

Stockholm School of Economics  
Department of Economics  
5350 Master Thesis in Economics  
Academic Year 2014-2015

# THE PARADOX OF DECLINING FEMALE HAPPINESS AND THE IMPACT OF SOCIAL CAPITAL

*An Empirical Analysis Employing an Instrumental Variable Model*

Berfin R. Mert \*

---

**Abstract** In the article “The Paradox of Declining Female Happiness” by Stevenson and Wolfers (2009) the authors find that although the lives of women in the United States by many objective measures improved between 1972 and 2006, their happiness decreased both absolutely and relative to men. Subsequent studies have failed at finding an explanation to this pattern due to significant methodological issues limiting their ability to draw any causal conclusions. This study aims to bridge this gap by employing a superior empirical research design, namely an instrumental variable model, in which social capital is instrumented by burglary victimization. The hypothesis directing this study is that a parallel decline in social capital can help explain the absolute and relative decline in female happiness. I analyze data from the General Social Survey, a pooled cross-sectional and nationally representative survey of the population of the United States. I provide evidence that the absolute decline in female happiness between 1972 and 2006 is, indeed, partly caused by a parallel decline in social capital. However, social capital fails to explain the decline in women’s happiness relative to that of men’s.

---

**Keywords** Female Happiness, Social Capital, Simultaneous Causality, Instrumental Variable, Burglary

**JEL** A130, I31, J160

Supervisor: Chloé le Coq  
Date submitted: January 7, 2015  
Date examined: January 14, 2015  
Discussant: Erika Gyllström (21653)  
Examiner: Maria Perrotta Berlin

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	<b>4</b>
1.1	Research Hypothesis.....	4
1.2	Relevance and Purpose .....	5
1.3	Structure of the Paper .....	6
<b>2</b>	<b>CURRENT STATE OF KNOWLEDGE</b>	<b>6</b>
2.1	The Paradox of Declining Female Happiness .....	7
2.1.1	<i>Potential Explanations to the Absolute Decline in Female Happiness.....</i>	<i>7</i>
2.1.2	<i>Potential Explanations to the Relative Decline in Female Happiness .....</i>	<i>7</i>
2.2	Social Capital as an Explanatory Variable .....	8
2.2.1	<i>What is Social Capital? .....</i>	<i>9</i>
2.2.2	<i>Previous Studies on The Impact of Social Capital on the Paradox.....</i>	<i>9</i>
2.3	Research Gaps and My Contribution .....	10
<b>3</b>	<b>DATA</b>	<b>11</b>
3.1	Happiness .....	12
3.2	Control Variables .....	12
3.3	Social Capital.....	12
3.4	The Instrumental Variable.....	13
3.4.1	<i>The Process of Finding an Instrumental Variable .....</i>	<i>13</i>
3.4.2	<i>The Final Choice of Instrumental Variable .....</i>	<i>14</i>
3.5	Data Amendments .....	18
<b>4</b>	<b>METHODS AND EMPIRICAL ANALYSIS</b>	<b>18</b>
4.1	Preliminary Empirical Analysis .....	19
4.1.1	<i>The Paradox of Declining Female Happiness Replicated.....</i>	<i>19</i>
4.1.2	<i>Empirical Assessment of Social Capital as an Explanatory Variable.....</i>	<i>22</i>
4.2	Results.....	24
4.2.1	<i>Ordered Probit Analysis.....</i>	<i>25</i>
4.2.2	<i>Instrumental Variable Ordered Probit Analysis .....</i>	<i>28</i>
4.2.3	<i>Hausman Test.....</i>	<i>30</i>
<b>5</b>	<b>DISCUSSION</b>	<b>31</b>
5.1	A Brief Recap.....	31
5.2	Findings in Relation to the Research Hypothesis and the Current State of Knowledge .....	32
5.3	Theoretical and Practical Implications.....	33
5.4	Internal and External Validity .....	33
5.4.1	<i>Internal Validity.....</i>	<i>34</i>
5.4.2	<i>External Validity.....</i>	<i>35</i>
5.5	Future Research.....	36
	<b>REFERENCES</b>	<b>38</b>

## **LIST OF FIGURES**

FIGURE 1. HAPPINESS TRENDS IN THE UNITED STATES BY GENDER, 1972–2006..... 20

## **LIST OF TABLES**

TABLE 1. POTENTIAL INSTRUMENTAL VARIABLES ..... 14  
TABLE 2. FIRST-STAGE REGRESSION ..... 15  
TABLE 3. HAPPINESS TRENDS IN THE UNITED STATES BY GENDER, 1972–2006..... 21  
TABLE 4. IMPACT OF SOCIAL CAPITAL ON HAPPINESS IN THE US BY GENDER, 1972–2006 ..... 23  
TABLE 5. SOCIAL CAPITAL TRENDS IN THE UNITED STATES BY GENDER, 1972–2006 ..... 24  
TABLE 6. HAPPINESS TRENDS IN THE US BY GENDER – ACCOUNTING FOR SOCIAL CAPITAL BY  
EMPLOYING AN ORDERED PROBIT ANALYSIS..... 26  
TABLE 7. CHANGE IN THE TREND OF THE GENDER HAPPINESS GAP – TABLE 3 VERSUS TABLE 6..... 27  
TABLE 8. HAPPINESS TRENDS IN THE US BY GENDER – ACCOUNTING FOR SOCIAL CAPITAL BY  
EMPLOYING AN INSTRUMENTAL VARIABLE ORDERED PROBIT ANALYSIS ..... 29  
TABLE 9. CHANGE IN THE TREND OF THE GENDER HAPPINESS GAP – TABLE 3 VERSUS TABLE 8..... 30

## 1 INTRODUCTION

*The very purpose of our life is to seek happiness.*

—Dalai Lama XIV

Happiness is what all human beings desire to feel. Or at least, few people would argue the opposite. However, what *makes* people happy is not as evident.

Let's picture the day of August 26, 1970. More than 20,000 women were gathered in the United States for a massive strike, demanding equal opportunities in the workforce, political rights for women, and social equality in relationships. The day marked the history as the *Women's Strike for Equality*.

Now, let's shift the focus to today. Today, women in the United States no longer earn 59 cents for every dollar a man makes for similar work. They no longer are tied to working at home; instead, they are free to take positions managing thousands of employees. They are no longer prohibited from serving on a jury or doing an abortion. Women today have many more rights than they had 40 years ago. But are they happier?

According to an article written by Stevenson and Wolfers (2009) the answer is no. In their article "The Paradox of Declining Female Happiness" the authors find that although the lives of women in the United States by many objective measures improved between 1972 and 2006, their happiness decreased both absolutely and relative to men. This paradoxical observation raises the question: Why did women's happiness decline despite seemingly beneficial developments?

### 1.1 RESEARCH HYPOTHESIS

There are a number of possible explanations to the absolute and relative decline in female happiness observed by Stevenson and Wolfers (2009) – all of which will be elaborated in section 2.1 – however, the hypothesis guiding this research is that a parallel decline in social capital is what caused the decline in female happiness. This variable was not included in Stevenson and Wolfers' study.

Social capital is a relational good defined in a variety of ways. In layman's terms, it is usually referred to as sociability. In *Bowling Alone: The Collapse and Revival of American Community* (2000), Robert Putnam, one of the most renowned social capital theorists, defined social capital as the "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (p.19). Putnam has provided evidence that shows a declining pattern of social capital in the United States. Among his most prominent arguments is that many of the troubles of the American society can be attributed to this decline in social capital (OECD 2001).

This paper will empirically assess whether the two above-mentioned stylized facts – the absolute and relative decline in female happiness, along with the decline in social capital – are connected. The particular hypothesis that this paper aims to target is the following:

*A decline in social capital had a negative and gender-biased causal impact on women's happiness in the United States between 1972 and 2006, causing a decrease in women's happiness both absolutely and relative to men.*

For increased clarity, this hypothesis can be separated into two hypotheses:

*Hypothesis 1) A decline in social capital had a negative causal impact on the absolute happiness of women in the United States between 1972 and 2006.*

*Hypothesis 2) A decline in social capital had a gender-biased negative impact towards women, causing a decrease in women's happiness relative to that of men's in the United States between 1972 and 2006.*

## **1.2 RELEVANCE AND PURPOSE**

Why is it interesting to assess this hypothesis? What value does it add? The answer to these questions is manifold and explained below.

Studies, almost unanimously, show a robust link between happy people and positive features such as productivity, creativity and health (e.g. Pannells 2008). *Happiness* is therefore a crucial factor for policy makers to consider when it comes to creating strong economies and societies. The decline in female happiness fosters concerns about whether contemporary developments have been detrimental for women. It is imperative to identify these harmful developments in order to enable the possibility of turning the negative trend of female happiness around.

Studying the decline in female happiness is relevant also from another perspective, namely the *gender-equality* perspective. This due to the fact that women's happiness declined not only on an absolute level but also relative to men's happiness. Since happiness is a vital determinant of a vast amount of positive aspects in people's lives, ranging from productivity to health, an emerging happiness inequality between sexes could cause subsequent gender gaps also in many other facets of life. For instance, since a decline in happiness impacts productivity negatively, a decrease in women's happiness relative to that of men's could in extension lead to an increasingly biased demand for male workforce. Thus, an evaluation of what might be causing the relative decline in female happiness is essential for the equality between sexes.

Since female happiness has declined despite economic growth and sociopolitical liberalizations, it is important to assess what other variables might have caused this decline. One such variable might be *social capital* and, as already stated, this study will aim at evaluating the particular impact of this variable on the decline in female happiness. The current trends of modern civilization have put significant strains on social capital. As Putnam claims, growing TV-watching and Internet use, increased working time, and urban sprawl have all contributed to significantly deteriorate the social capital of societies (OECD 2001). Since these trends are persistent, their negative impact on social capital is lasting too. It is therefore important to evaluate the possible effects of a decline in social capital and, in particular, its potential effects on happiness – the latter being the focus of this paper.

*So, how will this study contribute to the current state of knowledge?* There are already a few studies that have tried to explain the declining female happiness in the United States between 1972 and 2006. There are even studies that have aimed at particularly investigating the

possible impact of social capital on the declining female happiness (e.g. Bartolini et al. 2007; Herbst 2011). However, no distinct results have been reached, mostly due to endogeneity issues in the methodological approaches. Previous studies aiming at explaining the declining female happiness have employed standard OLS/ordered probit regression analyses. To simplify – as the dependent variable they have used female happiness, and as the independent variable they have had a factor hypothesized to explain the declining female happiness. However, this setup cannot control for the possible simultaneous causality between happiness and the investigated explanatory variable. Let us clarify this simultaneous causality issue by the following example. The hypothesis is that social activity has an impact on female happiness. So, in this setup we have female happiness as the dependent variable and social activity as the independent variable. Let us say that the social activity coefficient shows a significant positive result. Does this mean that social activity makes women happier, or, conversely, that happiness makes women more socially active? An OLS/ordered probit analysis cannot distinguish between these two different effects, and it is therefore difficult to interpret the results as causal. Due to the fact that previous studies have employed the OLS/ordered probit approach, there is a gap in the current state of knowledge, since the studies have failed at analyzing the causal effect of social capital on the declining female happiness. This paper will contribute to the current state of knowledge by targeting the simultaneous causality issue through the use of an instrumental variable approach, and thereby assess the causal impact of social capital on the declining female happiness. This approach will be further explained in *Methods and Empirical Analysis*.

Due to the above-mentioned reasons, further research on the potential impact of social capital on the declining female happiness is a substantial necessity – especially since the underestimation of its importance risks jeopardizing the well-being of society. Although social capital, similarly to other types of relational goods, cannot be directly created by the state, there are a broad variety of policies, ranging from urban planning to labor market institutions, which may have an impact on its production (Bartolini et al. 2007). The policy implications of my findings are therefore potentially significant. The results of my study will provide useful implications for the outlook of female happiness and the potential gender gap arising in-between genders' happiness levels.

### **1.3 STRUCTURE OF THE PAPER**

This paper is structured in the following way. In section 2, I will outline the relevant current state of knowledge. Next, in section 3, I will describe the dataset and the key variables used in the following empirical analysis section. The empirical analysis will – along with a description of the method of analysis and results – be presented in section 4. I will conclude with a discussion of the results in section 5.

