An Examination Of The Impact Unemployment Has On Mental And Physical Health in Ireland

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Abstract

This paper is one of the first to examine the impact unemployment has on both physical and mental health in an Irish context. These impacts on health were assessed via the use of regression analysis and confirmed using non – parametric equivalent tests, which allowed for a comprehensive review of the data. The data used in this study was taken from the European Social Survey in 2018 and only Irish data was selected. The overall impact to the economy was then estimated given previous valuations for changes in health, which used the 'Willingness To Pay' method for calculations. The results from this study demonstrate the negative impact that unemployment has on physical and mental health. Mental health levels were found to deteriorate extensively in unemployed individuals actively seeking reemployment. Short term and long term unemployment were found to diminish both mental and physical health, with long term unemployment exacerbating the effects experienced in the short term. The results also suggest that the negative health effects experienced are quantifiably similar for mental and physical health but differ in the way they effect each health variable. These findings were in line with similar related literature previously conducted. Furthermore, the economic cost of health loss is valued at US$1.3 Million per person.

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Table of Contents

Title Page…….1

Abstract……....2

Declaration……...3

Acknowledgments……....4

Table of Contents…….....5

Chapter 1: Introduction……7

Chapter 2: Research Question……..9

Chapter 3: Literature Review……..11

3.1: Introduction……....11

3.2: Theoretical Framework……..11

3.3: Applied Literature……..16

Chapter 4: Methodology ……22

4.1: Introduction……...22

4.2: Data Sources……..22

4.3: Key Model…….....22

4.4: Key Dependent Model Variables……..23

4.5: Key Independent Model Variables……25

4.6: Statistical Analysis…….27

4.7: Assessment of Model Assumptions……...28

4.8: Limitations…….....35

Chapter 5: Analysis and Findings……...37

5.1: Descriptive Statistics…..……37

5.2: Regression…….....39

5.3: Mann Whitney Equivalent Test……..44

Chapter 6: Discussion……..47

6.1: Mental Health……47

6.2: Physical Health……...50

6.3: Economic Implications……...51

Chapter 7: Conclusion……..53

Chapter 8: Bibliography……...55

Introduction

This research study was developed in times of uncertainty within the economy. The Covid – 19 Coronavirus has become a global pandemic, with every country in the world being affected in one way or another from the virus. The health implications caused by the Coronavirus have not been the only problem experienced by the Irish population. The Irish economy has suffered greatly since the beginning of the pandemic. In just 11 days, the Irish stock market lost €22.7 Billion in trading with the Irish Stock Exchange (ISEQ) dropping 6.4% in one day (Brennan, 2020). These major losses and nationwide closures to businesses have resulted in mass amounts of unemployment. As of April 2020, the Covid – 19 adjusted unemployment rate, was at 28.2% if one classed everyone out of work due to the virus as unemployed (CSO, 2020).

Given these levels of unemployment, this research study wanted to focus on the impact unemployment can have on the individual, more specifically, the individual's health. The link between socio – economic status, unemployment and health has been well researched previously, with many studies concluding how improvements in socio – economic status leads to lower levels of unemployment and better health outcomes (Cooper, 2006). The aim of this research study, was to test the association between unemployment and health, assuming a normal distribution of socio – economic status within the sample. The primary theory within this literature related to Human Capital Theory. This theory argues that improvements in levels of health and education lead to more productive individuals and thus enhanced economies, with lower levels of unemployment. The theory postulates an inverse relationship between health and unemployment, with improvements in health resulting in decreases in unemployment levels (Becker, 1994). This research study seeks to examine the reverse of the relationship, investigating whether increases in unemployment lead to decreases in health for a society.

There are two primary gaps in the literature that have been identified that justify this research. The first, relates to the association between unemployment and health in Ireland. Similar studies had been conducted in other European countries, such as Hungry (Gaspar, 2009), but none related to Ireland. The difference in culture and habits between the different countries could alter the mental and physical health effects to unemployment, thus calling for Irish specific research in the area. The second, a lack of evidence towards the physical health

effects of unemployment. In recent years, more and more emphasis has been placed on the mental health of individuals and rightly so. As of 2016, Ireland had the third highest rate of mental health illnesses in Europe, at 18.5% (MentalHealthIreland, 2020). This is a reason why mental health is being examined in this study. However, this prevalence of mental health problems has seen a large body of research focusing around the topic. As a result, the physical health effects of suffering unemployment have been studied less, a gap in the literature that this study seeks to rectify.

Given the gaps mentioned and the research proposed, the null hypothesis for the research study states that unemployment has no impact on physical or mental health levels for the Irish population. A regression analysis will be used to test this null hypothesis with rejections of the null hypothesis signalling that unemployment has an effect on either physical or mental health for Irish people. Mann Whitney equivalent tests will then be conducted to confirm the findings of the regression tests.

Research Question

The primary theory in this field of research is the concept of 'Human Capital'. The theory, popularized by Becker (1993), views human capital as a resource which allows for growth. Becker argued that education and health are key to improving human capital (Almendarez, 2011). A more educated and healthier population is believed to be a more productive population. The OECD explanations as to the globalization of economies are pinned on improvements in Human Capital with developments in technology at the centre of this growth.

This research study focuses on the health aspect of human capital and how it is impacted by unemployment. Physical and mental wellbeing will be examined across a number of different categories including self perceived general health and happiness levels. The framework for this research is based on the impact unemployment has on health, and thereby, indirectly, economic growth.

Based on this framework, the research question posed is "How does unemployment impact the physical and mental health of the Irish population and what are the implications for economic growth?". The aim of the research is to quantify the impact of unemployment on health through the use of secondary quantitative sources and the application of inferential statistical analysis. The current unemployment situation in the Irish economy due to the Covid-19 outbreak highlights the importance of this research question. In April of this year, RTE news reported that unemployment rates reached an all-time high of 28.2% due to the Covid-19 restrictions in place (RTE, 2020).

This research questions generates two further sub questions, one of which being, does the duration of unemployment impacts an individual's health? The results from this sub-question will allow the researcher to quantify how short term and long term spells of unemployment directly relate to one's physical and mental health. Long term unemployment is expected to cause a deterioration of mental health due to the mental exhaustion experienced through stress and anxiety that may not be experience in the short term (SerenityAmidstFrustartion, 2020).

The second sub-question posed by the research seeks to gain an understanding of how the health effects of unemployment differ, depending on if one is actively seeking future employment or whether they are not actively seeking future employment. This study expects groups who are actively seeking employment to suffer greater negative health impacts than those who are not seeking employment.

Literature Review

This chapter will focus on the field of health, unemployment and macroeconomic factors, and will highlight the relevant surrounding literature in this area. The chapter will be broken into two parts, the first part will establish the theoretical framework of the study. The reason for this is to examine the key theories within the literature to show how past researchers have conceptualized the relationship between health and unemployment and how this effects society. The second part of the chapter involves the examination of the applied literature in the field. This examination will demonstrate the importance of research in this field, allow one to identify gaps within the literature and highlight the relevance of this research study.

Theoretical Framework

Human Capital Theory

Human Capital Theory is the primary theory surrounding this field of research. The research objective within this study seeks to quantify the link between unemployment and health and see how this impacts the economy. The theory suggests that improvements in education and health lead to an increase in the 'productivity' of individuals and in turn the greater economy. The concept argues that education improves the efficiency of people within the economy due to an increase of their level of cognitive skills which impacts decision making and productiveness (Becker, 1994). The theory was originally postulated by Becker in 1962 and Rosen in 1976, where the latter argued that human capital was at the centre of permanent earnings theory (Fletcher, 2017). Rosen believed that education was the only form of human capital and that it was the primary variable that influenced future earnings, disregarding variables such as health, job type and family systems (Bartolo, 1999).

One of the main pros to this theory is that it develops a chain of income. Human capital improves productivity, which in turn improves income. Becker's revision highlights this which showcases how college graduate earnings exceed high school graduate's earnings on average (Becker, 1994). However, the reasoning behind this could be argued. While some

may say that the human capital skills that were earned in college raised their productiveness and hence their income, a counterargument may be that the more productive students went to college and it was rather this productivity that raised their income, not their college degree (Becker, 1994). However, a consensus could be found within Neal's work on the topic (Neal, 2000). Neal argued that income dispersion is required for people to make investments in education that will improve their skills. These investment decisions are based on the endowments of talent that one possesses. Neal's combines both the argument and counterargument to Becker's work and suggests that the more productive students go to college, an investment which will in turn, improve their productivity.

