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Understanding the Relationship between Unemployment and Happiness:
How Healthcare Efficiency Plays a Role in Life Satisfaction

This thesis is submitted in partial fulfillment of the requirements for the course Senior Seminar (EC 375), during the Spring Semester of 2017

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Abstract: *This paper examines the impact of unemployment on happiness (life satisfaction, subjective well-being) in a cross-sectional study, while focusing on country's health care systems. I used a classic multivariate OLS model in attempts to capture the effects of unemployment and healthcare efficiency on life satisfaction. Overall, I found that unemployment has a significant negative effect on life satisfaction and living in a country with an efficient health care system greatly and positively impacts one's happiness. Unlike previous literature, my results add to the general discussion about life satisfaction by focusing on how efficient healthcare systems play a role.*

I. INTRODUCTION

Subjective well-being is widely researched in various academic fields because it is affected by several known and unknown factors. Psychologists have found that unemployment is one of the factors that affect happiness most, both directly and indirectly, due to its repercussions on economic and psychological well-being. Although it is assumed that unemployment has such an impact, conclusions from related research regarding the relationship between life satisfaction and unemployment cross-country are limited. Studies are even more limited when discussing the roles of Healthcare systems in this relationship. Studies that focus on the relationship between healthcare and life satisfaction are important because unemployment affects psychological well-being. Understanding the relationship between unemployment, healthcare, and life satisfaction is important because it affects the thoughts and actions of an individual, which may lead to the thoughts and actions of a nation.

Throughout this paper, I will refer to subjective well being as happiness and life satisfaction interchangeably. Shin and Johnson specified that happiness is a judgmental process; one in which individuals have the opportunity to evaluate the quality of their lives, based on their own unique set of standards (Pavot & Diener, 1993). Individuals take subjective well-being surveys to report how they think they are doing, based on their life standards. Depending on their responses, a value for their life satisfaction is generated. By reporting how satisfied they are with their lives, their responses essentially give a measure of how happy they are.

The scientific study of subjective wellbeing began to expand in the early 20th century. In 1925, “Flugel studied moods by having people record their emotional events

and then summing emotional reactions across moments. Flugel's work was the forerunner of modern experience sampling approaches to measuring subjective well-being on-line as people go about their everyday lives" (Diener, Lucas, & Oishi, 2009). Around the 1960's, using large-scale assessment surveys became prominent. Through alterations and developments in these surveys, the most efficient way to measure well-being emerged. In time, assessment surveys including questions such as "Taking things all together, how would you say things are these days – would you say you're *very happy*, *pretty happy*, or *not too happy* these days?" became the most efficient way to measure life satisfaction (Angner, 2009). Current literature and research use this type of assessment when conducting their studies.

There are many reasons to study the relationship between unemployment and happiness, but one of the most important is the Suicide Paradox. The Suicide Paradox is the notion that suicide rates are higher in countries that have an overall higher life satisfaction reported. Although there is not much evidence to this phenomenon, it greatly relates to the relationship between unemployment and life satisfaction because the implications of one defies the other. Proving that high unemployment causes lower life satisfaction and leads to lower mental health states would prove that countries with high unemployment rates should have higher suicide rates; however, if the Suicide Paradox were true, there would be no direct connection between unemployment and happiness, although, the efficiency of healthcare systems may play a large role in this relationship. Thus, studying this particular relationship could be more helpful in understanding whether the Suicide Paradox exists.

The efficiency of healthcare systems may be an important factor that can determine why the Suicide Paradox happens. Although it seems illogical that countries with low unemployment rates will have higher suicide rates, this trend could be a result of many other factors in these countries, such as the healthcare systems. It is practical to assume that an inefficient healthcare system would result in a nation with a high-level of suicide rates. If there is a country with a low unemployment rate and an inefficient healthcare system, even though the country is more stable overall, people who are in need of receiving help may not get the help that they need. Therefore, countries that are better off but do not have good healthcare systems would have high levels of suicide rates. Thus, if the healthcare efficiency impact outweighs all of the other independent variables, this variable could provide some insight for why the Suicide Paradox exists.

Existing research uses assessment surveys in order to test the effects of different variables, such as unemployment, or life satisfaction. Previous literature, as discussed by Kassenboehmer and Haisken-DeNew, has proven that unemployment is one of the strongest individual determinants of unhappiness (2008; Ochsén and Welch, 2011). Individually and cross-country, unemployment plays a large role in determining happiness. Other factors, such as GDP per capita, life expectancy, inflation rate, also play roles in determining happiness across countries. Typically, GDP has no effect on happiness but life expectancy, inflation rates and other basic socioeconomic factors do. Given previous findings, this paper investigates the relationship between unemployment and life satisfaction and whether healthcare efficiency changes the dependence between the former two. In order to prove that a relationship does exist, I will begin by researching previous literature to determine whether they have found sufficient evidence

to support this claim, found in Section II. Section III will provide a brief background of the data used in this paper and present the methodology. Section IV will present the results obtained in this research. Section V will discuss the meaning of those results and the limitations. Sections VI will conclude and state final remarks of the topic. Section VII and VIII will provide a list of the tables and graphs used to present and analyze the data. Finally, Section IX will be a list of references used throughout the paper.

II. LITERATURE REVIEW

Despite the limited research on the study of happiness across countries, particularly including the variable for efficient healthcare systems, there are similar ways in which life satisfaction and well-being are measured in current literature. The majority of the time that happiness is studied in a cross-country scale, the variables used for establishing a link between unemployment and life satisfaction are similar national variables; most economic models use the nation's unemployment and inflation rates. Other literature will hone in on the effect that this relationship has on the individual's well-being. There is a scarce amount of research that considers what the differences are in countries with good versus poor healthcare systems. Thus, I will divide this section into three subsections: the effect of unemployment on a nation, the effect of unemployment on the individual, and health care's relation to life satisfaction.

THE EFFECT OF UNEMPLOYMENT ON A NATION

Esteban Calvo et al. use a three-level hierarchy to test if unemployment affects life satisfaction through the individual, additive, or multiplicative effects (2014). More specifically, they looked at how the individual is affected by their unemployment status

(level one), how the individual is affected by both the unemployment rate and their unemployment status added together (level two), and how the individual is affected by both the unemployment rate and their unemployment status with varying values, independent of each other (level 3). Their data was obtained from the World Values Survey and European Values Survey, which had over 398,000 participants in over 90 countries. Using this data, they ran a regression with key independent variables (which included individual level data) and control variables. For their main results, they found that individual-level unemployment has a detrimental effect on life satisfaction, but that country-level unemployment has a greater negative effect on life satisfaction. Most importantly, the detrimental effect that individual-level unemployment on a person's well-being is dependent on the country-level unemployment rate (Calvo et al., 2014). This is crucial because their study provides evidence of the connection between a country's national unemployment level and the individual's life satisfaction.