## **2 CURRENT STATE OF KNOWLEDGE**

In this section I will elaborate on the current state of knowledge. I will begin with a description of the paradox of declining female happiness in 2.1, alongside an outline of possible explanatory factors to the decline. Next, I will narrow the scope in 2.2 and focus on the social capital factor in particular. I will conclude in 2.3 with a summary of the current gap in the literature and how my paper contributes to filling this gap.

## **2.1 THE PARADOX OF DECLINING FEMALE HAPPINESS**

According to Stevenson and Wolfers – whose research in “The Paradox of Declining Female Happiness” constitutes the basis of this study – the lives of women in the United States improved considerably between 1972 and 2006, judging by a vast amount of objective measures. Still, they found that happiness among women in the US declined – both absolutely and relative to men – during that same period.

In this section I will elaborate on two patterns derived from this empirical observation. Firstly, I will provide some background on general determinants of happiness and reasons that might have caused the *absolute* decline in female happiness. Secondly, I will discuss potential reasons to why female happiness declined also *relative* to male happiness.

### **2.1.1 POTENTIAL EXPLANATIONS TO THE ABSOLUTE DECLINE IN FEMALE HAPPINESS**

In order to understand the potential reasons behind Stevenson and Wolfers’ (2009) observation of an absolute decline in female happiness between 1972 and 2006, it is important to understand the underlying determinants of happiness in general.

In 1975, Richard Easterlin introduced what came to stir a serious debate among economists on the determinants of happiness, namely the *Easterlin Paradox*. The Easterlin Paradox refers to the fact that people in developed countries have not become happier even though GDP has increased (Easterlin 1995). This finding has encouraged subsequent research aimed at analyzing and understanding the determinants of happiness. The result of this research has led to the finding of a number of determinants. Among the most established determinants are *unemployment*, *inflation*, *relative income*, and *social capital* (Oswald 1997; Blanchflower and Oswald 2004; Easterlin 1995; Frey and Stutzer 2002; Di Tella et al. 2005).

However, not all of these variables can serve as explanations to the absolute decline in female happiness 1972–2006. For instance, unemployment and inflation cannot explain the declining happiness trends simply since they do not demonstrate any increasing pattern over time. Further, Blanchflower and Oswald (2004) detect a declining happiness trend in the United States between 1974 and 1998, even when controlling for relative income. Nevertheless, social capital is a factor that might indeed have played a role in the absolute decline in female happiness. This will be elaborated in 2.2.

### **2.1.2 POTENTIAL EXPLANATIONS TO THE RELATIVE DECLINE IN FEMALE HAPPINESS**

According to Stevenson and Wolfers (2009), the happiness of women in the United States did not only decline in absolute terms between 1972 and 2006, but also relative to men. Happiness levels and its drivers have been extensively researched during the last decades. However, happiness inequality has not been as widely investigated. Thus, the literature concerning happiness inequality within countries is scarce, with merely some recent exceptions such as Stevenson and Wolfers (2009), Van Praag (2011), and Dutta and Foster (2011). In their study, Stevenson and Wolfers pointed on a number of factors that might have caused the decline in female happiness relative to men. These will be elaborated below.

One explanation to the relative decline in female happiness might, seemingly paradoxically, be due to the *increased opportunities* available for women over time. The increased economic, political and social opportunities may have caused women to expect more in order to be able to call themselves happy. Also, the increased opportunities to prevail in the workforce may have led women to compare themselves to a wider group of people, including also men, and thereby more easily find their lives not measuring up – in contrast to when their focus was on the housework, and their comparison group consisted of women only.

A second potential explanation to the relative decline in female happiness is the *social shift* in the roles of women and what is expected from them. A few decades ago women were primarily expected to focus on their roles as housewives, whereas today they often also have a work outside of home (Norton 2009). Consequently, it might be more difficult for women to call themselves happy today since there are more domains that need to be satisfactory.

The third possible explanation involves *socioeconomic drivers* that have had a negative impact on the lives of women. Examples of such socioeconomic drivers include the following trends that have been observed over time: decreased social capital (Putnam 2000), increased anxiety (Twenge 2000), and increased household risk (Hacker 2006). Although these trends have influenced both men and women, it is plausible that they have had a biased impact towards women given that men and women react in different ways to the mentioned drivers. For instance, if women are more sensitive to social closeness to family than men are, then a general decrease in that closeness may lower women's happiness relative to that of men's.

This third explanation involving socioeconomic drivers – and more specifically decreased social capital – will be the focus of this paper. I will evaluate whether a decline in social capital may have caused the declining pattern of female happiness. The concept of social capital and the reason to why I choose to investigate this factor in particular will be elaborated in the next section.

## **2.2 SOCIAL CAPITAL AS AN EXPLANATORY VARIABLE**

As stated, the hypothesis directing this research is that the absolute and relative decline in female happiness in the United States between 1972 and 2006 is partly a consequence of the decline in social capital during the same period. Although all the above-mentioned explanations are relevant and in need of further investigation, the quest of understanding the declining female happiness needs to start in one end.

The rationale behind choosing to test the social capital explanation, in particular, is twofold. Firstly, it is a factor with potentially significant practical implications on policies and on how the public chooses to live their lives. Many people in the developed world would recognize the following trends as significant parts of their own lives: increased TV-watching, an almost obsessive use of smartphones, more work and less quality time with friends and family. Each of these trends has been proven to negatively impact our sociability or social capital (e.g. OECD 2001). A better understanding of the subsequent impact of social capital on happiness would help contribute to encouraging people to lead their lives and everyday routines towards more fulfilling and happiness-creating practices. Further, policy makers would get increased incentives to consider social capital when making public decisions.

Secondly, social capital is a widely investigated phenomenon that has stirred a vast interest among scholars as well as laymen. However, previous research has still not managed to yield any distinct answers to the possible causal impact of social capital on the declining pattern of female happiness. Therefore, it is important to further assess social capital as an explanatory variable to the declining female happiness. Before assessing this qualitatively in 2.2.2, let us first clarify what the concept of social capital really refers to.

### **2.2.1 WHAT IS SOCIAL CAPITAL?**

Social capital is a concept that has been widely debated over the last decades. However, the term still lacks a unanimous definition. Social capital is defined in a multiple different ways, but common for all definitions is the reference to the relationships, shared values and tolerances in society that enable individuals and groups to trust each other and cooperate. An example of a more specific definition of social capital was coined by the author Lyda Hanifan who defined social capital as “assets [that] count for most in the daily lives of people: namely goodwill, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit” (as cited in Keeley 2007, p. 102).

Similar to its definition, the measurement of social capital is widely debated; there is no indisputable way of measuring social capital. Even among scholars who use the same definition of social capital, the measurements they employ differ. Among the many measures of social capital are: social trust, social relationships, membership in networks/clubs/associations, volunteer work, common values and civic participation (Galabuzi and Teelucksingh 2010; Demireva 2011; Vigdor 2004). However, there is a long road ahead in terms of reaching a cross-sectional consensus on how to measure social capital. We are far from having a straightforward metric similar to, for instance, what years of education is for human capital (Putnam 2001). Still, social trust is the one measure of social capital that is consistently and increasingly being used in current research. Social trust refers to how much one trusts in other people or institutions (OECD 2001).

### **2.2.2 PREVIOUS STUDIES ON THE IMPACT OF SOCIAL CAPITAL ON THE PARADOX**

As stated, my hypothesis is that a declining pattern of social capital in the United States between 1972 and 2006 had a negative and gender-biased causal impact on women’s happiness, causing a decrease in women’s happiness both absolutely and relative to men.

For this hypothesis to be viable, we need to have some evidence that (A) social capital is positively associated with general happiness, (B) social capital has a gender-biased impact towards women, and that (C) social capital declined between 1972 and 2006. Each of these relationships will be empirically assessed later in *Methods and Empirical Analysis*; however, this section will provide some literature background on what previous studies have found on the matters.

#### **2.2.2.1 RELATIONSHIP A – IMPACT OF SOCIAL CAPITAL ON HAPPINESS**

The literature on the potential impact of social capital on happiness is relatively scarce and the question remains open. The matter has been examined only by a few recent groundbreaking studies (e.g. Helliwell 2003, 2006; Helliwell and Putnam 2004). These studies, almost consistently, show a positive effect of social capital on happiness. However, most studies do not analyze trends of social capital variables, but rather

employ a cross-country approach (Bartolini et al. 2007). This limits their ability to deduce implications on the potential impact of social capital trends on happiness trends within countries – which is the research focus of this study.

#### 2.2.2.2 RELATIONSHIP B – GENDER-BIASED IMPACT OF SOCIAL CAPITAL ON HAPPINESS

The empirical research on the gender-biased impact of social capital on happiness is even more limited than the research on the general relationship between social capital and happiness. Although the empirical research is scarce, there is theory supporting that women’s happiness is more positively affected by an increase in social capital than men’s happiness. As an example, the *socialization theory* presumes “women to be more related and affiliated than men” (Hudson 2006). Differently put, women tend to be more relationship-oriented and value relationships higher in comparison to men (Chodorow 1978).

#### 2.2.2.3 RELATIONSHIP C – TRENDS OF SOCIAL CAPITAL

Putnam popularized the concept of social capital and stirred a buoyant discussion on the trends of social capital. He argued that the trend of social capital had been significantly negative during the last five decades in the United States (Putnam 2000). His studies have been scrutinized by, amongst others, Ladd (1996), Paxton (1999), Robinson and Jackson (2001), and Costa and Kahn (2003). However, all things considered, the trend of social capital in the United States has been established as decreasing, though not as severely as Putnam first argued (Bartolini et al. 2007).

Several of the activities that produce social capital have decreased over the last few decades in the United States. For instance, the participation in civic organizations and clubs has declined by more than fifty percent. Also family dinners and vacations have gone down. These declining trends in the generators of social capital have corresponded to similar declines in the indicators of social capital. As an example, the voting rate has decreased, Americans’ trust in institutions and each other have declined, and they have become less civil to one another (Resnick 2001).

### 2.3 RESEARCH GAPS AND MY CONTRIBUTION

To repeat, Stevenson and Wolfers (2009) have found that female happiness in the United States declined both absolutely and relative to male happiness between 1972 and 2006. This finding constitutes the basis of this thesis. However, Stevenson and Wolfers have not empirically explored the potential impact of social capital on these happiness trends. Instead, they have simply mentioned a decline in social capital as a potential explanatory factor. On the other hand, subsequent studies by other researchers have tried to investigate the potential impact of social capital on the happiness trends observed by Stevenson and Wolfers (e.g. Herbst 2011).

Yet, there is particularly one gap in these studies, and consequently also in the current state of knowledge, that I aim to bridge with my thesis. It concerns the fact that the studies have – due to weak research designs – not yet been able to yield causal answers to what might have caused the decline in female happiness. Instead, the authors of the previous studies have personally urged for further research. The main reasons for this is that the empirical studies this far have used standard OLS/ordered probit regressions when trying to assess the impact of different factors (explanatory/independent variables, e.g. social capital) on the declining female happiness (dependent variable). However, they have not accounted for the possible – and very probable – endogeneity issue stemming

from the presence of simultaneous causality between the happiness and the investigated explanatory variables (as previously explained in section 1.2). The underlying assumption in the research design of previous studies has – naïvely – been that happiness is the effect, and not the cause, of social capital (or other explanatory factors).

My study aims to fill this gap through the use of an instrumental variable approach, which will be further elaborated in *Methods and Empirical Analysis*. In short, an instrumental variable model is a research design commonly used as a solution when there is an endogenous explanatory variable (such as social capital) disturbing the estimation of the causal effect on the dependent variable (in this case happiness). To the best of my knowledge, no previous studies have employed an instrumental variable analysis to analyze the impact of social capital on the happiness trends in the US observed by Stevenson and Wolfers.

For the sake of clarity, the research hypotheses are stated once again below:

*Hypothesis 1) A decline in social capital had a negative causal impact on the absolute happiness of women in the United States between 1972 and 2006.*

*Hypothesis 2) A decline in social capital had a gender-biased negative impact towards women, causing a decrease in women's happiness relative to that of men's in the United States between 1972 and 2006.*

These hypotheses will be guiding this paper.