Woodhall carried on from the work conducted by Becker and applied his concepts to the modern economy (Woodhall, 1997). With globalization an ever growing trend within the economy, Woodhall argued that this created a need for improvements within the "cognitive stock" levels of the employees. This need is driven by the self-interested nature of individuals within the modern economy (Woodhall, 1997). This assumption that all individuals are self - interested within the economy and being self – interested is the only way to achieve growth are two of the primary limitations to Woodhall's work. Murtaza argues that pursuing self – actualization, over self – interest, would lead to more wise economy that can both increase personal wealth and also reduce competition between individuals (Murtaza, 2011) . Although Woodhall's assumption can accurately depict the mindset of some individuals within the economy, it is false to assume that everyone is motivated in this fashion. The arguments made by Woodhall and Murtaza differ in terms of premise but their fundamental goal is similar, both focus on aspects of self -improvement which ultimately lead to monetary gain (Murtaza, 2011) (Woodhall, 1997).

The importance of human capital theory and why governments and business should focus more capital into this area was highlighted by Babalola in 2003 (Almendarez, 2016). Babalola based his work off the statements made by Becker (1994) and Woodhall (1997) and noted three primary arguments that must be met in order to successfully utilise the benefits of investment in human capital. Firstly, that prior knowledge accumulated by past generations must be passed on. Secondly, that the processes based on this existing knowledge would be taught to the new generation. Lastly, creativity and new ideas are encouraged. The first two arguments are easily applicable to modern society with training and inductions used in many business practises. The third, however could often be failed to be met due to the rigidness of business structures in the modern economy (Almendarez, 2016). These processes allow

organisations to understand how knowledge surrounding health can be passed down to new generations. Based on Becker's argument (1994), this knowledge will improve human capital which will result in higher incomes for organisations .

One of the main problems behind human capital theory is that the statements made regarding the predictions from the theory are not falsifiable and change from study to study. This can be seen in the aforementioned chain of income. The relative change from one part of the chain to the next are unquantified and therefore makes it challenging to test in practise. Wilson however did test the relationship between productivity and income and found that social context is a primary feature when measuring productivity, contradicting the individual nature of human capital theory (Muir & Wilson, 2016). This questionable relationship between the variables in the theory doesn't stop here as empirical evidence doesn't support a strong relationship between human capital and income. In 1974, Mincer found that the correlations between education and earnings were very low and regression coefficients of schooling were weak. These weak findings led to an expansion of the definition of human capital to support the theory, which previously only involved school education (Mincer, 1974). This expansion of human capital involved the addition of health into the theory. Scheffler studied this area and found that education and health are more closely linked than education and income (Scheffler, 2010). The author suggests that it is rather the improvements in education surrounding physical health that improve productivity and thus income, rather than just education in general. Scheffler's studies also note the importance of mental health in terms of human capital, a previously overlooked factor. Educational improvements are seen to promote better mental health levels which lead to enhancements in individual and social capital (Scheffler, 2010).

While human capital theory has weaknesses and the results can vary, there are many strengths to the concept. One strength to the theory is that it allows policymakers to quantify the benefits of increased expenditure on health as the theory suggests improvements in health and education will lead to improvements within the economy and society. This can be seen in the nutrition intervention studies carried out in Central America (Martorell, 2010). These studies show how improvements in human capital in the form of nutritional developments led to greater economic productivity. Opportunities such as this, allow policymakers to test the efficiency of investments by analysing trends in the economy which leads to better policies being implemented within society. Another strength to theory is that allows policymakers to offer incentives for individuals to pursue education. The costs of education benefit the

economy, but the additional education benefits the individual with higher wages in the future. This win-win scenario allows for short term and long term economic growth within a society (Netcoh, 2016).

With these strengths and critiques in mind it seems that human capital theory can be described as a basic explanation for the way in which one can improve their personal income. The theory's chain of income certainly has a role in income creation and is the primary finding within the literature. This chain of income is crucial to this study as it directly shows how improvements in human capital, in particular, health can impact the society positively. However, the caveat is that when one examines the causal chain extensively, the variables within the chain have little relationship to each other, thus weakening the arguments made by the theory (Fix, 2018) . The lack of a concrete definition in relation to human capital theory makes it both hard to prove and disprove as many explanations of the theory are too broad to measure. That being said, the vast amounts of empirical evidence surrounding the theory supports the claims made by the original authors and thus shows how the theory is fit for purpose.

Health

Health is seen as an input into human capital as poor health reduces productivity. Health plays a vital role in human capital as it is impacted at both ends of the income chain discussed by Becker (Becker, 1994). Being unhealthy impacts one's ability to work and have a positive influence on the economy. This reduction in productivity is followed by a subsequent reduction in income. Health, however, is a normal good meaning that the more income one has, the more income they will spend on health. As a result, unhealthy individuals are not only impacted by their inability to raise income, this lack of income subsequently has a negative effect on future health choices (Bleakley, 2010).

The thought that health was a component of human capital was shared by Bloom (Bloom & Canning, 2003). Bloom's findings showcase the numerous links between health and the economy. Similar to Bleakley (Bleakley, 2010), he notes that healthier workers return a greater investment into the economy than unhealthy workers. On top of this, the link between health and the economy can be shown through the need for retirement income. Healthier

populations lead to retirement periods being longer than ever before (Bloom & Canning, 2003). With this prolonged retirement period, individuals require further income and therefore must be productive within the economy for a greater period of time. This increased longevity forces improvements in efficiency. Lastly, Bloom (2003) stated how healthier economies have lower mortality rates. These lower mortality rates result in a subsequent reduction in child and infant mortality deaths, increasing the potential for these lives to add value into the economy by obtaining education, working throughout their life and eventually retiring, highlighting the importance of health in terms of productivity. (Bloom & Canning, 2003). This value of health as a function of productivity can be viewed in many ways. Santerre's theory as viewing health as a stock allows one to demonstrate this importance (Santerre, 2012) The theory suggests that the greater one's health stock is, the healthier and thus the more productive that individual will be in a given year. This theory is limited to the possibility of sudden events deteriorating health such as accidents but offers value in terms of its premise.

Although poor health has been seen to reflect negatively in the productivity of employees, these effects may be diminishing due to the increasing number of people working from home, during and after the Covid – 19 pandemic. The original thought process was that working from home would lead to even further losses in productivity due to a lack of supervision but the results from Bloom's study in 2014 suggest otherwise (Bloom, 2014). Bloom found that working from home actually led to a 13% performance increase with 9% of this increase stemming from increased shift duration and 4% from calls per minute improvements. The results also showed an increased work satisfaction. This study led to the company involved offering a work from home policy to the entire firm, a trend that will likely be followed in modern society (Bloom, 2014) These claims from Bloom are supported by recent data from individuals working from home due to the pandemic where 48% of employees within a Metova study claimed they were more productive when working from home (Metova, 2020).

The primary aim from this section was to showcase that health can be defined as an input into human capital. Confirmation of this would allow further research to take place as now one can determine the impacts for productivity and income in a society based on changes to levels of health. The main findings surrounding this topic support the claim that health is an input into human capital with multiple links being shown between health and the economy, supporting this research.

Unemployment

The impact that unemployment has on one's life can also be highlighted as a key theme throughout the literature. The negative effects of unemployment on general well-being have been examined in relation to set point theory. Based on this theory, individual well-being should diminish with unemployment but then over time return to the previous baseline well-being level (Easterlin, 2014). A study from Lucas (2004) found that on average individual did not return to their previous level of well-being, even after reemployment. Additionally, individuals who suffered from past unemployment, reacted in a similar fashion to those who had never suffered unemployment prior to this study. This suggests that unemployment significantly and consistently impacts one sense of self and thus their overall wellbeing for a long lasting period of time (Lucas, 2004). Outside factors could cause both unemployment and life dissatisfaction, such as addictive behaviours to alcoholism or drug use, reducing the causal role of unemployment in the study. However, as the study consisted of 24'000 people, the likelihood that an outside factor like drug use played a major role is reduced.

Applied Literature

The applied literature in the field of health, unemployment and macroeconomic factors highlights the cause-effect relationship that unemployment has on health. This applied literature section will discuss the empirical evidence of studies relating to this field to demonstrate the existing relationship between health and unemployment and how they influence the economy. This will justify this studies reasoning for research in the area by identifying the need for additional research. Within this applied literature section, two different themes will be identified, these themes will consist of 'Mental Health and Unemployment' and 'Physical Health and Unemployment'.

Mental Health and Unemployment

The first theme that can be found in the literature relates to the concept of mental health and unemployment. This theme will focus on the impact unemployment has on mental health, an input into human capital. Unemployment has been linked to cause doubt in individual abilities with unemployed persons being seen to make more intrapersonal comparisons than employed people. These intrapersonal comparisons have been linked to signs of self-esteem issues and depression, showcasing a heighted level of self-awareness and negative thoughts (Sheeran, 1995). The implications of Sheeran's study highlight the relevance for further studies in the area and offer guidance as to the results one could expect from this study.