Andrew Oswald and Stephen Wu study the relationship between life satisfaction and mental health across the United States (2011). Using data from the Behavioral Risk Factor Surveillance System, they drew their analyses from a sample of 1.3 million U.S. citizens while initially controlling for people's personal characteristics, except for income as they determined that there is "no correlation between state's regression-adjusted well-being and their GDP per capita" (Oswald & Wu, 2011). Oswald and Wu also concluded that their analyses provide support to a u-shape in life satisfaction for most of an individual's life course. This finding also adds value to existing research because a great deal of literature fails to determine an overall shape for life satisfaction over an individual's lifetime. This is intriguing because, according to this result, life satisfaction

is low during the time when most individuals are in the labor force (which includes being unemployed and looking for employment). This means that, on average, the most difficult times in our lives happen to be when one is unemployed or looking for employment.

Instead of focusing on specific nations, Puntscher et al. look across different regions in Europe to determine whether unemployment has different effects on life satisfaction intra-nationally (2014). Instead of running a cross-sectional or panel model, they use different spatial models in order to account for the different regions, where the first model only consisted of economic and dummy variables. Obtained from model 1, similar to previous literature, the results show that lower unemployment rates improve regional life satisfaction and that a high unemployment rate depletes life satisfaction at the regional level. Interestingly, the results also demonstrate that life satisfaction appears to be greater in Scandinavian regions, while transition regions (an area with two or more nations) tend to have lower levels of happiness. Model 2 includes variables that pertain to subjective well-being and religion. It is important to note that by adding non-monetary variables to the model, the effects and statistical significance found in Model 1 is no longer held in Model 2 or 3 for those specific variables. Model 3 adds four different variables that represent social capital: institutional trust, general trust, strong ties, and weak ties (Puntscher et al., 2014). Thus, the results from Model 3 are found to be more reliable than the results from Model 2. Further analysis from Model 3 shows that both urban and rural regions had lower values for life satisfaction than intermediate regions. This implies that neither urban nor rural areas tend to cause residents higher levels of happiness. Unlike previous literature, Puntscher et al. looked at the impact of religion and

level of self-rated health on life satisfaction and determined it was strong and positive, suggesting that those individuals who report themselves as religious or healthy tend to have higher life satisfactions (2014).

Ochsen and Welch investigate the link between life satisfaction and duration of unemployment (2011). The data was obtained from a survey of over 50,000 individuals in 10 European countries, ranging from 1992-2002. Ochsen and Welsch ran a total of five different regressions; the first (Regression A) was run to create a baseline, which did not include the variable they were testing because they wanted to be able to compare one with the other. The second (Regression B) included their variable of interest. The results from this Regression were important because it determined how strong the pure level of unemployment duration affects life satisfaction. In other words, by comparing the different unemployment coefficients, it was easy to see how much of an affect unemployment duration has on life satisfaction. The third regression (Regression C) included other variables like age, education, and marital status. The last two regressions (D and E) included a dummy variable that accounted for whether a country had high unemployment and low unemployment at that time (2011).

Ochsen and Welch study found that countries with high unemployment resembled Regression A and countries with low unemployment resembled Regression B (2011). What can be interpreted from these results is that unemployment duration has more of an effect in countries with low unemployment. It would be interesting if in future studies, they delved more into why low unemployment countries are more affected by unemployment duration because there seems to be more factors in play.

Sibel Selim determines the effects that unemployment has on life satisfaction in Turkey (2008). Unlike previous literature, Selim does not use yearly consecutive data to create a panel model. Instead, he uses survey data collected from years 1990, 1996, and 2001 to run three separate cross-sectional regressions. Using 2001 as a base year, the results show that for the earlier years, life satisfaction was higher than later years. This implies that the relationship between life satisfaction and age is negative: as age increases, life satisfaction decreases. This is consistent with Gudmundsdottir's study on life satisfaction, which also provides evidence for this negative relationship (2011).

Helliwell and Huang use two U.S. surveys to estimate the indirect effects of unemployment on individuals' subjective well-being (2014). Before using data from the BRFSS and Gallup-Healthways survey and running a regression analysis, they looked for data correlations between the average amount of happiness and unemployment rates. As both expected, they found that the data showed a negative relationship between the two variables. They also looked at variations in happiness over time by dividing the counties who had the largest unemployment rate increase from the counties who had the lowest during the recession. Helliwell and Huang found that the happiness measures between the two quartiles were somewhat stable despite the severity of the recession (Helliwell and Huang, 2014). In order to test the indirect effects of unemployment on happiness, Helliwell and Huang ran a total of 6 different regressions to more accurately determine the estimates of each variable on life satisfaction. Conclusively in all of their models, unemployment was associated with lower values of happiness. Helliwell and Huang also found, consistent with the Oswald and Wu study, that there is an U-shape relationship

between age and life satisfaction, with happiness falling as age rises but reaching a turning point later in life (2014; 2011).

Although the literature explored in this paper describes the effect of unemployment on happiness as a negative relationship, there are some articles that have found different conclusions when focusing on individual countries. In “Elusive Effects of Unemployment on Happiness”, Bockerman and Ilmakunnas discuss the effects of unemployment on life satisfaction in Finland, like Calvo et al., their dataset was retrieved from World Value Surveys (although the sample size was not defined) (2005; 2014). Their results show that “personally experiencing unemployment reduces life satisfaction, but unemployment and happiness are not related (conditional on income)” (Bockerman and Ilmakunnas, 2005). This means that when an individual becomes unemployed, their personal life satisfaction decreases, but there was no general trend observed between unemployment and happiness in Finland. One reason that this conclusion may be reached is because the amount in which unemployment decreases personal life satisfaction is not significant enough in a nationwide scale.

A study conducted by Gudmundsdottir focuses on how unemployment affects happiness after the 2008 economic downfall in Ireland (2011). The data was collected through questionnaires before and after the economic crisis and the study found that, overall, a decrease in happiness was detected after the collapse. Further analysis shows that unemployment (and income) did not influence life satisfaction, while marital status, financial difficulty, and social relationships were the strongest contributors towards happiness. It is noteworthy that unlike Oswald and Wu, this study shows that the relationship between age and happiness is not u-shaped but linear for both points, before

and after the economic crisis (2011). Gudmundsdottir 's findings contradict the findings of Oswald and Wu who proposed that throughout a person's life, the happiness curve is a u-shape (2011; 2011).