### **3 DATA**

Since this study is derived from Stevenson and Wolfers' (2009) findings and aims at finding an explanation to their observation of a declining female happiness, I intend to stay as consistent with their empirical analysis as possible.

Therefore, this study uses the same dataset and period of study used by Stevenson and Wolfers. The dataset is obtained from the General Social Survey (GSS), an extensive data file derived from interviews with large samples of the US population and covering the years between 1972 and 2006. The General Social Survey includes pooled cross-sectional data for all the relevant variables for this study.

My study includes both variables used by Stevenson and Wolfers in their analysis, as well as additional variables not included in their analysis. The variables not included in Stevenson and Wolfers are the ones related to my hypothesis that social capital has played a role in the decline in female happiness (Stevenson and Wolfers did not test this hypothesis). These variables are *social capital* and an *instrument for social capital*.

This section will begin with a description of the variables also included in Stevenson and Wolfers' study (*happiness* and relevant *control variables*), continue with a description of the variables unique for this study (*social capital* and the *instrument*), and finally end with a brief description of some amendments made to the dataset.

### 3.1 HAPPINESS

Again, since this study is mainly derived from Stevenson and Wolfers' (2009) findings, the variables chosen are in accordance with the ones used in their study. Stevenson and Wolfers uses the variable HAPPY in the GSS. The HAPPY variable includes survey answers to the following question: "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?" There are three possible responses to this question, namely "very happy" coded as 1, "pretty happy" coded as 2, and "not too happy" coded as 3. I inverted the codes in order for higher values to correspond with higher levels of self-reported happiness, and thereby make the codes more intuitive.

### 3.2 CONTROL VARIABLES

Stevenson and Wolfers (2009) include a number of control variables in their empirical specification when assessing the happiness trends in the United States. This study will include these same variables in order to maintain comparability between the results.

The empirical analysis includes two sets of control variables – exogenous variables and socioeconomic variables. The exogenous set of control variables comprises age, race<sup>1</sup>, and immigrant status<sup>2</sup>. The second set of socioeconomic control variables comprises the following factors: employment<sup>3</sup>, real income, marital status<sup>4</sup>, education outcomes<sup>5</sup>, number of children born, parent's education<sup>6</sup>, religion<sup>7</sup>, and region<sup>8</sup>. The control variables are all interacted with a dummy variable for gender in order to enable their associations to be different for men and women.

### 3.3 SOCIAL CAPITAL

Since the guiding hypothesis of this study is that the declining pattern of female happiness can be partly explained by a parallel decline in *social capital*, this variable will play a significant role in the empirical analysis. Social capital is not included in Stevenson and Wolfers' (2009) analysis; instead, it is a hypothesized explanatory variable unique for my study.

As explained in section 2, social capital can be measured by a set of different variables. For the purpose of this study, social capital is measured by *social trust* – a measure of social capital often-used in scientific research (e.g. Lochner, Kawachi and Kennedy 1999). Yet, the different measures of social capital are oft-times interrelated. In other words, a person who has a high level of social trust is likely to also be more sociable in relationships and interactions with other people, and vice versa (Resnick 2001). The reason why I choose to measure social capital by social trust in particular, is partly because of the data availability, and mainly because of its acclaimed relevance as a solid measure of social capital. The latter is supported by – amongst others – Galea et al.

---

<sup>1</sup> In the GSS race is categorized into "white", "black", and "other".

<sup>2</sup> Denotes whether the respondent is native-born or not.

<sup>3</sup> Denotes whether the respondent is full- or part-time employed, is on temporary illness/vacation/strike, unemployed, retired, in school, keeping house, and other.

<sup>4</sup> Denotes whether married, widowed, divorced, separated, or never married.

<sup>5</sup> Denotes the respondent's highest earned form of degree.

<sup>6</sup> Denotes the highest form of degree earned by the parents of the respondent.

<sup>7</sup> Denotes whether Protestant, Catholic, Jewish, none, or other.

<sup>8</sup> The GSS distinguishes between the following regions: New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific.

---

(2002) who claim that social trust is a “*central aspect* [emphasis added] of social capital [that] establishes a social network of reciprocity and social exchange that can be drawn upon by community members” (p.1374). Social trust is therefore concluded to be a viable measure of social capital also for the purpose of this study.

In the GSS, social trust is measured by the question “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?” The question offers three possible self-reported responses; “can trust” coded by 1, “cannot trust” coded by 2, and “depends” coded by 3. To simplify, I excluded “depends” from the analysis and created a dummy variable, where 0 denotes “cannot trust” and 1 denotes “can trust” – also this time in order to make the responses more intuitive when interpreting the results.

### **3.4 THE INSTRUMENTAL VARIABLE**

Since the main contribution of this thesis is its targeting of the simultaneous causality issue between happiness and social capital, as described earlier, the major part of the work has entailed the search for potential instrumental variables (IV) to be used in an instrumental variable model. In this section, I will describe the process of finding a suitable instrumental variable and the final choice of variable.

#### **3.4.1 THE PROCESS OF FINDING AN INSTRUMENTAL VARIABLE**

In order to yield consistent estimates of causal relationships, instrumental variable analyses require both *relevant* and *exogenous* instruments. To be relevant, an instrument must be highly correlated with the explanatory and endogenous variable. To be exogenous, the instrument must be uncorrelated with the error term (Wooldridge 2008; Martens et al. 2006). Thus, for the purpose of this study, the instrumental variable had to be strongly correlated with individual-level social capital, and uncorrelated with self-reported individual-level happiness – except indirectly through its impact on social capital.

The search for a suitable instrumental variable was directed by the following three criteria: (1) exogeneity, (2) relevance, and (3) data availability. The final choice of instrumental variable had to satisfy all of these criteria. This task proved to be extremely challenging, time-consuming, and many times discouraging. It became clear to me why previous studies must have purposely refrained from employing an instrumental variable analysis.

In practice, the process of finding an instrument was an iterative process. The process began with what can be called the *brainstorming phase*. During this phase I thought freely around variables that could potentially fulfill the exogeneity criterion. The instrument having to satisfy this criterion significantly narrowed the range of suitable variables. The exogeneity of an instrument cannot be tested for, but instead must be argued for by common sense and economic theory. Therefore, this phase mainly consisted of brainstorming and economic literature review rather than statistical analyses.

Once I had brainstormed around potential instruments and had found a variable that I considered satisfied the exogeneity criterion, I had to check if there was data available for this variable. This stage can be referred to as the *data phase*. The frequent outcome of this phase was a realization of there being no, or too few, data points available on the

variable. Therefore, the usual next step was to start over again by going back to the initial brainstorming phase.

However, a few variables managed to pass the brainstorming phase as well as the data phase. These variables entered the so-called *first-stage regression phase*. In this phase I would evaluate whether the variable was relevant by employing a first-stage regression, regressing social capital over the variable. Normally, also this stage resulted in non-satisfactory weak results, leading to the need to restart at the brainstorming phase again. Only one variable managed to pass also this phase. This variable was chosen as the suitable instrumental variable and will be described in section 3.4.2.

In Table 1 below, I have stated one of the many types of variables analyzed through this three-phase iterative process – namely, *travel time to family or friends*. The reason I want to emphasize this variable type is because of its excellent suitability as an instrument for social capital, had it not been for its lack of data points. The travel time to family members and friends are highly correlated with the level of sociability with those family members and friends – it satisfies the relevance criterion. The time it takes to travel to a family member or a friend is highly unlikely to be correlated with happiness in any other way than through its impact on the level of sociability – it satisfies the exogeneity criterion. I therefore strongly urge GSS to extend their dataset on the variables *Travel time to family or friends*. This would be vastly valuable for the research on the causal impact of social capital on happiness.

**TABLE 1. POTENTIAL INSTRUMENTAL VARIABLES**

Instrument	In GSS	Exogeneity	Relevance	Data
Travel time to mother	MATIME	No apparent relationship with happiness, other than through its impact on sociability (social capital)	Strongly correlated with sociability with parents (SOCPARS)	Unfortunately, data for these instruments were available only for one single year in the GSS
Travel time to father	PATIME			
Travel time to sister	SISTIME		Strongly correlated with sociability with siblings (SOCSIBS)	
Travel time to brother	BROTIME			
Travel time to friends	FRITIME		Strongly correlated with sociability with friends (SOCFRIEND)	

### 3.4.2 THE FINAL CHOICE OF INSTRUMENTAL VARIABLE

After a vast number of iterations and careful considerations, I found a suitable instrumental variable for social capital, namely *Burglary*. The variable is measured with the GSS variable BURGLR, a simple two-category self-reported answer to this question: “During the last year – that is, between last March and now – did anyone break into or somehow illegally get into your (apartment/home)?” For the purpose of this study, I reversed the original codes given to the answer; so “no” is coded as 0, and “yes” as 1.

The rationale behind the choice of using burglary as an instrumental variable is explained in the two sections below. The first section describes how *Burglary* fulfills the relevance criterion of an instrument. The second section describes how it satisfies the exogeneity criterion.

### 3.4.2.1 CRITERION 1: A RELEVANT INSTRUMENT

The relevance of an instrument can be tested by performing a first-stage regression analysis. This analysis is presented below.

In order to assess the relevance of burglary as an instrumental variable for social capital I used an ordered probit model<sup>9</sup> (standard errors clustered by years) on the GSS data. The first-stage regression model was as follows

$$Social\ Capital_{i,t} = \alpha + \beta_1 Burglary_{i,t} + \varepsilon_{i,t}$$

where  $i$  stands for individual, and  $t$  stands for the year in which individual  $i$  was interviewed by the GSS. This model was used as a base model (indicated by (1) in Table 2) and included no control variables. Model (2) includes the exogenous control variables age, race and immigrant status. Model (3) includes both the exogenous control variables as well as the set of socioeconomic<sup>10</sup> variables.

**TABLE 2. FIRST-STAGE REGRESSION**

Dependent variable: “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people: [1] Can trust; [0] Cannot trust?”			
Ordered probit	(1)	(2)	(3)
Burglary	-0.409*** (0.102)	-0.386*** (0.101)	-0.332*** (0.107)
<i>Control variables</i>			
Age, race, native-born		✓	✓
Socioeconomic controls			✓
<i>Observations</i>	45,452	45,452	45,452

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2 presents the relationship between social capital and burglary. Burglary and social capital are negatively and significantly correlated, even after the addition of control variables. This strong correlation supports the relevance of burglary as an instrument for social capital. In addition, F-tests show results above 10, further supporting its relevance (Angrist and Pischke 2009).

Adding to this empirical support there is also previous studies backing the fact that burglary victims (and neighbors of victims) have lower levels of social trust than their

---

<sup>9</sup> An ordered probit model is a general form of a probit model, used whenever the dependent variable takes several different ordinal values (Wooldridge 2008).

<sup>10</sup> Employment, income, marital status, education, number of children, parent’s education, religion, region

socio-demographically alike peers whom have not been subject for burglary (e.g. Bosworth 2014).

Summing up, burglary is concluded to be a strong and relevant instrument for social capital.

#### 3.4.2.2 CRITERION 2: AN EXOGENOUS INSTRUMENT

Unlike the relevance criterion of instrumental variables, the exogeneity criterion cannot be tested. Instead, exogeneity needs to be argued using common sense and economic theory.

For burglary to satisfy the criterion of being exogenous it has to be uncorrelated with happiness, except indirectly through its impact on social capital. More specifically, the following need to hold: (a) happiness must have no impact on the probability of being subject for burglary, (b) burglary must have no impact on happiness other than through its impact on social capital, and (c) there must not exist any other factors that simultaneously affect both happiness and the probability of being burgled. Each of these conditions is discussed below.