The role of self-awareness and self-perception is a very useful tool to understand the personal implications of unemployment, though the use of this data does come with some drawbacks. Respondents in studies such as Sheeran's (1995) may have given answers they deemed to be socially acceptable, rather than how they actually feel. For example, individuals may have stated they experienced negative thoughts post unemployment as they believe this is how they should feel after such an event, when in reality, this may not be the case. On top of this, the self – reported responses by individuals cannot be tested, this leaves room for individuals to exaggerate or underestimate their feelings and health status (Shields, 2001). These biases can be overcome with use of adjustment method techniques, R Software Package and Stata are regularly used in health research to allow for biases within studies and for adjustments to be made (Althubaiti, 2016). This knowledge will aid this research study when dealing with the sub - research question surrounding self-perceived general health.

Sheeran's findings (1995) could also be contested with the studies conducted by Shamir who found that among highly educated Israeli adults, self-esteem levels were not sensitive to unemployment and found no relationship between changes in employment status and changes in self-esteem (Shamir, 1986). However, one limitation to Shamir's study (1986) is that it also found that psychological well-being levels were lower for unemployed persons, questioning the validity of his primary finding.

Unemployment has been found to cause more severe mental health problems than just general life dissatisfaction. It has been observed that extended periods of unemployment or numerous instances of re-unemployment can lead to depression (Frese, 1987). Frese's study, which consisted of blue collar workers over the age of 45 found that reductions in income

also impacted individual's depressive symptoms. Notably, the study concluded that a reduction of depressive symptoms came with employment or retirement. This suggests that once individuals are financially stable, either when employed or retired, depression is not present at the same rate. This leads to questions regarding whether financial instability causes depression and calls for further research in the field. While this study is useful for identification of patterns and trends, the questionnaires were conducted in 1975 and 1977. The vast developments society has made between now and then suggests the study may be outdated, particularly given the improvements in unemployment benefits over the period, easing any financial burden caused by job loss (Frese, 1987). While the findings of Frese may be outdated, the importance of the theme cannot be understated and is backed up by much more recent empirical evidence. Karsten (2009) tested both linear and non-linear models in relation to deterioration of mental health over time due to unemployment. Karsten (2009) found a linear relationship between average unemployment duration and negative mental health factors. Their study also found the effects of unemployment on mental health are larger among men and blue collar workers when compared to women and white collar workers (Karsten, 2009).

While the impacts of unemployment are evident in Frese and Karsten's findings, little reference is made to the support systems available to the individuals in the study. Studies conducted by Huffman (2015) found that social capital, aids to support individuals coping with unemployment. Family support is a form of social capital that could be measured against the effects of unemployment on mental health (Huffman, 2015). The lack of use of social capital in relation to these studies highlights a clear gap in the literature where future studies could focus on comparing the health variables of employed persons against unemployed persons with high levels of social capital for support. This would allow for a more accurate interpretation of the true effects of unemployment on mental and physical health. While this is not the focus on this research study, a gap in the literature can be highlighted here and calls for further research.

The main limitation to this research remains the same and has not changed since Frese's work, this limitation being causality. Largescale differences in relation to the effect sizes for transitions into and out of employment cast doubts on the connection between unemployment and mental health. Based on the research and the effects of employment and unemployment on mental health, a short period of unemployment followed by a gain in employment would actually improve one's mental health, a premise the research subsequently rejected where

they believed the loss of employment would be suffered at a greater extent than the gain in employment (Karsten, 2009). These causal findings can be overcome by looking at the work of Gordo (2009). Gordo found that a causal relationship occurs with long term unemployment and that while short term unemployment may have little impact on mental health, long term unemployment impacts men and women significantly (Gordo, 2006).

The key findings within this literature all show a strong connection between unemployment and health. Within these findings, it can be largely seen that increases in unemployment lead to deterioration of mental health levels. This is important as it opens up questions as to why unemployment has this effect on society and allows this research to test what impacts this reduction in mental health has on economic factors.

Physical Health and Unemployment

The second theme that can be found within the applied literature relates unemployment to physical health. Similar to the mental health effects caused by unemployment, physical health is also impacted with job loss. The negative thought process in relation to one's self translates over to physical health as well as mental. A pan European survey which examined self perceived physical health found that unemployment or early retirement had a strong association with perceived poor health status (Alavinia, 2008).

Drawing from the conclusions by Smed (2016), dietary choices and consumer purchasing behaviours change when individuals become unemployed. In the short run, unemployment leads to consumers shopping in discount stores and consuming extra animal based products, containing of higher fat and protein contents. Medium term effects see expenditure on food decrease and consumption of fresh foods diminish. In the long run, nutrient dense foods are substituted for high sugar carbohydrates. The reduction in nutrient dense foods can be explained as individuals seek to buy similar foods as before, but with lower quality ingredients due to a reduction in income (Smed, 2016). Smed's findings are consistent with work conducted by French (2019). French found that lower income households purchase less healthy foods, even when adjusted for education (French, 2019). This research informs this study as one can expect to see a reduction in physical health with high levels of unemployment due to a reduction in income.

While dietary choices are impacted by unemployment, physical activity levels are also affected. This conclusion can be drawn by the findings of Ali (2006) which found that individuals who are faced with a high degree of job strain or unemployment are more likely exhibit low levels of physical activity (Ali, 2006). However, once this data is adjusted for education, the differences between employed and unemployed diminish. This suggests that unemployment is more likely to be experienced by people with low levels of education, which in turn may result in low physical activity levels, reducing the causation effect of unemployment. Ali's study finds that unemployment is a by-product of socioeconomic status and education, both of which impact physical activity levels greatly (Ali, 2006).

Ali is not alone in the thought process that socio-economic status holds the causal relationship with health, this theory is shared with many others. Adler (2002) has found that low socio-economic status can be linked with having a more sedentary life (Adler, 2002). Doku (2019) found a multigenerational pattern where low socio-economic grandparents with low educational levels were more likely to have children and grandchildren who suffered prolonged periods of unemployment. The findings across these studies represent a relationship between socio-economic status, health and thus unemployment (Doku, et al., 2019). Based on the findings within the socio-economic status field of research, doubts are cast over any results that may come from finding a relationship between unemployment and health. This acts as one of the primary limitations to the research. Ali's theory that unemployment is a by-product of low socioeconomic status and thus the primary relationship is between socio-economic status and health, calls for more research in the field. (Ali, 2006) Ali's study is not without limitations, many countries have free education for all members of the community. Based on Ali's study, one would assume that employment levels would increase in the lower status groups, but in reality, this is not the case and the aforementioned trend continues. A link between education and health can be found, highlighting possible theories that higher education leads to improved health regardless of socio-economic status. This link is supported by evidence that the effects of income on health are weak (Cooper, 2006).

The thought that physical health is a component of human capital and thus a reduction in health impacts productivity in a negative manner is supported by empirical evidence. A study conducted by Goetzel (2003) utilised data from 374,799 employees and showcased the reasons behind health related productivity losses for employers. 29% of productivity losses for employers were due to physical health related absence, with the main reasons including

lower back pain, spinal trauma and diabetes (Goetzel, 2003) .These potential losses in productivity however have been shown to be reduced with the use of exercise during sick leave. Kellett's study found that sick leave due to back pain or spinal trauma decreased by over 50% when individuals exercised when absent (Kellet, 1991).

The expanding gap between first world and third world countries has been attributed to the role health has as a factor of human capital. The long term economic growth of countries is affected by the health of the country as seen by the empirical approach adopted by Lopez (2005). The model found that human capital, public policy and geographical location were all important factors when determining the long term economic growth of the country (Lopez, 2005). The model however, highlighted health in particular as one of the main factors. The results showed that changes in health status and improvements in adult survival rates subsequently show advancements in long term economic growth. These improvements were multiplied in countries with previously low levels of adult survival rates. This model questions the premise that the healthiest individuals are the most productive by adopting a macroeconomic viewpoint on a study largely focused on microeconomic trends (Lopez, 2005). Lopez's study supports the claim that health is an input into human capital, thus supporting this research study. Furthermore, it is evidence of the major improvements that can be made within the economy by improving the health of the population.

The key findings that relate to physical health show that all aspects of physical health are impacted with unemployment. Self-perception, diet and sickness are all impacted negatively with higher levels of unemployment. The implication of this is that a need for further research into this area is required, justifying this research. The primary limitation surrounding this topic is in relation to the causation with many claiming that socio-economic status impacts health, rather than unemployment. However, the empirical evidence questions this premise which further justifies this research. Findings from this study in relation to the impact unemployment has on physical health will hopefully add to this literature.

Methodology

This section refers to the methodology adopted in this research paper. The purpose of this section is to identify the methods that will be used to answer the research question and justify the reasoning behind the selection of these methods. The primary goal of this research is to determine how unemployment impacts the physical and mental health of the Irish population. From this data, one can infer the economic implications that may arise from such changes to health levels. The study also seeks to test whether the duration of unemployment experienced influences the health effects of unemployment. Furthermore, does actively pursuing employment effect one's health differently to not activity seeking employment.

