenged the theory of revealed preferences by examining television watching. TV viewing may be an unhealthy habit if it interferes with daily life (smoking or gambling are other examples of self-control problems). In Standard Revealed Preference Theory, TV viewing is one of the biggest leisure time activities. It is voluntary so Revealed Preference Theory tells us that TV viewing has a strong positive influence on subjective well-being. However, the model contradicts this as a significantly negative effect on life satisfaction is found from the amount of time spent watching TV. This is just one example of why subjective well-being captures some effects that observed utility (in this case, revealed preferences) may misinterpret. Frey and Stutzer (2002, p. 405) explain "exclusive reliance on an objectivist approach by standard economic theory is thus open to doubt, both theoretically and

empirically. In any case, it restricts the possibility of understanding and influencing human well-being.”

With the collaboration of psychological factors and traditional economics measures, subjective well-being has emerged as a possible proxy for utility. This combination is important as Jorgensen, Jamieson, and Martin (2010, p. 622) write, “Much can be learned from the cooperation between economics and psychology.” But with the challenge to use subjective measurements rather than empirical measurements arises the challenge of determining the best model. Over the years a common model has been developed. The first step is to decide if the subjective well-being model should be measured with the bottom-up, top-down, or an alternative approach.

The bottom-up approach to subjective well-being claims that overall happiness is a combination of pleasurable and unpleasurable experiences derived from a number of domains. It is built on the assumption that there are basic human needs for life. Domains may be income, education, health and a number of other factors (Diener, 1984). The easiest way to describe this is that an individual is happy because they experience happy moments. While the bottom-up approach is the most commonly applied model, it has been challenged by a top-down approach (Moller & Saris, 2001). The top-down approach claims that there is a global dimension of personality that determines subjective well-being. People are predisposed to happiness through personality and genetic traits (Diener, 1984). To clarify the difference further, the bottom-up approach implies that it is our experiences that affect subjective well-being but top-down suggests our personality affects the way we react to events and therefore controls overall happiness. Some models use elements from both ideas when modeling for subjective well-being (e.g. Brief, Butcher, George, & Link, 1993).

Another type of model uses a different approach called the Homeostatic Theory. In Homeostatic Theory, subjective well-being is considered to be positive affect (people are normally considered to feel happy) and it is considered to be held between a specific range determined by personality. This range, or threshold level, is controlled by the homeostatic process, but as this value is approached the system must work harder to maintain control. If the threshold value is exceeded, homeostasis loses control of subjective well-being and negative affect takes control (Cummins, 2000; Cummins, 2010).

There are two types of buffers in Homeostasis Theory (external and internal) meant to lessen the impact of environmental experiences. Although there are many external buffers, the two main ones are wealth and relationships. The impact of wealth on happiness is a highly studied and intriguing topic. Under Homeostatic Theory, wealth cannot make someone happier because subjective well-being is assumed to be under genetic control; the average level of subjective well-being cannot be sustained at a level higher than its range. According to Cummins (2010, p. 6) “people adapt readily to luxurious living standards, so genetics trumps wealth after a certain level of income has been achieved.” Wealth can, however, serve as a protection device by minimizing negative circumstances from occurring. The other important external buffer, relationships, or more specifically, relationships involving intimacies with another adult, act as a buffer by reducing stressful situations. In this sense, external buffers are meant to “comprise resources, such as personal assistance, to ameliorate the impact of potentially negative events” (Cummins, 2000 p. 133).

Internal buffers in Homeostatic Theory “comprise beliefs in perceived control, self-esteem, and optimism” to lessen the effect of a negative situation (Cummins, 2000 p. 133). These buffers work by many different means. For one, adaptation and habituation occur naturally as a way to make people less aware of past difficult experiences. The use of cognition

works in many different ways as well. For example, in response to a negative event, one can find positive meaning in the event, regard it as useful, or simply fail to take responsibility (Cummins, 2010).

While Homeostatic Theory is interesting, most models are focused on a top-down or bottom-up approach. Determining the best model between these two have been a subject of debate. Studies to test which is best have been inconclusive. Moller and Saris (2001) conducted a study to try to answer which approach is best. Findings show that top-down and bottom-up varies by living conditions and there exists differences between countries and groups within countries. One important conclusion is that countries with a lower GDP should use bottom-up models to determine income satisfaction but in countries with higher GDP this effect might be reversed or even non-existent. Diener (1984) makes the argument that satisfaction is more determined by personality characteristics, top-down, than situational circumstances, bottom-up. He claims both may be partially true but the true challenge is to determine how the two models interact. Brief, Butcher, George, and Link (1993, p. 650) use both approaches in their model and conclude that the “two seemingly opposing psychological theories of subjective well-being can be meaningfully integrated.” Although there are arguments to both sides, the issue remains unresolved.

In addition to determining the best model, it is important to distinguish the difference between types of subjective well-being. Life satisfaction and emotional well-being are two commonly interrelated concepts that are actually very different. Life satisfaction is how one feels about their life as a whole. Emotional well-being relates to every day experiences. According to Kahneman and Deaton (2010, p. 1) emotional well-being is “the frequency and intensity of experiences of joy, stress, sadness, anger, and affection that makes one’s life

pleasant or unpleasant.” Subjective well-being is most commonly associated with life satisfaction and that follows in this paper as well.

But the question remains, what makes an individual happy? A common belief is an increase in income will increase overall happiness. This has led to income being one of the most studied domains in the economics literature for subjective well-being. The topic grew in interest with Easterlin’s (1974) conclusion that at any point in time, income has a positive effect on happiness yet as economic growth increased over time, happiness remained constant. This challenges the Absolute Income Hypothesis (the idea that the level of utility varies positively with the level of income up to a threshold). One explanation is that people adapt to rising income with rising expectations. Another explanation is the Relative Income Hypothesis which suggests how individuals feel about their well-being depends on their distance from their actual income to a reference value (Easterlin, 1995). This hypothesis claims that relative income, not absolute income, is what determines utility.

The idea of relative income is not new by any means. Marx (1847) writes “A house may be large or small; as long as the surrounding houses are equally small it satisfies all social demands for a dwelling. But if a palace rises beside the little house, the little house shrinks into a hut.” In 1995, over twenty years after his famous 1974 conclusion, Easterlin (1995, p. 44) empirically shows this to be true and concludes that “raising the incomes of all does not increase the happiness of all.” This led other economists to determine how relative and absolute income interact. Although some have found that individual and relative income is equally important (Ferrer-i-Carbonell, 2005), most find otherwise. Caporale, Georgellis, Tsitsianis, and Yin (2009) suggest that absolute income does increase life satisfaction but it is weakened when controlling for relative income or other factors such as employment and education. McBride (2001) found that as own income increases, the relative effects become stronger and can even

overtake the effect of own income on subjective well-being. Another study reinforces these findings concluding that absolute income mattered to the poorest third and relative income to the richest third. Relative income is found to be more important to happiness at higher levels of absolute income (Kingdon & Knight, 2007). This suggests that after a certain threshold, relative income becomes more important to well-being than absolute income.

The relationship between relative income and subjective well-being typically is negative (McBride, 2001; Ferrer-i-Carbonell, 2005; Caporale, Georgellis, Tsitsianis, & Yin 2009). Belonging to a higher reference group negatively impacts an individual by feelings of comparison. However, recent studies are finding that poorer countries may experience a positive relationship between subjective well-being and relative income (Kingdom & Knight, 2007; Bookwalter & Dalenberg, 2009; Posel & Casale, 2010). This positive effect has come to be known as the Tunnel Effect Hypothesis which implies that reference income is used as a source of information for forming future expectations rather than for the traditional sense of comparison.

One of the most interesting examples of the effects of reference income uses data from the European Social Survey in the years 2002 and 2004 – a time of transition for Eastern European economies. Nineteen European countries are included in the study for a sample of 30,285 individuals. The variable for relative income is defined in this model as all individuals who are in the age range of five years younger and five years older than the specific individual. General results for Europe show the traditional negative effect between relative income subjective well-being. However, when limiting the sample to only Eastern European countries, the coefficient for relative income becomes positive. This brings more confidence to the hypothesis that transition economies use relative income as a form of future expectations rather than comparisons (Caporale, Georgellis, Tsitsianis, & Yin 2009).



One common question in the research of relative income is which reference group is most appropriate – who do people compare themselves to? One broad answer is that the reference group is defined as “people like me” (Clark, Frijters, & Shields, 2008 p. 14). Age cohorts (McBride, 2001; Caporale, 2009) geographic (Luttmer, 2005; Kingdon & Knight, 2007) or a combination of education, age, and region (Ferrer-i-Carbonell, 2005) are traditional groups examined. Some studies look at achievement relative to one’s parents and find that to be a meaningful reference group (Bookwalter & Dalenberg, 2009). Jorgensen, Jamieson, and Martin (2010) studied residents in Australia using the average household income for each of the seventeen planning districts in their sample. Results did not show a significant positive or negative relationship for reference group income on subjective well-being. They make the argument that it is not very likely that individuals know their actual ranking of relative income compared with the given reference group. Instead the respondents have perceptions of their rank in regard to income instead rather than being aware of their actual empirical measure.

This idea has been carried out in other studies. Posel and Casale (2010) studied data from South Africa. They agree that empirical measures of relative income make the unlikely assumption that individuals are able to correctly rank themselves in the income distribution. To show this, they examine a question asking individuals to rank where they belong economically on a six-rung ladder where one is the poorest and six is the richest. Comparisons are made between the actual measures of relative standing in regard to income with individuals’ perceptions of where they rank themselves. Distinct differences between the two are found – in general, people typically underestimate their financial situation. When broken down by race, the difference between empirical and perceptive income is more substantial among Africans than Whites. This is most likely because Whites in Africa tend to have higher levels of education and are more likely to be proficient in the dominant language (English). This provides them with

more access to information most likely making their perceptions closer to reality. At the end of the study, Posel and Casale find that perceived relative measure of economic standing not only has a significantly positive effect on life satisfaction, but it has a greater effect on subjective well-being than actual relative income.

Graham and Pettinato (2001) performed a similar study where they studied data from seventeen countries in Latin America that asked individuals to rank their income on a ladder from one to ten. When comparing perceptions of income to actual income they found similar results to Posel and Casale. At the low end of the income distribution, those who perceived themselves on the lowest rung of the ladder had an actual mean wealth greater than those who placed themselves on the second. In addition to this, at the higher end of the income distribution, those who perceived themselves to be on the top two rungs of the ladder had an actual mean income level lower than the average income levels of those who thought themselves to be at rungs six to eight. Again, this study finds a significantly positive relationship between life satisfaction and the perceptions of relative income. This shows perceived relative standing does not always match with empirical measures and reinforces the idea that perceptions do matter in overall well-being.

Income is not the only factor in subjective well-being and is not the only determinant that may be affected by perceptions. In fact it is not always the most important determinant either. Using the Homeostatic model, Cummins (2000) finds absolute income is important for the less financially stable in that it buys the basic needs for life. After a threshold, relative income becomes more important as comparisons start taking place. Using both top-down and bottom-up approaches, Moller and Saris (2001) concludes that if financial security is uncertain, then that is the individuals' main domain of concern that determines subjective well-being. However, once they reach financial security, other domains become important.

But what goes into determining subjective well-being has been a topic of debate for many years. In 1967 Wilson (p. 294) claimed that “the happy person emerges as a young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, high job morale, modest aspirations, of either sex and of a wide range of intelligence.” Over forty years have passed and most of these traits are still examined in the model for happiness.

Good health is one characteristic assumed to increase overall happiness. This is obvious to most people as poor health causes restrictions to daily life, interference with goals, and general negative feelings of pain or sadness. This is confirmed in results by several studies (Kingdom & Knight, 2007; Posel & Casale, 2010). Some results suggest that health has a stronger impact than income on subjective well-being (Fuentes & Rojas, 2001). Helliwell (2003, p. 340) goes further to discover that health is the most significant explanatory variables with a strong positive correlation. His results show that on a ten-point well-being scale, the difference of being in very good health compared with very poor health is 2.46 points, an important increase. Another study finds that a marginal improvement of health is comparable to an increase in income from the lowest to the middle income bracket which raised life satisfaction by 0.71 points (Caporale, Georgellis, Tsitsianis, & Yin, 2009). However, health may be subject to adaptation. In Diener, Suh, Lucas, and Smith’s (1999) summary of health on subjective well-being, they conclude that when health is compromised or an individual has chronic problems then it may negatively influence subjective well-being. However, if the problem is not as severe then adaptation may reverse the negative results of poor health.

Wilson’s theory that the better educated are happier has mixed results. One would assume that more education would generally lead to higher levels of subjective well-being. However, many studies have found a smaller than expected coefficient with education. Helliwell

(2003) suggests that education should be critical to happiness because it is the strongest determinant of participation in social activities yet he finds that education has a small and insignificant effect. He concludes that those who stay in full-time education until a later age are not necessarily more satisfied with their lives. Many other studies have found a similar small and weakly significant effect of education on life satisfaction (Posel and Casale, 2010; Caporale, Georgellis, Tsitsianis, & Yin, 2009; Jorgensen, Jamieson, & Martin, 2010). In Ferrer-i-Carbonell's (2005) study, education was an important factor in determining subjective well-being in East Germany only, not West Germany. Some models show that education is not even significant (Wills-Herrera, Orozco, Forero, Pardo, & Andonova, 2010). Economists generally conclude that the effect of higher education is captured through better health, employment status, and income (e.g. Helliwell, 2003, Posel and Casale, 2010). Another suggestion for the small effect of education is that higher education may lead to expectations that cannot be met thus lowering subjective well-being (Diener, Suh, Lucas, & Smith, 1999).

Being married is generally associated with higher levels of subjective well-being as well. This relationship is shown in several studies (Caporale, Georgellis, Tsitsianis, & Yin, 2009; Wills-Herrera, Orozco, Forero, Pardo, & Andonova, 2010). In Diener, Suh, Lucas, and Smith's (1999) summary of determinants of subjective well-being they conclude that there tends to be a significantly positive relationship with subjective well-being and marriage and that married people are happier than those who were never married, divorced, separated, or widowed. Helliwell (2003) provides additional evidence to support Diener's claim as he found married people tend to report being happiest. His results also showed that being separated is worse on overall life satisfaction than being divorced. Again, this is most likely because people adapt over time and learn to adjust to situations. And finally, it is found that being from a collectivist instead of an individualistic nation plays a role on subjective well-being. Collectivist nations tend

to have a smaller benefit of being married over being divorced or separated (Diener, Gohm, Suh, & Oishi, 2000).

Employment status is a large part of subjective well-being – specifically when discussing unemployment. The paradox of employment exists because work is usually considered a burden but evidence shows that being unemployed decreases overall well-being (Frey & Stutzer, 2002). Many studies find a significantly negative effect of unemployment on subjective well-being (Helliwell, 2003; Di Tella, MacCullough, & Oswald, 2001). Clark and Oswald (1994) studied a British Household Panel Study and found that the effect of unemployment decreased well-being more than any other single characteristic. They also found that unemployment affects the young less than other age groups. People who are in high unemployment areas or people who have been unemployed for a long period of time are affected less by personal joblessness than others. There is evidence stating that the loss of life satisfaction from unemployment is not necessarily from the loss of income. Frey and Stutzer concluded that lower happiness levels could not be explained simply by lower income so it must be a non-monetary cost. A psychic cost (unemployment produces depression, anxiety, and loss of self-esteem) and a social cost (the fact the employment may define someone) are considered.

Religion is another aspect thought to improve subjective well-being. However, there is debate over whether subjective well-being is increased because of a belief in a higher power, or from the increased community involvement. Diener, Suh, Lucas, and Smith (1999) explain that church attendance may provide both psychological and social benefits. The belief in God may provide meaning in life but the social networks are helpful during major life events. Helliwell (2003) examines this question and finds that while both personal beliefs and increased social activity give a significantly positive effect on life satisfaction, those who report that God is very

important in their lives have a coefficient three times as large as the coefficient for frequent church attendance.