##### 3.4.2.2.1 HAPPINESS MUST HAVE NO IMPACT ON THE PROBABILITY OF BEING BURGLIED

It is seemingly easy to argue that an individual's happiness has no effect on its probability of being burgled. Still, it could for instance be the case that unhappy people are more risk averse and have a higher fear of being subject for crime. This could in turn increase their likelihood of taking measures to prevent burglary, for instance through the use of a more thorough security system in their homes or a higher carefulness in general, consequently decreasing their risk of being burgled. Thus, happiness could through this path have an impact on the probability of being burgled. However – to the best of my knowledge – a potential impact of happiness on burglary lacks support from previous research. Therefore, I will conclude that happiness has no impact on the probability of being subject for burglary – solving the simultaneous causality issue described previously.

##### 3.4.2.2.2 BURGLARY MUST HAVE NO IMPACT ON HAPPINESS OTHER THAN THROUGH ITS IMPACT ON SOCIAL CAPITAL

There are a limited number of studies investigating the relationship between crime victimization and subjective well-being (e.g. Demaris and Kaukinen 2005; Michalos and Zumbo 2000; Norris and Kaniasty 1994; Rochelle et al. 2000; Zlotnick et al. 2006). The existing studies differ in their conclusions regarding this relationship. However, the general conclusion is that relatively *non-violent* crimes (such as burglary) have no significant impact on the happiness of its victims (Hanson et al. 2000).

##### 3.4.2.2.3 THERE MUST NOT EXIST ANY OTHER FACTORS THAT SIMULTANEOUSLY AFFECT BOTH HAPPINESS AND THE PROBABILITY OF BEING BURGLIED

There are possibly factors that could simultaneously impact individual happiness and the probability of being burgled. An example of such a factor includes individual income. Higher earning people could be happier than less earning people, and at the same time be able to afford security systems in their homes along with living in safer areas, consequently leaping less risk of being burgled. However, this simultaneous impact of income on both happiness and the risk of being burgled does not disturb the viability of burglary as an instrumental variable, since income is an observable variable and thereby possible to control for in the empirical IV analysis in 4.2.2.

The question is if there could be other factors than individual income affecting both happiness and the probability of being burgled. One approach through which one can answer this question is by establishing the determinants of burglary victimization, and then assess if these determinants could impact also the happiness of victims. Below follows a number of factors that previous research has found likely to determine the probability of being burgled – namely *environmental risk*, *occupancy*, and *potential reward*. Along with a description of each determinant follows an assessment of whether the determinant could have an impact also on happiness, and, if so, how to target this issue in the empirical analysis.

- ⊕ *Environmental risk*: The first, and fundamental, determinant of burglary victimization is environmental risk. Environmental risk signifies the ease with which a dwelling can be burgled without anyone noticing. Accessibility and visibility are the two main components of environmental risk. Accessibility refers to how easy it is to enter the dwelling, while visibility refers to the extent to which the dwelling can be seen by others. As part of the accessibility reasoning, ground-floor and detached dwellings are more likely to be burgled because they have more possible entry points (Robinson and Robinson 1997; Felson 2002). As for the visibility reasoning, dwellings that are hidden behind other objects such as buildings or hedges, or distant from streetlights and passing traffic, are less likely to be burgled (Cromwell et al. 1991).

*To the best of my knowledge, there is no research that confirms that factors such as accessibility and visibility have any impact on happiness. Therefore, the environmental risk does not need to be controlled for in the empirical analysis.*

- ⊕ *Occupancy*: The second determinant of burglary victimization is the extent to which a dwelling is occupied. Burglary is more likely to occur in dwellings that are left unoccupied – and especially when left unoccupied for longer periods of time (Chun and Lee 2013; Cohen and Cantor, 1981).

*There is no research that confirms that dwellings being left unoccupied for longer periods of time are homes to happier or unhappier residents than dwellings that are not left unoccupied as often. However, I believe household size could affect the probability of a house being occupied or not. A home with many household members is probably more often likely to be occupied than a house with one single member. Therefore, household size (measured by number of children) should – and will – be included as a controlling variable in the empirical analysis.*

- ⊕ *Potential reward*: The third determinant of burglary victimization is the potential reward that a burglary might yield the burglar. The potential reward that a burglar expects to get is mainly affected by the value of the dwelling. A high-valued dwelling is expected to contain the most valued goods (Kohfeld and Sprague 1988; Kennedy and Forde 1990; Bursik and Grasmick 1993; Paternoster and Bushway 2001).

*The potential reward is highly linked to the income of the residents. As explained above, income is likely to affect also happiness, and will therefore be included as a control variable in the empirical analysis.*

In summary, burglary can be considered as a viable instrumental variable for social capital since it satisfies the relevance and exogeneity criteria outlined above, once *income* and *number of household members* are controlled for. (The *Discussion* in section 5 includes

further reflections on the viability of this instrument and potential considerations for future research.)

### **3.5 DATA AMENDMENTS**

As stated, the dataset used in this study is a pooled cross-sectional file that extends over 34 years. For a dataset that covers different time periods, it is crucial to assure that the measurements are stable and not changing over time. Otherwise, the results in the empirical analysis would include not only actual variation but also variations in the measurement of the variables. In order to limit this risk of changing measurements of the variables, I made some amendments to the dataset.

The first amendment was on the variable HAPPY. In the original dataset, this variable could potentially suffer from some measurement bias. In 1972 the question HAPPY was preceded by a question on marital happiness, but not in all the other years during the period 1972–2006. In addition, in all years except 1972 and 1985, the variable HAPPY was preceded by a five-scale satisfaction question. These two measurement inconsistencies were found to cause measurement biases through analyses made at the GSS institution. When preceded by the question on marital happiness, the variable HAPPY tended to show greater happiness for married people than when not preceded by marital happiness. And when preceded by the five-scale satisfaction question, the variable HAPPY scored significantly higher than when not preceded by the question. In accordance with Stevenson and Wolfers (2008, 2009), I targeted these measurement issues by making amendments to the sampling weights in the GSS dataset.<sup>11</sup>

The second amendment – also in accordance with Stevenson and Wolfers (2009) – involved an oversampling of the black population in the GSS in 1982 and 1987, and the fact that interviews were offered in Spanish in 2006 but in no other years of the dataset. I targeted these inconsistencies in the dataset by excluding the 1982 and 1987 black oversamples, and the interviews in 2006 that would have not taken place if they had been offered only in English.

## **4 METHODS AND EMPIRICAL ANALYSIS**

In this section, I will present the empirical analysis performed to target the initial hypothesis – *a decline in social capital had a negative and gender-biased causal impact on women’s happiness in the United States between 1972 and 2006, causing a decrease in women’s happiness both absolutely and relative to men*. Alongside the empirical analysis and results, I will elaborate on the methods used. (A separation between methods and empirical analysis is in many cases to be preferred. However, due to the anatomy of this study, I have deliberately chosen to combine the two for the sake of readability.)

This section is structured in the following way. In section 4.1 I will present a preliminary analysis that sets the ground for the final empirical testing of the hypothesis in section 4.2.

---

<sup>11</sup> Stevenson and Wolfers (2009) specify the relevant STATA codes on their personal webpages.

## **4.1 PRELIMINARY EMPIRICAL ANALYSIS**

Before testing the hypothesis in section 4.2, we need to perform a preliminary analysis by exploring two areas.

Firstly, we need to empirically validate Stevenson and Wolfers' observation of the declining female happiness trend. If we do not observe any declining female happiness trend, then an analysis of social capital as a potential explanatory factor to this trend will be of no relevance. Therefore, in section 4.1.1, I will replicate Stevenson and Wolfers' analysis to show and further substantiate their findings of an absolute and relative decline in female happiness between 1972 and 2006.

Secondly, we need to study the social capital variable and analyze its viability as an explanation to the declining female happiness. Thus, in section 4.1.2, I will leave the replication and examine the relevance of social capital as a factor that may help to account for the declining pattern of female happiness demonstrated in the preceding replication.

### **4.1.1 THE PARADOX OF DECLINING FEMALE HAPPINESS REPLICATED**

I will in this section describe and analyze the pattern of happiness, both male and female, during the period between 1972 and 2006. This will serve as a starting point before narrowing down into analyzing the impact of social capital on the declining female happiness in section 4.2.

The analysis executed in this part of the thesis is a straightforward replication of "The Paradox of Declining Female Happiness" by Stevenson and Wolfers, declaring an absolute and relative decline in female happiness. First, I will provide a visual overview of the happiness patterns between 1972 and 2006 in Figure 1. Secondly, I will specify these patterns through an ordered probit regression analysis in Table 3.

Figure 1 below shows a comparison of the trends in mean happiness values for men and women between 1972 and 2006.

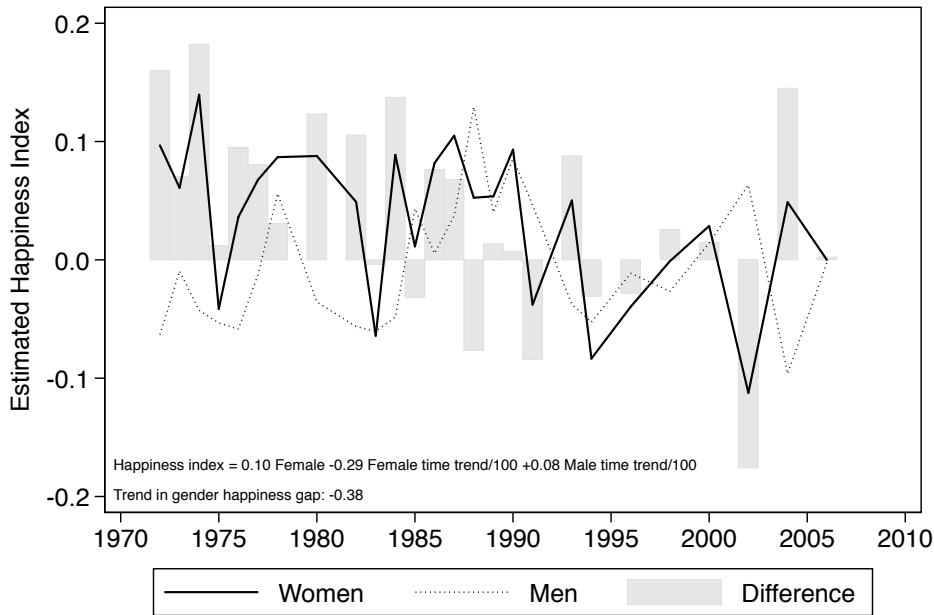


FIGURE 1. HAPPINESS TRENDS IN THE UNITED STATES BY GENDER, 1972–2006

The happiness patterns presented in Figure 1 are consistent with the patterns observed by Stevenson and Wolfers (2009). Female happiness starts at a level substantially higher than male happiness, then follows a pattern over the period that is rather coherent with the pattern of male happiness, ending in 2006 at a level notably lower than its starting point in 1972, and now almost equal to the level of male happiness. In summary, female happiness seems to have declined both absolutely and relative to that of male happiness during the period 1972–2006.

In order to analyze the patterns of happiness shown in Figure 1 in more detail, I will now turn to an ordered probit regression analysis. In line with the analysis of Stevenson and Wolfers (2009) I created a female time trend variable [equivalent to  $female \times (year - 1972)/100$ ] and a male time trend variable [ $male \times (year - 1972)/100$ ] – indicating the changes in happiness per 100 years. In addition, I created a dummy variable for sex (1 indicating female and 0 indicating male). These three variables constituted the main independent variables in a regression model of the following form:

$$Happiness_{i,t} = \alpha + \beta_1 Female_i \times (Year_t - 1972)/100 + \beta_2 Male_i \times (Year_t - 1972)/100 + \beta_3 Female_i + \varepsilon_{i,t}$$

In the regression model stated above  $i$  stands for individual, and  $t$  stands for the year in which individual  $i$  was interviewed by the GSS. Standard errors are clustered by year.

Using this ordered probit regression model as a base (indicated by (1) in Table 3), I created two additional models including two different sets of control variables. In the first model (indicated by (2)) I included the exogenous control variables age, race, and immigrant status. In the second model (indicated by (3)) I included both the exogenous control variables as well as the socioeconomic variables (employment, income, marital status, education, number of children, parent’s education, religion, and region).

The results are presented in Table 3 below. For readability, the coefficients for the control variables are not included in the table.