Data Sources

Both the dependent and the independent variables in this study have been selected from the European Social Survey conducted in 2018. The data involved within the study will only reflect the respondents from Ireland to relate the study to the Irish population and not the entirety of Europe. A total of 2216 respondents were included in the study from Ireland and it is from this data that the regression calculations and Mann Whitney equivalent tests will be made from. The data was released on June 15th, 2020 and is publicly available. Key definitions of the variables used from this data source are listed in the following sections. This data is highly valid due to the method in which it was collected. Face to face interviews were conducted in an academic manner to understand the beliefs and attitudes of European people.

Key Model

This section will provide information regarding the model that will be used within this research study, the variables being examined and the methods used in data analysis. The model for this research study has been adopted from the work conducted by Gaspar (2009). The quantitative model uses regression analysis to evaluate how shifts into and out of unemployment influence self – rated health for individuals living in Hungary. Furthermore,

the findings within (Gaspar, 2009) demonstrate the need for research in this area within Ireland as the researcher concluded that unemployment has a negative effect on health levels. Unlike Gaspar, this study will use a Mann Whitney equivalent tests to ensure findings are accurate.

In order to improve the explanatory power of the study and compute an effective regression analysis, in relation to mental health, the factors that contribute to happiness must also be included in the model. Helliwell (2019) found that there were four key variables that contributed to one's general well-being and happiness. These variables were generosity, freedom, trust and having someone to rely on (Helliwell, 2019). These variables often define the differences in life satisfaction between individuals and thus must be taken into account in this study.

In a similar manner, determinants of physical health must be included in the study to improve the explanatory power of the research. Two key determinants of health are lifestyle and environment as seen in work conducted by Patwardhan (2015). This can be seen in the allocation of resources in healthcare budgets, where 75% or more of the budget is allocated towards lifestyle related conditions (Patwardhan, 2015). As a result, variables that refer to one's lifestyle satisfaction and to health care, have been included in the study.

Key Dependent Model Variables

While Gaspar (2009) solely looked at self – rated health as the dependant variable, this research study will be selecting two dependant variables to test, these variables are:

- "Subjective General Health"
- "Happiness"

"Subjective General Health" is a measure of one's self – reported health status relating primarily to one's physical health. "Happiness" refers directly to one's mental health and life satisfaction (Monden, 2014). By addressing these two factors, this study feels that all aspects of health can be addressed within the study and how they are impacted by unemployment.

The rationale behind including the "Subjective General Health" variable in the study was based on the prevalence of unhealthy behaviours in Irish society. Based on the Healthy Ireland Survey of 2016, 86% of the population exhibited a minimum of one form of

"unhealthy behaviour". These behaviours included smoking, excess alcohol intake, poor fruit and vegetable consumption and sedentary behaviours (HealthyIreland, 2016). 2215 respondents answered the question rating their subjective general health on a scale of "1-5", with "1" representing very good health and "5" representing very bad health.

The decision to include the "Happiness" variable was based on the substantial mental health problems are that can be seen in Ireland. Ireland has the third highest rate of mental health illnesses in Europe with 18.5% of the Irish population being diagnosed with some form of mental health problem as of 2016 (MentalHealthIreland, 2020). 2213 answers were collected for the "Happiness" variable where respondents were asked to rate how happy they were on a scale of "0-10". A score of "0" meant the individual was extremely unhappy while a score of "10" meant the individual was extremely happy.

The study has generated two equations based on these key models:

- **$Mh = \alpha + \beta(Att) + \beta(Stu) + \beta(Ltu) + \beta(Tru) + \beta(Sup) + \beta(Fre)$**

- **$Ph = \alpha + \beta(Att) + \beta(Stu) + \beta(Ltu) + \beta(Sat) + \beta(Hc)$**

Mh	Mental Health
Ph	Physcial Health
Att	Attitude towards reemployment
Stu	Short Term Unemployment
Ltu	Long Term Unemployment
Tru	Trust in Politicians
Sup	Support of friends
Fre	Freedom
Sat	Life Satisfaction
Hc	Health Care

Key Independent Model Variables

The independent variables in this study have been chosen to test the dependant health variables, they relate to unemployment and happiness and are as follows:

- "Ever unemployed and seeking work for a period more than three months"
- "Any period of unemployment and work seeking lasted 12 months or more"
- "Attitude When Unemployed"
- "Trust in politicians"
- "How many people with whom you can discuss intimate and personal matters"
- "Important to make own decisions and be free"
- "Life Satisfaction"
- "State of health services in country nowadays"

The first two independent variables have been selected to test whether there is a difference in the health levels of individuals when they experience short or long term unemployment. This will be useful in answering one the sub questions in this research study, which directly relate to this concept. Both of these were answered with either a "Yes" response or a "No" response. There were 2216 respondents for each question. Recoding of the variables had to be completed in order for sufficient analysis of the data. An answer coded as "1" signified that the respondent had experienced the given level of unemployment. An answer of "2" signified that the respondent had not experienced the given the level of unemployment. Originally, answers ranging from "3-6" included responses such as "don't know" and "N/A". For the purpose of this study, these responses were recoded to a "2", signifying that the respondent had not experienced the given period of unemployment. For ease of reading within this study, these variables may be referred to as short term unemployment and long term unemployment respectively throughout the research.

The next independent variable, "Attitude When Unemployed", was selected to test if health levels are impacted in a different manner given one's attitude towards reemployment. This will be beneficial when seeking to answer the other sub question in this study, examining the different health effects of unemployment, depending on the attitudes towards gaining future employment. An answer marked "0" signifies that the respondent is not actively looking for

employment while an answer marked “1” signifies that the respondent is actively seeking reemployment. No recoding of data was necessary for this variable. 2216 respondents answered this question.

The next three independent variables, “Trust in politicians”, “How many people with whom you can discuss intimate and personal matters” and “Important to make own decisions and be free” serve two purposes in this study. The first purpose is to add to the explanatory power of the research study as it had been proven that these variables influence one’s happiness, thus, reducing error within the study. Second, is to allow for a viable regression analysis to take place. A regression analysis requires at least some of the variables to be continuous and linear and thus these variables must be included in the study. No recoding was needed within these variables. Within the “Trust in politicians” variable, answers ranged from “0-10” with “0” signalling that the individual had no trust in politicians and “10” having complete trust in politicians. 2165 respondents answered the “Trust in politicians” question. The “how many people with whom you can discuss intimate and personal matters” had 2202 respondents to the question. Answers ranged as followed, “0” = None, “1” = 1 person, “2” = 2 people, “3” = 3 people, “4” = 4-6 people, “5” = 7-9 people and “6” = 10 or more people. 2190 people answered the “Important to make own decisions and be free” where answers ranged from “1-6”, “1” being strongly agree and “6” being that the respondent strongly disagreed. These independent variables will only be tested against the “Happiness” dependent variable as they only refer to mental health.

The final two independent variables, “Life Satisfaction” and “State of health services in country nowadays”, serve similar purposes to the independent variables mentioned above. These variables will be used to add explanatory power to the findings surrounding unemployment and physical health, as these factors are seen to influence physical health greatly. 2195 individuals answered the “Life Satisfaction” question which asked respondents to rate how satisfied they were with their life currently. Answers ranged from “0-10” with “0” being extremely dissatisfied and “10” being extremely satisfied. 2198 responses were gathered based on the “State of health services in country nowadays” which involved Irish people rating the country’s health services on a scale of “0-10”. A “0” reflected an extremely bad rating of the service while a “10” response viewed the service as extremely good. These two independent variables will only be tested the “Subjective General Health” variable as they only refer to physical health in this study.

Statistical Analysis

Regression analysis can be thought of as a way to quantify the relationship between two or more variables with the use of observations or data. Regression uses dependant and independent variables to predict certain outcomes. Dependant variables are the variables that are being measured while independent variables are the factor that is being changed to test its impact on the dependant variable. As we are testing the impact that unemployment has on health, unemployment variables will be classed as the independent variables in this study while health variables will be the dependant variables. Linear regression analysis is used to create a line of best fit in order to determine whether there is a causal relationship between the two variables.

As this study involves quantifying the extent of how unemployment impacts the two health variables, physical health and mental health, (exact dependant variables have been defined previously), a regression method will be employed. This method is used to explain to what degree of the independent variable's variance influences the variance of the dependant variable. Linear regression will be utilised within this study so that a line of best fit can be created, which will allow one to calculate the R – squared values mentioned above. This will be achieved using the method of least squares which creates a line of best by calculating the relationship between the dependant and independent variables for each point of data. R - squared values are computed from this line by comparing the predicted values to the actual values and squaring the difference.

Singular ANOVA calculations will be employed to use the aforementioned least squares method. For ease, ANOVA testing has been chosen over T testing, as ANOVA calculations allow one to examine the relationship between two or more variables, whereas the T test only allows for analysis between two variables. Both tests examine the difference in means and the variance across the variables in a similar manner.

