PART

One

Happiness, Health, and Longevity during the 2008 Global Financial Crisis

CHAPTER 1

Does the Recent Financial Crisis Impact Health and Happiness?

Xin Yan
Lawrence R. Klein
Viktoria Dalko
Ferenc Gyurcsány
Michael H. Wang
Christine Huang[1]

Has the global financial crisis of 2008 had measurable consequences for broadly defined health and happiness? Is its impact minor, transitory, or significant? If there is an impact, what are the most critical factors in determining the level and change of health and happiness in times of crisis? Our study is among the first to link a financial crisis simultaneously with both health and happiness. For our longitudinal study we designed a survey and collected semiannual survey responses from spring 2008 to spring 2010—five data points over two years, from 335 young professionals, who were mainly working professionals, and were former graduate students of the authors. The statistical analysis of the small and unique panel data reveals that the current global financial crisis has had a measurable and detrimental impact on health and happiness. In particular, there has been an immediate loss of happiness. Emotional health deteriorated at the onset of the crisis, and physical health followed after a delay, resulting in loss of happiness due to the financial crisis. We compare the impact of the financial crisis on happiness and health with that of the terrorist attack of 9/11 in the United

States and of Hurricane Katrina on direct survivors. Such traumatic impact on people calls for financial-crisis prevention.

CONCEPTS OF HAPPINESS

Happiness and governance were intrinsically linked by Aristotle in his *Nicomachean Ethics* (2011). According to Aristotle, the goal of governance is to create the conditions in which citizens can be happy. In the contemporary era, the Stiglitz Committee (CMEPSP 2009), as well as Derek Bok (2010), reaches the same conclusion. Bruno Frey announced that economics "is—or should be about happiness" (2008). Happiness is certainly a very close—some argue, the closest—construct to what economists traditionally mean by utility and welfare. We use Aristotle's standard as a reference for our approach to defining the objectives and the methods to apply in dealing with financial crisis.

The happiness concept we use in our research is based on our understanding of Aristotle's *Eudaimonia,* and as such it includes a notion of deep self-awareness as to the consequences of change in the comforts of life as well as the implications for one's ability to accomplish the most important goals in life—in work, family, friendships, and ultimate contribution to society. The concept of happiness we focus on is not a momentary mood or a brief experience of pain and pleasure—and therefore we did not collect instantaneous reports of feelings of pain and pleasure as it is done by contemporary hedonic psychology (Kahneman, Diener, and Schwartz 1999). Rather, we asked survey respondents about their happiness experience over a longer time horizon, such as the previous one month. Even though our aim was to measure happiness similar to Aristotle's *Eudaimonia,* we recognized the difficulties it poses, especially the challenges of surveying the level of virtue and frequency of virtuous acts of other people. Therefore, at this stage of our research we did not incorporate questions regarding virtuous actions into our survey. When interpreting the survey results, we relied on the millennia-old tradition of Chinese medicine and the progress made during the last several decades in positive psychology, the appraisal theory of emotions, stress research, and the economics of happiness.

To the best of our knowledge, our research is among the first to connect a financial crisis simultaneously with health and happiness. We approach the question of health and happiness using a defensive orientation; that is, unlike most of the current literature, we do not look for factors in the private or public domain that could contribute to more happiness of the public but take the opposite logic to address what should be avoided so people do not lose happiness. In so doing we aim to build a stronger defense against

unhappiness on a national and international level since we identify a condition for the deterioration of happiness: financial crisis.

In our study, health has a very specific meaning, inspired by the World Health Organization (WHO): "Health is a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity" (1948). When we talk about *health,* we mean this kind of comprehensive health. Accordingly, the *domains of health* we distinguish in our study are emotional health, physical health, social relationship health, and economic health. When we refer only to a particular domain of health, such as physical health, we specifically say so.

Our key contribution is that, based on our unique survey results, we can answer the questions on whether the global financial crisis of 2008 had measurable consequences for broadly defined health and happiness. We are also the first to define the most critical health domains determining the level and change of health and happiness in times of crisis.

THE HISTORY OF MODELING HEALTH AND FINANCIAL CRISIS

The statistical and theoretical modeling of how crisis impacts health, which has a history going back to the Great Depression of the 1930s, focuses on three areas: crisis impact on mental health, morbidity, and mortality.