Regarding income, the literature seems to have varying conclusions. Oswald and Wu found that when they controlled for incomes, life satisfaction is lower in richer states in the U.S. (2011). The difference between GDP and income is interesting because they yielded different results. One possible reason is due to the fact that income is specific to the residents in the population. When accounting for income in specific regions, it is logical that wealth affects life satisfaction. Contrary to logic, in this case richer areas had lower life satisfaction. Like Oswald and Wu, and seemingly following logic, both Selim and Ochs and Welch found that the correlation between life satisfaction and income is positive and strong (2008; 2011). Also, Helliwell and Huang found that life satisfaction increases greatly and linearly with the log of household incomes (2014). However, they do address the uncertainties that arise when establishing the cross-sectional correlation between the income and happiness. They note that if a person's subjective well-being adapts to an income change, there may be a stronger short-run effect to that individual's happiness than a long-run effect. This means that, specifically for the time range in the data they are analyzing, it may show that happiness is strongly correlated to income because it is short time period compared to analyzing decades of a person's life. They also believe that there are omitted factors that may contribute to this correlation. Contrary to Oswald and Wu, Puntischer et al. found that income does not exhibit a statistically significant effect on life satisfaction (2014). Hence, life satisfaction is not affected by income within regions. However, they attribute this result to an overall high-income

sample. Having a high-income sample could be causing an undetected bias where the results reveal that the happiness of individuals with higher income levels is not affected by income.

Pertaining to education, the literature has varying conclusions about how it affects happiness. Ochsens and Welch analyzed how education played a role in their model (2011). Their results show that the number of years of education is positively correlated with happiness. This supports Helliwell and Huang's results, which also found that higher levels of education are linked to higher values (2014). Contrary to these positively correlated results, Selim concludes that education overall does not have a statistically significant effect on happiness (2008). The results also show that upper education levels are insignificant with the life satisfaction model. Additionally, although not large quantitatively, Selim found that middle education has a negative effect on female's life satisfaction. Overall, there is not a definitive conclusion on how education affects life satisfaction. However, Selim tested this relationship in Turkey while Ochsens and Welch tested these effects in the United Kingdom and the United States. Thus, suggesting that education levels matter in the latter countries.

In terms of gender, the literature proves that males tend to be less happy than females. Helliwell and Huang found that men have a reported lower life satisfaction value than females (2014). Interestingly, they found that women tend to report higher values for emotional experiences despite if they are negative or positive. This suggests that women are more expressive in their responses than men. Selim's results show that the predicted probability of males having a higher life satisfaction than females is 0.03 fewer (2008). In other words, similar to the Helliwell and Huang's study, males tend to have lower

happiness levels than females. Their regressions also show that both females and males in older age groups tend to have lower happiness values than younger age groups. On the contrary, Gudmundsdottir found that men and women have the same happiness scores both before and after the economic crisis (2011). However, because Gudmundsdottir was looking at the life satisfaction values before and after the crisis, this does not give an accurate description of the differences in gender throughout lifetimes.

Referring to marital status, the literature provides evidence that married individuals tend to be happier. Selim's results show that married people reported higher life satisfaction compared to those who were never married or who are divorced, separated, or widowed (2008). Gudmundsdottir found that marital status had the strongest correlation with happiness, amounting to 29% (2011). He also found that those who were married had an average of 1 point higher than those who were single or divorced on the life satisfaction scale (one to ten scale). Similar to the Gudmundsdottir study, Helliwell and Huang found that married couples have higher life satisfactions than single or never married, while those who were never married have a higher life satisfaction than the divorced, separated, or widowed (2014). Overall, the literature determines that those who are married have a higher life satisfaction than any other group.

Ultimately, the relationship between subjective well-being, macroeconomic factors, and unemployment rates lead to the same conclusion: an individual's life satisfaction is negatively affected by the unemployment rate. There are many other factors that can have an influence on this too, however, there are some conflicting results in how well-being is affected by them: education levels, gender groups, and marital

status. Although my research will not specifically include these variables, it is important to note the possible implications they have.

THE EFFECT OF UNEMPLOYMENT ON AN INDIVIDUAL

Natalio Extremera and Lourdes Rey study whether emotional intelligence is correlated with the impact that unemployment has on the individual (2016). In order to conduct this study, they obtained data from 1,126 unemployed Spanish participants who completed life satisfaction and suicidal questionnaires or surveys. As they expected, they found that the relationship between life satisfaction and suicidal thoughts and behaviors are negatively associated, the lower the life satisfaction, the higher the suicidal thoughts and behaviors. Their results also “suggest that the wide range of stressful problems frequently experienced by the unemployed might be related to higher levels of life dissatisfaction and reduced happiness” (Extremera & Rey, 2016). In other words, when unemployed individuals experience consecutive stressful situations, their life satisfaction tends to be much lower than unemployed individuals who do not experience these situations. They also concluded that higher emotional intelligence scores were correlated with higher levels of life satisfaction and happiness. They determined that participants with lower levels of emotional intelligence experience a massive amount of negative emotions that make them more likely to have suicidal thoughts and behaviors. Perceptibly, a lower emotional intelligence could be correlated with individuals who have lower levels of education. Drawing this connection could make an interesting case, suggesting that unemployed individuals with lower education levels are more impacted by unemployment than those with higher education levels (Extremera & Rey, 2016).

Clark et al. test the psychological effect that previous unemployment has on individuals (2001). Their data comprised of subsample obtained from of the German Socioeconomic Panel. From their data, they created a well-being econometric estimation. From this estimation, one interesting result was observed: being out of the labor force has a negative impact on male life satisfaction but has a positive impact on female life satisfaction (Clark et al., 2001). This is compelling because it suggests that there is a difference between the way females and males perceive unemployment. However, this data focuses on a subset of Germany's population. Because the majority of other literature does not comment on the different effects on gender, it is difficult to apply these results cross-country. It could be interesting to apply this same econometric estimate to test whether these results hold in different nations.

Lucas et al. tested a life satisfaction set-point theory that states life satisfaction has a baseline or a steady level that is maintained over time and this baseline gets disrupted (happiness increases or decreases) when a life event occurs, such as unemployment (2004; Parducci, 1995). When an individual becomes unemployed, their life satisfaction decreases. However, the theory states that wellbeing eventually reverts back to its original baseline. The writers tested the life satisfaction theory by examining the reaction and adaptation to unemployment in a 15-year study of more than 24,000 individuals living in Germany. As a result, they found that individuals reacted strongly to unemployment, shifting from their LS baseline, but eventually shifted back toward their baseline levels. On average, they found that individuals did not completely return to their former levels of satisfaction, even after they became reemployed (Lucas et al., 2004). This shows that unemployment has a larger effect than initially thought. In addition, they

also found that people who had experienced unemployment in their past did not react any less negatively to becoming unemployed again compared to people who had not been previously unemployed. This suggests that although life satisfaction can be moderately stable over time, there are some life events, such as unemployment, that can have a strong influence on long-term levels of well-being.

Although there is considerable research in support of the set-point theory, there are also plenty of articles that oppose it. Some research refutes the set-point theory because they argue that individuals never return to their original baseline. Other articles argue that the theory's generalization of the set-point theory does not give enough detail for it to apply to a particular individual's life. In their article, Ed Diener et al. revises the set-point theory by separating the revisions into five sections: non-neutral set points, individual set points, multiple set points, happiness can change, and individual differences in adaptation (2006). The first, third, and last revisions are the most interesting because they directly address the issues that set-point theory has (Calvo, 2014).