The chosen method of least squares has some assumptions that must be stated prior to the research being conducted:

- The model assumes that all independent variables have no correlation between the variables, meaning there is no multicollinearity in the model.

- The model assumes a normal distribution of data within the dependant variable.
- Regression errors will on average, be equal to zero.
- The model assumes linearity and thus large outliers in the data are unlikely.

To ensure an accurate interpretation of results is conducted, Mann Whitney equivalent tests will be conducted after regression analysis has taken place. This nonparametric test does not assume a normal distribution within the data and thus will be used to confirm the findings made within the regression analysis.

Assessment Of Model Assumptions

As mentioned earlier, there are four assumptions associated with a least squares model, this section will seek to justify the selection of this model by testing the validity of these assumptions.

Multi – Collinearity

Multi – collinearity is concerned with the level of intercorrelations between the independent variables in a study. The presence of multi – collinearity in a sample leads to data being deemed as unreliable and thus reduces the accuracy of the study. Multi - collinearity can be caused by the repetition of the independent variables in a study. The presence of multi – collinearity can be detected with the use of the variance inflation factor (VIF), with VIF value's greater than 10 highlighting presence of intercorrelation (StatisticsSolutions, 2020).

Attitude When Unemployed

Variable	VIF
Short Term Unemployment	1.828
Long Term Unemployment	1.821
Trust in Politicians	1.221
How many people with whom you can discuss intimate and personal matters	1.057
Important to make own decisions and be free	1.028
Life Satisfaction	1.093
State of health service in country nowadays	1.210

Table 1

Short Term Unemployment

Variable	VIF
Long Term Unemployment	1.073
Trust in Politicians	1.221
How many people with whom you can discuss intimate and personal matters	1.059
Important to make own decisions and be free	1.027
Life Satisfaction	1.091
State of health service in country nowadays	1.209
Attitude When Unemployed	1.061

Table 2

Long Term Unemployment

Variable	VIF
Trust in Politicians	1.22
How many people with whom you can discuss intimate and personal matters	1.056
Important to make own decisions and be free	1.03
Life Satisfaction	1.093
State of health service in country nowadays	1.209
Attitude When Unemployed	1.06
Short Term Unemployment	1.076

Table 3

Trust in Politicians

Variable	VIF
How many people with whom you can discuss intimate and personal matters	1.058
Important to make own decisions and be free	1.029
Life Satisfaction	1.078
State of health service in country nowadays	1.033
Attitude When Unemployed	1.072
Short Term Unemployment	1.844
Long Term Unemployment	1.839

Table 4

How many people with whom you can discuss intimate and personal matters

Variable	VIF
Important to make own decisions and be free	1.019
Life Satisfaction	1.063
State of health service in country nowadays	1.203
Attitude When Unemployed	1.07
Short Term Unemployment	1.846
Long Term Unemployment	1.836
Trust in Politicians	1.221

Table 5

Important to make own decisions and be free

Variable	VIF
Life Satisfaction	1.084
State of health service in country nowadays	1.211
Attitude When Unemployed	1.07
Short Term Unemployment	1.841
Long Term Unemployment	1.841
Trust in Politicians	1.22
How many people with whom you can discuss intimate and personal matters	1.047

Table 6

Life Satisfaction

Variable	VIF
State of health service in country nowadays	1.199
Attitude When Unemployed	1.071
Short Term Unemployment	1.841
Long Term Unemployment	1.841
Trust in Politicians	1.204
How many people with whom you can discuss intimate and personal matters	1.029
Important to make own decisions and be free	1.021

Table 7

State of health service in country nowadays

Variable	VIF
Attitude When Unemployed	1.071
Short Term Unemployment	1.843
Long Term Unemployment	1.838
Trust in Politicians	1.042
How many people with whom you can discuss intimate and personal matters	1.052
Important to make own decisions and be free	1.03
Life Satisfaction	1.083

Table 8

Eight multi – collinearity tests were conducted on SPSS, changing the 'dependent' variable in each test to a new independent variable to compare intercorrelation levels. As shown in the above data, all VIF statistics were below 2, signalling that there is no multi – collinearity between independent variables in this study, this meets the assumption made in the model.

Auto - correlation

Auto - correlation is concerned with the level of correlation between values of the dependent variable across different observations in the data set. Auto - correlation within a study results in prior dependant variable values influencing current values. The presence of auto – correlation within a study would skew the results of the regression analysis. The Durbin – Watson test can be conducted via SPSS to test for auto – correlation with values close to 2 suggesting little auto – correlation, and values close to 0 or 4 indicating higher levels of auto – correlation, either positive or negative (StatisticsSolutions, 2020).

Durbin - Watson	2.132

Table 9

Dependent Variable = Happiness

Independent Variables = Important to make own decisions and be free, Trust in politicians, Attitude When Unemployed, How many people with whom you can discuss intimate and personal matters, Long Term Unemployment, Short Term Unemployment

Durbin - Watson	2.036

Table 10

Dependent Variable = Subjective General Health

Independent Variables = State of health services in country nowadays, Attitude When Unemployed, Life Satisfaction, Long Term Unemployment, Short Term Unemployment

Two Durbin – Watson tests were conducted to measure the level of auto – correlation within the study. Both tests give a Durbin – Watson value very close to 2. This suggests that the model has no auto – correlation, meeting our assumption.

Linearity

This model assumes that the relationship between the dependent and the independent variables is linear. This relationship is required in this form in order to form a linear regression model. Based on this, it is assumed that probability of large outliers occurring in the data is very low (Schreiber-Gregory, 2018). This linear relationship is met as continuous variables have been included in the research to allow for regression calculations to be made

Normality

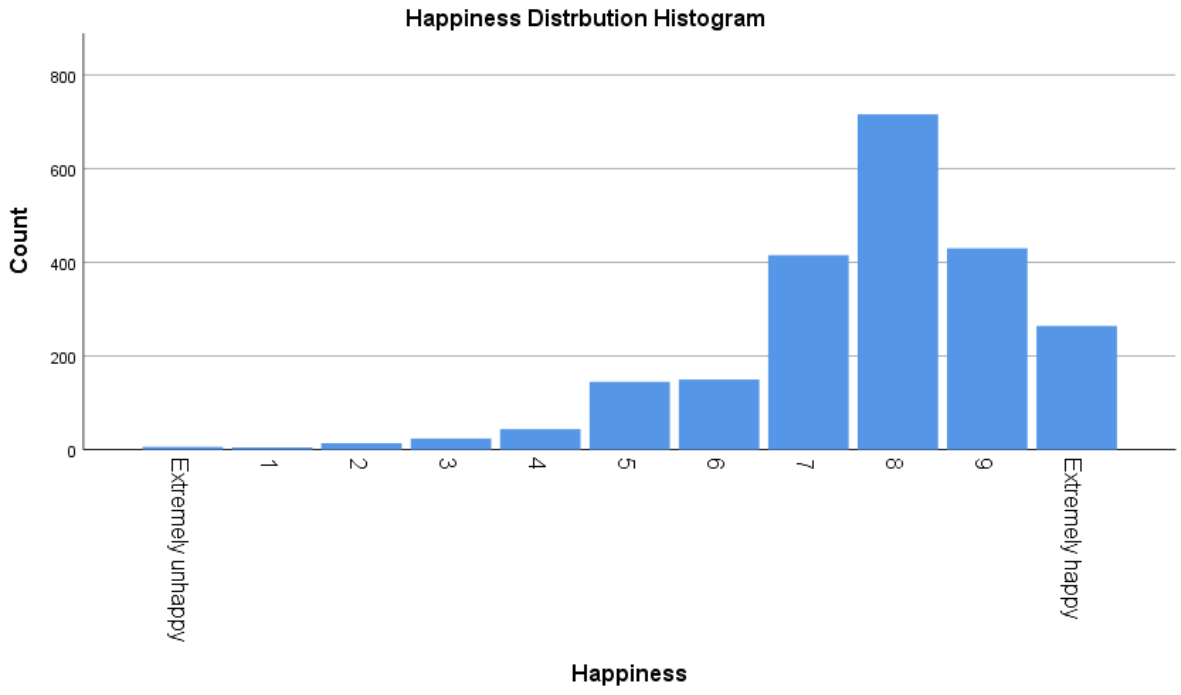
The linear regression model requires that the residuals of the regression are normally distributed. The need for data to be normally distributed is in relation to the interpretation of the results. Normally distributed data allows the researcher to make explanations within their analysis and results that are based on the parameters from this type of data. This normality assumption can be tested via the Kolmogorov-Smirnov test in SPSS.