Type and quality of the political system may play an important role on subjective well-being. A good political system may influence happiness while a corrupt government may provide feelings of insecurity or distrust. Preferences for democracy have been found to have a positive effect on subjective well-being (Graham & Pettinato, 2001). Yet above and beyond democracy, an effective and trustworthy government with low corruption is the most likely political cause that may lead to a greater reported measure of subjective well-being (Helliwell, 2003). In addition, active civic participation tends to be significantly positive with overall well-being (Jorgenson, Jamieson, & Martin, 2010).

Although culture leads us to believe that the young are the happiest, research shows otherwise. The results of many studies show age to have a u-shaped pattern (Caporale, Georgellis, Tsitsianis, & Yin 2009; Kingdom & Knight, 2007; Posel & Casale, 2010; Richter, 2008). Some studies give specific results with those happiest being between the ages of 18 and 24 and then returning to those similar levels after mid-50s (Helliwell, 2003). Clark and Oswald (1994) describe their results as a u-shaped pattern with the happiness lowest in the mid-thirties.

Lastly Wilson (1967) says that the happy person is of either gender. This is generally found to be the case (e.g. Richter, 2008). When there are differences, women are more likely to report a higher subjective well-being (e.g. Caporale, Georgellis, Tsitsianis, & Yin 2009; Jorgensen, Jamieson, & Martin, 2010; Wills-Herrera, Orozco, Forero-Pineda, Pardo, & Andonova, 2010). These differences tend to disappear while controlling for other demographic variables (Diener, Suh, Lucas, & Smith, 1999).

While empirical measures matter, many studies have gone on to examine how perceptions in these domains of subjective well-being affect the model. In a review of subjective

well-being literature, Dolan and Peasgood (2008) conclude that all of the evidence suggests that perceptions of our situations are very important predictors of life satisfaction. As shown by relative income, perceptions do not always match reality and it depends on access to information. People will be influenced by events around them – advertisements, television, and the actions of others. The study of television viewing cited earlier also found that those who watch television more tend to be more anxious, have higher material aspirations, less financial satisfaction, more distrust in others, and lower perceived relative frequency of social activities – all of which are factors affecting subjective well-being (Frey, Benesch, & Stutzer, 2007). This shows more evidence that perceptions matter.

The role of perceptions on individual health status is another example. If one has cancer but they are not yet aware of this, does the empirical measure of the disease lower subjective well-being even if the individual does not feel the effects of it yet? Health is a matter of how one feels and is subject to adaptation. In the review of subjective well-being, Diener, Suh, Lucas, and Smith (1999) conclude that perceptions of health seem to be a better indicator on life satisfaction than empirical measures of health. Looking at several studies they explain that self-reported health is strongly correlated with subjective well-being but it considerably weakened when empirical ratings are taken into consideration. Brief, Butcher, George, & Link (1993) explain that the reason behind their relatively weak empirical measure of health on subjective well-being is in part due to individuals' interpretation of life circumstances. And it was not the actual accessibility of health services but the perceptions of health service accessibility that was the largest predictor of overall well-being using Australian data (Jorgensen, Jamieson, & Martin, 2010).

Another example is how perceptions of insecurity differ from empirical measures of insecurity in Colombia. Wills-Herrera, Orozco, Forero-Pineda, Pardo, & Andonova (2010) argue

that empirical indicators may be underrepresented because people may adapt to their situations. Perceptions on the other hand, take into account objective security measures as well as the ability of a person to respond to the measure. Data collection involved 742 surveys that were sent out in 2006. Owners of rural productive properties located in 25 different municipalities belonging to five different geographical regions of Colombia were surveyed. The regions were chosen by different levels of objective insecurity as well as type of production. The survey consisted of four well-being measures that were reduced to one using factor analysis. This is used as the dependent subjective well-being variable. In addition, factor analysis was performed with fourteen items to produce four components of perceptions of insecurity: perceptions about personal safety, perceptions about political freedom of voice and expressions, perceptions of economic security, and perceptions of security provided by the community. Measures of objective insecurity were measured at the municipal level that includes indexes of homicides, kidnappings, armed clashes, and displaced people. Other common control variables were included in the model as well.

Like relative income, subjective perceptions did not correlate with the empirical data in regard to insecurity suggesting that perceptions about insecurity are not necessarily related to empirical measures of insecurity. Furthermore, recent violent events had more effect than past violent effects on perceptions of insecurity. Results show a negative and significantly statistical relationship between perception of insecurity and subjective well-being (Wills-Herrera, Orozco, Forero-Pineda, Pardo, & Andonova, 2010).

Income, health, and security are just a couple of the research areas where perceptions affect the subjective well-being model. Graham and Pettinato (2001) and Posel and Casale (2010) both show that individual perceptions of where one ranks in terms of income do not match where one is objectively located on the financial ladder. Results for insecurity are similar.



Subjective insecurity did not necessarily correlate with empirical insecurity (Wills-Herrera, Orozco, Forero-Pineda, Pardo, & Andonova, 2010). This shows that perceptions do not always correspond to reality. The focus of this paper is not to look at how perceptions of just one single determinant effect subjective well-being, but to expand this idea to determine how well the empirical determinants from a standard subjective well-being model match up with what people perceive to be the most important indicators of life satisfaction.

### 3. East Timor

The small Southeast Asian country of East Timor (Timor-Leste) had a difficult and violent path to become the independent nation it is today. In the beginning of the 16<sup>th</sup> century Portugal began trading with Timor. By midcentury, Portugal had colonized the island. The Netherlands also saw potential in the tiny island leading to disagreements with Portugal until an 1859 treaty separated the island. The Netherlands territory was to be the western portion (now West Timor) and Portugal's territory to be the eastern portion (now East Timor). For a brief period between 1942 and 1945 Japan occupied the island. However, at the end of WWII Portugal regained control (Central Intelligence Agency, 2011).

On April 25, 1974 a revolution in Portugal took place causing them to eventually give independence to their overseas territories including East Timor. This caused many political parties to arise in East Timor such as the UDT (Timorese Democratic Union) which called for "Timor's integration in a Portuguese-speaking community," ASDT (Timorese Social Democratic Association) which later became FRETILIN (Revolutionary Front for an Independent East Timor) which supported the right to independence, and APODETI (Popular Democratic Association of Timor) which wanted "integration with autonomy within Indonesian community." On November 28, 1975 East Timor officially claimed independence from Portugal. Nine days later, Indonesia invaded to take control of the country (Government of Timor-Leste, 2011).

Indonesia claimed East Timor as its 27<sup>th</sup> province. This caused tension between many in East Timor and Indonesia and over next two decades East Timor fought for their independence. The effects of the violence lead to approximately 100,000 to 250,000 lives lost (World Bank, 2002). Hill (2001, p. 1139) explains that "Indonesia's rule of East Timor, 1976-99, would have to be judged a failure both because of an inability to win over the 'hearts and minds' of the East Timorese people, and because of the manner of its abrupt and tragic departure in late 1999."

Initially, major world powers did little to stop Indonesia's rule. However in the 1990s, two events in East Timor helped capture the world's attention. The first was in 1991 when over 250 people were killed by Indonesian forces at a memorial session in Dili, the capital. This event is now known as the Santa Cruz massacre. The second event was in 1996 when two East Timorese, Jose Ramos-Horta and Ximenes Belo were awarded the Nobel Peace Prize for their work towards the defense of human rights and independence of East Timor. Both of these events shifted international attention to East Timor's needs and put political pressure on Indonesia (World Bank, 2002).

On August 30, 1999 the combination of the resignation of Indonesian President Suharto and increased world pressure caused Indonesia to hold a referendum in East Timor. Over 90 percent of East Timor's population participated in the vote and of those, 78.5 percent voted for independence for East Timor. While this should have been a moment for celebration, it was violently interrupted by angry pro-Indonesian militia. The militia murdered hundreds and destroyed the infrastructure of the country. Approximately 1,400 Timorese were killed and 300,000 were displaced, mainly into West Timor, as refugees. About 70 percent of the infrastructure was destroyed including nearly 100 percent of the electrical grid. On September 20, 1999 peace keeping troops led by Australia arrived bringing an end to the violence. This International Force for East Timor (INTERFET) disarmed the militia and began the restoration of infrastructure (Central Intelligence Agency, 2011).

Despite the end of the violence, becoming an independent nation was still an incredible struggle. East Timor is one of the poorest areas in Southeast Asia. Poverty incidence in 2001 was estimated at 41 percent. In addition, illiteracy, malnutrition, malaria, and tuberculosis are major concerns. At the time, life expectancy averaged only 52 years, 20 years less than the Indonesian average and infant mortality rates were among the highest in the world (World Bank, 2002). In

addition, there was very strong economic growth concentrated in the public sector during Indonesia's rule. In fact, nearly one half of East Timor's gross regional product (GRP) was either directly or indirectly related to the government. With the absence of the Indonesian government, government expenditure was suddenly withdrawn. This caused an estimated decline in GRP of 25 to 30 percent in 1999. In addition, the Indonesian population made up a majority of the skilled workers and their departure led to a major shortage of skilled workers that were needed to rebuild the nation (Hill, 2001). Between poverty, lack of skilled workers, loss of government expenditure, the massive amount of destroyed infrastructure, and the displacement and loss of lives, recovery is expected to take years.

However, progress has been made. Initially the relief effort was focused on short-term tasks such as food supplies, basic humanitarian assistance, and restoring the most urgent infrastructure. It was not long after that attention turned to longer-term goals such as establishing a functioning bureaucracy, adopting monetary and exchange rate policy, and fiscal policy (Hill, 2001). By August 30, 2001 another vote took place with similar turnout to elect a constituent assembly. FRETILIN won the majority of the votes. This assembly was elected for the purpose of drafting the Constitution. At the same time, the UN Transitional Authority (UNTAET) gradually began to transfer government duties to the East Timorese. Xanana Gusmao was sworn in as the country's first president and Mari Alkatiri became the first Prime Minister. On May 20, 2002 East Timor was recognized as an independent country (Government of Timor-Leste, 2011).

During this time, the long process of rebuilding the nation began. This process required a national plan and poverty reduction strategy to assure improvements were made in the necessary areas. This required the use of data collection to be undertaken to assess the living conditions. The Timor-Leste Transitional Authority along with the World Bank, the Asian Development Bank, the United Nations Development Program and the Japanese International

Cooperation Agency (JICA) undertook a Poverty Assessment Project consisting of three collections of data: the Suco Survey, the Timor-Leste Living Standards Measurement Survey (TLSS) and the Participatory Potential Assessment (PPA). The Suco Survey is a census of the 498 sucos (villages) taken between February and April 2001. The TLSS is a household survey with a national representative sample of 1800 families from 100 sucos. The purpose of the survey is to “diagnose the extent, nature and causes of poverty, and to analyze policy options facing the country” (World Bank, 2005, p. 1). This was carried out between August and November 2001. The third data collection is the PPA. This is a survey in 48 aldeias (hamlets) in the 13 districts of East Timor with the purpose of taking “stock of their assets, skills and strengths, identify the main challenges and priorities, and formulate strategies for tackling these within their communities” (p. 1). The PPA was taken between November 2001 and January 2002 (World Bank, 2005). All three collections of data provide meaningful information for the restructuring of East Timor.

Although there was careful planning and hope for a peaceful restructuring of the country, there have been some setbacks. In February 2006, approximately 400 members of the military (out of a total military strength of 1400) made complaints about discrimination in the military. These soldiers were dismissed from duty leading to a protest that brought about violence on April 28. Throughout the next couple of weeks many people began to flee their homes as mob and gang violence took over Dili. At its peak, there were 150,000 internally displaced persons (all estimated to have returned home by 2009). By May 28, the Government of Timor-Leste asked the governments of Australia, Malaysia, New Zealand, and Portugal to send security forces to help restore stability. As a result of the violence, Prime Minister Mari Alkatiri resigned from political pressure and Jose Ramos-Horta (the then Foreign and Defense Minister) replaced him. Another response to the violence was that the United Nations

Integrated Mission in Timor-Leste (UNMIT) was created on August 25, 2006 to help restore the nation after the violence. UNMIT has a large policing component and as of May 2009 has been transferring policing responsibility to the Timorese Police Force. UNMIT is expected to end its role in East Timor by the end of 2012 (U.S. Department of State, 2012).

The other major political setback for progress was an unsuccessful assassination attack against President Ramos-Horta (who became president in 2007) and Prime Minister Gusmao. Since then the leader of the attacks has been killed and others involved have surrendered. East Timor has been relatively stable and peaceful since these two major events (Central Intelligence Agency, 2011).

Although East Timor is still one of the least developed countries, progress has been made in some areas over the past ten years. East Timor still ranks very low in a 2010 UN Human Development Report (120th out of 169 countries) but it has moved up eleven rankings in the last five years. In addition, the country has improved to the point that the UN considers it to have medium rather than low human development. Despite a contraction in GDP in 2006, the economy has grown on average by 9.9 percent between 2007 and 2010 (Australian Government, 2012). The development of the Joint Petroleum Development Area, shared with Australia, has contributed to this and has brought in a significant amount of revenue. One of the major benefits of this is the Petroleum Fund set up in 2005 to guarantee use of petroleum revenue over the long term. However, this has done little to develop jobs and long-term challenges continue to be a problem for economic growth in the private sector. The shortage of skilled workers and poor infrastructure (specifically transportation, telecommunication, and electricity) continue to be a problem (U.S. Department of State, 2012).

Despite all the struggles East Timor is continuing to grow. A 20-year Strategic Development Plan is in place for the future of East Timor that emphasizes education in order to

build the skills necessary to grow and improve as a nation. In addition the plan addresses the other continuing issues of health care, housing, infrastructure and others and collaborates with many people of the nation to find ways to overcome these problems. President Jose Ramos-Horta summarizes the attitudes and goals of the people of East Timor as he writes “All Timorese should be proud not only of achieving our independence but also of the advancements we have made as a nation in a short period. [...]Timor-Leste has also faced obstacles in our short history as a nation and we have lived through periods of strife. But as a nation and as a people we have made a shared commitment to peace and, in a spirit of national solidarity, we are moving together to develop our nation and secure our future. We are consolidating our democratic governance and building our state from the ground up. We are laying down a strong foundation for ongoing stability and security, and we are working hard to create new opportunities for all our people” (Government of Timor-Leste, 2012, p.7).

#### 4. Empirical Method

One purpose to study subjective well-being, as described in the literature review, is to create a model to identify the most important aspects of improved life satisfaction. The purpose of this paper is to determine if this model accurately reflects individual perceptions of what most contributes to overall life satisfaction. This section focuses on creating a general subjective well-being model and then applying a method to rank the coefficients in the model in order to compare them with individual perceptions of life satisfaction.

The first step is to determine the ranking of individuals' perceptions of life satisfaction. This information is found from two questions on an East Timor household survey used for this study (dataset is further described below). In this household survey, there is a section on subjective well-being that asks individuals "What is most important for improving your living standards?" and "What is most important for improving living standards in East Timor?" There are eleven options to choose from (categories and frequencies listed in Table 1) in which respondents were asked to choose up to two answers for each question. Because people had the choice to respond with one or two answers, the total amount of responses differs between the two categories.

Examining these frequencies, it is obvious that there is already some discrepancy between what people believe improves their subjective well-being most and what people believe is best for the entire country of East Timor. The question "What is most important for improving living standards?" is a closer match to what the model for subjective well-being attempts to capture. However, the question about improving living standards in East Timor is still important to analyze as the similarities and differences between the model and the two questions may be relevant for policy purposes. Therefore, both questions will be examined and will be used as the measures of perceptions of what improves overall subjective well-being.



These will then be compared with the empirical results of what improves individual subjective well-being (derived from the subjective well-being model).