The first revision discussed was the 'non-neutral set points'. The set-point theory stated above begins all individuals on the same baseline, where the baseline is zero. A good event (marriage, graduation, etc.) will cause a positive increase from the baseline, shifting it up, while a bad impact causes a negative shift from the baseline. This revision explains that individuals begin with different baseline values; there are some individuals who have a high life satisfaction score and others that begin on the more negative end. This has an effect on the conclusions drawn from the set-point theory above because it may be leading to false conclusions. The third set point revision, 'multiple set points'

addresses the fact that happiness is measured as one value, when in reality, happiness is made up of several set points. This is crucial because sometimes these set points move in different directions over time. Thus, “the idea of a unitary set point is not tenable, because positive and negative emotions might both decline in tandem or life satisfaction might move upward while positive emotions decrease” (Diener, 2006). Another strong opposing view is the ‘individual differences in adaptation’. This revision is also compelling because it explains that individual’s responses to life events, despite the event being the same one, have different magnitudes of effect. Therefore, becoming unemployed for one individual may cause much more distress than to another, making the shift back to the original baseline more difficult or not possible.

RELATING HEALTHCARE TO LIFE SATISFACTION

Papavlassopoulos and Keppeler study the effects of life expectancy on life satisfaction while also looking at how healthcare can influence this relationship through income (2011). More specifically, they first establish a relationship between income and life expectancy. Then they establish a relationship between life expectancy and healthcare. Afterwards, they provide a theoretical analysis explaining how income affects health care costs/accessibility, thus affecting life expectancy and life satisfaction. This is interesting because previous literature has not found a significant relationship between GDP per capita and subjective well being, meaning that income may not necessarily have an effect on life satisfaction. Even more so, some life expectancy values are the same for countries with really high and really low GDP per capita's. From this trend, one would assume that money has minimal effect on life expectancy.

Through statistical analysis, Papavlassopoulos and Keppeler establish the effects income and health care have on life expectancy, and, therefore, on subjective well being. The results show that as income per capita increases, life expectancy increases at a decreasing rate. The results are the same when looking at the relationship between health care costs per capita and life expectancy. Because both yielded similar results, they then analyzed whether income or health care had a higher impact on life satisfaction. They found that investing in health care leads to a decrease in income; however, increasing healthcare costs leads to an increase in life expectancy, creating a classic trade-off. This is important because one can conclude that healthcare has an effect on life satisfaction.

Papavlassopoulos and Keppeler were not the only ones who established a connection between income, health, and life satisfaction, Deaton also drew connections between health and life satisfaction (2011; 2008). Using the same data as the World Happiness Report, Deaton discusses general happiness, but focuses on health satisfaction in low-, middle-, and high-income countries. Overall, the results show that typically individuals are more satisfied with their health in high-income countries, however, as age rises, the less satisfied the individuals are. Older age groups tend to be less satisfied with their health, not only in low- and middle-income countries, including the high-income countries such as the United States (Deaton, 2008). This trend might occur due to the increased concern of health by the elderly. Increased concern leads to increased visits and communication with the health care systems in place. Therefore, these results are logical and expected. Deaton also found that the impact of age on health is much larger in magnitude than income. Although income is one of the main factors in determining whether one gets an efficient or inefficient health care provider, it is age has a more

significant effect on health satisfaction. Similar to the previous finding, this could be a result of an increase in visits within the healthcare system. One very interesting result Deaton found was that the rate at which health satisfaction depreciates is greater in low- and middle-income countries (Deaton, 2008). Deaton deduces that income would seem to provide protection against the self-perceived effects of age on health. This implies that the overall happiness for individuals that live in high-income countries is not as greatly diminished as for those in low/middle-income countries.

Unfortunately, besides Papavlassopoulos and Keppeler and Deaton's articles, there is little to no research done in testing how healthcare can affect an individual's life satisfaction. Thus, my research is crucial for this topic. Potentially finding how health care can impact an individual's happiness, may lead to questions or answers that the literature has yet to resolve.

III. DATA AND METHODOLOGY

For this section of the paper, I will first describe the dependent and independent variables used in my model while describing their sources. Then, I will explain the foundation of my model and state the different regressions I will run. Finally, I will discuss my hypotheses for the model. The literature, previous and current, discusses specific individual characteristics that factor into a person's well-being. Through my research, not only will I try to establish a connection that has not been discussed intently, the link between healthcare systems and life satisfaction, but establish this link through a worldwide cross-country study.

Because I want to determine the effect of unemployment on life satisfaction, life satisfaction is my dependent variable (*LS*). To obtain which other variables to include in this macroeconomic model, I relied on the population regression function used by Ochsen and Welsch to determine some variables that are essential for my model but also included some variables from other literature (2006). These variables for my regressions include: unemployment rate (UR), GDP PPP per capita (GDP), inflation rate (IR), developed countries (D), least developed countries (LDC), and a variable of interest (HCd).

DEPENDENT VARIABLE

The World Happiness Report is a worldwide survey published by the United Nations Sustainable Development Solutions Network. The first report was published in 2012 as a result to the United Nations high-level meeting on well-being and happiness: the defining a new economic paradigm. This meeting included more than 800 participants, including leaders and scholars from several fields, who discussed what additional measures, specifically economical; better capture the pursuit of happiness (Royal Government..., 2012). As a result, the need for a worldwide happiness measure emerged and once the report was published, it gained popularity among professionals in Government, Economics, and Psychology. The report used data from the Gallup World Poll, which has been conducting worldwide surveys since 2005 that include 99% of the world's adult population. Using this highly representative data, the World Happiness Report establishes a ranking for Happiness annually; each report is easily available and accessible to the public online.

The source for the life satisfaction variable is the World Happiness Report 2016, which includes world data ranging from 2006 to 2015. This report is an attempt to

measure the overall happiness of over 150 nations. The nations rankings were measured through several questions from the Gallup World Poll, on a scale where life satisfaction was measured on a 1 to 10 scale, with the best possible life score being 10 and the worst possible life score being 0. Nations are also ranked using a Cantril Ladder, which is a measurement system used to quantify life satisfaction by asking individuals to: “please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. Suppose we say that the top of the ladder represents the best possible life for you. On which step of the ladder would you say you personally feel you stand at this time, assuming the higher the step, the better your life”. Then, the Gallup weights are estimated using the happiness metric. Gallup weights are the margin of errors for the polls; they are used to “correct for unequal selection probability and nonresponse and are also used in final samples to match the national demographics of each selected country” (“How Does the...”, n.d). The ‘happiness metric’ is built by aggregating indicators of general well being in different aspects of life, measured by variables such as economic well-being, social support, healthy life expectancy, economic mobility, generosity, and political enthusiasm (Helliwell, 2016). The happiness metric is, essentially, the average life satisfaction for individuals in each nation.