Kolmogorov – Smirnov Normality Test

Dependent Variable	Significance
Happiness	0.000
Subjective General Health	0.000

Table 11

While both the dependent variables appear to have failed the test for normality by having a significance level of less than 0.05, tests such as the Kolmogorov – Smirnov tests have regularly shown to be inaccurate when testing normality. Quinn and Keough (2002) do not recommend the use of these tests as variations in sample size result in the test rejecting the null hypothesis when in reality the data is normally distributed (Quinn & Keough, 2002). This slightly skewed but relatively normal distribution can be seen in the graph below. For this reason, this study believes that this data meets the assumption of normality.



Graph 1

Limitations

Every study is subject to some form of limitations and this research study is no different.

The first limitation is in relation to an assumption made in the recoding of two of the independent variables. The variables "Ever unemployed and seeking work for a period more than three months" and "Any period of unemployment and work seeking lasted 12 months or more" initially had 5 and 6 options when answering the question respectively. For computation of regression, only 2 options per questions were allowed. For this purpose, the data was recoded so that answers which consisted of a "N/A", "refusal or "don't know" response were assumed as no. This is a minor limitation as the majority of responses in the data set were given as a "Yes" or a "No". The table below will offer the frequencies of the data prior to the recoding.

Frequency table of data

Variable	Yes	No	Refusal	Don't Know	N/A
Short Term Unemployment	557	1639	13	7	0
Long Term Unemployment	290	1923	1	2	0

Table 12

The next limitation of the study is in relation to the failure of the normality test that is assumed within a least squares' regression model. As mentioned previously, this may be as a result of the sample size skewing the actual normal distribution of the data as concluded by Quinn and Keough (2002). For the purpose of this study, we must assume that this is the reason behind the failure of the test as the assumption is crucial to the model.

The last limitation is concerned with the two independent variables "Ever unemployed and seeking work for a period more than three months" and "Any period of unemployment and work seeking lasted 12 months or more". This events are not mutually exclusive as individuals who were seeking work for more than 3 months initially, may have been left

searching for employment for longer than 12 months too. However, the multi – collinearity tests for a correlation between these two variables didn't conclude any association.

Analysis and Findings

This chapter will focus on the results of the research, given the methods mentioned in the previous 'Methodology' chapter. From these results, an in depth analysis will be conducted to examine the findings in the data. Firstly, the descriptive statistics of the data will be presented in order to quantify the basic features of the data in this research study. Next, regression analysis will provide a comprehensive examination of the data in the study. Lastly, Mann Whitney equivalent tests will be used to confirm the results found in the regression analysis. Tables of results will be displayed throughout the chapter to easily comprehend the findings.

Descriptive Statistics

Descriptive statistics of all variables, both the dependent and independent variables, in the study are displayed below as they offer a basic summary of the data involved in this research.

Descriptive Statistics of variables in the study

Variable	N	Min	Max	Mean	St. Dev	Variance
Happiness	2213	0	10	7.7	1.654	2.735
Subjective General Health	2215	1	5	1.88	0.863	0.744
Attitude When Unemployed	2216	0	1	0.03	0.173	0.03
Short Term Unemployment	2216	1	2	1.75	0.434	0.188
Long Term Unemployment	2216	1	2	1.87	0.337	0.114
Trust in Politicians	2165	0	10	3.93	2.416	5.839
People who one can discuss intimate matters	2202	0	6	2.85	1.359	1.848

Importance of freedom	2190	1	6	2.2	1.138	1.294
Life Satisfaction	2195	0	10	7.24	1.957	3.831
State of Health Service	2198	0	10	4.16	2.494	6.219

Table 13

Starting with the dependent variables, the "Happiness" variable displayed a mean of 7.70 and a standard deviation of 1.65. Scores of 0 represented an extremely unhappy individual while scores of 10 represented an extremely happy individual. A mean statistic of 7.70 allows one to observe that there is a generally happy population within this study. . However, this happiness level does vary, as shown by the 1.65 standard deviation statistic. This is to be expected due to subjective and personal nature of the dependent variables. In a similar fashion, it seems that the population within this data perceive themselves to have a good level of general health. Within the "Subjective General Health" variable, a mean of 1.88 was observed. This data was ranked 1 – 5 with 1 representing very good health and 5 representing very poor general health. Less variation occurred in this variable with a standard deviation of .863. Based on this mean, the average self – perceived general health of the Irish population is classed between the "good" and "very good" categories.

Moving to the independent variables relating to unemployment, we can observe that the "Attitude When Unemployed" variable has a mean of 0.03. As mentioned previously, a score of 0 reflects an individual not seeking reemployment while a score of 1 represents an individual actively looking for reemployment. A mean of 0.03 means that only 3% of the population were actively seeking reemployment in the last 7 days, as that is the time frame outlined in the question. In relation to short term and long term unemployment, it can be observed from the graph that more people in the study have suffered from short term unemployment than long term unemployment, as expected, as the mean for short term unemployment is closer to 1. Based on their respective means, we find that 25% of the population have suffered from short term unemployment while 13% of the population have experienced long term unemployment.

Upon examination of the supporting independent variables in the study, we find that a large standard deviation is exhibited in both the "Trust in Politicians" and the "State of the Health Service" variables. The large variation in the trust of politicians can be explained by demographic factors, as variations in age, gender, race and education all influence one's

opinion on politicians (Christensen, 2005). The large standard deviation in relation to public opinion can also be explained. Public opinion on health care changes with respect to income, higher income households reflect a more positive assessment of the state of the health service, as they have the finances needed to cover medical costs. Lower income households reflect a more negative assessment of the health service, with many lower income households seeking better public health care (Blendon, 1989).

The "importance of freedom" variable allows the research to gain an interpretation of the beliefs of the individuals within the study. A mean of 2.2 represents a general agreement to the statement "it is important to make your own decisions and be free". Very little variance is exhibited within this variable, suggesting this is a widespread opinion within the sample. Lastly, the "Life Satisfaction" variable displays a mean of 7.24. With 0 representing an extremely dissatisfied individual and 10 representing an extremely satisfied individual, a mean of 7.24 suggests that the average individual is largely satisfied with their current situation in life within this sample. The relatively high standard deviation is to be expected due to the personal nature of the variable.

Regression

Given the knowledge we have acquired surrounding the data, through analysis of the descriptive statistics, a regression analysis can now be conducted to study the data in more detail. Singular and multiple ANOVA calculations will be made involving the two dependent variables in the study and their relevant independent variables.

ANOVA test comparing "Attitude When Unemployed" to "Happiness"

R^2	F	β	Sig
0.008	17.256	-0.849	0.00

Table 14

The "Attitude When Unemployed" was found to have a significantly different mean to "Happiness" as the P value was less than 0.05. A beta of -0.849 can be observed, this suggests that for every 1 unit change in the "Attitude When Unemployed" variable, a change

of -0.849 occurs in the "Happiness". A R square value of 0.008 represents that the independent variable causes 0.8% of the variance in the dependent variable.

ANOVA test comparing "Short Term Unemployment" to "Happiness"

R^2	F	β	Sig
0.008	16.802	0.331	0.00

Table 15

The "Short Term Unemployment" variable was found to have a significant difference in means when compared to "Happiness" given the P Value of less than 0.05. This can be seen in the large F statistic of 16.802. A beta of 0.331 occurred in the test, suggesting that for every 1 unit change in "Short Term Unemployment", "Happiness" will change by 0.331.

ANOVA test comparing "Long Term Unemployment" to "Happiness"

R^2	F	β	Sig
0.080	14.194	0.392	0.00

Table 16

"Long Term Unemployment" was seen to be the cause of a large amount of variance in "Happiness", as an R square value of 0.080 means 8% of the variance in "Happiness" is caused by Long Term "Unemployment". This test was significant as the P value fell below the 0.05 threshold and thus, we reject the null hypothesis. A beta of 0.392 reflects how a 1 unit change in "Long Term Unemployment" causes a 0.392 change in "Happiness".

ANOVA test comparing "Trust in Politicians" to "Happiness"

R^2	F	β	Sig
0.018	39.423	0.092	0.00

Table 17

"Trust in Politicians" was found to be significant with "Happiness" at the 95% confidence level, as a P value of less than 0.05 is displayed. A positive beta of 0.092 is observed in the table, meaning that for every 1 unit increase in "Trust in Politicians", "Happiness" levels rise by 0.092.

ANOVA test comparing "How many people with whom you can discuss intimate and personal matters" to "Happiness"

R^2	F	β	Sig
0.028	63.563	0.205	0.00

Table 18

The "How many people with whom you can discuss intimate and personal matters" variable is seen to cause 2.8% of the variance in "Happiness", given the R square value. The very large F statistic of 63.563 means a significance level of 0.00 is displayed, thus we reject the null hypothesis. A beta of 0.205 means that for every 1 unit increase in "How many people with whom you can discuss intimate and personal matters", "Happiness" increases by 0.205

ANOVA test comparing "Important to make own decisions and be free" to "Happiness"

R^2	F	β	Sig
0.003	7.584	-0.085	0.006

Table 19

The differences in means between the "Important to make own decisions and be free" and the "Happiness" variables are statistically significant. This can be concluded due to a P value of 0.006 being displayed in 'Table 19'. A beta of -0.085 means that for every 1 unit increase in the importance of freedom, happiness levels reduce by -0.085.