Table 1: Frequency and rank of survey responses for improving life satisfaction (perceptions of subjective well-being)

<b>Response</b>	<b>Frequency</b> (your living standards)	<b>Rank</b> (your living standards)	<b>Frequency</b> (East Timor's living standards)	<b>Rank</b> (East Timor's living standards)
Employment	3,145	1	2,317	2
Health Care	1,732	2	1,826	3
Education	1,528	3	3,517	1
Housing	1,181	4	402	5
Demand for Products	1,072	5	346	6
Safety	481	6	954	4
Infrastructure	453	7	329	7
Access to Land	172	8	127	9
Other	102	9	45	11
Status in Community	88	10	48	10
Political Participation	81	11	140	8
<b>Total</b>	<b>10,035</b>		<b>10,051</b>	

The dependent variable in the model is from the survey as well and asks the question from the subjective well-being section “Are you satisfied with your life in general at this present time?” Respondents are asked to reply on a five point scale with answers very satisfied, rather satisfied, neither satisfied nor unsatisfied, somewhat unsatisfied, and very unsatisfied. For this study, the order of the responses was reversed to be from very unsatisfied (one) to very satisfied (five).

The independent variables chosen for this model follow previous literature on subjective well-being. Previous literature describes a general framework for this type of model. Typically,

variables are grouped into broad categories such as income, individual demographics, a set of household characteristics, and so on depending on each model. Because the rankings of the empirical results from the model will be compared to the ranking of perceptions of life satisfaction, this model is set up to resemble the structure of the rankings of perceptions. The model will attempt to include everything normally included in a subjective well-being model, but these variables will be grouped into eight sets of the eleven categories of the household survey. The included categories are: employment, health care, education, housing, demand for products, infrastructure, status in community, and political participation. A category for demographic characteristics is included for variables that do not fall into a specific category but are used in other subjective well-being models. The categories for other, safety, and access to land are omitted due to data limitations discussed below. Therefore the model can be written as:

$$\begin{aligned}
 SWB_i = & \beta_0 + \beta_1 * Demographic_i + \beta_2 * Employment_i + \beta_3 * Health\ Care_i + \beta_4 \\
 & * Education_i + \beta_5 * Housing_i + \beta_6 * Demand\ for\ Products_i + \beta_7 \\
 & * Infrastructure_i + \beta_8 * Status\ in\ Community_i + \beta_9 \\
 & * Political\ Participation_i + \varepsilon_i
 \end{aligned}$$

In regard to the specification of the model, previous research uses OLS, ordered probit, or ordered logit to model subjective well-being. When using OLS, the dependent variable (the subjective well-being measure) is assumed to be cardinal. In other words, the difference between each level of subjective well-being is equivalent. Moving from a one to a two on the lower end of life satisfaction and moving from a four to a five on the higher end are assumed to be the same. However, an ordered model is more generalized as it does not make this assumption of cardinality. Instead it assumes the dependent variable to be ordinal.

There is little evidence to show general support of using one model over another. In fact, research has shown little difference between running an OLS model, an ordered logit, or an ordered probit model. Ferrer-i-Carbonell (2004) found that when comparing models, using data from the German Socio-Economic Panel, the sign and significance of the coefficients was the same between OLS and ordered logit or order probit models. In addition, the trade-offs between variables were roughly the same. Helliwell (2003) found that the difference in the cut-lines of the ordered probit model were relatively similar suggesting linearity. He concludes that his results “do not depend importantly on whether the measures of subjective well-being are treated as ordinal or cardinal” (p. 354). Therefore, the initial model will be estimated using both OLS and ordered logit models. These first estimations are simply to verify that an acceptable subjective well-being model has been chosen.

However, simply running a model for subjective well-being will not be sufficient to rank and compare categories in the model to the categories of perceptions. Many of the categories in the model have several variables describing each category. For example, the category for education will be represented by six variables: whether or not an individual is literate and five indicator variables representing the highest grade level completed. Therefore, if two variables in a category are significant and positive, but the coefficients differ greatly in size, which of these two variables should be used to represent the category?

To solve this problem, another model is estimated. This regression will still have the set of control variables but only one variable out of each of the eight sets will be used in this model. When choosing these variables, the culture of East Timor along with previous literature on subjective well-being is taken into consideration to determine the best representation of categories. Then, by standardizing the coefficients, these variables may be ranked and compared to individuals’ perceptions of what improves their living standards.

For most categories, the best variable is straightforward. Health, for example only has one variable to represent this category. Employment has ten variables (whether or not they are employed, and ten indicator variables for occupation), but it is easy to see that whether or not an individual is employed is a better representation than choosing one occupation to represent this category. However, in some cases, such as the category for infrastructure, there are many variables that best represent this category so it is more difficult to choose one. For example, infrastructure includes indicator variables for the main source of drinking water. There are ten indicator variables for drinking water source (bottled water, tap water, pump, protected well, unprotected well, protected spring, unprotected spring, river, and other), a variable for whether or not they own a mosquito net, and five other variables that belong in this category. There are two methods used to solve this issue. The first is simply to choose the most common response to represent the category. The other is to combine indicator variables to create an index based on characteristics. For example, infrastructure indicator variables can be combined to represent individuals who have better methods of drinking water sources and/or those that own mosquito nets. The specific construction of the variables is described in detail in the data section.

## 5. Data

The data used in this study is from a household survey called the Timor-Leste Living Standards Measurement Survey (TLSS). The TLSS is just one of three collections of datasets that the Planning Commission of Timor-Leste Transitional Authority along with the World Bank, the Asian Development Bank, the United Nations Development Program, and the Japanese International Cooperation Agency (JICA) undertook in 2001. The Suco Survey, a census of the 498 sucos (villages), was taken to collect an inventory of current conditions, and the Participatory Potential Assessment (PPA), used to identify and improve on the main challenges of East Timor, are the other two parts of the survey. The purpose of these combined datasets is to understand living conditions in East Timor in order to fulfill the government's National Development Plan (NDP) which is to "promote rapid, equitable and sustainable growth and to reduce poverty" (World Bank, 2005, p. 1).

The TLSS is a cross-sectional dataset taken between August and November of 2001 (World Bank, 2005). The sample consists of 1800 households. These households were interviewed throughout 100 different sucos (villages) in East Timor. This is approximately one percent of the total number of households. Some sections of the survey required individual responses while others required just one response from each household. This accounts for a total of 9,113 individuals.

The 100 different sucos can be divided into three regions: Major Urban Centers, including Dili (the capital) and Baucau; Other Urban Centers (the remaining 34 urban sucos based on the Indonesian classification of what defines an urban area); and Rural Areas. These can then be categorized into sub-sections of agro-ecological zones (Highlands or Lowlands depending on the share of surface area above and below 500 m), geographic areas (Western,

Eastern, and Central Regions), and those sucos that are landlocked against those with sea access.

The method for determining which households were to be interviewed required three stages with the exception Dili. The first stage used probability proportional to size (PPS) to determine the number of sucos in each region to be selected. This determined that four sucos were to be selected from Baucau, 14 from other urban centers, and 61 sucos from rural areas. The second stage used PPS to choose three aldeias (hamlets) from each suco. To better understand this, one can think of a suco as a county and an aldeia as a city within that county. In the final stage, six households from each aldeia were chosen using equal probability. Because of the way that Dili is set up, a two-stage process was used. The first stage selected 63 aldeias using PPS. The second stage used equal probability to select the six households. This process was done to ensure that each household had the same chance of being selected to be part of the sample. Reserve households were selected as well to be used if one of the original households could not be interviewed (303 households needed to be replaced by the reserve household). The final sample consists of 450 households in the Major Urban Centers (378 in Dili, 72 in Baucau), 252 households from Other Urban Centers, and 1,098 from the Rural Areas.

There are thirteen sections to the TLSS consisting of a variety of household topics such as education, health, expenditures and so on. With some exceptions, units of observation are either the household or the individual depending on the section. For example, the description of the dwelling is the same for each household so only one response per household is required while health is different per each person and so it is answered by each individual. During the process of merging the data, individuals became the primary unit of observation. While most data for the model is gathered from a variety of sections, the main section of interest is the thirteenth section, the subjective well-being section. This section asks interviewers about their

perceptions of their economic situation, how much power they have, and overall life satisfaction. Because only individuals over the age of fourteen are interviewed on the subjective component of the TLSS, every individual age fourteen and under is omitted from the sample. This reduces the sample to 5,065 individuals.

As described earlier, one part of the subjective well-being section that is critical for the model is the question that asks “What is most important for improving living standards?” and “What is most important for improving living standards in East Timor?” These responses are described as people’s perceptions of what most improves their life satisfaction. These eleven options are relisted in order to examine the question more closely. However, in this table, only the eight responses that are included in the model are ranked. Safety, access to land, and other are omitted from the model.

Table 2: Frequency and rank of survey responses for improving life satisfaction (perceptions of subjective well-being)

<b>Response</b>	<b>Frequency</b> (your living standards)	<b>Rank</b> (your living standards)	<b>Frequency</b> (East Timor’s living standards)	<b>Rank</b> (East Timor’s living standards)
Employment	3,145	1	2,317	2
Health Care	1,732	2	1,826	3
Education	1,528	3	3,517	1
Housing	1,181	4	402	4
Demand for Products	1,072	5	346	5
Safety	481	-	954	-
Infrastructure	453	6	329	6
Access to Land	172	-	127	-
Other	102	-	45	-
Status in Community	88	7	48	8
Political Participation	81	8	140	7
<b>Total</b>	<b>10,035</b>		<b>10,051</b>	

As previously noted, the results to improving “your living standards” compared with “East Timor’s living standards” are not ranked in the same order. The results for improving individual’s living standards emphasize employment as the single largest contributor to overall life satisfaction whereas the importance of East Timor’s living standards places most importance in their education. Several other items stand out such as the importance of housing for an individual’s answer (1,182 answered this as important) but this is hardly a relevant improvement for improving the country (402 chose this answer). This is similar with demand for products with 1,073 individuals perceiving this as a necessary improvement for their own personal life yet only 347 people see this as important for improving East Timor’s living standards. Overall, answers to both questions include employment, health care, and education as the top three methods of improvement; however their importance is weighted differently in each category.

Again, the dependent variable used is found in the subjective well-being section of the TLSS. The question asked “are you satisfied with your life in general at the present time?” in which respondents answered on a 5-point scale from one as very satisfied to five, very unsatisfied. This is recoded to one as very unsatisfied to five, very satisfied. As shown in the Figure 1 below, there are few responses at the two extreme ends (very satisfied and very unsatisfied). Only 83 individuals answered that they were very unsatisfied with their overall life satisfaction while only 183 individuals answered it to be the other extreme, very satisfied. Therefore the dependent variable was recoded to a 3-point scale as unsatisfied (one), neutral (worded as “neither satisfied nor unsatisfied” on the survey), and satisfied (three).



Figure 1: Histogram of subjective well-being responses on 5-point scale



The explanatory variables were categorized by eight sets of variables to match the responses to the questions “what is most important for improving your living standards?” and “what is most important for improving living standards in East Timor?” The eight sets of variables are all considered the variables of interest and will be compared to the rankings of the perceptions of life satisfaction taken from the individual responses to the question above.

There are three responses that are in the perceptions list but are not included while creating the model. The response other will be dropped for obvious reasons. The response access to land will also not be included as a set of variables. There is no clear support that this is generally included in a subjective well-being model. Second, there is not a question in the TLSS that is fully capable of representing this response and therefore including an extra variable that doesn’t particularly belong may confound the results of the model. In addition access to land is not a popular response to either of the above questions. Less than two percent of the sample chose this for their response for either of the questions. Therefore, it is omitted from the model.

Safety is the third response that will be dropped from the main model. This is more questionable because it ranks higher on the list of importance than access to land. However, the TLSS lacks an appropriate question to be included for safety. When safety is included in the

subjective well-being model it is typically a measure of physical threat. There are several questions in the TLSS that ask about physical safety during the violence in 1999 such as whether or not an individual was displaced during 1999 and what buildings were damaged during the violence. However, these variables seem to be weak proxies when looking at life satisfaction in 2001 – two years after the violence ended. In addition, questions on adequacy of food, health care, and housing were considered as a measure of safety. Although these measures seem to be a measure of safety in a sense, it most likely does not match individuals' idea of safety while they were choosing it as an option. In addition, while some subjective well-being models include a measure of safety, others ignore the topic entirely.

Examining the overall picture, only 482 individuals (4.8 percent of the sample) chose safety as one of the qualities that improved their personal living standards. When compared to categories of higher importance this is relatively low. Employment is at 31.3 percent, health care is at 17.2 percent, and education is at 15.2 percent. However, in response to the question on improving life satisfaction for East Timor, safety was chosen by 955 (9.5 percent of the sample) people. While this is a more important percentage, the model for subjective well-being more closely corresponds to individual life satisfaction than the entire country's life satisfaction. Therefore, with only 4.8 percent of the sample choosing safety as important for improving individual life satisfaction and the lack of an appropriate question from the survey used as a proxy for safety, this group will be omitted from the main restricted model.

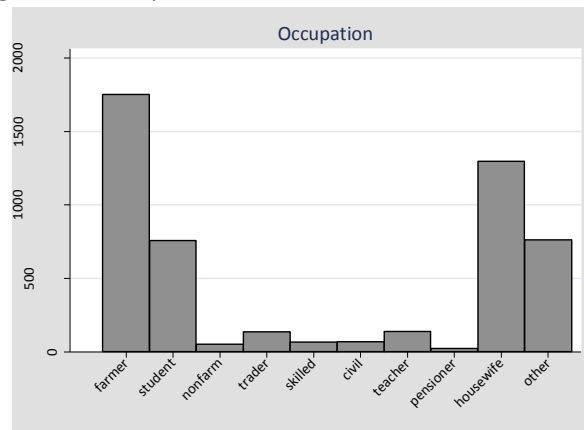
With the elimination of other, access to land, and safety from the model, this leaves the remaining eight sets of variables to include: employment, health care, education, housing, demand for products, infrastructure, status in community, and political participation. While some of these sets of variables were less important in the response to the question than access to land and safety, they are variables that are normally included in a subjective well-being model

and would be included whether or not it was in the survey. It should also be pointed out that the model explained below is for a general subjective well-being model – the restricted model will be explained later on.

In addition to the eight sets of variables, there will be a set of controls in the form of demographic variables. The demographic variables include gender, age, age squared, marital status (married, widowed, never married, or divorced which includes the response separated), household size, and the suco where they reside in. Religion is not included in this model because of little variation since East Timor is predominately Catholic (98 percent according to the survey).

Employment status is the first set of variables established. In the literature, unemployment is found to be one of the most prominent factors for decreasing subjective well-being in the standard model. In addition, in the response to “what is most important for improving your living standards” employment was the most common response. There are ten indicator variables used to represent occupation type. The first variable, farmer, represents the agriculture sector. In East Timor, employment is dominated by this trade. Over one in three adults over the age of fifteen responded to a survey question that their main occupation had to do with agriculture (farmer, share cropper, farm laborer). These categories combined with fisherman make up the farmer variable. The next most common occupation was housewife at approximately a quarter of the population. Other (the omitted variable) and school student were the next two largest categories at fifteen percent and fourteen percent respectively. The remaining categories represent less than three percent of the population per category. However, they are all included in the model separately. These are: nonfarm (non-farm labor), trader, skilled (skilled worker), civil (civil servant), teacher, and pensioner.

Figure 2: Histogram of occupation



Employment in the model will also be represented by whether or not an individual is considered employed. Because of the structure of the survey, this is defined by answering yes to at least one of the following two questions: do you have a permanent job even though you did not work in the last seven days or have you had a job in the past three months?

The variable for health status is straightforward. Based on the literature, people's perceptions to their own health is more important in the subjective well-being model than actual health. Therefore, a subjective measure of health is used in the place of any empirical measure and is assumed to capture overall health. The variable is from the question "How would you evaluate your own health?" which has five responses in descending order. These were recoded to be one as very bad to five as very good. Health was the second most common response for both questions of life satisfaction and is expected to rank high in the model.

The third category established is education. A common assumption is that education is very important for overall life satisfaction due to social effects and better job satisfaction. While it does tend to be positively correlated with subjective well-being, previous literature generally shows a smaller effect than expected. Economists suggest that this may be due to the effect of higher education getting captured through other aspects of subjective well-being such as higher

income, employment status, and health. In regard to the question “what is most important for improving living standards in East Timor?” education was the number one response by individuals (it is ranked number three for improving “your living standards”). Because of this imbalance between standard results of subjective well-being models and individuals’ perceptions, education will be one of the most important variables to interpret in the results.