INDEPENDENT VARIABLES

The World Data Bank is an open online database that provides worldwide information on several economic factors. The World Bank’s development data group “coordinates statistical and data work and maintains a number of macro, financial, and sector databases” (“About Us”, n.d). They work closely with banks and institutions that specialize in the collection and compilation of data to ensure the quality and integrity of

the data produced. The World Bank also aims to improve the capacity, efficiency, and effectiveness of national statistical systems in developing countries (“About Us”, n.d). Their testament to countries throughout the world makes them one of the most reliable open data sources.

I pulled the majority of the independent variable information from the World Data Bank: life expectancy, unemployment rate, GDP per capita, and inflation rate (refer to Table 1 for summary statistics). The life expectancy refers to the average number of years a newborn is expected to live if the mortality patterns in a respective country remain the same. The particular life expectancy values that are used in this model have derived from both male and female life expectancies at birth to get a measure for any individual, regardless of gender. Unlike the other variables, this data was also obtained from the World Happiness Report. The unemployment rate captures the portion of the population that is in the labor force and, similarly, was derived from the percentage of male and female unemployment in the respective country. Figure 2 shows the overall relationship between the two variables while highlighting the lowest and highest unemployment rates and satisfaction scores. For this model, instead of using nominal or real GDP, the GDP per capita adjusted by purchasing power parity (PPP) is used in this model. This GDP data allows us to account for the varying currencies throughout the countries (“What Is...”, n.d). The information for the dummy variable accounting for developed versus developing countries was obtained from a country classification done by the United Nations. Later in the regressions, I also include a variable that accounts for the least developed countries worldwide, also obtained from a United Nations classification.

VARIABLE OF INTEREST

The main interest in this study is the health care dummy variable, which captures whether a country has an efficient or non-efficient health care system. In order to create this variable, I will use a ranking created by Tandon et al. for the World Health Organization or WHO (2000). To establish this ranking they first created a composite index, which is a weighted average of the five goals of a health care system: health of the population, health inequality, responsiveness-level, responsiveness distribution, and fair financing. It is important to note that the averages were rescaled on a 0 to 1 interval. Then, they ran a fixed-effects panel data model to determine the rankings. The data included information on 191 countries' total healthcare expenditures per capita, educational attainment, etc.

For their results, Tandon et al. found that the maximum of the efficiency index was 0.994 for France and a minimum of 0 for Sierra Leone (on a 0 to 1 scale). However, when they ran the estimation calculation 1000 times and averaged the scores, France was not the best performing country. Their estimations ranged due to overlaps in the confidence intervals. Although overlaps in confidence intervals typically mean that values are not significant, the overlaps only occurred in certain consecutive sets, for example, France, Italy, and San Marino overlapped with one another and but that does not change their positions from being the top three on the index. Therefore, despite the fact that it is an older article, this index is the only index that measures worldwide efficient health care. In their paper, they create a scale in which they show the most inefficient to most efficient healthcare systems. I used this scale to create a dummy variable that captures whether a country has an efficient or inefficient system (Graph 1).

ANALYTICAL FRAMEWORK AND REGRESSIONS

Across the literature, there are several different model types to test the relationships between micro- and macro-level characteristics and happiness. However, there is no specific theoretical framework that is relied upon to discuss these effects on life satisfaction. Therefore, for the foundation of the models used in this paper, I will be using a classic multivariate OLS model with a panel data set where X is any given independent variable: $Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \dots + \beta_n X_{it} + \varepsilon_{it}$. For my model specifically, I will be using variables based on the model used by Ochs and Welsch (2006). For the most part, the regressions will remain linear in an attempt to find general results that tie the independent variables with the dependent.

I will run multiple regressions in order to test which macroeconomic model provides the most accurate estimate for the relationship between unemployment and happiness. Regression A and B will be linear OLS regressions; the former will omit the variable of interest and the latter will include it. Running one regression with and another without will result in a basic understanding in how the values of impact change for each variable's effect on life satisfaction. These two regressions are meant to provide a basic understanding between unemployment and happiness, and how health care efficiency changes that. Regressions C and D will account for a panel data set by including an, fixed or random effects will be determined according to the Hausman test. The estimates obtained from regressions C and D will be a more accurate representation than regressions A and B. Regressions E and F will have an alternative for the GDP per capita variable (by squaring it) in order to try to establish a better relationship between GDP and life satisfaction. Finally, regressions G and H also use an alternative for GDP and have an additional variable that accounts for least developed countries. Similar to the previous set

of regressions, this final set should be the most accurate and representative of them all.

My study uses the following population regression functions:

$$\text{Regression A: } LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 GDP_{it} + \beta_3 IF_{it} + \beta_4 UR_{it} + \beta_5 D_i + \varepsilon_{it}$$

$$\text{Regression B: } LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 GDP_{it} + \beta_3 IF_{it} + \beta_4 UR_{it} + \beta_5 D_i + \beta_6 HCD_i + \varepsilon_{it}$$

$$\text{Regression C: } LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 GDP_{it} + \beta_3 IF_{it} + \beta_4 UR_{it} + \beta_5 D_i + \alpha_i + \varepsilon_{it}$$

$$\text{Regression D: } LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 GDP_{it} + \beta_3 IF_{it} + \beta_4 UR_{it} + \beta_5 D_i + \beta_6 HCD_i + \alpha_i + \varepsilon_{it}$$

$$\text{Regression E: } LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 GDP_{it} + \beta_3 GDP_{it}^2 + \beta_4 GDP_{it}^3 + \beta_5 IF_{it} + \beta_6 UR_{it} + \beta_7 D_i + \varepsilon_{it}$$

Regression F:

$$LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 GDP_{it} + \beta_3 GDP_{it}^2 + \beta_4 GDP_{it}^3 + \beta_5 IF_{it} + \beta_6 UR_{it} + \beta_7 D_i + \beta_8 HCD_i + \varepsilon_{it}$$

$$\text{Regression G: } LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 \log(GDP_{it}) + \beta_3 IF_{it} + \beta_4 UR_{it} + \beta_5 D_i + \beta_6 LDC_i + \varepsilon_{it}$$

Regression H:

$$LS_{it} = \beta_0 + \beta_1 LE_{it} + \beta_2 \log(GDP_{it}) + \beta_3 IF_{it} + \beta_4 UR_{it} + \beta_5 D_i + \beta_6 LDC_i + \beta_7 HCD_i + \varepsilon_{it}$$

HYPOTHESES

From the results and discussions of previously reviewed literature, I determined the expected relationships between my dependent and independent variables. Primarily, I expect the relationship between unemployment and life satisfaction to be negative. This relationship is logical, as it is unfavorable to become unemployed. I also expect that there is no relationship between GDP (PPP) and life satisfaction. Most of the previous literature has concluded that GDP has no effect on an individual's life satisfaction.

Following the results of Ochs and Welsch (2006), I expect the relationship between the inflation rate and life satisfaction to be negative and the relationship with life expectancy to be positive. I expect that the relationship between developed countries and life

satisfaction is positive while the variable for least developed countries and life satisfaction is negative. Finally, I expect the relationship between health care efficiency and life satisfaction to be positive.