ANOVA test comparing "Attitude When Unemployed" to "Subjective General Health"

R^2	F	β	Sig
0.001	2.392	0.164	0.122

Table 20

The differences in means between the "Attitude When Unemployed" and the "Subjective General Health" variables are not statistically significant. The P value of 0.122 exceeds our 0.05 limit and thus we fail to reject the null hypothesis that one's attitude when unemployed has no impact on one's physical health.

ANOVA test comparing "Short Term Unemployment" to "Subjective General Health"

R^2	F	β	Sig
0.005	11.707	-0.144	0.001

Table 21

In 'Table 21' we see that "Short Term Unemployment" has a statically different mean to "Subjective General Health" and thus we reject the null hypothesis. A beta of -0.144 is displayed, meaning that for every 1 unit increase in one's short term unemployment, their physical health reduces at a rate of -0.144.

ANOVA test comparing "Long Term Unemployment" to "Subjective General Health"

R^2	F	β	Sig
0.010	23.021	-0.259	0.00

Table 22

From the above table, we see from the R square value that "Long Term Unemployment" causes 1% of the variance in "Subjective General Health". A P value of 0.00 implies the test is statistically significant. A negative beta of -0.259 suggests that for every 1 unit increase in long term unemployment, physical health diminishes by a factor of -0.259

ANOVA test comparing "Life Satisfaction" to "Subjective General Health"

R^2	F	β	Sig
0.053	122.614	-0.101	0.00

Table 23

"Life Satisfaction" is seen to cause 5.3% of the variance within ones "Subjective General Health". A significance level of less than 0.05 means the test is significant and we reject the null hypothesis. This low significance level is due to the F statistic of 122.614, which is vastly outside of the critical value.

ANOVA test comparing "Attitude When Unemployed" to "Subjective General Health"

R^2	F	β	Sig
0.004	7.729	-0.020	0.005

Table 24

"Attitude When Unemployed" was seen to marginally impact "Subjective General Health". The test was significant as the P value fell below the 0.05 value. A beta of -0.020 is displayed, meaning that for every 1 unit change in "Attitude When Unemployed", one's physical health will change by a factor of -0.020. "Attitude When Unemployed" causes 0.4% of the variance in "Subjective General Health", as seen in the R square value.

Multiple Regression ANOVA test on "Happiness"

R^2	F	Sig
0.060	22.675	0.00

Table 25

A multiple regression analysis took place with "Happiness" as the dependent variable in the test. The independent variables in the test included variables that were determinants of happiness, to allow for the regression to take place, and unemployment variables. A R square value of 0.060 means that 6% of the variance within one's happiness levels are down to unemployment and happiness factors. This test was significant at the 95% confidence level as the P value was 0.00.

Multiple Regression ANOVA test on "Subjective General Health"

R^2	F	Sig
0.061	28.407	0.00

Table 26

A multiple regression analysis took place with "Subjective General Health" as the dependent variable in the test. The independent variables in the test included variables that were determinants of physical health, to allow for the regression to take place, and unemployment variables. The test found that the means of the independent variables were statistically

significant to that of the dependent variable as the P value fell below 0.05. Given the R square value, we can conclude that 6.1% of the variation in one's physical health is due to unemployment and other lifestyle factors.

Mann Whitney Equivalent Test

For confirmation of these results, Mann Whitney Equivalent tests were conducted on the unemployment independent variables against the dependent variables.

Mann Whitney Equivalent Test on "Attitude When Unemployed" against "Happiness"

Z	Sig
-3.121	0.002

Table 27

A Z statistic of -3.121 was observed from the test, resulting in a significance value of 0.002. As a result, we reject the null hypothesis as the value falls below 0.05. This is in line with the previous regression result.

Mann Whitney Equivalent Test on "Short Term Unemployment" against "Happiness"

Z	Sig
-3.469	0.001

Table 28

A rejection of the null hypothesis occurred in this test due to a significance value of 0.001 being computed. A Z score of -3.469 was realised. This is in line with the previous regression analysis result.

Mann Whitney Equivalent Test on "Long Term Unemployment" against "Happiness"

Z	Sig
-2.866	0.004

Table 29

In line with the previous regression result, a rejection of the null hypothesis occurred. This is due to a Z statistic of -2.866 resulting in a significance value of 0.004.

Mann Whitney Equivalent Test on "Attitude When Unemployed" against "Subjective General Health"

Z	Sig
-1.831	0.067

Table 30

In 'Table 30', we see a failure to reject the null hypothesis, as seen in the relevant regression analysis, 'Table 20'. The significance value 0.067 is greater than the 0.05 critical value and thus a failure to reject occurs.

Mann Whitney Equivalent Test on "Short Term Unemployment" against "Subjective General Health"

Z	Sig
-2.874	0.004

Table 31

A Z statistic of -2.874 is observed in 'Table 31', this results in a significance value 0.004 being computed. This coincides with previous ANOVA calculations.

Mann Whitney Equivalent Test on “Short Term Unemployment” against “Subjective General Health”

Z	Sig
-4.524	0.000

Table 31

Short term unemployment is found to be significant within this calculation due to a Z statistic of -4.524 being computed. The significance value falls below the 0.05 threshold and thus we reject the null hypothesis. This is in line with the previous relevant regression calculation.

Discussion

This chapter will be concerned with answering the research question and sub-questions posed in the "Introduction" section of the research study. These questions will be answered based on the findings within the "Analysis and Findings" chapter with explanations given regarding the significance of these results. How these findings fit in relation to the pre-existing literature in the field of unemployment and health will also be addressed within the chapter.

How does unemployment impact the physical and mental health of the Irish population and what are the implications for economic growth?

The primary research question in this study was concerned with understanding the impact that unemployment has on one's physical and mental health levels. By understanding this relationship, the research study could then locate any implications for economic growth that may arise based on a change to the health levels of its society. A number of results were found within the "Analysis and Findings" section of the study where some very interesting observations could be made. Discussion of these findings will be categorized into subsections titled either "Mental Health" or "Physical Health". All ANOVA results relating to unemployment were supported by Mann Whitney equivalent tests as confirmation.

Mental Health

This study used the variable "Happiness" from the European Social Survey in 2018 to quantify mental health levels of Irish citizens. The first thing to note is that the descriptive statistics for this data computed a high mean for the variable, suggesting high happiness levels in general for the population. A high happiness level to begin with benefits the study as a low level of happiness as a starting point could mask the negative effects that unemployment has on the variable.

The primary finding in the mental health area refers to the significance level of the "Attitude When Unemployed" variable. The ANOVA test concluded that there is a significant statistical difference between the means of "Attitude When Unemployed" and "Happiness". This is important as we now reject the null hypothesis that one's attitude to reemployment has no effect on their mental health. A beta of -0.849 is observed. This beta represents a negative association between the variables where 1 unit increases in "Attitude When Unemployed", causes a -0.849 change in "Happiness" levels. Remembering that increases in the "Attitude When Unemployed" variable, reflect an increase in one actively seeking reemployment, we can now make conclusions about this relationship. The study finds that as individuals pursue reemployment at a greater extent, their mental health level diminishes. This could be due to the feeling of rejection that the individual experiences. Previous literature surrounding rejection and mental health has found connections between rejection sensitivity and mental health illnesses such as depression (Gao, 2017). If the individual views failure to gain employment as personal rejection, mental health levels could deteriorate in a similar manner to social rejection.

An interesting finding in the analysis can be found in relation to duration of unemployment and mental health levels. In 'Table 15' and 'Table 16', we see that both "Short Term Unemployment" and "Long Term Unemployment" are statistically significant and a rejection of the null hypothesis takes place. As both durations are statistically significant, this study can conclude that suffering any form of unemployment, regardless of duration, significantly impacts one's mental health. This finding coincides with the findings in relation to set point theory and unemployment, which saw life satisfaction significantly reduce and remain reduced after one suffers unemployment (Lucas, 2004). The addition of Irish data backs up the findings of Lucas (2004) who studied this phenomenon in Germany. Based on Lucas's findings, it can be concluded that Irish mental health levels will remain at a reduced baseline levels post unemployment.