In the model, education is explained through a couple of different variables. The first is a dummy variable for whether or not an individual is literate. An individual is considered literate if they answered on the survey that they can read and write with or without difficulty as opposed to not being able to read or write at all. If they answered no to either of the questions, they are considered illiterate. The next set of variables is indicator variables for individuals’ level of education. Approximately half of the population does not have any formal education and this will be the omitted category. The other categories are primary education (including kindergarten to sixth grade), junior secondary (grades seven through nine), senior secondary (grades ten through twelve), and university (including academia, defined as professional institutions training people with direct orientation towards the world of work, and university-level education).

The next category is housing and is considered the fourth most important in people’s perceptions of what improves their living standards. Nearly twelve percent of people chose this response. Furthermore, type and size of housing is typically included in the subjective well-being especially for low income countries. For example, Bookwalter and Dalenberg (2004) found that housing plays one of the most important roles in well-being for the poorest quartiles while using a dataset from South Africa. Therefore a set of housing variables are important and will be included in this model. From the survey housing will be represented by what type of dwelling the household resides with indicator variables for the following responses: bamboo, semi-

permanent, traditional, small house in compound, permanent, emergency, or other (the omitted variable). Area of the dwelling is included as well defined as floor area in square meters. Condition of the dwelling is the final variable for this category. This is an ordinal variable from severely damaged (one) to good (four).

The response, demand for products, is more difficult to capture than the previous responses. Although the TLSS does not define what is specifically meant by this variable, it is safe to assume that demand for products may be similar to household expenditures. A couple of different variables are used to capture this category. The first comes from the Consumption Measure calculated by the TLSS. The four main types of goods and services reported in the survey included food, non-food, consumer durables, and housing. Non-food includes health and education expenditures but it excludes taxes (only fourteen households reported paying them), marriages, dowries, birth, and death expenditures. Durable goods are excluded from the expenditure measure as only few reported ownership of such items and a lack of information on the survey prohibits from estimating a proper measurement. Because many households own their dwelling rather than renting, an imputed value for housing was calculated. The survey asked respondents how much their dwelling could be rented for and after running a hedonic housing regression to determine predicted rents (based on characteristics of the house), the TLSS concluded that predicted rent and imputed rent estimates matched fairly closely.

The TLSS also adjusts this measure across time and space. To adjust for temporal price differences, consumption is deflated to prices in the beginning of September 2001. Spatial differences in price variation are fixed by using a Laspeyres Price Index. All of this information was pre-calculated by the TLSS. Measurements are in US dollars using the exchange rate 10,000 Rupiah/US Dollar. Three observations (from one single family) are dropped as they are clearly outliers.

In addition to an absolute measure of income, two measures for relative income are examined. A measure for perceptions of relative income is formed from the question on the survey asked “imagine a 9-step ladder where on the bottom, the first step, stand the poorest people, and on the highest step, stand the rich. On which step are you today?” Results from previous literature explain that not only is relative income important to include in a subjective well-being model, but the evidence suggests that individuals’ perceptions of where they believe they rank is a better indicator for relative income than an empirical ranking (Graham and Pettinato, 2001; Posel and Casale, 2010). However, comparing actual relative income from the sample and perceptions of relative income it is obvious to see that the two have very little in common (Table 3). This could be for a number of reasons. For one, actual relative income is for all of East Timor while people perceptions may just be comparing themselves to those around them. Second, Graham and Pettinato (2001), and Posel and Casale (2010) both found that individuals underestimated their economic situation. This may be a very extreme case of similar results to those studies as the majority (3703 out of 5057) underestimated their economic situation. However, it could also simply be the case that people did not understand the ladder question and results are inaccurate to what people truly believe. Following Posel and Casale’s model in their study, the model will be estimated using both forms of relative income to determine the best indicator to represent demand for products.

Table 3: Perceptions of relative income compared with actual rank of expenditure

Actual Expenditure Rank in East Timor	Perceptions of Relative Income									
	1	2	3	4	5	6	7	8	9	Total
<b>1</b>	<b>137</b>	215	134	52	15	4	0	0	5	562
<b>2</b>	135	<b>210</b>	145	62	8	2	0	0	0	562
<b>3</b>	139	195	<b>164</b>	48	12	4	0	0	0	562
<b>4</b>	120	217	148	<b>55</b>	22	0	0	0	0	562
<b>5</b>	130	241	135	41	<b>11</b>	3	0	0	0	561
<b>6</b>	103	219	148	70	16	<b>6</b>	0	0	0	562
<b>7</b>	135	217	107	78	16	5	<b>3</b>	1	0	562
<b>8</b>	112	174	152	79	34	9	0	<b>2</b>	0	562
<b>9</b>	91	141	144	106	53	22	5	0	<b>0</b>	562
<b>Total</b>	1102	1829	1277	591	187	55	8	3	5	<b>5057</b>

After the violence of 1999, much of the infrastructure was destroyed. Because of this, one may assume that infrastructure may be more important to the people of East Timor than in other locations and thus the infrastructure variables will be particularly important to analyze. However, in both responses to the questions of above, the importance of infrastructure was surprisingly low. Only 453 individuals chose this as most important for improving their living standards and only 329 chose it as important for improving East Timor's living standards. Because infrastructure doesn't seem to be an important indicator of life satisfaction in terms of individuals' perceptions suggests that the people of East Timor have adapted to a new lifestyle after the couple of years since the violence.

Infrastructure will be captured by several variables. The first is the main source of water for drinking with indicator variables representing the responses: bottled water, tap water, pump, protected well, unprotected well, protected spring, unprotected spring, river/stream/lake/pond, and other (the omitted variable). Type of toilet is also included. Indicator variables are given for each response: flush toilet, traditional latrine, bowl/bucket, no



toilet, and other (the omitted variable). The final indicator for infrastructure is the response to whether or not an individual slept under a mosquito net last night.

Status in the community is captured by many variables. An indicator variable for head of household will be included in this category. In addition, whether or not an individual participated in any social group over the past twelve months is included. This measure also takes into account social capital which is generally included in subjective well-being model. Language is also necessary to include in this model for two reasons. Speaking a common language represents access to information while the linguistically diverse culture represents cultural identity. Two languages are chosen for this: Indonesian and Tetum. Although Indonesian is not the official language of East Timor, 63 percent of the population speaks this language and it is considered a working language for the time being. Indonesian as a language dominates the “high status” language domains such as secondary and higher education, and many professions and small businesses (Taylor-Leech, 2009).

Tetum is one of the official languages in East Timor and 90 percent of the population reports speaking this. In addition, Tetum is a widely spoken indigenous language out of the many in East Timor. Ethnic identity and culture is very important in East Timor and communities tend to favor their own language first and foremost in part to identify with their local culture (Hicks, 2007, p. 15). After Tetum was chosen as an official language, studies suggest that those with Tetum as a mother tongue felt empowered. Richter (2008, p. 378) finds that the impact of Tetum as a mother tongue on power is substantially larger than all other mother tongues. In addition, those that just spoke the language as a non-native tongue did not have the same increasing effects on power as those that have Tetum as a mother tongue. He suggests that “the group whose mother tongue is Tetum were distinctly empowered in the aftermath of the crisis, as Tetum was selected as the national language.” Therefore Tetum as a mother tongue and the

ability to speak Tetum (two separate variables) will be used to represent ties to ethnic culture and status.

The final category is political participation. This is captured through a subjective response. From previous literature, preference for democracy, a trustworthy government with low corruption and active civic participation are all shown to have a positive effect on subjective well-being. Therefore, political participation will be explained by the response to a question asking on “a 9-step ladder where on the bottom, the first step, people who are completely without rights, and on the highest step, stand those who have a lot of power. On which step are you today?” This subjective measure explains how people feel about their rights in regard to the political system.

Descriptive statistics are given in Table 4. Variable definitions as well as specific locations in the TLSS are described in Appendix A.

Table 4: Descriptive statistics

	Mean	St Dev	Min	Max
<i>Dependent Variable</i>				
SWB	2.17	0.74	1	3
<i>Demographic</i>				
Male	0.50	0.50	0	1
Age	34.79	15.16	15	99
Age <sup>2</sup>	1,440.07	1,273.56	225	9801
Married	0.56	0.50	0	1
Widow	0.09	0.29	0	1
Nevermarried	0.33	0.47	0	1
Divorced	0.01	0.11	0	1
Housesize	5.95	2.83	1	19
Suco	505.62	292.17	11	1003
<i>Employment</i>				
Employed	0.53	0.50	0	1
Farmer	0.35	0.48	0	1
Housewife	0.26	0.44	0	1
Student	0.15	0.36	0	1
Nonfarm	0.01	0.10	0	1
Trader	0.03	0.16	0	1
Skilled	0.01	0.11	0	1
Civil	0.01	0.12	0	1
Teacher	0.03	0.16	0	1
Pensioner	0.00	0.07	0	1
Otherjob	0.15	0.36	0	1
<i>Health Care</i>				
Health	3.82	0.61	1	5
<i>Education</i>				
Literate	0.56	0.50	0	1
Noeduc	0.46	0.50	0	1
Primary	0.21	0.41	0	1
Junsecond	0.13	0.33	0	1
Sensecond	0.17	0.38	0	1
University	0.03	0.17	0	1

	Mean	St Dev	Min	Max
<i>Housing</i>				
Bamboo	0.11	0.31	0	1
Semipermanent	0.30	0.46	0	1
Traditional	0.21	0.41	0	1
Smallcompound	0.00	0.07	0	1
Permanent	0.25	0.43	0	1
Emergency	0.10	0.30	0	1
Otherdwelling	0.03	0.17	0	1
Condwell	3.00	0.84	1	4
Area	48.98	25.92	8	238
<i>Demand for Products</i>				
Expenditure	30.04	26.70	4.50	349.57
Rankexpend	5	2.58	1	9
Rich	2.44	1.17	1	9
<i>Infrastructure</i>				
Bottledwater	0.00	0.06	0	1
Tap	0.37	0.48	0	1
Pump	0.12	0.33	0	1
Protwell	0.04	0.19	0	1
Unprotwell	0.12	0.32	0	1
Protspring	0.04	0.20	0	1
Unprotspring	0.20	0.40	0	1
River	0.07	0.25	0	1
Otherwater	0.04	0.20	0	1
Flush	0.02	0.15	0	1
Latrine	0.29	0.45	0	1
Bucket	0.28	0.45	0	1
Othertoilet	0.05	0.21	0	1
Notoilet	0.36	0.48	0	1
Mosquito	0.47	0.50	0	1
<i>Status in Community</i>				
Head	0.36	0.48	0	1
Social	0.03	0.16	0	1
Speaktetum	0.91	0.29	0	1
Speakindonesian	0.64	0.48	0	1
Tetum	0.17	0.37	0	1
<i>Political Participation</i>				
Rights	3.93	1.75	1	9

Note: n = 5057

## 6. General Subjective Well-Being Model

Estimated coefficients and their standard errors for the OLS and ordered logit models are given in Table 5. Dummy variables for sucos are included in each regression but the coefficients are not shown in the results. In addition, standard errors are clustered by households. Following Posel and Casale's (2010) study this model includes absolute income, actual income rank, and perceived rank in income. Alternative specifications for income and area of the dwelling were taken into consideration including the logarithmic form. However, the raw data for these variables seem to be the best estimator and this will be the only specification shown in the results. The rest of this section will focus on analyzing and comparing the linear and ordinal subjective well-being models. In addition I use these results along with information on East Timor during this time period to choose the single best variable to represent each category for the restricted subjective well-being models. Coefficients from this will be standardized, ranked, and compared to the rankings of perceptions of subjective well-being.

Table 5: OLS and ordered logit results

VARIABLE	OLS		Ordered Logit	
	$\beta$	S.E.	B	S.E.
<i>Demographic<sup>a</sup></i>				
Male	0.005	0.025	0.044	0.090
Age	-0.004	0.004	-0.015	0.014
Age <sup>2</sup>	0.000**	0.000	0.000**	0.000
Married	-0.058	0.042	-0.206	0.150
Widow	-0.068	0.052	-0.204	0.183
Divorced	-0.005	0.084	0.011	0.295
Hhsize	0.014*	0.008	0.050*	0.030
<i>Employment<sup>b</sup></i>				
Employed	0.089***	0.026	0.305***	0.094
Farmer	-0.046	0.036	-0.191	0.132
Student	0.020	0.042	0.006	0.156
Nonfarm	0.039	0.099	0.119	0.355
Trader	-0.101	0.068	-0.361	0.248
Skilled	-0.060	0.096	-0.105	0.400
Civil	0.122	0.094	0.604*	0.362

Teacher	0.138**	0.058	0.550**	0.233
Pensioner	-0.030	0.101	-0.181	0.414
Housewife	0.068*	0.038	0.218	0.135
<i>Health</i>				
Health	0.029	0.020	0.098	0.071
<i>Education<sup>c</sup></i>				
Literate	-0.028	0.063	-0.113	0.217
Primary	-0.023	0.064	-0.051	0.221
Junsecond	-0.043	0.068	-0.127	0.232
Sensecond	0.018	0.068	0.085	0.235
University	0.046	0.081	0.233	0.299
<i>Housing<sup>d</sup></i>				
Bamboo	-0.028	0.104	0.018	0.375
Semipermanent	-0.077	0.102	-0.197	0.368
Traditional	-0.067	0.106	-0.190	0.383
Smallcompound	-0.597**	0.291	-1.886	1.179
Permanent	-0.217*	0.111	-0.742*	0.404
Emergency	-0.223**	0.113	-0.722*	0.405
Area	0.000	0.001	0.001	0.003
Condwell	0.026	0.024	0.119	0.086
<i>Demand for Products</i>				
Expenditure	0.003***	0.001	0.012***	0.004
Rankexpend	0.007	0.012	0.010	0.044
Rich	0.068***	0.016	0.252***	0.063
<i>Infrastructure<sup>e</sup></i>				
Bottledwater	0.308	0.262	1.154	0.987
Tap	0.232***	0.088	0.681**	0.309
Pump	0.249**	0.108	0.797**	0.388
Protwell	0.270**	0.132	0.853*	0.497
Unprotwell	0.289***	0.097	0.879***	0.341
Protspring	0.230**	0.113	0.699*	0.396
Unprotspring	0.260***	0.088	0.785**	0.305
River	0.213*	0.126	0.525	0.454
Flush	0.102	0.153	0.402	0.571
Latrine	0.106	0.108	0.346	0.392
Bucket	0.095	0.113	0.237	0.407
Notoilet	0.030	0.106	0.023	0.384
Mosquito	0.049	0.033	0.179	0.125
<i>Status in Community</i>				
Social	0.067	0.060	0.252	0.213
Head	-0.009	0.028	-0.048	0.101
Speakindonesian	0.099***	0.031	0.353***	0.110
Speaktetum	0.037	0.045	0.160	0.168
Tetum	0.243***	0.055	0.919***	0.217
<i>Rights</i>				
Rights	0.032***	0.011	0.124***	0.043
Suco dummy variables	Yes		Yes	

Constant	1.315***	0.319		
Cut1			1.247	1.067
Cut2			3.950	1.069
F/Chi-Squared	17.06		9662.21	
R <sup>2</sup> /Pseudo R <sup>2</sup>	0.3886		0.2385	
Observations	5057		5057	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Standard errors clustered by households

Omitted Base Case:

- a. nevermarried
- b. otherjob
- c. no educ
- d. otherdwelling
- e. otherwater and othertoilet

The estimates from the OLS and ordered logit models are fairly similar in respect to sign and significance. The only variables that change in sign between the two models are divorced and bamboo. However, these variables are not statistically significant in either model. In the ordered logit model, being in the civil service is statistically significant but it is not in the OLS model. Housewife, small compound and river are significant in the OLS model but not in the ordered logit model. All other variables have similar sign and significance between the two models. Because ordered logit coefficients are not directly interpretable, OLS coefficients will be interpreted first. Discussion of the marginal effects (Table 6) from the ordered model will follow.