**TABLE 3. HAPPINESS TRENDS IN THE UNITED STATES BY GENDER, 1972–2006**

Dependent variable: “Taken all together, how would you say things are these days? Would you say that you are: [3] Very happy; [2] Pretty happy; [1] Not too happy?”			
Ordered probit	(1)	(2)	(3)
Female time trend	−0.294*** (0.100)	−0.297*** (0.115)	−0.400*** (0.119)
Male time trend	0.0817 (0.0760)	0.0408 (0.101)	0.0605 (0.119)
Female dummy	0.0955*** (0.0222)	0.0949*** (0.0226)	NA
<i>Implied trend in gender happiness gap</i>			
Difference in time trends (male–female)	0.376*** (0.135)	0.338*** (0.133)	0.460*** (0.173)
<i>Control variables</i>			
Age, race, native-born		✓	✓
Socioeconomic controls			✓
<i>Observations</i>	45,452	45,452	45,452

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The results shown in Table 3 are in accordance with the findings of Stevenson and Wolfers (2009). The key result is the significant negative female time trend indicating that female happiness has been declining over the time period 1972–2006. This finding is consistent between all the three models, although the negative magnitude of the coefficient increases for each added set of control variables. The fact that the negative female time trend is consistent between all the three models shows that the finding of a decline in female happiness is robust to the inclusion of control variables<sup>12</sup>. This demonstrates that the decline in female happiness cannot be straightforwardly explained by the personal characteristics covered by the control variables. The male time trend in all three models is on the other hand positive, although not significant. The female dummy coefficient is significant positive in all the models, showing that women are in general happier than men. Summing up, female happiness seems to have declined both absolutely and relative to male happiness.

In the ordered probit model, only the signs and significance of the coefficients can be directly interpreted – not the magnitude. So, how large is the decline in female happiness? In order to make the answer to this question perceptible, I will compare the female time trend in column 1 to the corresponding increase in unemployment needed to cause an equivalent decline in happiness. The *absolute* decline in female happiness 1972–2006 corresponds to a decline by  $-\beta_1 \Delta t = 0.294 \times (2006 - 1972)/100 \approx 0.1$  points. According to Wolfers (2003), a 1-percentage point increase in a state’s unemployment

---

<sup>12</sup> Age, race, immigrant status, employment, income, marital status, education, number of children, parent’s education, religion, and region

rate causes 0.015 points decrease in individual happiness. Therefore, 0.1 points decrease in happiness is equivalent to the effect on happiness that would be brought by a  $0.1/0.015 = 6.7$  percentage points increase in unemployment rate. Analogously, the *relative* decline in female happiness ( $(\beta_2 - \beta_1)\Delta t = (0.082 + 0.294) \times (2006 - 1972)/100 \approx 0.13$  points) is comparable to the negative impact that 8.7 percentage points increase in unemployment rates would have on happiness. Thus, it is not difficult to argue that the absolute and relative decline in female happiness during the period is substantial and worth being taken seriously.

Concluding, this replication validated the findings of Stevenson and Wolfers. In addition to serving a validating purpose, the results presented in Table 3 will be used as the basis for the hypothesis tests in section 4.2. I will then assess whether social capital can explain the observed patterns of declining female happiness by including social capital into the analysis. But before testing the hypothesis, I will empirically assess the viability of social capital as an explanatory variable in the section below.

#### **4.1.2 EMPIRICAL ASSESSMENT OF SOCIAL CAPITAL AS AN EXPLANATORY VARIABLE**

Now that we have replicated Stevenson and Wolfers' study, demonstrating the absolute and relative decline in female happiness in the US between 1972 and 2006, we will in this section shift gears and focus on evaluating the potential relevance of social capital for the observed patterns of female happiness. (Stevenson and Wolfers did not empirically evaluate the relevance of social capital on their observed decline in female happiness. The remaining part of this thesis is therefore no part of any replication but rather a unique contribution of this thesis.)

As previously stated, the hypothesis directing this research is that a decline in social capital had a negative and gender-biased causal impact on women's happiness in the United States between 1972 and 2006, causing a decrease in women's happiness both absolutely and relative to men. For this hypothesis to be viable, we need to have some evidence that (A) social capital is positively associated with general happiness, (B) social capital has a gender-biased impact towards women, and that (C) social capital declined between 1972 and 2006. These relationships were discussed from a literature perspective in section 2, *Current State of Knowledge*; however, in this section we will turn to evaluate and validate the same relationships empirically.

##### **4.1.2.1 RELATIONSHIP A & B: POSITIVE IMPACT OF SOCIAL CAPITAL ON HAPPINESS & GENDER-BIASED IMPACT TOWARDS WOMAN**

To assess the relationship between happiness and social capital I regressed happiness over social capital using an ordered probit regression (standard errors clustered by year) of the following form

$$Happiness_{i,t} = \alpha + \beta_1 Social\ Capital_{i,t} + \epsilon_{i,t}$$

where  $i$  stands for individual, and  $t$  stands for the year in which individual  $i$  was interviewed by the GSS.

Using this model as a base I created three main models; a simple model with no control variables (1), a model including a set of exogenous control variables (2), and a model

including exogenous<sup>13</sup> control variables as well as socioeconomic<sup>14</sup> control variables (3). Each of these three models was analyzed in three ways – first including all respondents, second separately for men, and third separately for women – resulting in a total of nine models. The results are presented in Table 4.

**TABLE 4. IMPACT OF SOCIAL CAPITAL ON HAPPINESS IN THE US BY GENDER, 1972–2006**

Dependent variable: “Taken all together, how would you say things are these days? Would you say that you are: [3] Very happy; [2] Pretty happy; [1] Not too happy?”									
Ordered probit	(1) All	(1a) Male	(1b) Female	(2) All	(2a) Male	(2b) Female	(3) All	(3a) Male	(3b) Female
Social capital	0.262*** (0.0170)	0.256*** (0.0206)	0.270*** (0.0215)	0.222*** (0.0166)	0.222*** (0.0204)	0.225*** (0.0209)	0.161*** (0.0163)	0.165*** (0.0191)	0.157*** (0.0216)
<i>Control Variables</i>									
Age, race, native-born				✓	✓	✓	✓	✓	✓
Socio-economic controls							✓	✓	✓
<i>Observations</i>	45,452	20,021	25,431	45,452	20,021	25,431	45,452	20,021	25,431

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The table demonstrates a statistically significant and positive association of social capital with happiness, for both men and women. This relationship holds also with the inclusion of control variables, although with a decrease in magnitude for each added set of control variables. (The fact that the positive relationship between social capital and happiness remains even after the inclusion of control variables, demonstrates that the relationship is robust to the personal characteristics covered by the control variables. In other words, the positive coefficient of social capital is not simply because of other factors, such as education, impacting both social capital and happiness. The estimated coefficient is thereby closer to being interpreted as causal than as a mere correlation. However, this analysis cannot exclude the potential effect that happiness has on social capital.)

Social capital shows a slightly biased positive impact towards women’s happiness in the regression with no controls (1) and in the regression controlling for age, race and immigrant status (2), however, not in the regression with the full set of control variables (3).

Summing up, and connecting to relationships A and B, the following can be noted. Social capital is positively associated with happiness, satisfying relationship A. It is, however, not as straightforward to draw any conclusions on the gender-biased impact of social capital on happiness. Still, for two of the three models, social capital has a gender-biased impact towards women, giving some support to relationship B.

<sup>13</sup> Age, race, and immigrant status

<sup>14</sup> Employment, income, marital status, education, number of children, parent’s education, religion, and region

#### 4.1.2.2 RELATIONSHIP C: DECLINING TREND OF SOCIAL CAPITAL

The next step is to examine the change in social capital between 1972 and 2006. I regressed social capital over time using an ordered probit regression of the following form

$$Social\ Capital_{i,t} = \alpha + \beta_1 (Year_t - 1972)/100 + \varepsilon_{i,t}$$

where  $i$  stands for individual, and  $t$  stands for the year in which individual  $i$  was interviewed by the GSS.

Table 5 presents the trends in social capital for all respondents in the GSS along with a separate analysis for each sex. The results indicate a statistically significant decline ( $p < 0.01$ ) in social capital over the studied time period. This decline holds for both sexes.

**TABLE 5. SOCIAL CAPITAL TRENDS IN THE UNITED STATES BY GENDER, 1972–2006**

Dependent variable: “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people: [1] Can trust; [0] Cannot trust?”			
	(1) All	(2) Male	(3) Female
Ordered probit			
Time Trend	-0.618*** (0.0693)	-0.631*** (0.101)	-0.599*** (0.0949)
<i>Observations</i>	45,452	20,021	25,431
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Now that we have found support that social capital (A) has a significant positive impact on happiness, (B) a gender-biased impact towards women, and (C) has declined between 1972 and 2006, we have established that social capital might indeed have caused the absolute and relative decline in female happiness over the investigated time period. In the following section, we will assess if this really is the case.

## 4.2 RESULTS

In this section, I aim to empirically test the research hypotheses of this study:

*Hypothesis 1) A decline in social capital had a negative causal impact on the absolute happiness of women in the United States between 1972 and 2006.*

*Hypothesis 2) A decline in social capital had a gender-biased negative impact towards women, causing a decrease in women's happiness relative to that of men's in the United States between 1972 and 2006.*

The guiding premise in testing *Hypothesis 1* is that once the decline in social capital is statistically controlled for, the negative trend in female happiness observed in Table 3 should diminish in magnitude or disappear entirely.

The guiding premise in testing *Hypothesis 2* is that once the decline in social capital is statistically controlled for, the female time trend should rise more than the male time

trend rises. This should result in a decrease in the gender happiness gap trend between 1972 and 2006.

I will test the hypotheses first with an ordered probit approach and secondly with an instrumental variable ordered probit approach. Lastly, I will perform a Hausman test in order to assess which of the two models is statistically superior.

#### **4.2.1 ORDERED PROBIT ANALYSIS**

To test whether changes in social capital can account for the absolute and relative decline in happiness among women, I added social capital to the model constructed for the analysis shown in Table 3. I also tested for potential interactions between social capital and gender by including interaction factors between the female dummy and the social capital dummy; this in order to assess whether social capital impacts happiness differently for men and women. The resulting regression model was of the following form

$$Happiness_{i,t} = \alpha + \beta_1 Female_i \times (Year_t - 1972)/100 + \beta_2 Male_i \times (Year_t - 1972)/100 + \beta_3 Female_i + \beta_4 Social\ Capital_{i,t} + \beta_5 Social\ Capital_{i,t} \times Female_{i,t} + \epsilon_{i,t}$$

in which  $i$  stands for individual, and  $t$  stands for the year in which individual  $i$  was interviewed by the GSS.

Table 6 presents the results of this analysis. The first column in Table 6 presents the results from the regression model without controls. The second column demonstrates the results from a regression model including an exogenous<sup>15</sup> set of control variables. The third column shows the results from a model including both exogenous control variables as well as socioeconomic<sup>16</sup> control variables. (The control variables are left out from the table for increased readability.)

---

<sup>15</sup> Age, race, immigrant status

<sup>16</sup> Employment, income, marital status, education, number of children, parent's education, religion, region

---

**TABLE 6. HAPPINESS TRENDS IN THE US BY GENDER – ACCOUNTING FOR SOCIAL CAPITAL BY EMPLOYING AN ORDERED PROBIT ANALYSIS**

Dependent variable: “Taken all together, how would you say things are these days? Would you say that you are: [3] Very happy; [2] Pretty happy; [1] Not too happy?”			
Ordered probit	(1)	(2)	(3)
Female time trend	−0.244* (0.128)	−0.319*** (0.115)	−0.382*** (0.123)
Male time trend	0.138 (0.111)	0.0244 (0.112)	0.0715 (0.132)
Female dummy	0.102*** (0.0225)	0.100*** (0.0232)	0.657 (0.947)
Social capital	0.255*** (0.0212)	0.220*** (0.0198)	0.163*** (0.0193)
Social capital * female	0.0154 (0.0234)	0.00936 (0.0236)	−0.00557 (0.0242)
<i>Implied trend in gender happiness gap</i>			
Difference in time trends (male–female)	0.382*** (0.135)	0.343*** (0.133)	0.453*** (0.171)
<i>Control variables</i>			
Age, race, native-born		✓	✓
Socioeconomic controls			✓
<i>Observations</i>	45,452	45,452	45,452

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Results for Hypothesis 1:*

The female time trend coefficient in the first column with no controls shows a decrease in magnitude compared to the equivalent coefficient in Table 3 (from −0.294 to −0.244). With the addition of the exogenous controls (column 2), the coefficient increases in magnitude from −0.297 in Table 3 to −0.319. With the addition of the socioeconomic controls (column 3), the coefficient declines slightly from the value observed in Table 3 (from −0.400 to −0.382). All female time trend coefficients remain statistically significant.