IV. RESULTS

Table 2 shows the results of two linear life satisfaction regressions stated above. Similar to previous research, both Regression A and Regression B show a statistically significant negative relationship between unemployment and life satisfaction. Both regressions yielded nearly the same coefficient for the unemployment rate. Also, similar to previous literature, both regressions yielded the same results for GDP. Although there are more differences than similarities, it is important to note that both regressions support previous fundamental evidence between GDP, unemployment and happiness, as discussed in literature.

Despite there being similarities between Regression A and Regression B, adding the healthcare variable created notable differences between the two. The main differences between the results are the changes in coefficient values and changes in significance. The first difference is the change in the developed countries variable; its effect on life satisfaction decreased by about half of its original value by going from a 25% effect to 12.5%. This is a direct result of adding the variable of interest. The variable of interest is now the most significant factor affecting life satisfaction by 60%. There was a slight decrease in the life expectancy variable and a slight increase in the coefficient for inflation rate. Also important is that the standard error for the inflation rate is higher than desired. Additionally, the dummy variable for developed countries and the inflation rate's

significance level changed from 1% to 5% and 10% to a 1% levels, respectively. The R-squared values also had a slight increase. Overall, Regression B seems to represent the population more than Regression A. However, these two regressions assume that the variables are linear and do not include the α_i , which means that it does not account for a panel regression.

Table 3 shows the OLS estimates obtained from the fixed and random effects from Regression C. The main problem, as seen in Regression A and B, is that the constant has remained significant. From both the fixed and random effects models, GDP remained the same and unemployment remained significant and negative. The main difference between the two is that the random effects included my developed variable while the fixed effects model removed the dummy variables in the model because of collinearity between the variables and the α_i . Because the random effects model does not take into account the α_i , estimates could be drawn. In order to determine which model would be more accurate, I conducted a Hausman test. The results suggest that I choose the random effects estimates.

Resembling Table 3, Table 4 shows the OLS estimates obtained from Regression D. The difference between Regression C and D is the addition of the healthcare efficiency variable. Similar to Table 3's fixed effect results, the fixed effects model for Regression D also omitted my dummy variables due to collinearity. I followed the same steps as above and performed a Hausman test. Once again, the Hausman test suggested I used the random effects model versus the fixed effects. Notable is that the results from the fixed effects are actually the same as in Table 3 because, through the removed variables, the same regression was run.

Because both of the regressions are interconnected, I will spend some time discussing the differences in results between Regression C and Regression D's random effects results. The most interesting thing I noticed in the change of estimates from regression C to D because, typically, when a variable is added to a regression, the effect of other variables on the dependent is subdued. In this case, the developed countries estimate has an increase in its effect, going from 29% to 57%, while the healthcare efficiency variable has an impressive 75%. Expected and significant results were found for life expectancy (4.2%), unemployment rate (-3.8%), and GDP (0.0%), however, the constant is significant, meaning that there is a variable or something this regression is not capturing. This led me to alter the GDP variable, to see if I could get better results and, thus, a more accurate model.

Table 5 shows the OLS estimates obtained from the random effects model of regressions E and F. Instead of a fixed effects model, the random effects model was chosen for two reasons. The first is that the Hausman test concluded that, in this case, I use the random effects model. The second is that, like Regression C and D, the fixed effect models omitted the dummy variables present in my model due to collinearity. For the most part, the estimates remain the same between regressions E and F. In both regressions, life expectancy and healthcare efficiency remained significantly positive while unemployment rate remained significantly negative. Although insignificant, inflation rate remained negative, while GDP still significantly shows no effect on life satisfaction. The changes I made to this model were to square and cube the GDP. Ultimately, adding GDP^2 and GDP^3 made the sign for the 'developed countries' variable change from positive to negative. Curiously, the estimate for GDP was positive and the

estimate for GDP^2 was negative. Although both are practically zero, it is seen that GDP has a positive effect on life satisfaction at a diminishing rate. This prompted me to create regressions G and H, to have a more clear understanding of the effect that GDP or income has on life satisfaction and see if I could get a positive estimate for the ‘developed countries’ variable.

In order to obtain a better understanding of GDP’s effects on life satisfaction, I used the log of GDP in regressions G and H. I also added a new variable, ‘least developed countries’, in an attempt to regain the positive estimate from the ‘developed countries’ variable. Table 6 shows the OLS estimates obtained from these regressions. Ultimately, both of these regressions seem to be the most fitting and accurate because they yielded a high R-squared value and the constants are insignificant. However, similar to previous regressions I have discussed before, these regressions also have some minor limitations that I could not adjust for. In regression G, all of the estimates have the expected signs, however, not all of the estimates acquired significance. One of the most important estimates to note is $\log(GDP)$ ’s coefficient. It is 0.478 and significant. However, because this regression omits my variable of interest, the value of the coefficient changed when the ‘healthcare efficiency’ variable was added. The $\log(GDP)$ ’s coefficient became 0.391, which is still large in magnitude. The main drawback I had with regression H is that the ‘developed countries’ variable changed back to a negative sign. However, the variable is insignificant so not much would have been concluded from the estimate to begin with. We can see from regression H that the healthcare efficiency has a large effect on life satisfaction (52.5%). Out of all of my regressions, due to the

insignificant constant and high R-squared, Regression H, which obtains my variable of interest, is the most accurate and reliable regression of my models.

V. DISCUSSION

My main finding is that, overall, there is a significant negative relationship between unemployment and life satisfaction. It is important to note, however, that the magnitude for unemployment rate was not as large as some of the other variables in the regressions. The largest and most significant value was the variable of interest, healthcare efficiency. In other words, living in countries where efficient healthcare systems are present has a higher impact on life satisfaction than becoming unemployed. This means that an individual's happiness is more reliant on whether they live in a country with good healthcare systems. One reason that might explain why this occurs is that people who become unemployed and live in a country with an efficient healthcare system have better resources that help them overcome their situation; therefore, their unemployment experience does not negatively taint their overall life satisfaction

As for the other independent variables, the majority of them match my expectations. Due to the positive correlation between healthcare efficiency and happiness, it was expected that life expectancy would also have a positive effect. Although drastically different magnitudes, it is expected to see how the two independent variables positively impact well-being due to the conclusions from Papavlassopoulos and Keppeler (2011). The important factor was the $\log(\text{GDP})$'s estimate. This yielded a positive estimate with a large magnitude. Because GDP grows exponentially, it is much easier to interpret and understand the effects GDP now has on life satisfaction in my model. In my

model, increasing one unit of GDP, will produce an increase of 0.391 in life satisfaction. This is interesting because, although GDP per capita seemed to have no effect on life satisfaction, it is clear that there is some relation between the two variables. The relationship between GDP and life satisfaction comes from increasing the GDP from one unit to the other. Before, having GDP instead of the $\log(\text{GDP})$ on accounted for the money an individual has at that given point in time. What had failed to be recognized by that model is that increasing an individual's GDP will also increase their life satisfaction and that is what having the log of GDP does. Although modifying this variable to create a linear-log model resulted in stronger results, this process was one of few limitations I encountered that I knew how to adjust for.