Overall, results seem to follow a general subjective well-being model fairly well. Age is u-shaped following previous literature. Household size is positive suggesting the larger the household, the better off the individual. Being married, however, appears to be negative compared with the omitted variable of never being married. However, this is not statistically significant. The one variable representing the category for health is positive. This will be used as the health variable in the restricted model. Likewise, how many rights an individual perceives they have is strongly significant and positive. This is the variable that will represent political participation.

Being employed is significant and positive just as expected. Being employed increases subjective well-being by 0.089 points on average, all else equal. This variable will be used to

represent the category for employment since it is both theoretically and empirically a better predictor of overall employment than one single sector of the economy. However, certain sectors should not be dismissed entirely from discussion as they provide interesting aspects of East Timor. For example, being a farmer reduced subjective well-being by 0.046 points on average as compared with the omitted category of other job. The only two sectors (out of ten) worse off than being a farmer are being a trader or being a skilled worker. This is especially interesting as a large proportion of the population consider themselves to be farmers or to be a part of the agricultural environment.

However, there is some explanation as to why the agricultural sector has such a low coefficient in the models. Poverty is found most in rural areas in East Timor suggesting the possibility that people in rural jobs are worse off than those with jobs in the urban sectors. In addition, the traditional benefits of living in an urban area include easier access to services such as clinics, schools, and utilities. Urban living became much more desirable after the referendum; for instance, the population of Dili almost doubled between mid-1999 and 2002. This suggests that when compared with urban jobs, it is possible that the agricultural lifestyle has become less appealing (World Bank, 2002).

The two sectors that are most likely to increase subjective well-being are education and the civil service. Being a teacher increases subjective well-being by 0.138 points on average and being employed by the civil service increases subjective well-being by 0.122 points on average compared with the omitted category. Being a teacher is significant in both models and being in the civil service is significant in the ordered logit model. The large and positive effect of these sectors is consistent with the developing roles of education and the civil service during this time period.

As a result of the end of the Indonesian rule, many of the skilled workers in the public sector departed. In addition, the original 26,000 employees of the public sector under Indonesian rule were downsized dramatically to less than half its pre-referendum level. As a result, public sector salaries increased drastically to a median of eight to ten times East Timor's per capita GDP. The World Bank (2002, p. 113) explains "Those employed in the civil service, even at the lower levels, are well off relative to the majority of the population."

Like the civil service, there existed a similar shortage in the teaching supply after the Indonesian departure. In 1999, East Timorese made up a majority of primary school teachers (78 percent) but only three percent of junior secondary and eight percent of senior secondary teaching supply. There is an obvious shortage and need for higher-level educators during this time period. As a result primary school teachers that did well on a national test of knowledge and interested university graduates were chosen to fill the positions for higher education (World Bank, 2002). The positive and statistically significant coefficient for being a teacher may therefore be explained by the high demand of upper-level teachers.

Initially the variables for education are surprising. Being literate is negative. However, it is not significant in both models. In addition, compared with the omitted variable of no education, having attended primary or junior secondary school will negatively affect an individual's overall well-being. Primary education decreases subjective well-being by 0.023 points and junior secondary decreases it by 0.043 points on average. On the other hand, attending senior secondary or above will positively affect overall well-being. Although all education variables were not statistically significant, it is interesting that having no education and having higher-level education are both superior to basic education.

One possible reason for this is that the labor market worsened during this time period. The urban unemployment rate was 11 percent for those without any education but it was much



higher for those with primary education or lower secondary education (17 percent and 27 percent, respectively). This shows support for the model's negative coefficients for lower education. However, the urban unemployment rate was actually just as bad for higher education. Twenty-four percent of those with upper secondary education or more were unemployed in the urban areas (Richter, 2008 p. 377).

Despite these urban unemployment numbers, the World Bank (2002 p. 65) explains that "The private returns to higher levels of education in East Timor (as in most countries) are very high. One World Bank estimate for the private return to tertiary education in East Timor compared to 'no education' was over 100 percent immediately prior to disturbances." In addition, similar to the benefits of being in the civil service or being a teacher, a shortage of skilled employees exists in East Timor resulting from the departure of the Indonesian workforce. There were large wage increases for those with higher education. In addition, large skill shortages are expected to last for years. These skill shortages "will place continued pressure on skilled wages and mean that private returns to education will have increased significantly and will be sustained for some time" (World Bank, 2002, p. 65).

Determining the variable to best represent education is difficult because of the negative returns to education at the lower levels. However, because the questions on perceptions of overall well-being do not specify which level of education is meant, an indicator variable is created to represent having any level of education. One must keep in mind that this is an imperfect measure of education as higher levels of education are much better for subjective well-being than low levels of education. Therefore this will be examined more closely with different specifications of the model.

The category for housing has many variables including six dummy variables for type of housing. The indicator variables for type of dwelling do not provide a clear basis that one type of

dwelling can serve as a proxy for the category of housing. Living in a bamboo, semi-permanent, or traditional dwelling are much more likely to increase subjective well-being than living in a small compound, permanent house, or emergency dwelling – although the latter three variables are the only statistically significant variables for type of dwelling. The other two variables, area of the dwelling and condition of the dwelling are both not statistically significant. However, the coefficient for area of dwelling is very small while improving the condition of the dwelling increases subjective well-being by 0.026 points. Because of this, and by the fact that condition of the dwelling is a better indicator of the overall quality of the living situation than the size of the housing, condition of dwelling will be used to represent the category for housing.

Demand for products produces interesting results. As expected from a relatively poor nation, both perceptions of relative income and actual relative income are positive; yet only the perceptions of relative income are statistically significant. In addition, the coefficient for perceptions of relative income is much larger than actual relative income which is similar to Posel and Casale's (2010) study of relative income in South Africa. Perceiving to be one step higher on the income ladder increases subjective well-being by 0.068 points but actual income only increases subjective well-being by only 0.007 points on average. The most interesting finding from this is that perceptions of relative income are so important in the model to increase life satisfaction despite the fact that these perceptions are extremely different from reality. Initially these perceptions were so different that an assumption was made that individuals simply did not understand the question. However, the model suggests that the East Timorese are aware of their perceptions of their relative income and these perceptions are a better indicator than actual relative income for measuring overall subjective well-being.

As interesting as the results are for relative income, the restricted model for subjective well-being will focus on absolute expenditure. This variable is statistically significant and a one

dollar (10,000 Rupiah) increase in expenditure increases subjective well-being by 0.003 points on average. This variable is the most reliable source of demand for products in the model. However, specifications will be chosen to examine relative income as well.

Of the infrastructure variables, with the exception of bottled water all of the dummy variables for access to water are statistically significant. All of the estimates for access to services are not statistically significant therefore they will not be used in the final, restricted model. Therefore, the fifteen original variables are reduced to ten. As there is not one clear variable that can represent this category, a strategy to make a scale for infrastructure is formed. For sources of drinking water, the CIA World Factbook (2012) defines improved drinking water sources. Some relevant examples are piped water, public tap, protected well, or protected spring. Relevant examples of unimproved drinking water sources are unprotected wells or springs, surface water such as rivers and lakes, or bottled water. Therefore, any individual that falls into one of the improved water sources gets one point. Similarly, any individual that has recently used a mosquito net gets an additional point for infrastructure. Therefore, the variable for infrastructure will run from zero to two and is dependent on water source and ownership of a mosquito net. Because recent use of a mosquito net is not statistically significant, the model will also be examined without this variable influencing the scale as well.

Originally, whether or not an individual was the head of the household seemed to be the best representative for status in community. However, this variable is insignificant. The only two significant variables in this category are whether or not an individual speaks Indonesian, increasing subjective well-being by 0.099 points, and if Tetum is their mother tongue, with a positive coefficient of 0.243. Although Indonesian is not an official language, it has the status of a working language under the Constitution and it was the official language during Indonesian rule. This signifies not only frequent use of the language but common usage among the

educated and the professionals (Taylor-Leech, 2009). As mentioned before, Richter (2008) found evidence that those with the mother tongue of Tetum felt empowered after their native tongue was chosen as an official language. In addition, East Timor is a linguistically diverse culture in which communities favor their own language for ethnic identity (Hicks, 2007). Therefore, an individual gets one point for speaking Indonesian, representing access to information, and one point for having Tetum as a mother tongue, representing social identity.

Because ordered logit coefficients are not directly interpretable, marginal effects are in Table 6. Estimates are given for each possible category of subjective well-being (dissatisfied, neutral, or satisfied). Estimates represent the percentage change in the probability of that response from a one unit change in the independent variable. This is calculated as the mean of the marginal effect over each individual. For example, being employed increases the probability that an individual responded satisfied by 5 percentage points on average. Having attended primary school increases the probability of being dissatisfied with subjective well-being by 0.6 percentage points on average.

Table 6: Ordered logit marginal effects

VARIABLE	Dissatisfied	Neutral	Satisfied
Male	-0.005	-0.002	0.007
Age	0.002	0.001	-0.002
Age <sup>2</sup>	-0.000 **	-0.000 **	0.000 **
Married	0.023	0.011	-0.034
Widow	0.023	0.011	-0.033
Divorced	-0.001	-0.001	0.002
Hhsize	-0.006 *	-0.003 *	0.008 *
Employed	-0.034 ***	-0.016 ***	0.050 ***
Farmer	0.021	0.010	-0.031
Student	-0.001	-0.000	0.001
Nonfarm	-0.013	-0.006	0.019
Trader	0.040	0.019	-0.059
Skilled	0.012	0.006	-0.017
Civil	-0.067 *	-0.032 *	0.099 *
Teacher	-0.061 **	-0.029 **	0.090 **
Pensioner	0.020	0.010	-0.030

Housewife	-0.024	-0.011	0.036
Health	-0.011	-0.005	0.016
Literate	0.013	0.006	-0.018
Primary	0.006	0.003	-0.008
Junsecond	0.014	0.007	-0.021
Sensecond	-0.009	-0.004	0.014
University	-0.026	-0.012	0.038
Bamboo	-0.002	-0.001	0.003
Semipermanent	0.022	0.010	-0.032
Traditional	0.021	0.010	-0.031
Smallcompound	0.209	0.099	-0.308
Permanent	0.082*	0.039*	-0.121*
Emergency	0.080*	0.038*	-0.118*
Area	-0.000	-0.000	0.000
Condwell	-0.013	-0.006	0.019
Expenditure	-0.001***	-0.001***	0.002***
Rankexpend	-0.001	-0.001	0.002
Rich	-0.028***	-0.013***	0.041***
Bottledwater	-0.128	-0.061	0.189
Tap	-0.075**	-0.036**	0.111**
Pump	-0.088**	-0.042**	0.130**
Protwell	-0.094*	-0.045*	0.139*
Unprotwell	-0.097**	-0.046**	0.144***
Protspring	-0.077*	-0.037*	0.114*
Unprotspring	-0.087**	-0.041**	0.128**
River	-0.058	-0.028	0.086
Flush	-0.045	-0.021	0.066
Latrine	-0.038	-0.018	0.056
Bucket	-0.026	-0.012	0.039
Notoilet	-0.002	-0.001	0.004
Mosquito	-0.020	-0.009	0.029
Social	-0.028	-0.013	0.041
Head	0.005	0.003	-0.008
Speakindonesian	-0.039***	-0.019***	0.058***
Speaktetum	-0.018	-0.008	0.026
Tetum	-0.102***	-0.048***	0.150***
Rights	-0.014***	-0.007***	0.020***
Suco dummies	Yes	Yes	Yes
Observations	5057	5057	5057

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

These marginal effects further emphasize that the linear and ordered models are similar. Positive coefficients in the linear model coincide with a negative marginal effect for being unsatisfied with life and a positive marginal effect for being satisfied with life. Negative

coefficients coincide with positive marginal effects for being unsatisfied with life and negative marginal effects for being satisfied with life.

## 7. Restricted Subjective Well-Being Model

The restricted linear and the restricted ordered subjective well-being models are shown in Table 7 with the original demographic variables (with suco dummies omitted from the table). The variables are now limited to the eight variables representing the eight categories for life satisfaction. They are listed in the order of importance of the perceptions of individual life satisfaction. Standard errors remain clustered by households. The first column of results is the unstandardized coefficients of the linear model in order to interpret the results more clearly. The second column shows the fully standardized coefficients in order to rank the variables. Standardized coefficients can be interpreted as for every one standard deviation increase in the independent variable, the dependent variable increases by  $\beta_k$  standard deviations. The third column lists the empirical rank of the absolute value of coefficients. The absolute value of the coefficients is chosen to examine as this study is interested in the strength of the determinant first and foremost. Similar results can be found in the fourth, fifth, and sixth column for the ordered logit results.

Table 7: Restricted OLS and restricted ordered logit results

VARIABLE	OLS			Ordered Logit		
	UnStd $\beta$	Std $\beta$	Rank	UnStd $\beta$	Std $\beta$	Rank
Male	-0.047*** (0.018)	-0.032		-0.146** (0.060)	-0.020	
Age	-0.003 (0.004)	-0.052		-0.008 (0.013)	-0.032	
Age <sup>2</sup>	0.000* (0.000)	0.128		0.000* (0.000)	0.085	
Married	-0.041 (0.037)	-0.028		-0.130 (0.128)	-0.018	
Widow	-0.086* (0.051)	-0.034		-0.256 (0.174)	-0.021	
Divorced	-0.030 (0.087)	-0.004		-0.068 (0.302)	-0.002	
Hhsize	0.016** (0.007)	0.060		0.056** (0.025)	0.043	

Employed	0.054** (0.021)	0.036	5	0.174** (0.074)	0.024	5
Health	0.033 (0.021)	0.0269	7	0.115 (0.070)	0.019	7
Education	-0.040 (0.027)	-0.0268	8	-0.128 (0.093)	-0.018	8
Condwell	0.026 (0.022)	0.029	6	0.094 (0.079)	0.022	6
Expenditure	0.003*** (0.001)	0.114	2	0.012*** (0.003)	0.088	2
Infrastructure	0.041 (0.026)	0.040	4	0.131 (0.090)	0.026	4
Status	0.173*** (0.029)	0.156	1	0.605*** (0.103)	0.112	1
Rights	0.046*** (0.011)	0.109	3	0.181*** (0.043)	0.087	3
Suco dummies	Yes	Yes		Yes	Yes	
Constant	1.700*** (0.261)			-		
Cut1	-			0.025 (0.827)		
Cut2	-			2.648 (0.826)		
F/Chi-Squared	29.04			10478.70		
R <sup>2</sup> /Pseudo R <sup>2</sup>	0.3656			0.2209		
Observations	5057			5057		

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Standard errors in parentheses.

Standard errors clustered by households.

The first point of interest from the restricted models is that they are fairly consistent to the full subjective well-being models from Table 5. The only demographic variable to change sign is the variable for male. However, research finds that gender doesn't necessarily matter when it comes to subjective well-being models and not considered a concern. Education had two positive and two negative coefficients when it was represented by four variables in the full model. In this restricted model education becomes negative suggesting that less education has more of an effect on subjective well-being in East Timor than higher education. All other variables are of expected sign according to the previous models. Significance is similar between the full model and the restricted models as well with the exception of infrastructure.



There is minimal difference between the linear and ordered restricted models. Sign and significance is the same for each coefficient. In addition, the order of the rankings is identical between the two models. According to the model, the order of the determinants that have the largest effect to the smallest effect on subjective well-being is: status in community, demand for products (expenditure), political participation (rights), infrastructure, employment, housing (condition of dwelling), health, and education.

Marginal effects for the restricted models are in Table 8. This is in order to interpret the ordered logit coefficients. Interesting results from the ordered model show that having any education decreases the likelihood of being satisfied with subjective well-being by 2.2 percentage points – the same amount that the category for infrastructure improves an individual’s chances of being satisfied with subjective well-being. In addition, marginal effects show that improving one’s status (speaking Indonesian or having Tetum as a mother tongue) increases the probability of life satisfaction by a much larger percentage point than any other category.