Tying up these coefficients, the main finding in Table 6 related to *Hypothesis 1*, is the diminishing of the negative female time trend in columns 1 and 3 when compared to the results of Table 3. This supports the hypothesis that the *absolute* decline in female happiness between 1972 and 2006 might have been partly caused by a parallel decline in social capital (*H1*). Column 2, however, shows a strengthening of the female time trend. The fact that the weakening of the female time trend is not robust to the inclusion of control variables casts doubts on the actual impact of social capital on the decline in female happiness. Therefore, no distinct conclusion can be drawn related to *Hypothesis 1*.

*Results for Hypothesis 2:*

In order to test *Hypothesis 2*, the change (between Table 3 and Table 6) in the female time trend needs to be compared with the corresponding change in the male time trend. If the female time trend is more positively affected by the inclusion of social capital than the male time trend is, then this will support the hypothesis that the decline in social capital

had a gender-biased negative impact towards the happiness of women. In other words, if the trend in the gender happiness gap between 1972 and 2006 decreases once social capital is added to the analysis, this will confirm *Hypothesis 2*.

The coefficients in all three models for the male time trend are positive and statistically insignificant (as in Table 3). The change in the magnitude of the male time trend (between Table 3 and Table 6) is rather consistent with the change in the female time trend. This can be seen in the *Trend in gender happiness gap* coefficients in Table 6 remaining comparable to the equivalent coefficients in Table 3. These are summarized in Table 7 below.

**TABLE 7. CHANGE IN THE TREND OF THE GENDER HAPPINESS GAP – TABLE 3 VERSUS TABLE 6**

	(1)	(2)	(3)
Trend in gender happiness gap in Table 3	0.376***	0.338***	0.460***
Trend in gender happiness gap in Table 6	0.382***	0.343***	0.453***
<i>Difference (Table 6–Table 3)</i>	+0.006	+0.005	–0.007
<i>Control Variables</i>			
Age, race, native-born		✓	✓
Socioeconomic controls			✓

Robust standard errors in parentheses

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

In column 3, the gender happiness gap trend decreases, giving some support to *Hypothesis 2*. However, the contrary is seen in columns 1 and 2, as the gender happiness gap trend then increases. The change in the gender happiness gap trend is not robust to the inclusion of control variables. This inconsistency between the results makes it difficult to draw any conclusion on the hypothesis of a decline in social capital having had a gender-biased impact towards female happiness, causing also the *relative* decline in female happiness. *Hypothesis 2* can therefore not be confirmed.

*Other results:*

The female dummy variable in Table 6 yields positive coefficients for all three models, yet statistically insignificant for the third model with the full set of controls – also consistent with the results presented in Table 3. In sum, women appear to be generally happier than men also when including social capital in the analysis.

The dummy variable for social capital shows significant positive coefficients on general happiness for all three models. This is in accordance with the findings of the preliminary analysis presented in Table 4, showing a positive relationship between social capital and happiness.

Interaction effects between social capital and the female dummy variable show statistically insignificant coefficients for all models, although positive in the first two models and negative in the third model. The statistical insignificance of the interaction

effect makes it difficult to draw any conclusions on any gender-biased impact of social capital on happiness.

I will deliberately end this analysis here, without explaining the results any further or deeper. The reason is that the results may suffer from endogeneity, anyways limiting their ability to be interpreted as causal. Even though the coefficients many times appear robust to the inclusion of control variables, the main issue is that the simultaneous impact that happiness may have on social capital cannot be controlled for in this research design. The solution to this issue is to employ an instrumental variable approach. The instrumental variable analysis will be performed in the section below.

#### **4.2.2 INSTRUMENTAL VARIABLE ORDERED PROBIT ANALYSIS**

An instrumental variable model – when used properly – is considered as a research design that can help tackle simultaneous causality issues. In this section, I will therefore employ such a research design with the aim to find the causal impact of social capital on the absolute and relative decline in female happiness between 1972 and 2006.

In order to test whether changes in social capital can account for the decline in happiness among women, I used an empirical regression model that differed from the model used in 4.2.1 mainly on two points. First, I used an instrumental variable ordered probit regression instead of a ‘naïve’ ordered probit regression. Second, I used burglary (described earlier in 3.4.2) as an instrument for social capital.

More specifically, the second stage instrumental variable regression model was as follows

$$Happiness_{i,t} = \alpha + \beta_1 Female_i \times (Year_t - 1972)/100 + \beta_2 Male_i \times (Year_t - 1972)/100 + \beta_3 Female_i + \beta_4 \widehat{Social\ Capital}_{i,t} + \beta_5 \widehat{Social\ Capital}_{i,t} \times Female_{i,t} + \varepsilon_{i,t}$$

in which  $i$  stands for individual, and  $t$  stands for the year in which individual  $i$  was interviewed by the GSS.

Table 8 presents the results of this analysis. The first column in the table presents the results from the regression model without controls. The second column demonstrates the results from a regression model including an exogenous set of control variables (age, race, immigrant status). The third column shows the results from a model including both exogenous control variables as well as socioeconomic<sup>17</sup> control variables. (Again, the control variables are left out from the table for increased readability.)

---

<sup>17</sup> Employment, income, marital status, education, number of children, parent’s education, religion, region

---

**TABLE 8. HAPPINESS TRENDS IN THE US BY GENDER – ACCOUNTING FOR SOCIAL CAPITAL BY EMPLOYING AN INSTRUMENTAL VARIABLE ORDERED PROBIT ANALYSIS**

Dependent variable: “Taken all together, how would you say things are these days? Would you say that you are: [3] Very happy; [2] Pretty happy; [1] Not too happy?”			
IV ordered probit	(1)	(2)	(3)
Female time trend	−0.255*** (0.0698)	−0.291*** (0.0823)	−0.342*** (0.0993)
Male time trend	0.122 (0.0768)	0.0397 (0.0896)	0.156 (0.112)
Female dummy	0.0803*** (0.0214)	0.0813*** (0.0215)	0.859 (0.763)
Social capital	0.241*** (0.0821)	0.213*** (0.0804)	0.208*** (0.0712)
Social capital * female	−0.495*** (0.0666)	−0.487*** (0.0693)	−0.381*** (0.0808)
<i>Implied trend in gender happiness gap</i>			
Difference in time trends (male–female)	0.378*** (0.104)	0.331*** (0.104)	0.499*** (0.149)
<i>Control Variables</i>			
Age, race, native-born		✓	✓
Socioeconomic controls			✓
<i>Observations</i>	51,020	51,020	51,020

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Results for Hypothesis 1:*

The key finding from Table 8 is that once we control for social capital through the use of burglary as an instrumental variable, we observe a weakness in the negative female time trend compared to the results in Table 3 (from −0.294 in Table 3 to −0.255 in column 1). The weakness in the female time trend holds also when controlling for age, race, immigrant status (from −0.297 in Table 3 to −0.291) as well as socioeconomic variables (from −0.400 in Table 3 to −0.342). The coefficients are all statistically significant.

This finding supports *Hypothesis 1* that a decline in social capital played a role in the *absolute* decline in female happiness. The fact that the weakening of the female time trend remains robust to the inclusion of control variables substantiates the hypothesis that social capital has played a causal role in the absolute decline in female happiness.

*Results for Hypothesis 2:*

The male time trend coefficients are all positive and statistically insignificant as in Table 3. In the first model with no controls the coefficient is larger than in Table 3 (0.122 compared to 0.0817). In the second model with exogenous control variables the coefficient is slightly smaller (0.0397 compared to 0.0408 in Table 3). In the third model, the coefficient is more than twice as large as in Table 3 (0.156 compared to 0.0605).

In order to draw any conclusions in response to *Hypothesis 2*, the change in the male time trend (between Table 3 and Table 8) needs to be compared with the corresponding change in the female time trend. This can be directly observed by comparing the *Trend in gender happiness gap* coefficients in Table 3 and Table 8. These changes are summarized in Table 9 below.

**TABLE 9. CHANGE IN THE TREND OF THE GENDER HAPPINESS GAP – TABLE 3 VERSUS TABLE 8**

	(1)	(2)	(3)
Trend in gender happiness gap in Table 3	0.376***	0.338***	0.460***
Trend in gender happiness gap in Table 8	0.378***	0.331***	0.499***
<i>Difference (Table 8–Table 3)</i>	+0.002	–0,007	+0.039
<i>Control Variables</i>			
Age, race, native-born		✓	✓
Socioeconomic controls			✓

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9 shows an increase in the gender happiness gap trend for models (1) and (3). Therefore, the inclusion of social capital into the analysis appears not to decrease the gender happiness gap trend.

In sum, this lends no support to *Hypothesis 2* that a decline in social capital had a gender-biased negative impact on women, causing a decline in women’s happiness relative to that of men’s. (If anything, the impact of social capital appears to be biased towards the happiness of men.)

*Other results:*

As for the other variables in Table 8 – the female dummy coefficient is positive for all three models, yet statistically insignificant in the third column. These results are consistent with the results presented in Table 3. In sum, women appear to be generally happier than men also when including social capital in the analysis.

Social capital is shown to have a significant positive impact on general happiness, however, a significant biased positive impact towards men. This holds for all three models. These results further substantiate the fact that the decline in social capital appears to yield little support to having had a gender-biased negative impact on the female happiness trend.

**4.2.3 HAUSMAN TEST**

In order to test if the instrumental variable ordered probit analysis in 4.2.2 is statistically superior to the ‘naïve’ ordered probit regression in 4.2.1, I need to conduct a Hausman test.

A Hausman test is a general test for endogeneity in which two estimators are compared. If we have a plausible instrumental variable (IV) estimator, and a suspicious naïve estimator, we can use a Hausman test to test the consistency of the naïve estimator (Wooldridge 2008). The hypotheses in the test are as follows:

$H_0$ :  $b_{IV}$  and  $b_{NAIVE}$  are consistent but only  $b_{NAIVE}$  is efficient

$H_1$ :  $b_{IV}$  is consistent and  $b_{NAIVE}$  is inconsistent

This means that if  $H_0$  is rejected, the instrumental variable ordered probit model is superior to the naïve ordered probit regression.

In my analysis, the Hausman test rejects the null hypothesis ( $p < 0.001$ ). It thereby shows that the naïve ordered probit regression is inconsistent and that the instrumental variable ordered probit model is indeed statistically superior.

## 5 DISCUSSION

In this section I will discuss the findings of my study. I will begin with discussing the findings in relation to the research hypothesis and current state of knowledge. I will continue with an analysis of theoretical and practical implications of the findings. Next, I will assess the internal and external validity of my results. Lastly, I will suggest directions for further research.

Before doing this, I will briefly encapsulate the previous part of this thesis in a few sentences. Several analyses have been performed and it is easy to lose track if moving forward before firstly tying them all up.

### 5.1 A BRIEF RECAP

In short, this study was introduced with the following research hypothesis:

*A decline in social capital had a negative and gender-biased causal impact on women's happiness in the United States between 1972 and 2006, causing a decrease in women's happiness both absolutely (H1) and relative (H2) to men.*

This hypothesis guided the thesis throughout its different components. In the *Current State of Knowledge*, the decline in female happiness (observed by Stevenson and Wolfers) was explained. I pointed out different potential explanations to the decline and explicated the rationale behind choosing to focus on the social capital explanation in particular. I clarified that previous studies suffered from endogeneity issues in their empirical research designs, and argued that an instrumental variable (IV) model could be used to target this issue. From then on, the quest of my study was to perform an IV analysis.