Despite the conclusive results discussed above, there are several limitations I encountered while creating and running these regressions. The first and most prevalent problem that I encountered was gathering data. Although Stata does well with missing data, not having as many blank spaces for data would have led to more accurate results. Also, it was difficult to include countries that were recently established or do not have the resources to record statistics for their country. Eventually, I had to omit the countries that did not have sufficient information. This may or may not have any relation to my next drawback, which was the fixed effect model omitting my dummy variables. As I previously mentioned, Stata omitted the variable because the program found collinearity between the dummy variables and the α_i . I found that fixed effects models are intended to study what causes the change within a person or entity and that time-invariant characteristics cannot cause such a change because they are constant for each individual or entity, thus the dummy variables I created were omitted (Kohler, 2009). Another

problem with data I encountered, which only applies to the health care efficiency variable, was that the information came from 2000.

Another limitation I encountered was building the analytical framework to bridge the gap between the economic and psychological fields. Because this paper discusses a behavioral economics theme, there was not a specific model that was referred to throughout previous literature. Thus, when trying to create a model myself, I had to refer to all of the papers I reviewed and see what were the overall trends and variables included in each. This leads to my third limitation, which was creating a model where life satisfaction can be u-shaped. Oswald and Wu found that their results suggest that life satisfaction starts at a certain level, decreases throughout teen and adult years, and increases during seniority (2011). This would have been a very interesting theory to test, however, because there are no previous frameworks to base a model that can capture this phenomena, I could not test this theory.

Another limitation that I encountered was not being able to use more individualistic variables, such as demographic aspects of countries. Because I wanted to conduct a cross-country worldwide study by inputting as many countries as I could, I could not include individual characteristics for all of the countries in my study. This is mainly due to not all countries having this data readily and accessible. However, it would have been extremely intriguing to see how this, not only affected the results, could lead to different conclusions that have not been discussed by literature before. For example, seeing how different races tend to generally perceive different levels of happiness in these countries.

I found the last limitation, or more of a fault with the regression, while running robustness checks. Because my data set is both cross-country and time series, I checked Park and White's test as well as checking for correlation with graphed residuals. All of these tests cleared for my final regression, Regression H. However, when conducting the test for multicollinearity, I found that the variable for the $\log(\text{GDP})$ has a VIF that is more than five. When discussing how to adjust for the multicollinearity present, it is suggested to remove variables from the model. I conducted a correlation exam to determine which of the variables I would have to remove and it resulted in being the dummy variables, including my variable of interest. Therefore, I decided to keep the model as is. All of the regressions conducted need more adjustments and hopefully, in the future, I will be able to figure out a regression that truly captures this relationship.

VI. CONCLUSION

The purpose of this paper was to examine the relationship between the general unemployment rate and life satisfaction, placing the emphasis on healthcare efficiency of the countries. My models find evidence that unemployment rate has a positive impact on happiness but that effect diminishes when the individual resides in a country with an efficient healthcare system. My model also finds evidence that life expectancy and $\log(\text{GDP})$ have a positive effect on overall life satisfaction.

In the future, I would like to keep working on developing and specifying my regression. First, I would like to include more variables that would be a more accurate representation of the populations in these countries. Eventually, I would want to add more variables or create a multi-level regression that covers individual characteristics

such as race, sex, age, size of household, income, education, and marital status. Although I found clear and good results, by adding and evolving this multivariate regression, I can create a more accurate model that accounts for more of the population in the world.

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Table 1. Summary Statistics.

Variable	Observations	Mean	Variance	Min	Max
Life Satisfaction	1254	5.44	1.27	2.69	8.09
Life Expectancy	1254	61.92	67.08	36.17	76.04
Unemployment Rate	1550	8.54	37.18	0.10	37.59
GDP PPP per capita	1724	17202.46	371515424	476.74	141542.66
Inflation Rate	1606	5.95	51.85	-35.84	121.74
Developed Countries	550	-	-	0	1
Least Developed Countries	553	-	-	0	1
Healthcare Efficiency	1771	-	-	0	1

Table 2. OLS estimates obtained from Regression A and B.

Dependent Variable: <i>Life Satisfaction</i>	Regression A	Regression B
Life Expectancy	0.072*** (0.004)	0.063*** (0.004)
GDP per capita	0.000*** (0.000)	0.000*** (0.000)
Inflation Rate	0.006* (0.004)	0.009*** (0.004)
Unemployment Rate	-0.027*** (0.004)	-0.026*** (0.004)
Developed Countries	0.251*** (0.064)	0.125** (0.063)
Healthcare Efficiency	.	0.604*** (0.064)
Constant	0.791*** (0.218)	1.261*** (0.214)
R-squared	0.636	0.666
Adjusted R-squared	0.634	0.664
N	1,015	1,015

All standard errors are in parentheses

* indicates significance at 10% level of significance

** indicates significance at 5% level of significance

*** indicates significance at 1% level of significance

Table 3. OLS estimates obtained from Regression C.

Dependent Variable: <i>Life Satisfaction</i>	Fixed Effects	Random Effects
Life Expectancy	-0.011 (0.012)	0.035*** (0.007)
GDP per capita	0.000*** (0.000)	0.000*** (0.000)
Inflation Rate	-0.003 (0.002)	-0.001 (0.002)
Unemployment Rate	-0.045*** (0.006)	-0.036*** (0.005)
Developed Countries	-	0.289*** (0.154)
Healthcare Efficiency	-	-
Constant	6.276*** (0.763)	2.721*** (0.423)
N	1,015	1,015

All standard errors are in parentheses

* indicates significance at 10% level of significance

** indicates significance at 5% level of significance

*** indicates significance at 1% level of significance

Table 4. OLS estimates obtained from Regression D.

Dependent Variable: <i>Life Satisfaction</i>	Fixed Effects	Random Effects
Life Expectancy	-0.011 (0.012)	0.042*** (0.007)
GDP per capita	0.000*** (0.000)	0.000*** (0.000)
Inflation Rate	-0.003 (0.002)	-0.001 (0.002)
Unemployment Rate	-0.045*** (0.006)	-0.038*** (0.005)
Developed Countries	-	0.571*** (0.151)
Healthcare Efficiency	-	0.757*** (0.153)
Constant	6.276*** (0.763)	3.032*** (0.417)
N	1,015	1,015

All standard errors are in parentheses

* indicates significance at 10% level of significance

** indicates significance at 5% level of significance

*** indicates significance at 1% level of significance

Table 5. Estimates obtained from random effects model of Regression E and F.