Table 8: OLS and ordered logit marginal effects

Coefficient	OLS	Ordered Logit Marginal Effects		
	B	Dissatisfied	Neutral	Satisfied
Male	-0.047 <sup>***</sup>	0.017 <sup>**</sup>	0.008 <sup>**</sup>	-0.025 <sup>**</sup>
Age	-0.003	0.001	0.000	-0.001
Age <sup>2</sup>	0.000 <sup>*</sup>	-0.000 <sup>*</sup>	-0.000 <sup>*</sup>	0.000 <sup>*</sup>
Married	-0.041	0.015	0.007	-0.022
Widow	-0.086 <sup>*</sup>	0.029	0.014	-0.043
Divorced	-0.030	0.008	0.004	-0.012
Hhsize	0.016 <sup>**</sup>	-0.006 <sup>**</sup>	-0.003 <sup>**</sup>	0.009 <sup>**</sup>
Employed	0.054 <sup>**</sup>	-0.020 <sup>**</sup>	-0.010 <sup>**</sup>	0.029 <sup>**</sup>
Health	0.033	-0.013	-0.006	0.019
Education	-0.040	0.015	0.007	-0.022
Condwell	0.026	-0.011	-0.005	0.016
Expenditure	0.003 <sup>***</sup>	-0.001 <sup>***</sup>	-0.001 <sup>***</sup>	0.002 <sup>***</sup>
Infrastructure	0.041	-0.015	-0.007	0.022
Status	0.173 <sup>***</sup>	-0.069 <sup>***</sup>	-0.034 <sup>***</sup>	0.102 <sup>***</sup>
Rights	0.046 <sup>***</sup>	-0.020 <sup>***</sup>	-0.010 <sup>***</sup>	0.031 <sup>***</sup>
Suco dummies	Yes	Yes	Yes	Yes

Constant	1.700 <sup>***</sup>			
Observations	5057	5057	5057	5057

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Comparisons of the rankings can be found in Table 9. The first column shows the rankings and the frequencies for the response to the survey question “What is most important for improving your living standards?” The second column shows the rankings and frequencies for the survey questions “What is most important for improving living standards in East Timor?” The third column lists the ranking of the linear model and the standardized coefficients. The fourth column displays rankings and standardized coefficients of the ordered logit model.

This table shows some interesting yet unexpected results. Looking closely at the results, they are almost opposite of what was expected. The top four determinants from both individual and national perceptions (employment, health care, education, and housing) correspond to the four least important determinants from the empirical results of the models. Furthermore, demand for products, status in community and political participation are the only variables in the model significant at the one percent level, yet they are relatively unimportant according to perceptions. Employed is the only other statistically significant variable.

Table 9: Rank comparisons between: perceptions of individual life satisfaction, perceptions of national life satisfaction, OLS standardized coefficients, and ordered logit standardized coefficients

	Individual Perceptions		East Timor Perceptions		OLS		Ordered Logit	
	Rank	Freq	Rank	Freq	Rank	Std $\beta$	Rank	Std $\beta$
Employment	1	3,145	2	2,317	5	0.036	5	0.024
Health Care	2	1,732	3	1,826	7	0.0269	7	0.019
Education	3	1,528	1	3,517	8	-0.0268	8	-0.018
Housing	4	1,181	4	402	6	0.029	6	0.022
Demand for Products	5	1,072	5	346	2	0.114	2	0.088

Infrastructure	6	453	6	329	4	0.040	4	0.026
Status in Community	7	88	8	48	1	0.156	1	0.112
Political Participation	8	81	7	140	3	0.109	3	0.087

Furthermore, while education ranks first for improving life satisfaction for East Timor, it is ranked last in both the ordered logit model and the OLS model. Health is ranked second most important for individual perceptions, but it is ranked second to last in the models. Status in community is ranked seventh for perceptions of individual well-being and last for perceptions of national well-being but it is ranked first in both models with a large and statistically significant standardized coefficient.

To statistically measure the difference between perceptions and the empirical model the Kendall Coefficient of Concordance ( $w$ ) is calculated. Kendall's coefficient expresses the degree of association among  $k$  sets of rankings. The coefficient ranges from 0 implying no agreement between the raters and 1, full agreement between then raters. The null hypothesis is that there is no agreement between the raters (Siegel and Castellan, 1988).

In this case, the four tests (perceptions of individual and national well-being, the OLS standardized results, and the ordered logit standardized results) are the raters ( $k=4$ ). The objects being ranked are the eight categories of interest ( $N=8$ ). Comparing all four tests give a Kendall coefficient of 0.0952 implying that there is little agreement between the four tests. Furthermore, the p-value is large at  $p=0.9140$  and fails to reject the null hypothesis implying that there is no agreement between perceptions and empirical measures. Table 10 provides the Kendall coefficient and the corresponding p-value comparing just two categories at a time. Notice that any perception measure compared to an empirical measure gives a very low Kendall's coefficient ( $w$ ) and a very high p-value statistically showing that the rankings of perceptions do not match the rankings of the empirical model for subjective well-being.

Furthermore, comparing the two perceptions lists gives a high Kendall's coefficient and low p-value suggesting that the people of East Timor believe that what is important for improving individual well-being is similar to improving national well-being. A coefficient of one is found when comparing the empirical measures as the results are the same between the ordered logit and OLS model.

Table 10: Kendall's Coefficient of Concordance

	Individual Perceptions	East Timor Perceptions	OLS
East Timor Perceptions	w=0.9524 p=0.0644		
OLS	w=0.1429 p=0.9598	w=0.0714 p=0.9948	
Ordered Logit	w=0.1429 p=0.9598	w=0.0714 p=0.9948	w=1.000 p=0.0512

Status in the community is one category that stands out in the results. It is the largest empirical contributor to increasing subjective well-being with a one standard deviation increase in status leading to an increase in subjective well-being of 0.156 standard deviations in the linear model and increases the perception of subjective well-being by 0.112 standard deviations in the ordered model. Furthermore, there is a relatively large difference between this first ranked variable in the model to the last ranked variable. In the linear model, a one standard deviation increase in status in community raises subjective well-being by 0.129 standard deviations more than the lowest ranked category, education, and in the ordered model it raises the perception of subjective well-being by 0.094 standard deviations more than the education.

This is especially surprising when compared with the frequencies of the rankings of perceptions. There is a similar sized but opposite difference in the frequencies between status in the community and education and health. Of the respondents, 17 percent believe health to be the most important and 15 percent believe education to be the most important for improving

individual well-being. For perceptions on improving national well-being, education is the number one ranked category for improving life satisfaction with 3,517 people (35 percent) choosing this response while health was chosen by 1,826 respondents (18 percent). In comparison, there are only 88 people (less than one percent of the respondents) that believe status is the most important for increasing their own overall well-being and only 48 people (less than half a percent) believe it is important for their national well-being.

The difference in the very significant and large standardized coefficient for status in community and the frequency at which people believe this category is important raises some questions as to whether or not speaking Indonesian and Tetum as a mother tongue are good proxies for this category. Yet Indonesian is a working language in East Timor signifying higher education and economic success. In addition, Tetum is a tie to the importance of status in regard ethnic identity. And while the literature is limited for the importance of social status and how it is defined in East Timor, there is a modest amount of literature on language status and ethno-linguistic culture in East Timor placing more emphasis on the fact that mother tongue is a contributing factor to feelings of overall status.

Without a deeper understanding of East Timor's culture, it is difficult to justify an exact reason to why these variables for status are significant in the model. Yet further specification shows that they are extremely important to subjective well-being. Table 11 shows an ordered logit model of the same variables except that status is separated into the two variables that comprise it: ability to speak Indonesian and Tetum as a mother tongue (unstandardized coefficients for the OLS model and marginal effects for the ordered logit model can be found in Appendix B). Results show that Tetum is still the first most important variable as a one standard deviation increase in this variable increases the perception of subjective well-being by 0.097 standard deviations (compared with demand for products, still ranked second, with a coefficient

of 0.088). Speaking Indonesian fell to the fourth most important variable with a one standard deviation increase in the ability to speak Indonesian leading to a 0.055 standard deviation increase in the perception of subjective well-being. The constant strength of the coefficient for speaking Tetum further emphasizes the idea that this specific linguistic group benefited from the aftermath of the 1999 uprising. And while speaking Indonesian is not as important as having Tetum as a mother tongue, the standardized coefficient is still much greater than the coefficients for infrastructure, employment, health, housing, and education. Both variables remained statistically significant.

In addition to status in community, it is interesting to emphasize that the second most important variable in the restricted model is demand for products represented by expenditure. Like status, this variable is statistically significant and positive. Expenditure can be seen as important by the traditional means of purchasing power or by an alternative form of measuring status through wealth. The idea that the income variable can be a separate form of status is further justified by the previous and complete subjective well-being model in which the positive coefficient on relative income suggests that individuals with a larger relative income compared with others have higher levels of life satisfaction. Results from Table 11 show the rankings if the model used the variable for rich and the variable for actual expenditure rank in the place of absolute expenditure. This is to determine if this restricted model has similar results for relative income as the full model. Unstandardized coefficients and marginal effects for this specification can be found in Appendix C.

Results from the revised model for income show standardized coefficients for the ordered logit model. Demand for products remains the second most important category when perceptions of relative income is used as the proxy for this category. A one standard deviation increase in perceptions of richness increases the perception of subjective well-being by 0.088

standard deviations on average. This variable remains significant at the one percent level. However, using the actual income rank decreases the size of this standardized coefficient and it becomes third in the rankings. This is to be expected as in the full model (Table 5) actual rank was not significantly important and had a much smaller coefficient than perceptions of richness.

The difference between perceptions of relative income compared with actual rank in relative income may be due to how the question for perceptions of relative income was worded on the survey. The measure for perceptions of relative income was taken from the question on the survey that asked “imagine a 9-step ladder where on the bottom, the first step, stand the poorest people, and on the highest step stand the rich. On which step are you today?” The question asked about being rich and poor rather than directly asking about income. Family, friends, accomplishments and simply overall happiness may have contributed to how rich an individual felt. Therefore the East Timorese may have interpreted their richness not as a measure of monetary wealth but as a measure of their overall quality of life. This distinction between the two may be a main contribution to the difference between perceptions and actual rank of the relative income measures.

Table 11: Specifications for restricted ordered logit model:

(1) status is separate variables: speak Indonesian and mother tongue as Tetum

(2) demand for products is captured by the variable rich

(3) demand for products is captured by the variable rankexpend

VARIABLE	(1)		(2)		(3)	
	Std $\beta$	Rank	Std $\beta$	Rank	Std $\beta$	Rank
Male	-0.017**		-0.019**		-0.019**	
Age	-0.038		-0.025		-0.021	
Age <sup>2</sup>	0.084*		0.082*		0.075	
Married	-0.016		-0.021		-0.018	
Widow	-0.021		-0.019		-0.022	
Divorced	-0.002		-0.003		-0.003	
Hhsize	0.041**		0.004		0.038*	
Employed	0.024**	6	0.022**	6	0.022**	6
Health	0.020*	8	0.019	7	0.020*	7
Education	-0.009	9	-0.018	8	-0.018	8

Condwell Expenditure	0.021	7	0.032*	4	0.024	5
Rich	0.088***	2	-		-	
Rankexpend	-		0.088***	2	-	
Infrastructure	-		-		0.066**	3
Status	0.026	5	0.031*	5	0.026	4
Speakindonesian	-		0.118***	1	0.114***	1
Tetum	0.055***	4	-		-	
Rights	0.097***	1	-		-	
	0.086***	3	0.067***	3	0.087***	2
Suco dummies	Yes		Yes		Yes	
Chi-squared	10339.82		10318.61		10589.26	
Observations	5057		5057		5057	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The third most important variable, political participation, follows in a similar way to status in community and demand for products (under the assumption that this variable is a form of status). Political participation is measured as where a person perceives they rank on a nine-step ladder where on the bottom are the people without any rights and the top were the people with a lot of power. Like status, this may be an imperfect proxy for political participation. However, whether or not it can properly capture political participation, it is interesting to point out that these three most important categories in the models have much higher standardized coefficients than the five lower ranked categories from the models. Status in community, demand for products, and political participation have ordered logit standardized coefficients of 0.112, 0.088, and 0.087, respectfully. The fourth ranked variable, infrastructure, has a coefficient 0.061 standard deviations lower than the three highest ranked variables. In addition these five lower ranked variables in the model have a much smaller spread between them ranging from the eighth ranked variable, education, with an absolute valued standardized coefficient of 0.018 to the fifth ranked variable, infrastructure, with a standardized coefficient of 0.026. When comparing absolute values, this is less than a 0.01 standard deviation difference whereas there is almost an entire tenth of standard deviation spread between the number one ranked variable, status in community to the last ranked variable, health care. Table 12 lists the



variables from the ordered logit model in order of importance according to this model. Standardized coefficients and the differences between them are given for clarity. It is important to notice from this table the large difference between political participation and infrastructure – it shows the separation between the three most important variables (status, demand for products, political participation) and the five least important variables (infrastructure, employment, housing, health care, education).

Table 12: Differences in standardized coefficient for the restricted ordered logit

Category	Standardized $\beta$	Difference between standardized $\beta$ s
Status	0.112	-
Demand for Products	0.088	0.024
Political Participation	0.087	0.001
Infrastructure	0.026	0.061
Employment	0.024	0.002
Housing	0.022	0.002
Health Care	0.019	0.003
Education	0.018	0.001

The large variation of the three highest coefficients compared with the five lowest coefficients in the model is especially noteworthy as there is a similar, yet opposite spread in the rankings of perceptions. Table 13 shows the categories listed in the same order as Table 12 (in the order of relative importance from the ordered model). It is clear to see that the top three determinants from the ordered model correspond to very low preferences from the people of East Timor. Status in community and political participation are viewed as important to less than one percent of the population for improving individual subjective well-being. For perceptions of improving national well-being, this holds true for status in community and is just over one percent for political participation. In addition, demand for products is considered relatively

unimportant for national well-being with only 346 respondents choosing this (it is much more important for perceptions of improving individual well-being).

Table 13: Response percentages for perceptions of subjective well-being

Category	Individual		East Timor	
	Frequency	Percent	Frequency	Percent
Status	88	0.88%	48	0.48%
Demand for Products	1072	10.68%	346	3.44%
Political Participation	81	0.81%	140	1.39%
Infrastructure	453	4.51%	329	3.27%
Employment	3145	31.34%	2317	23.05%
Housing	1181	11.77%	402	4.00%
Health Care	1732	17.26%	1826	18.17%
Education	1528	15.23%	3517	34.99%

So why the discrepancy between the two lists? It is possible that some of the differences between perceptions and empirical results of life satisfaction may be that pride or a sense of being humble deters one from admitting that feelings of importance matter. Status may matter greatly to people but many may be too humble to acknowledge this. This could be cultural. Or it is even possible that individuals do not realize that their status is such an important factor to their overall life satisfaction. Employment, level of education, and type of dwelling are variables that can be directly observed; neighbors and friends know each other's employment status, they know what level of education they have accomplished and the appearance of one's dwelling is public knowledge. Status and relative power, on the other hand, are subjective feelings to each person. So while people perceive that the things they can directly see and observe influence subjective well-being the most, the model suggests it is subjective feelings of status and power that have the greatest effect on subjective well-being.

Another possible reason for the discrepancy in status between the lists is that this variable may be correlated to other elements of subjective well-being specifically education and employment. Status is represented by two language indicators. As mentioned before, speaking

the working language of Indonesian is tied to higher academic and economic success. Therefore this variable in the model may be capturing some of the effects of education and employment. This makes theoretical sense as well. One's status can be earned or acquired through accomplishments. A career may define a person; the level of education achieved brought this person to that career. With this reasoning, education and employment are perceived to be important in improving life satisfaction but it is status that captures these factors in the subjective well-being model.

Focusing now on the lower five categories of the models (infrastructure, employment, education, housing, and health care) provides for some interesting discussion as well. These five lowest variables have relatively similar sized coefficients ranging from 0.018 to 0.026 in the ordered model. This small range in standardized coefficients is different than the relatively large range in frequency of perceptions. There is over a 25 percent difference in frequency between people who believe infrastructure is most important to people who believe employment is the most important for improving individual life satisfaction. There is over a 30 percent difference in frequency between people that believe infrastructure to be most important and the people that believe education to be most important in improving life satisfaction for East Timor.