Before digging into performing the IV analysis, a number of areas had to be directed. Most importantly, a relevant and exogenous instrument for social capital had to be found. The instrument and the process of finding it – along with a description of other variables – were described in the *Data* section.

Once the instrument had been explained and justified, and the other variables outlined, it was time for the empirical analysis. The empirical analysis, along with a description of

associated methods used, followed in the *Methods and Empirical Analysis* section. Introducing this section was a replication of Stevenson and Wolfers' analysis, and an empirical assessment of whether social capital could count as a viable explanation to the declining female happiness. These two analyses served as preparatory for the main analyses testing the research hypothesis. Again, before directly proceeding to the results of the IV analysis, also a 'naïve' model had to be analyzed. Only by analyzing both the 'naïve' model and the IV model, could I draw a conclusion on whether the IV model was superior or not – this through a Hausman test. The IV model was indeed found to be statistically superior to the 'naïve' model. The implications of the results of the IV analysis will be elaborated below.

## **5.2 FINDINGS IN RELATION TO THE RESEARCH HYPOTHESIS AND THE CURRENT STATE OF KNOWLEDGE**

The hypothesis directing this research has been that women's happiness in the US between 1972 and 2006 declined *absolutely* and *relative* to men, partly as a result of a parallel decline in social capital. A number of studies have aimed at investigating this hypothesis, however, due to endogeneity concerns in their empirical research designs it has been difficult to draw any causal conclusions. This study has intended to contribute to this gap in the literature through the use of a research design – an instrumental variable ordered probit regression analysis – that minimizes the endogeneity bias and consequently enables inferences on the causal impact of social capital on the declining pattern of female happiness.

One of the main findings of this study, derived from the instrumental variable analysis, is that a decline in social capital had a causal negative impact on the *absolute* decline in female happiness in the US between 1972 and 2006 – confirming *Hypothesis 1*. An interesting and very natural subsequent question to this result is how large impact the decline in social capital really had on the decline in female happiness. In order to make this magnitude tangible, I will compare it to an increase in unemployment. As explained in 4.1.1, the absolute decline in female happiness 1972–2006 (as observed in the first column of Table 3, when not including social capital in the analysis) corresponds to a decline by  $-\beta_1 \Delta t = -(-0.294) \times (2006 - 1972)/100 \approx 0.1$  points. This is analogous to the negative impact that a 6.7 percentage points increase in unemployment rates would have on happiness (Wolfers 2003)<sup>18</sup>. However, the IV estimation shown in Table 8, including the social capital trend, shows a weakening of the negative female time trend to a trend corresponding to  $-\beta_1 \Delta t = -(-0.255) \times (2006 - 1972)/100 \approx 0.087$  points decrease in female happiness. This decline in female happiness in turn corresponds to only 5.8 percentage points increase in unemployment rates. In other words, the effect that the decline in social capital had on the parallel decline in female happiness was comparable to a 0.9 percentage points ( $6.7 - 5.8 = 0.9$ ) increase in unemployment rates. This highlights the significant impact that the decline in social capital had on the decline in female happiness.

However, when it comes to analyzing the impact of social capital on the decline in female happiness *relative* to men (*Hypothesis 2*), the results were not as confirmatory. The results lent no support to social capital having had a gender-biased impact on women's happiness.

---

<sup>18</sup> Wolfers (2003) found that a 1-percentage point increase in a state's unemployment rate causes 0.015 points decrease in individual happiness.

---

Summing up, these are the two main findings of my study related to the initial research hypotheses:

*(Hypothesis 1)* A decline in social capital had a negative causal impact on the *absolute* happiness of women in the United States between 1972 and 2006.

*(Hypothesis 2)* A decline in social capital showed no gender-biased negative impact towards women, failing to explain the decrease in women's happiness *relative* to that of men's in the United States between 1972 and 2006.

### **5.3 THEORETICAL AND PRACTICAL IMPLICATIONS**

This study has theoretical as well as practical implications. This section elaborates on each of these, starting off with the theoretical implications.

In addition to the contribution to the emerging happiness literature described in the previous discussion section, this study has a number of further theoretical implications stemming both from the method used and the results obtained. As for the *methodological* implications, this study has put light on an empirical research design – the instrumental variable model – to be used when evaluating the determinants of happiness in general. Happiness is a phenomenon with the potential to impact a vast amount of different areas – including its own determinants – ranging from individuals' willingness to engage in social activities to their ability to perform at the workplace. Therefore, it is difficult to distinguish the pure effect of different potential determinants on happiness. Instead, it is possible that the measured effects include the effects that happiness simultaneously has on its determinants. The instrumental variable model targets this issue of simultaneous causality and is therefore a preferable method to use in the happiness research. As for the theoretical implications stemming from the *results* of this study, social capital has been shown to have a significant impact on the absolute decline in female happiness. This result encourages further research on the determinants of social capital and on how individuals and society can contribute to a rise of social capital.

The practical implications of this study links to its finding of a significant impact of social capital in explaining the absolute decline in female happiness. This finding demonstrates why it is vital for policy makers to not underestimate the importance of social capital when making decisions. This pertains to a broad range of policy decisions concerning everything from education policies, elderly care, health care, labor market policies, and urban policies (Bartolini et al. 2007). Again, further research needs to be done on the determinants of social capital and on what public measures could be taken to increase the public level of social capital. Although the purpose of this study has not been to analyze the determinants of social capital, I will briefly point on some individual-level activities that are generally considered to generate social capital. Such activities include family dinners, social gatherings with friends, voluntary social engagements, participation in civic organizations and clubs (Resnick 2001). I want to conclude with an encouraging note on the importance of these activities for individuals to produce social capital and subsequently benefit from increased happiness levels.

### **5.4 INTERNAL AND EXTERNAL VALIDITY**

In this section, I will discuss the internal and external validity of my study. Internal validity refers to the ability to draw statistical inferences on causal effects for the population studied. External validity refers to the ability to generalize the statistical

inferences from the population studied and apply them on other populations and settings. Both types of validity are discussed sequentially below.

#### 5.4.1 INTERNAL VALIDITY

As in so much empirical studies, although what are desired are causal results, the research designs seldom give any warranty of yielding such results. There are several ways in which a research design can fail to yield causal answers and thereby threaten the internal validity of the research. These threats include i) omitted variable bias, ii) errors-in-variables bias, iii) sample selection bias, and iv) simultaneous causality bias. Below, each of these threats will be assessed in relation to my study.

*i) Omitted variable bias* – This bias is caused by the exclusion of variables from the empirical specification that are correlated with both the dependent variable – in this case *happiness* – and the independent variable – in this case *social capital* or *burglary*. However, the empirical specifications used in this study include an extensive set of control variables<sup>19</sup> that has aimed at reducing the omitted variable bias. Therefore, this issue seems to be of limited threat to the internal validity of the analysis. Still, future research is encouraged to reassess the control variables included in the empirical specification used in this study and the possibility of there being variables omitted from the specification causing potential bias. Examples of such possible omitted variables include: relative income, health conditions, and macroeconomic factors (quality of government, globalization, new technology, diversity, economic performance, political institutions). These variables have been excluded from the analyses in this study for two reasons: (1) to maintain comparability with Stevenson and Wolfers' analysis, and (2) due to the lack of data in the GSS. Nevertheless, adding irrelevant control variables to the empirical specification disturbs the standard errors of the estimated coefficients, and I therefore advice future researchers to be deliberate in their choice of control variables.

*ii) Errors-in-variables bias* – This threat to the internal validity of an analysis stems from potential measurement errors in the variables included in the empirical specification model. This threat can be considered as relatively limited due to the use of the renowned and nationally representative dataset in the General Social Survey. However, since this dataset is based on survey answers obtained from personal face-to-face interviews, the data may be biased due to subjectivity issues. The variable *happiness*, in particular, might suffer from social desirability bias that tends to inflate the responses on self-reported happiness. This possibility is supported by the survey methodology literature (e.g. Presser and Stinson 1998), which indeed finds that there are differences between measures obtained using face-to-face interviews and measures obtained through other methods. Therefore, future research is encouraged to use alternative datasets such as the *Life Style Survey*, which is a survey that obtains data through mail questionnaires. The use of such a dataset would maintain the anonymity of the respondents, and thereby possibly limit the social desirability bias in the measured variables.

There is also a second potential measurement error related to the variable measuring happiness. In short, is a person that thinks that he or she is happy, really happy? In other words, just because a person's response – although genuine – is 'very happy', does it really mean that the person truly is that happy? Since the feeling of happiness is

---

<sup>19</sup> Age, race, immigrant status, employment, income, marital status, education, number of children, parent's education, religion, and region

subjective, two persons feeling the exact same level of happiness, may still report different levels of happiness. While this certainly is a problem worth considering, studies have shown that there is a strong correlation between subjective measures of happiness and objective measures such as smiling, laughing, brain activity and heart rate (Diener 1984).

A third possible measurement error stems from the use of time-series data. This form of data causes potential problems with the stability of the measurement over time. For instance, the social desirability bias may have increased over time, causing a misleading trend in the measured variables. This issue further confirms the need to conduct the analysis of this study also with other datasets and assess whether the results remain robust.

*iii) Sample selection bias* – This bias is caused by the use of non-random data. Due to the use of the nationally representative and – by renowned researchers considered – reliable GSS dataset, this potential bias can be trusted to be relatively small.

*iv) Simultaneous causality bias* – This bias occurs when the dependent variable – in this case *happiness* – causes the independent variable – in this case *social capital*. This issue has been lifted up throughout this study. There is a very possible presence of an effect of happiness on social capital, which – to the best of my knowledge – no studies have yet targeted. As previously explained, the contribution of this study has been its use of the instrumental variable research design. This is a research design specifically used for the purpose of solving simultaneous causality bias. The research design that this study is based upon thereby constitutes the main strength of this study in terms of its internal validity. However, since the exogeneity of an instrument cannot be tested empirically, there is no warranty that the instrument *burglary* is in fact exogenous. The research on the relationship between burglary and happiness is scarce. Therefore, although existing research on the US population – to the best of my knowledge – finds no robust direct impact of burglary on happiness, one needs to be careful before totally excluding a potential effect. More research on this matter is therefore encouraged. If burglary does in fact affect happiness directly, or indirectly through its impact on other factors omitted from the analysis, then the exogeneity criterion is violated, harming the validity of burglary as an instrument. In addition, although there is no previous research that states that the happiness of individuals might affect their risk of being burgled, this does not automatically need to hold. It could be the case that the relationship described in 3.4.2.2.1 in fact exists; i.e. that unhappy people are more risk averse, have a higher fear of being subject for crime, and thereby take higher measures to prevent burglary. This association between happiness and burglary would deteriorate the validity of using burglary as an instrument. Therefore, I encourage further research on this matter. Nevertheless, with the current state of knowledge on the relationship between burglary and happiness, burglary can be considered as a valid instrument for social capital in assessing its impact on happiness.

All in all, the internal validity of this study can be concluded as relatively strong except for some potential issues that should be addressed in future research. This will be further explained in section 5.5.

#### **5.4.2 EXTERNAL VALIDITY**

Now that we have elaborated on the internal validity of the study, let us conclude this section with a few words on the external validity. The population analyzed in this study

includes only the US population, making it difficult to generalize the results of this study to many other populations. However, the US population being a relatively heterogeneous group extending over a wide country, it should be possible to extend the statistical inferences to apply to at least the western community. The western countries are under relatively similar legal, policy, and physical environments and have related salient features. Therefore, it should not be a far-fetched conclusion to say that also the happiness trends of these countries are sensitive to trends in social capital.

Further supporting the external validity of this study is the fact that the main variables – happiness and social capital – are derived from the feelings and acts of human beings. Human beings may be different in many aspects, but as for their fundamental needs – such as the desire to be happy, and the determinants of their happiness – these should not differ too significantly. Therefore, the inferences of my study could potentially reach a further extent than to only be applied on the western community.

## **5.5 FUTURE RESEARCH**

The concerns described in the previous part of the discussion all point to fields relevant for future research. With this study I hope to encourage more research in the happiness area and on the specific determinants of happiness. In particular, I want to urge for more research using the research design – the instrumental variable model – used in this study. However, I would like to suggest some alterations to the empirical analysis employed in this study for future researchers to consider.