Dependent Variable: <i>Life Satisfaction</i>	Regression E	Regression F
Life Expectancy	0.050*** (0.011)	0.046*** (0.011)
GDP per capita	0.000*** (0.000)	0.000*** (0.000)
GDP per capita ²	-0.000*** (0.000)	-0.000*** (0.000)
GDP per capita ³	0.000** (0.000)	0.000** (0.000)
Inflation Rate	-0.006 (0.007)	-0.004 (0.007)
Unemployment Rate	-0.030*** (0.009)	-0.029*** (0.004)
Developed Countries	-0.270 (0.187)	-0.306* (0.184)
Healthcare Efficiency	.	0.390** (0.174)
Constant	1.789*** (0.586)	1.988*** (0.585)
Overall R-squared	0.697	0.705
N	254	254

All standard errors are in parentheses

* indicates significance at 10% level of significance

** indicates significance at 5% level of significance

*** indicates significance at 1% level of significance

Table 6. Estimates obtained from random effects model of Regression G and H.

Dependent Variable: <i>Life Satisfaction</i>	Regression G	Regression H
Life Expectancy	0.040*** (0.013)	0.034*** (0.013)
<i>log</i> (GDP per capita)	0.478*** (0.108)	0.391*** (0.107)
Inflation Rate	-0.006 (0.007)	-0.004 (0.007)
Unemployment Rate	-0.031*** (0.010)	-0.029*** (0.009)
Developed Countries	0.073 (0.175)	-0.035 (0.172)
Least Developed Countries	-0.056 (0.222)	-0.134 (0.215)
Healthcare Efficiency	.	0.525*** (0.169)
Constant	-1.124 (0.828)	-0.146 (0.864)
Overall R-squared	0.685	0.706
N	252	252

All standard errors are in parentheses

* indicates significance at 10% level of significance

** indicates significance at 5% level of significance

*** indicates significance at 1% level of significance

Table 7. Hausman test results for necessary regressions.

	Regression					
	C	D	E	F	G	H
Prob>chi²	0.1283	0.1249	0.3609	0.3377	0.2851	0.1988
Random Effects?	Yes	Yes	Yes	Yes	Yes	Yes

Table 8. Test for multicollinearity in the linear form of my final model.

Variables	VIF
Log(GDP)	6.94
Life Expectancy	4.57
Least Developed Countries	2.66
Healthcare efficiency	2.08
Developed Countries	1.97
Inflation Rate	1.25
Unemployment Rate	1.06
Mean VIF	2.93

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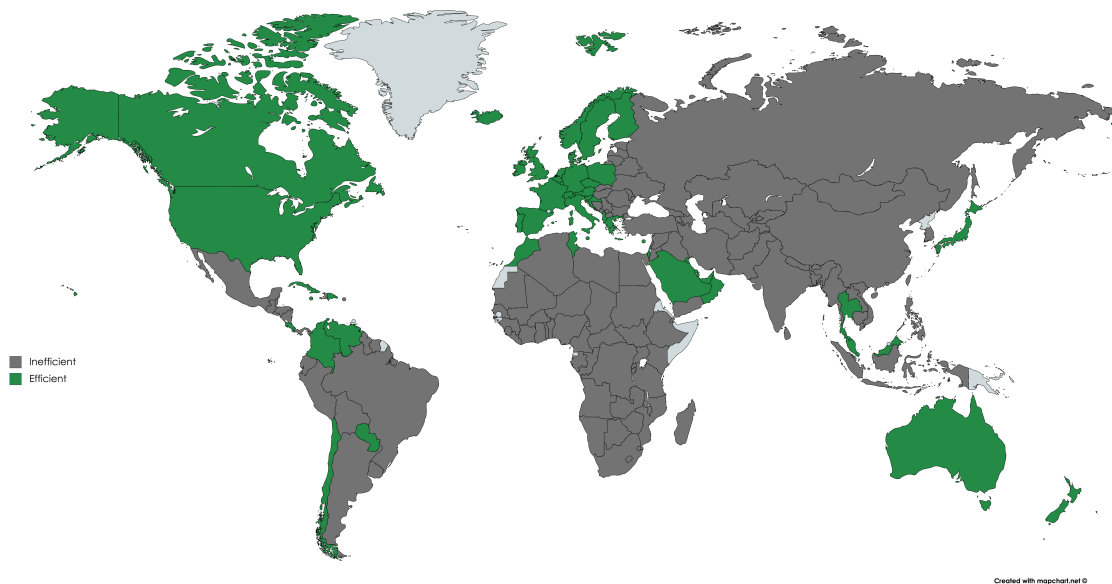


Figure 1. Ranking for efficient healthcare systems worldwide.

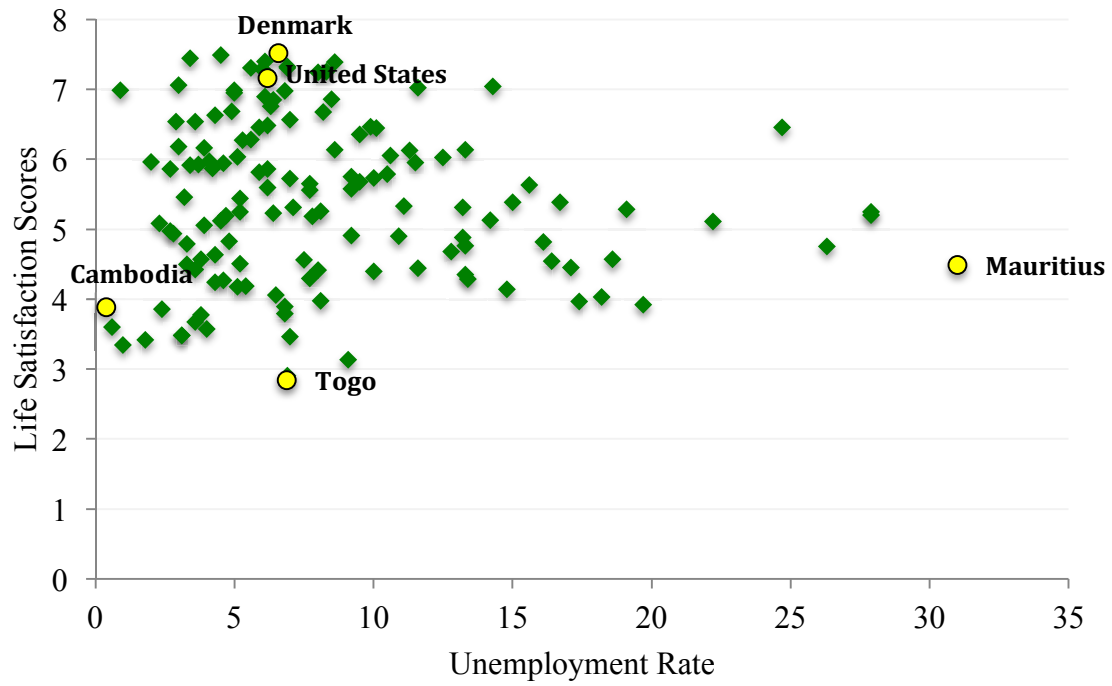


Figure 2. Relationship between the unemployment rates of 2014 and the 2015 life satisfaction scores.

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