The results expected to be the least correlated between the rankings of perception and the rankings of the model was the results for education. Education is believed to be the most important determinant to affect national well-being and the third most important for improving individual well-being. However, previous studies typically suggest that the coefficient for education is much smaller than it should be as some of the strength of the coefficient is captured through better health, better employment, and so on. Therefore, education was expected to, and actually did rank poorly in the model as compared with rankings of perceptions. Education was ranked last in both of the models. Yet the representative variable in

this restricted model is an imperfect measure of education as the full subjective well-being model suggested that lower education has a completely different effect on life satisfaction than higher education. Therefore education is separated into two variables in the model to determine the effects of just having the basic education.

Results are shown in Table 14. Linear unstandardized coefficients and ordered logit marginal effects can be found in Appendix D. Lower education (*lowereduc*) is a dummy variable for having attended primary or junior secondary education and higher education (*highereduc*) is represented by having attended senior secondary or university level education. By separating the variables for education so that the positive effect of higher education cannot positively influence the negative effect of lower education, a much stronger coefficient is found for lower education. The absolute value of lower education is now the fifth most important indicator for life satisfaction in the model and by itself becomes statistically significant. It is also the only variable of the categories in the restricted model to negatively influence subjective well-being. Higher education remains insignificant with a small coefficient. However, it remains positive. From studying East Timor culture, it is safe to assume that a higher education is going to have immediate and positive effects on an individual. Therefore it is possible that the higher education variable does not match the perceptions ranking as its positive effects are captured through other factors.

However, one of the variables that education is assumed to be captured in is health – yet health is ranked just as low in the empirical rankings as education. Health is ranked second to last in the models suggesting very low importance in improving life satisfaction. A one standard deviation increase in health increases the perception of subjective well-being by only 0.019 standard deviations. It is not statistically significant. In contrast, health is generally believed to be one of the most important factors for improving subjective well-being. From the

survey, health is perceived to be the second most important concept for improving life satisfaction for individuals and is perceived to be the third most important for improving the national well-being.

Although subjective measures of health are considered to be better indicators of subjective well-being than objective measures of health, there are some problems with the subjective measure that may be affecting the relatively low importance of health in the model. Helliwell (2003) suggests that the subjective health coefficient may be biased by personality differences. In addition Klasen (1997) further describes that subjective health measures are biased as the better educated and objectively healthy people are more aware of and tend to report relatively minor health issues compared with poorer individuals that tend to underreport negative health. As East Timor is a poor country in general, subjective health in this model may affect overall health in a similar way. Whether or not this is true, it is clear that the model does not capture the same importance of health as the list of perceptions does.

Perceptions of the importance of infrastructure are relatively similar between the two lists of individual and national well-being ranking sixth in both lists. However, it is the category that has the most variation between the lists of perceptions and empirical ranking in the lower five categories. In absolute terms, the rankings are fairly close as infrastructure placed fourth in the model but sixth in perceptions. However, examining these lower five categories only, infrastructure ranks number one in the empirical results but it ranks fifth for perceptions. In addition employment, health care, and education have a much higher frequency for perceptions than infrastructure does. Table 13 shows that infrastructure is considered important for improving individual subjective well-being by 4.5 percent of the sample and important for improving life satisfaction in East Timor by 3 percent. In contrast, employment, health care, and education are considered important for improving individual life satisfaction by 31 percent, 17

percent, and 15 percent, respectively, and for improving national well-being by 23 percent, 18 percent, and 35 percent, respectively.

It makes theoretical sense that infrastructure is important for improving life satisfaction. First of all, much of the infrastructure was destroyed in 1999 affecting many aspects of daily life. The destruction of roads blocked the access to the port and the airport as well as other services and interfered with the transportation of agricultural products. Frequent power outages occurred as much of the electrical grid was destroyed (World Bank, 2002, p. 22). Safe and healthy access to drinking water and the ownership of a mosquito net, both used in this restricted model, have a direct effect on well-being. Without proper infrastructure, many other aspects of life are affected.

In this model, it is safe to assume that access to drinking water is a better proxy to infrastructure than whether or not a person slept under a mosquito net last night. Recent use of a mosquito net is important, but it is not always considered infrastructure. In addition, it was not statistically significant in the full model. Table 14 lists the ordered logit results with infrastructure split into two indicators: access to water and recent use of mosquito net (unstandardized linear coefficients and ordered logit marginal effects are listed in Appendix E). This changes the coefficient for the category drastically. Access to water becomes very unimportant. It is insignificant in the new restricted model with a small coefficient. A one standard deviation increase in this variable increases the perception of subjective well-being by only 0.001 standard deviations, lower than any other category. In contrast, recent use of a mosquito net becomes statistically significant and remains as the fourth most important variable for improving subjective well-being in the model. Therefore having slept under a mosquito net is the variable driving the relative importance of infrastructure. This is not the best indicator for capturing infrastructure by itself and the small coefficient for access to water may be more

accurate. Therefore, when looking just at access to water as a proxy for infrastructure, perceptions and empirical measures of life satisfaction are closer than they originally appeared. This leads to infrastructure being relatively unimportant to life satisfaction both through individual opinion and through the restricted model.

Table 14: Specifications for restricted ordered logit model:

(1) education is separate variables: lowereduc and highereduc

(2) infrastructure is separate variables: water and mosquito

Variable	(1)	Rank	(2)	Rank
Male	-0.021**		-0.020**	
Age	-0.040		-0.030	
Age <sup>2</sup>	0.094*		0.085*	
Married	-0.016		-0.021	
Widow	-0.019		-0.022	
Divorced	-0.001		-0.002	
Hhsize	0.044**		0.045**	
Employed	0.024**	6	0.024**	5
Health	0.019	8	0.019	7
Education	-		-0.018	8
Lowereduc	-0.025**	5	-	
Highereduc	0.012	9	-	
Condwell	0.021	7	0.022	6
Expenditure	0.085***	2	0.088***	2
Infrastructure	0.0255	4	-	
Water	-		0.001	9
Mosquito	-		0.032*	4
Status	0.111***	1	0.112***	1
Rights	0.084***	3	0.086***	3
Suco dummies	Yes		Yes	
Chi-Squared	10456.97		10580.21	
Observations	5057		5057	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

At first look, employment is much lower than expected in the model as it ranks fifth. After some consideration though, employment, in a sense, is ranked where it should be compared to perceptions. If status, demand for products, and political participation are put aside (as they all signify importance in society) and infrastructure is ignored as access to water is very low in rank in the model, then employment becomes one of the most important variables.

In addition, it is one of the only four statistically significant variables. Although this is a stretch (especially because employment is perceived to be the most important for improving individual well-being by a large majority of the population) it makes some sense to think of it this way. In this sense, it is empirically and subjectively (for improving individual well-being) more important than health care, education, and housing.

The one variable that needs more discussion is the category demand for products. This variable has already been looked at from the perspective of a form of status. In a developing country, it is much more likely that people view their income as a direct means to goods. After all, previous literature finds that income is important in providing happiness up to a certain threshold – money buys happiness up to the point that it buys security. Therefore it makes theoretical sense that income ranks so high and is statistically significant in the empirical model. Yet it is interesting that only 1,072 people (eleven percent) believe that demand for products is important for improving individual life satisfaction.

Yet income by itself may not be perceived to be important as other factors have a directly observable influence over income. Being employed is a means to income. Education level may be considered an investment to future income. Both of these can be directly observed and compared with others. While income is not subjective, individual income is not generally common knowledge. Therefore people may perceive that these factors that control income and can be directly compared with others are much more important than income by itself. On the other hand, the model suggests that income by itself is enough to increase subjective well-being.

As mentioned earlier, safety was a category omitted from this restricted model as there was not a good variable to use as a proxy for this. It was acceptable to exclude safety as it was not ranked very high on the list of perceptions for individual well-being. However, status in



community and political participation were ranked very low in the list of perceptions as well but ended up being very important in the model results. Therefore, safety is still important to consider for this study.

A new restricted model is estimated using a question on the survey as a proxy for the category safety. The question on the survey asked if the respondent was displaced outside East Timor in 1999. Originally this question was not considered relevant as the displacement occurred two years prior to the survey – enough time to adapt to situations. However, it is interesting to at least have an understanding of the effect of an imperfect measure of safety. Of the total respondents, 23 percent answered that they were displaced. OLS and ordered logit unstandardized and standardized coefficients and their rankings are given in Table 15.

Table 15: Restricted OLS and restricted ordered logit models with displaced representing safety

VARIABLE	OLS			Ordered Logit		
	UnStd $\beta$	Std $\beta$	Rank	UnStd $\beta$	Std $\beta$	Rank
Male	-0.049*** 0.018	-0.033		-0.151** 0.061	-0.021	
Age	-0.003 0.004	-0.051		-0.007 0.013	-0.032	
Age <sup>2</sup>	0.000* 0.000	0.129		0.000* 0.000	0.086	
Married	-0.041 0.037	-0.027		-0.131 0.128	-0.018	
Widow	-0.086* 0.051	-0.034		-0.259 0.175	-0.021	
Divorced	-0.029 0.087	-0.004		-0.064 0.302	-0.002	
Hhsize	0.016** 0.007	0.061		0.056** 0.025	0.044	
Employed	0.054** 0.021	0.036	5	0.173** 0.074	0.024	5
Health	0.032 0.021	0.0266	7	0.114 0.071	0.019	7
Education	-0.040 0.027	-0.0265	8	-0.128 0.093	-0.018	8
Condwell	0.026 0.022	0.029	6	0.094 0.079	0.022	6
Expenditure	0.003***	0.114	2	0.012***	0.089	2

	0.001			0.003		
Infrastructure	0.041	0.040	4	0.132	0.027	4
	0.026			0.089		
Status	0.174***	0.158	1	0.609***	0.113	1
	0.029			0.104		
Rights	0.047***	0.109	3	0.181***	0.087	3
	0.011			0.043		
Displaced	-0.038	-0.022	9	-0.102	-0.012	9
	0.046			0.162		
Suco dummies	Yes	Yes		Yes	Yes	
Constant	1.727***					
	0.264					
Cut1				-0.050		
				0.845		
Cut2				2.572		
				0.845		
F/ Chi-Squared	32.03			10497.35		
R <sup>2</sup> /Pseudo R <sup>2</sup>	0.3659			0.2210		
Observations	5057	5057		5057	5057	

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Standard errors in parentheses

Standard errors clustered by households

No significant changes are observed by adding safety (displaced) to the model. Having been displaced negatively impacts subjective well-being yet this variable is not statistically significant. Displaced also ranks last in the model. However, one must use caution when concluding that safety is not an important factor for improving subjective well-being. People's perception of life satisfaction suggests that safety is relatively important. If the category for safety is included in the rankings of perceptions, safety would have only placed sixth out of nine categories for improving individual life satisfaction but it would have placed fourth for improving life satisfaction in East Timor. This along with the fact that none of the variables differed significantly from the previous model indicates that displaced may not be a relevant variable to this model and therefore it is not the best proxy for safety.

## 8. Conclusion

Overall the main results show that empirical measures in the model do not match people's perceptions of what they believe is the most important factors of life satisfaction. The four most important variables considered important for improving perceptions of life satisfaction correspond to the four least important determinants from the models. Furthermore, the subjective well-being model suggests that status in the community, demand for products, and political participation are the three most important factors for improving life satisfaction in East Timor with considerably larger standardized coefficients than the five lower categories. Further emphasis on the importance of status, demand for products, and political participation on subjective well-being is by the fact that they comprise three of the four statistically significant variables of the eight categories in the restricted model. Results from the TLSS, on the other hand, tell a different story about perceptions. The people in East Timor perceive that employment, health care, and education are the three most important factors for improving life satisfaction both for their individual well-being and for their country's well-being. Employment is the only statistically significant variable among these three in the subjective well-being model.

Calculating Kendall's Coefficient of Concordance gives a very small coefficient of 0.0952. A coefficient zero implies no agreement between the sets and a coefficient of one implies perfect agreement between the sets. Furthermore, the associated p-value is 0.9140 so the test failed to reject the null hypothesis that there is no agreement between then sets. Further tests between just two of the rankings statistically emphasize that perceptions do not follow the empirical results. Some of the differences that stand out the most include the ranking of health and the ranking of education. Health is ranked second to last in both models but second in perceptions of what improved individual life satisfaction and third in improving national well-being. Likewise, education ranks last in both of the models yet it ranks first for improving life

satisfaction for East Timor and it ranks third for improving individual life satisfaction. On the other end, very few people suggested that status in community is important for improving life satisfaction yet it produced a very large and significant standardized coefficient in both of the subjective well-being models.

Some of the variables representing certain categories need to be looked at with caution as they may not provide the best representation for that category. How many rights a person has may not represent political participation in the same sense that people interpreted it on the survey. Mother tongue and ability to speak Indonesian may not fully capture an individual's overall feelings of status. However, even if these variables are considered poor proxies for their category, it is noteworthy to mention that these are still variables that are more important, according to the model, in increasing subjective well-being than those variables traditionally perceived to effect life satisfaction (education, health, employment).

In addition, the three variables examined for the demand for products category may not be consistent with each other as well. The main variable used to represent this category, expenditure, is similar to previous literature. However, the variables for relative income may differ in their interpretation. Comparing perceptions of relative income to where people actually ranked in relative income was very different. Most often people underestimated their economic situation. In addition, when perceptions of relative income were used as a proxy for demand for products it remained second in the rankings and statistically significant at the one percent level. When actual rank of relative income was used it fell in the rankings to third and was statistically significant at the five percent level. The difference may be due to the wording of the question that derived the perceptions of relative income variable. The question asked about their level of richness rather than financial wealth. The East Timorese may be responding about their richness in regard to their entire life. Their family, their friends, and their overall happiness may be how

the respondents viewed how rich they were. In this regard, richness goes beyond financial wealth and may be the possible reason for the discrepancy between perceptions of relative income and actual rank in relative income in this study.

Furthermore the difference in the rankings of status between the lists may be due to status being tied to education and employment achievements. Status is represented by two language indicators. One of those two, the ability to speak Indonesian, is considered a working language and correlated with education and employment achievements. In the model, the variable for status may be capturing some of the effects of those two categories. Therefore, while people perceive education and employment to be important, the model may be indirectly showing this by emphasizing that status is the most important variable for improving life satisfaction. It is important to realize that these three variables are likely to be related especially when it comes to policy interpretation.

When looking at these results in regard to public policy, the question arises: which list does one follow? If looking strictly at the model then status, income, and rights are the three largest factors to improve on in order to improve subjective well-being. But how does the government improve these three areas? Status and rights are subjective. One cannot simply give out higher status or more rights. Instead, these two variables must be indirectly changed. As previously mentioned, education and employment are two key variables to improve one's status. In addition, rights are most likely increased by level of education. Being informed and well educated is important when it comes to individual rights. By focusing public policy on education and employment, both the empirical lists and lists of perceptions are satisfied. People perceive that employment and education are important for improving life satisfaction and these two variables influence the most important empirical measures: status, income, and rights.

Although results from this study cannot be directly compared to any other study, it can be compared with perceptions in the subjective well-being literature in general. Literature on perceptions is rather limited to how a subjective measure of a certain determinant affects subjective well-being compared with a similar empirical determinant. Relative income was one example used. Posel and Casale (2010) and Graham and Pettinato (2001) both determined that individual's perceptions of their income rank was noticeably different than where they actually ranked. Posel and Casale argued that it was due to a lack of information that made the differences so distinct among certain groups. In addition, Wills-Herrera, Orozco, Forero-Pineda, Pardo, & Andonova (2010) found the subjective measures of insecurity were more reliable indicators of overall happiness than empirical measures of insecurity. Their argument for the difference in perceptions and reality is that people adapt over time to their situations. When it comes to perceptions in regard to subjective well-being as a whole, it follows that perceptions do not match reality.

Of course, further research must be done to determine if similar results are found in other regions. This study is specific to East Timor and the time of transition may have specific impacts on this study alone. But the findings from this model do provide some fascinating insight to the role of perceptions on the empirical model. And while I do not attempt to list the many possible consequences for the subjective well-being model not lining up with individual perceptions, it provides awareness to the fact that models for subjective well-being, like most models, must be looked at with caution. Before relying completely on the subjective well-being model when determining public policy or for an indicator of life satisfaction, it becomes important to understand that individual perceptions may not be consistent with the overall results of the model.