Firstly, I recommend future researcher to greatly emphasize the importance of finding a strong instrument – potentially stronger than *Burglary* – when assessing the impact of social capital on happiness. However, after a significant amount of time and effort put into finding a strong instrument for social capital, I dare to declare that the General Social Survey used in this study will provide little to no data on other valid instruments. Therefore, I suggest the use of other datasets when exploring potential instruments.

Secondly, this study could be replicated and extended using other measures of *social capital* – such as for instance memberships in voluntary associations or relationships with family and friends. Such analyses would help substantiate the findings of this study.

Thirdly, I strongly encourage the empirical analysis employed in this study to be done on other hypotheses and potential explanations to the declining female happiness (see 2.1 for examples). Although my study finds a negative causal impact of social capital on the absolute decline in female happiness, social capital does not explain the entire decline. Therefore, further research analyzing other explanatory factors would contribute to expanding the understanding of the determinants of contemporary happiness trends in general, and female happiness trends in particular.

Lastly, using an alternative dataset to the General Social Survey would further substantiate the results of this study, not the least due to the potential social desirability bias in the GSS, as explained in section 5.4.

I want to genuinely hearten future researchers employing instrumental variable analyses to have a lot of patience. Finding a strong instrument is seldom an easy issue, but it is, however, the most vital part of the instrumental variable analysis. Once the instrument is found and there is confidence in its validity, the major part of the work can be considered done. I therefore want to reassure future researchers that the time and effort

put on finding the instrument, is time and effort very well spent. In my own opinion, patience is the single most important asset when performing an instrumental variable analysis. So have patience – and be happy.

## REFERENCES

- Angrist, J. D. and Pischke, J. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.
- Bartolini, S., Bilancini, E. and Pugno, M. 2007. *Did the decline in social capital decrease American happiness? A relational explanation of the happiness paradox*, Working Paper, No. 513, Department of Economics, University of Siena.
- Blanchflower, David. G. and Oswald, Andrew J. 2004, Well-being over time in Britain and the USA, *Journal of Public Economics*, Elsevier, vol. 88, no. 7–8, pp. 1359–1386, July.
- Bosworth, S. 2014. *Essays on Social Capital and Coordination*. Doctoral Dissertation, University of Pittsburgh.
- Bursik, R. J. Jr., and H. G. Grasmick. 1993. Economic deprivation and neighborhood crime rates, 1960–1980. *Law and Society Review*, vol. 27, pp. 263–68.
- Chin-Hon-Foei, S. 1989. *Life Satisfaction in the EC Countries, 1975–1984*, In: Veenhoven, R., Ed.: "Did the Crisis Really Hurt?" Universitaire Pers Rotterdam, Netherlands, pp. 24–43.
- Chodorow, N. J. 1978. *The Reproduction of Mothering: Psychoanalysis and the Sociology of Gender*, Berkeley: University of California Press.
- Chun, Y. and Lee, J. 2013. Traces of occupancy and its effect upon burglars' residential target selection, *Social Sciences*, vol. 2, no. 3, pp. 135-141, doi: 10.11648/j.ss.20130203.15.
- Cohen, L. E. and Cantor, D. 1981. Residential burglary in the United States: Life-style and demographic factors associated with the probability of victimization, *Journal of Research in Crime and Delinquency*, pp. 113–127, January.
- Costa, D. L. and Kahn, M. E. 2003. Understanding the decline in social capital, 1952–1998, *Kyklos*, vol. 56, pp. 17–46.
- Cromwell, P. F., Olson, J. N., and Avary, D. W. 1991. *Breaking and Entering: An Ethnographic Analysis of Burglary*, Newbury Park: Sage Publications.
- Demaris, A. and Kaukinen, C. 2005. Violent victimization and women's mental and physical health: Evidence from a national sample, *Journal of Research in Crime and Delinquency*, vol. 42, no. 4, pp. 384–411, November.
- Demireva, N. 2011. Briefing: Immigration, diversity and social cohesion, *The Migration Observatory at the University of Oxford*, pp. 1–6.
- Diener, Ed. 1984. Subjective Well-Being. *Psychological Bulletin*, vol. 95, no. 3, pp. 542–75.
- Dutta, I. and Foster, J. 2011. Inequality of happiness in US: 1972–2008, *The School of Economics Discussion Paper Series*, 1110, The University of Manchester.

- Easterlin, Richard A. 1995. Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior and Organization*, vol. 27, no. 1, pp. 35–47.
- Felson, M. 2002. *Crime and everyday life*, 3rd edition, Thousand Oaks: Sage Publications.
- Frey, B. S. and Stutzer, A. 2002. What can economists learn from happiness research? *Journal of Economic Literature*, vol. 40, no. 2, pp. 402–435, June.
- Galabuzi, G. and Teelucksingh, C. 2010. Social cohesion, social exclusion, social capital, *Region of Peel Immigration Discussion Paper*, Department of Citizenship and Immigration Canada.
- Galea, S., Karpati, A. and Kennedy, B. 2002. Social capital and violence in the United States, 1974–1993, *Social Science & Medicine*, vol. 55, pp. 1373–1383.
- Hacker, J. S. 2006. *The Great Risk Shift: The Assault on American Jobs, Families, Health Care, and Retirement—And How You Can Fight Back*, Oxford, UK: Oxford University Press.
- Hanson, R. F., Sawyer, G. K., Begle, A. M., and Hubel, G. S. 2010. The impact of crime victimization on quality of life. *Journal of Traumatic Stress*, vol. 23, no. 2, pp. 189–197.
- Helliwell, J. F. 2003. How's life? Combining individual and national variables to explain subjective well-being, *Economic Modelling*, Elsevier, vol. 20, no. 2, pp. 331–360, March.
- Helliwell, J. F. 2006. Well-being, social capital and public policy: What's new? *The Economic Journal*, vol. 116, no. 510, pp. C34–C45, March.
- Helliwell, J. F. and Putnam, R. D. 2004. The social context of well-being, *Philosophical Transactions of the Royal Society B*, vol. 359, no. 1449, pp. 1435–1446.
- Herbst, C. M. 2011. Paradoxical decline? Another look at the relative reduction in female happiness, *Journal of Economic Psychology*, vol. 32, no. 5, pp. 773–788.
- Hudson, J. 2006. Institutional trust and subjective well-being across the EU, *Kyklos*, vol. 59, pp. 43–62, doi: 10.1111/j.1467-6435.2006.00319.x.
- Keeley, B. 2007. Human capital: How what you know shapes your life, *OECD Insights*, OECD, Paris, <http://dx.doi.org/10.1787/9789264029095-en>.
- Kennedy, L. W., and D. R. Forde. 1990. Routine activities and crime: An analysis of victimization in Canada. *Criminology* vol. 28, pp. 137–51.
- Kohfeld, C. W., and J. Sprague. 1988. Urban unemployment drives crime. *Urban Affairs Quarterly*, vol. 24, pp. 215–41.
- Ladd, E. 1996. The data just don't show erosion of America's social capital, *Public Perspective*, vol. 7, pp. 1–30.
- Lochner, K., Kawachi, I. and Kennedy, B. P. 1999. Social capital: A guide to its measurement, *Health and Place*, vol. 5, 259–270.

- Martens, E. P., Pestman, W. R., de Boer, A., Belitser, S. V. and Klungel, O. H. 2006. Instrumental variables: application and limitations, *Epidemiology* 2006, vol. 17, no.3, pp. 260–267.
- Michalos, A. C. and Zumbo, B. 2000. Criminal victimization and the quality of life, *Social Indicators Research*, vol. 50, pp. 245–296.
- Norris, F. H. and Kaniasty, K. 1994. Psychological distress following criminal victimization in the general population: Cross-sectional, longitudinal, and prospective analyses, *Journal of Consulting and Clinical Psychology*, vol. 62, pp. 11–123.
- Norton, A. 2009. *Gender Inequality*. Available from: <<http://88.198.249.35/d/Chapter-15-Gender-inequality-Norton-August-pdf.pdf>>. [7 Jan 2015].
- OECD. 2001. The well-being of nations: The role of human and social capital, Paris: OECD Publications.
- Oswald, A. J. 1997. Happiness and economic performance, *The Economic Journal*, vol. 107, no. 445, pp. 1851–1831.
- Ott, J. 2010. Greater happiness for a greater number: Some non-controversial options for governments, *Journal of Happiness Studies*, vol. 11, pp. 631–647.
- Pannells, T. C. and Claxton, A. F. 2008. Happiness, creative ideation, and locus of control, *Creativity Research Journal*, vol. 20, no. 1, pp. 67–71.
- Paternoster, R., and S. D. Bushway. 2001. Theoretical and empirical work on the relationship between unemployment and crime. *Journal of Quantitative Criminology*, vol. 17, pp. 391–407.
- Paxton, P. 1999. Is social capital declining in the United States? A multiple indicator assessment, *The American Journal of Sociology*, vol. 105, no. 1, pp. 88–127.
- Presser, Stanley and Linda Stinson. 1998. Data collection mode and social desirability bias in self-reported religious attendance, *American Sociological Review*, vol. 63, pp. 137–145.
- Putnam, Robert D. 2001. Social capital: measurement and consequences, *ISUMA: Canadian Journal of Policy Research*, vol. 2, no.1, pp. 41–51.
- Putnam, Robert D. 2000. *Bowling Alone: The Collapse and Revival of American Community*, New York: Simon & Schuster.
- Resnick, P. 2001. Beyond bowling together: Sociotechnical capital. In J. Carroll (Ed.), *HCI in the New Millennium*. Boston, MA: Addison-Wesley, pp. 247–272.
- Robinson, R. V. and Jackson, E. F. 2001. Is trust in others declining in America? An age-period-cohort analysis, *Social Science Research*, vol. 30, no.1, pp. 117–145, March.
- Robinson, M. B., and Robinson, C. E. 1997. Environmental characteristics associated with residential burglaries of student apartment complexes. *Environment and Behaviour*, vol. 29, pp. 657–675.

Stevenson, B. and Wolfers, J. 2009, The paradox of declining female happiness, *American Economic Journal: Economic Policy*, vol. 1, pp. 190–225.

Stevenson, B. and Wolfers, J. 2008. Happiness inequality in the United States, *Journal of Legal Studies*, vol. 37, no. S2, pp. S33–S79.

Tella, R. D., MacCulloch, R. J. and Oswald, A. J. 2003. The macroeconomics of happiness, *The Review of Economics and Statistics*, MIT Press, vol. 85(4), pp. 809–827, November.

Twenge, J. M. 2000. The age of anxiety? Birth cohort change in anxiety and neuroticism, 1952–1993, *Journal of Personality and Social Psychology*, vol. 79, no. 6, pp. 1007–1021.

Van Praag, B. M. S. 2011. Well-being inequality and reference groups: An agenda for new research, *Journal of Economic Inequality*, vol. 9, no. 1, pp. 111–127, March.

Veenhoven, R. 2005. Return of inequality in modern society? Test by dispersion of life-satisfaction across time and nations, *Journal of Happiness Studies*, vol. 6, pp. 457–487.

Veenhoven, R. 1990. *Inequality in happiness; inequality in countries compared between countries*, Paper presented at the 12th Work Congress of Sociology, Madrid, Spain.

Vigdor, J. L. 2004. Community composition and collective action: Analyzing initial mail response to the 2000 census, *Rev Econ Stat*, vol. 86, no. 1, pp. 303–312.

Wolfers, J. 2003. Is business cycle volatility costly? Evidence from surveys of subjective well-being, *International Finance*, vol. 6, no.1, pp. 1–26.

Wooldridge, J. 2008. *Introductory Econometrics: A Modern Approach*, 4<sup>th</sup> edition, Mason, OH: South-Western College Publishing.

Zetter, R., Griffiths, D. and Sigona, N. 2006. *Immigration, social cohesion and social capital*, York: Joseph Rowntree Foundation.

Zlotnick, C., Johnson, D. M. and Kohn, R. 2006. Intimate partner violence and long-term psychosocial functioning in a national sample of American women, *Journal of Interpersonal Violence*, vol. 21, pp. 262–275.