In relation to duration of unemployment and mental health, we see that the R square value is greater in the "Long Term Unemployment" test than in the "Short Term Unemployment" test. In the long term, which is any period of unemployment lasting over 12 months, unemployment represents 8% of the variance in happiness level. In the short term, which is any period of unemployment last less than 3 months, unemployment represents 0.8% of the variance. This corresponds with previous literature in the area surrounding duration of unemployment and mental health, including the work of Chen (2012). Chen's study found

that long term unemployment resulted in more psychiatric symptoms for migrant works in Eastern China. However, Chen's study is fundamentally different to this research study as a normal distribution of the population is not assumed and the majority of unemployed individuals in Chen's study were low educated young males. This can be seen in the results of the study, as an abnormal amount of the sample, 50% were classed as mentally unhealthy (Chen, 2012). It is for this reason, why the findings in this study adds value to the field, as little research currently involves the Irish population and represents Irish society. Notably, the beta for both "Short Term Unemployment" and "Long Term Unemployment" is positive. This suggests that as the given unemployment variable increases, as does happiness. This reduces the validity of the results as in reality this relationship is not the case. However, these results are still crucial to the study as it outlines the impact that unemployment has on mental health

Overall, when one computes the multiple regression ANOVA table, 'Table 25', this study finds that unemployment impacts mental health in a negative manner. This helps to answer part of the research question as now one can conclude that unemployment negatively impacts the mental health of the Irish population, with 6% of the variance in mental health stemming from unemployment. The R square value for this multiple regression is 0.060, or 6%. We assume that this variation stems from the unemployment variables in the study and not the determinants of happiness. This is because the effect of these mental health variables will already be taken into account by the "Happiness" variable. This is in line with previous literature relating unemployment to mental health in Ireland. Brady (2010) also found that unemployment had a negative effect on the mental health of Irish population. Results within Brady's study differ to this research study, as Brady found elevated levels of emotional distress exhibited between 2-6 months after unemployment began (Brady, 2010). Brady's test may have been subject to outliers as only 200 participants were involved in the study, compared to the 2216 Irish respondents involved in the European Social Survey, validating this study's results on the impact of duration of unemployment on mental health. These findings in relation to mental health will add to the pre – existing literature surrounding the effects of unemployment. Due to the conflicting research between Brady's study (2010) and this research study, further research could examine the relationship between the duration of unemployment and mental health levels in Ireland more extensively in search of a resounding finding.

Physical Health

Physical health was measured in this study using the "Subjective General Health" variable taken from the 2018 European Social Survey. This self – perceived measure of one's overall health was used to establish the physical health levels of the Irish population. The mean taken from the descriptive statistics analysis shows an average to good self – perceived physical health level for the Irish population. This is in line with the level of monetary spending in Ireland on health, as on average, Ireland spends 40% more on health related goods and services compared to the EU average, as of 2017 (EuropeanCommission, 2017).

An interesting result found within the regression analysis stems from the relationship between the duration of unemployment experienced and physical health. In the short term, a beta of -0.144 is observed. This signifies that for every unit increase in short term unemployment, one's physical health diminishes at a factor -0.144. This reduction, is exacerbated in the long run, with a beta of -0.259 observed. With both tests being significant as the P value is less than 0.05, this study finds that unemployment impacts physical health in a negative manner in the short run, with these effects increasing as duration of unemployment increases. Although there is limited research regarding the effects of unemployment on physical health, the research that is available supports the findings made in this research study. A study in Germany examined the effect of unemployment on overall health, both mental and physical (Herbig, 2013). The study found that long term unemployment was associated with an increase in the likelihood of a heart attack or a stroke, when compared to short term unemployment. Mortality rates were also found to increase with the duration of unemployment. Given these findings, research is required in order to develop the understanding of this relationship further and to develop adequate support systems. These systems could include better health care and schemes to reduce long term unemployment.

The most significant result found within this portion of the "Analysis and Findings" section is in relation to the multiple regression ANOVA test conducted. The ANOVA test found a significant result between the unemployment independent variables, the supporting independent physical health variables and the physical health dependent variable. This led to a rejection of the null hypothesis and thus we can conclude than unemployment impacts the levels of physical health in Ireland. A R square value of 0.061 is observed, meaning that unemployment causes 6.1% of the variance in physical health, assuming the supporting

variables have little influence. Notably, this R square figure is very similar to the R square figure regarding unemployment and mental health. This suggests that unemployment impacts mental and physical health in a similar manner. The previous literature around this topic of unemployment and physical health is conflicting. Holland (2012) found little to no evidence of a reduction in physical health post unemployment, with the majority of health concerns being displayed surrounding injuries or illnesses suffered pre unemployment. However, Holland's study was an interviews based study and as a result, only consisted of three subjects to base findings off of (Holland, 2012). This casts doubts over the validity of the findings in that study. On the other hand, studies do support the findings made in this research study, including the research conducted by the UK Office of National Statistics (2019). They examined life expectancy with respect to employment rates and found that higher life expectancy is strongly correlated with improved levels of employment. In particular, the findings show an increase of 5 years in life expectancy for every 10% increase in employment rate (HealthFoundation, 2019). This highlights the significance of the findings within this study and the large scale effects that unemployment can have to a society.

While unemployment may impact physical health and mental health in a similar manner overall, the way in which unemployment impacts these health factors differs. As seen in 'Mental Health' portion of the discussion, "Attitude When Unemployed" impacted mental health significantly. Uniquely, this variable does not significantly impact physical health. A significance value of 0.122 means we fail to reject the null hypothesis in this instance. This leads one to conclude that the physical health effects of unemployment stem from financial changes rather than behavioural experiences. This finding was supported by the Mann Whitney equivalent test which too failed to reject the null hypothesis.

Economic Implications

As seen in the above sections, unemployment has been found to impact both physical and mental health levels of the Irish population, but what are the economic implications from a reduction in health due to unemployment? The majority of previous literature in this area studies the inverse relationship, how economic growth influences health, however, some work has been conducted on how health impacts the economy. Mayer (2001) studied this topic and found a 30 year causal relationship between improvements in health and economic

growth. The study found that improvements in health lead to a 0.8% to 1.5% increase in annual income per adult (Mayer, 2001).

Now that we have seen the casual relationship between the two variables, we must explore how reductions in health impact the economy, as this study found that unemployment reduces health levels. The economic value of health can be calculated in terms of 'Willingness To Pay'. A method used by quantifying how much of other commodities one is willing to give up, in exchange for this commodity. Based on this, health improvements goods are worth as much as non – health improvement goods. From this assumption, Topel (2006) was able to conclude that cumulative longevity gains were valued at US$1.3 Million per person (WHO, 2009). Based on these findings, one can assume that cumulative longevity losses can also be valued at US$1.3 Million per person. These losses can stem from a lack of contribution to the economy due to sick leave, inability to buy goods and services and mortality rates.

Conclusion

This research study examined the relationship between unemployment and health in Ireland by analysing the effects unemployment can have on the physical and mental health levels of the Irish population. This paper is not only one of the first studies to examine this relationship in an Irish context, but also one of the few studies that have examined the physical health effects of one suffering unemployment. This relationship was examined through SPSS with the use of descriptive statistics, regression analysis and Mann Whitney equivalent tests. Variables and data were taken from the results in the European Social Survey of 2018. Upon analysis of this relationship, the study also attempted to quantify the financial implications that changes in health due to unemployment had on the economy.

There were three research objectives outlined within this study, the primary research question was "How does unemployment impact the physical and mental health of the Irish population and what are the implications for economic growth?". Two sub-questions arose from this primary research question. The first, was concerned with identifying if health levels were impacted differently depending on the duration of unemployment sustained. The second, involved examination of the attitudes displayed once unemployed regarding reemployment, to test if a difference in health levels occurred between those actively searching for reemployment and those not actively searching reemployment.

A number of interesting results were found within the analysis of this study. Most notably, upon ANOVA analysis it was found that both mental health and physical health were impacted by unemployment. Overall, mental health levels and physical health levels were impacted in a similar manner according to the table. However, when we examined the single linear regression of the variables in the study, it was found that different independent variables impacted mental health to those that impacted physical health, and vice versa. In relation to mental health, it was observed that unemployed individuals who were actively seeking reemployment saw greater deteriorations in mental health levels than those who did not seek reemployment. This relationship was not observed when examining the attitudes towards reemployment and physical health. It was also observed that both short term and long term unemployment impact one's mental health. This suggests that mental health is

diminished regardless of duration and thus sustaining unemployment in any form has an impact on one's mental wellbeing. This was in line with the previous set point theory literature that was mentioned in the "Literature Review" portion of the study. As for the physical health results, it was found that long term unemployment impacted one's physical health in a negative manner. Short term unemployment impacted negatively on physical health, but not to the same extent. This was in line with expected results with possible explanations stemming from a lack of income changing one's dietary habits and less income to spend on discretionary items such as sports memberships and visits to the doctor. It was then hypothesised that these health changes could cost up to US$1.3 Million per person based on previous cumulative longevity gains estimations being assumed equal for longevity losses.

The primary conclusion that one can draw from this research study is that unemployment has been found to impact mental and physical health at a similar rate, but in different ways. The study was limited to data from 2018, but this does not diminish the value of the results as a relationship between the variables can be clearly identified. In light of the current Coronavirus pandemic, with large scale unemployment in place, further research is needed to examine the extent at which this unemployment rate will impact the health levels of society and in turn, the economy.

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