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**Appendix A**  
**Variable Definitions and Locations in the Household Survey**

<b>Variable</b>	<b>Description</b>	<b>Dataset</b>
<b>Life Satisfaction Question</b>		
Individual living standards	What is most important for improving your living standards?	s13a04a, s13a04b
East Timor's living standards	What is most important for improving living standards in East Timor?	s13a05a, s13a05b
<b>Dependent Variable</b>		
Subjective well-being	Are you satisfied with your life in general at the present time? (3-point scale)	s13a11
<b>Demographic</b>		
Male	1=male	s01a02
Age	Age in years	s01a06a
Age <sup>2</sup>	Age squared	s01a06a
Married	1=married	s01a08
Widow	1=widow or widower	s01a08
Nevermarried	1=never married (omitted category)	s01a08
Divorced	1=divorced or separated	s01a08
Hhsize	Number of people in the household	idperson
Suco	Indicator variables for the suco an individual resides in	id4
<b>Employment</b>		
Employed	1=has a permanent job or has had a job in the past 3 months	s08a11, s08b01
Farmer	1=farmer, share cropper, farm laborer, and fisherman	s01a07
Student	1=school student	s01a07
Nonfarm	1=non-farm laborer	s01a07
Trader	1=trader	s01a07
Skilled	1=skilled worker	s01a07
Civil	1=civil servant	s01a07
Teacher	1=teacher	s01a07
Pensioner	1=pensioner	s01a07
Housewife	1=housewife	s01a07
Otherjob	1=otherjob (omitted category)	s01a07
<b>Health Care</b>		
Health	How would you evaluate your own health? (5-point scale)	s06a03
<b>Education</b>		
Literate	1=Can read and write a letter with or without difficulty	s05a03, s05a04
Noeduc	Has never attended school (omitted category)	s05a05
Primary	1=highest level completed is primary school (grades 1-6) or kindergarten	s05a08a

Junsecond	1=highest level completed is junior secondary (grades 7-9)	s05a08a
Sensecond	1=highest level completed is senior secondary (grades 10-12)	s05a08a
University	1=highest level completed is academia or university	s05a08a
<b>Housing</b>		
Bamboo	1=dwelling is a bamboo house	s02a04
Semipermanent	1=dwelling is semi-permanent	s02a04
Traditional	1=dwelling is a traditional house	s02a04
Smallcompound	1=dwelling is a small house in compound of main house	s02a04
Permanent	1=dwelling is a permanent house	s02a04
Emergency	1=is emergency/tent	s02a04
Otherdwelling	1=any other type of dwelling (omitted category)	s02a04l
Area	Floor area of dwelling in square meters	s02a08
Condwell	What is the condition of the dwelling? (3-point scale)	s02a05
<b>Demand for Products</b>		
Expenditure	Real per capita monthly total consumption per household adjusted for cost of living differences	consumption01
ActualRank	Actual Expenditure Rank (1-9)	consumption01
Rich	On a 9-step ladder, where on the bottom stand people who are without rights, on which step are you?	s13a07
<b>Infrastructure</b>		
Bottledwater	1=main source of drinking water is bottled water	s02c01
Tap	1=main source of drinking water is tap water	s02c01
Pump	1=main source of drinking water is a pumb	s02c01
Protwell	1=main source of drinking water is a protected well	s02c01
Unprotwell	1=main source of drinking water is an unprotected well	s02c01
Protspring	1=main source of drinking water is a protected spring	s02c01
Unprotspring	1=main source of drinking water is an unprotected spring	s02c01
River	1=main source of drinking water is a river	s02c01
Otherwater	1=any other main source of drinking water (omitted category)	s02c01
Flush	1=type of toilet is flush	s02c11
Latrine	1=type of toilet is a latrine	s02c11
Bucket	1=type of toilet is a bucket	s02c11
Othertoilet	1=any other type of toilet (omitted category)	s02c11
Notoilet	1=no toilet	s02c11l
Mosquito	1=slept under a mosquito net last night	s06a05
<b>Status in Community</b>		

Head	1=head out household	s01a03
Social	1=participated in a user or community group in the past 12 months	s12103
Speakindonesian	1=speaks Indonesian	s01a12b
Speaktetum	1=speaks Tetum	s01a12a
Tetum	1=mother tongue is Tetum	s01a11
<b>Political Participation</b>		
Rights	On a 9-step ladder, where on the bottom stand people who are without rights, on which step are you?	s13a09
<b>Safety</b>		
Displaced	Were you displaced outside East Timor in 1999?	S01a16

**Appendix B**  
**Status Specification**

OLS unstandardized coefficients and ordered logit marginal effects for status separated into two categories: speakindonesian is a dummy variable for the ability to speak Indonesian and tetum is a dummy if your mother tongue is Tetum. Standard errors are listed below the coefficients.

VARIABLE	OLS	Ordered Logit Marginal Effects		
	$\beta$	Dissatisfied	Neutral	Satisfied
Male	-0.041**	0.014**	0.007**	-0.021**
	0.018	0.007	0.003	0.010
Age	-0.003	0.001	0.001	-0.002
	0.004	0.001	0.001	0.002
Age <sup>2</sup>	0.000*	-0.000*	-0.000*	0.000*
	0.000	0.000	0.000	0.000
Married	-0.037	0.013	0.006	-0.019
	0.037	0.015	0.007	0.022
Widow	-0.087*	0.029	0.014	-0.044
	0.051	0.020	0.010	0.029
Divorced	-0.030	0.008	0.004	-0.012
	0.087	0.034	0.017	0.050
Hhsize	0.015**	-0.006**	-0.003**	0.009**
	0.007	0.003	0.001	0.004
Employed	0.056***	-0.020**	-0.010**	0.030**
	0.021	0.008	0.004	0.012
Health	0.034	-0.013*	-0.007*	0.020*
	0.021	0.008	0.004	0.012
Education	-0.023	0.008	0.004	-0.011
	0.027	0.011	0.005	0.016
Condwell	0.025	-0.010	-0.005	0.015
	0.022	0.009	0.004	0.013
Expenditure	0.003***	-0.001***	-0.001***	0.002***
	0.001	0.000	0.000	0.000
Infrastructure	0.041	-0.015	-0.007	0.022
	0.026	0.010	0.005	0.015
Speakindonesian	0.120***	-0.047***	-0.023***	0.070***
	0.031	0.012	0.006	0.018
Tetum	0.255***	-0.107***	-0.052***	0.159***
	0.057	0.026	0.013	0.037
Rights	0.046***	-0.020***	-0.010***	0.030***
	0.011	0.005	0.002	0.007
Suco Dummies	Yes	Yes	Yes	Yes
Constant	1.736***			
	0.264			
F	31.26			
Observations	5057	5057	5057	5057

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$   
Standard errors clustered by household

**Appendix C**  
**Demand for Products Specification**

OLS unstandardized coefficients and ordered logit marginal effects for two difference measures of demand for products. Rich is where people believe they rank on an income ladder and rankexpend is people's actual expenditure rank. Standard errors are listed below the coefficient/marginal effects.

VARIABLE	OLS	Ordered Logit Marginal Effects		
	$\beta$	Dissatisfied	Neutral	Satisfied
Male	-0.045**	0.016**	0.008**	-0.024**
	0.017	0.007	0.003	0.010
Age	-0.002	0.001	0.000	-0.001
	0.004	0.002	0.001	0.002
Age <sup>2</sup>	0.000*	-0.000*	-0.000*	0.000*
	0.000	0.000	0.000	0.000
Married	-0.048	0.018	0.009	-0.026
	0.037	0.014	0.007	0.022
Widow	-0.081	0.027	0.013	-0.041
	0.051	0.019	0.010	0.029
Divorced	-0.034	0.010	0.005	-0.014
	0.087	0.035	0.017	0.052
Hhsize	0.002	-0.001	-0.000	0.001
	0.007	0.003	0.001	0.004
Employed	0.049**	-0.018**	-0.009**	0.027**
	0.021	0.008	0.004	0.012
Health	0.033	-0.013	-0.006	0.019
	0.021	0.008	0.004	0.012
Education	-0.042	0.014	0.007	-0.022
	0.028	0.011	0.005	0.016
Condwell	0.036*	-0.015*	-0.008*	0.023*
	0.021	0.009	0.004	0.013
Rich	0.077***	-0.031***	-0.015***	0.047***
	0.016	0.007	0.004	0.010
Infrastructure	0.044*	-0.017*	-0.008*	0.026*
	0.026	0.010	0.005	0.015
Status	0.181***	-0.072***	-0.035***	0.108***
	0.029	0.012	0.006	0.017
Rights	0.035***	-0.016***	-0.008***	0.023***
	0.011	0.005	0.002	0.007
Suco Dummies	Yes	Yes	Yes	Yes
Constant	1.627***			
	0.264			
F	35.52			
Observations	5057	5057	5057	5057

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Standard errors clustered by household

VARIABLE	OLS	Ordered Logit Marginal Effects		
	$\beta$	Dissatisfi ed	Neutral	Satisfied
Male	-0.045**	0.016**	0.008**	-0.023**
	0.018	0.007	0.004	0.010
Age	-0.002	0.001	0.000	-0.001
	0.004	0.002	0.001	0.002
Age <sup>2</sup>	0.000*	-0.000	-0.000	0.000
	0.000	0.000	0.000	0.000
Married	-0.042	0.015	0.007	-0.023
	0.037	0.015	0.007	0.022
Widow	-0.092*	0.032	0.016	-0.047
	0.051	0.020	0.010	0.029
Divorced	-0.037	0.012	0.006	-0.018
	0.088	0.034	0.017	0.051
Hhsize	0.015*	-0.006*	-0.003*	0.008*
	0.008	0.003	0.002	0.004
Employed	0.050**	-0.018**	-0.009**	0.027**
	0.021	0.008	0.004	0.012
Health	0.036*	-0.014*	-0.007*	0.020*
	0.021	0.008	0.004	0.012
Education	-0.041	0.015	0.007	-0.022
	0.028	0.011	0.005	0.016
Condwell	0.026	-0.012	-0.006	0.018
	0.022	0.009	0.004	0.013
Rankexpend	0.028***	-0.011***	-0.005***	0.016***
	0.010	0.004	0.002	0.006
Infrastructure	0.037	-0.014	-0.007	0.022
	0.026	0.010	0.005	0.015
Status	0.173***	-0.070***	-0.034***	0.104***
	0.029	0.012	0.006	0.017
Rights	0.047***	-0.020***	-0.010***	0.031***
	0.011	0.005	0.003	0.007
Suco Dummies	Yes	Yes	Yes	Yes
Constant	1.637***			
	0.259			
F	24.50			
Observations	5057	5057	5057	5057

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$   
Standard errors clustered by household



**Appendix D**  
**Education Specification**

OLS unstandardized coefficients and ordered logit marginal effects for education split into two variables. Lowereduc is a dummy variable for having attended primary or junior secondary education. Uppereduc is a dummy variable for having attended senior secondary or university education. The omitted category is no education. Standard errors are listed below the coefficient/marginal effects.

VARIABLE	OLS	Ordered Logit Marginal Effects		
	$\beta$	Dissatisfied	Neutral	Satisfied
Male	-0.049**	0.017**	0.009**	-0.026**
	0.018	0.007	0.003	0.010
Age	-0.003	0.001	0.001	-0.002
	0.004	0.001	0.001	0.002
Age <sup>2</sup>	0.000**	-0.000*	-0.000*	0.000*
	0.000	0.000	0.000	0.000
Married	-0.036	0.013	0.006	-0.019
	0.037	0.015	0.007	0.022
Widow	-0.081	0.027	0.013	-0.041
	0.051	0.020	0.010	0.029
Divorced	-0.019	0.004	0.002	-0.006
	0.087	0.034	0.017	0.051
Hhsize	0.016**	-0.006**	-0.003**	0.009**
	0.007	0.003	0.001	0.004
Employed	0.055***	-0.020**	-0.010**	0.030**
	0.021	0.008	0.004	0.012
Health	0.032	-0.013	-0.006	0.019
	0.021	0.008	0.004	0.012
Lowereduc	-0.058**	0.022**	0.011**	-0.032**
	0.027	0.011	0.005	0.016
Uppereduc	0.030	-0.013	-0.006	0.019
	0.039	0.015	0.008	0.023
Condwell	0.025	-0.011	-0.005	0.016
	0.022	0.009	0.004	0.013
Expenditure	0.003***	-0.001***	-0.001***	0.002***
	0.001	0.000	0.000	0.001
Infrastructure	0.039	-0.014	-0.007	0.021
	0.026	0.010	0.005	0.015
Status	0.171***	-0.068***	-0.033***	0.101***
	0.029	0.012	0.006	0.017
Rights	0.045***	-0.020***	-0.010***	0.029***
	0.011	0.005	0.002	0.007
Suco Dummies	Yes	Yes	Yes	Yes
Constant	1.724***			
	0.259			
F	30.22			
Observations	5057	5057	5057	5057

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Appendix E**  
**Infrastructure Specification**

OLS unstandardized coefficients and ordered logit marginal effects for infrastructure split into two variables. Mosquito is a dummy variable for sleeping under a mosquito net. Water is a dummy variable having access to water by: tap, pump, protected well, or a protected spring. Standard errors are listed below the coefficient/marginal effects.

VARIABLE	OLS	Ordered Logit Marginal Effects		
	$\beta$	Dissatisfied	Neutral	Satisfied
Male	-0.047 <sup>***</sup>	0.017 <sup>**</sup>	0.008 <sup>**</sup>	-0.025 <sup>**</sup>
	0.018	0.007	0.003	0.010
Age	-0.002	0.001	0.000	-0.001
	0.004	0.001	0.001	0.002
Age <sup>2</sup>	0.000 <sup>*</sup>	-0.000 <sup>*</sup>	-0.000 <sup>*</sup>	0.000 <sup>*</sup>
	0.000	0.000	0.000	0.000
Married	-0.048	0.017	0.008	-0.026
	0.037	0.015	0.007	0.022
Widow	-0.090 <sup>*</sup>	0.031	0.015	-0.046
	0.051	0.020	0.010	0.030
Divorced	-0.033	0.009	0.004	-0.013
	0.087	0.034	0.017	0.051
Hhsize	0.016 <sup>**</sup>	-0.007 <sup>**</sup>	-0.003 <sup>**</sup>	0.010 <sup>**</sup>
	0.007	0.003	0.001	0.004
Employed	0.054 <sup>**</sup>	-0.020 <sup>**</sup>	-0.010 <sup>**</sup>	0.030 <sup>**</sup>
	0.021	0.008	0.004	0.012
Health	0.032	-0.013	-0.006	0.019
	0.021	0.008	0.004	0.012
Education	-0.040	0.015	0.007	-0.022
	0.027	0.011	0.005	0.016
Condwell	0.026	-0.011	-0.005	0.016
	0.022	0.009	0.004	0.013
Expenditure	0.003 <sup>***</sup>	-0.001 <sup>***</sup>	-0.001 <sup>***</sup>	0.002 <sup>***</sup>
	0.001	0.000	0.000	0.001
Mosquito	0.069 <sup>**</sup>	-0.026 <sup>*</sup>	-0.013 <sup>*</sup>	0.039 <sup>*</sup>
	0.034	0.014	0.007	0.021
Water	0.004	-0.001	-0.001	0.002
	0.039	0.015	0.007	0.022
Status	0.173 <sup>***</sup>	-0.069 <sup>***</sup>	-0.034 <sup>***</sup>	0.102 <sup>***</sup>
	0.029	0.012	0.006	0.017
Rights	0.046 <sup>***</sup>	-0.020 <sup>***</sup>	-0.010 <sup>***</sup>	0.030 <sup>***</sup>
	0.011	0.005	0.002	0.007
Suco Dummies	Yes	Yes	Yes	Yes
Constant	1.686 <sup>***</sup>	-	-	-
	0.266			
F	32.28			
Observations	5057	5057	5057	5057

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Standard errors clustered by household