Crisis Impact on Mental Health, Morbidity, and Mortality

Pollock (1935), in describing the Great Depression, and later Brenner (1973), in a study of 127 years of history, firmly established the relationship between health and the state of the economy, especially between the level of unemployment and mental illness as measured by mental hospital admission. Eisenberg and Larzarsfeld (1938), and later Wecter (1948), also focused on the mental health impact of the Great Depression. Dooley and Catalano (1980) provided a survey of the field. In particular they reviewed all previous individual-level longitudinal studies on the connection between unemployment and subsequent psychological problems including suicide, depression, anxiety, and psychopathologic symptoms. They propose a model of intervening variables that may causally link changes in the economy with subsequent changes in treated mental disorders. Ganzini, McFarland, and Cutler (1990) documented that mental health deteriorates as a result of catastrophic financial loss, while Stuckler et al. (2009) pointed out the long-lasting effect of fear and anxiety that is due to crisis. In terms of its

mechanism, mental health has been found to deteriorate as a result of stress (Dohrenwend 2000; Turner, Wheaton, Lloyd 1995; Cui and Vaillant 1996; McGonagle and Kessler 1990). Das et al. (2009) and Friedman and Thomas (2007) documented the impact of the recent financial and economic crisis and find persistent increased psychological distress as a result of the crisis.

Social and economic determinants of health are widely accepted today (Wilkinson and Marmot 2003). As such, crisis also has a measurable impact on morbidity. Studies have linked unemployment and economic crisis to health (Catalano and Dooley 1983; Rayman and Bluestone 1982; Musgrove 1987). Bloom, Canning, and Jamison (2004) discussed the "vicious cycle" linking deteriorating health and slower economic growth. Burazeri et al. (2008) documented a case of a financial crisis affecting physical health: six to nine years after the collapse of a widespread pyramid scheme,[2] which resulted in severe and unexpected loss to a large part of the population of Albania, hospital admissions that were due to acute coronary syndrome significantly increased. Based on results obtained by stress researchers, we would also expect to see a negative impact of financial crisis on health; as House (2002) pointed out, there is considerable evidence that negative life events, including major economic losses or setbacks, are risk factors of morbidity. Kasl and Jones (2000), Pearlin et al. (1981), and House (1987) provided additional evidence on the contribution of crisis to morbidity. *The financial crisis and global health,* the WHO Report (2009), Frankenberg, Thomas, and Beegle (1999), and Cutler et al. (2002) documented the impact of a more current financial and economic crisis on health globally, in Indonesia, and in Mexico, respectively.

Mortality has been linked to economic crisis through either recession (Colledge 1982) or unemployment (Brenner 1979), although with a considerable time lag. Stuckler et al. (2009) warned against the potential mortality consequences of the current global crisis. Even though there is mounting evidence for the existence of a negative effect of financial crisis on physical health, Cutler et al. (2002) reached the conclusion that "no studies have systematically examined the link between economic crisis and health, or considered the mechanisms through which economic crisis affects health." Our research aims to add to the understanding of how the current economic and financial crisis is influencing health.

Crisis Impact on Happiness

Statistical analyses of and theoretical arguments about happiness in general are active research fields in psychology (Kahneman, Diener, and Schwartz 1999; Seligman 2002), summarized for economists by Frey and Sultzer

(2002); as well as in economics (Easterlin 2010; Layard 2005; Graham and Pettinato 2002; Bruni and Porta 2005). The sources of happiness mentioned in psychology and economics are generally accepted to be one's level of living, family, health, job/work, and social values/character (Cantril 1965). The same types of dimensions have been listed by Easterlin (2003) as income, family, work, health conditions, and friendship. Layard (2005) provided a list of prerequisites to happiness: family relationships, financial situation, work, community and friends, and health. These categories correspond well to the list Aristotle provided as the prerequisites of happiness (or rather *Eudaimonia*): adequate health, food, and other care for the body; friends; wealth; and power (*Nicomachean Ethics* 2011). Therefore, if financial crisis destroys any of these prerequisites of happiness, we expect happiness to decline.

Impact of Declining GDP, Unemployment, Financial Loss, and Financial Strain on Happiness A short-term relationship has been demonstrated to exist between life satisfaction and gross domestic product (GDP) growth. Life satisfaction declines during economic contraction/collapse and increases during expansion/recovery as documented in 25 developed countries (DiTella et al. 2001), in 17 developing Latin American countries, and 3 transition economies (Easterlin, et al. 2010). Empirical studies using cross-sectional data showed that subjective wellbeing is negatively affected by personal financial loss and the loss of employment as an individual event (Clark and Oswald 1994; Turner, Wheaton, and Lloyd 1995; Frey and Stutzer 1999; Layard 2005), as well as unemployment over time (Winkelman and Winkelman 1998). In addition, DiTella et al. (2003) measured the impact of macroeconomic slowdown and growing unemployment on those who did not lose their jobs, a feature that they refer to as the "important psychic cost of recession," and Wolfers (2003) demonstrated the measurable impact of macroeconomic volatility on happiness. With these findings in mind, we expect to find that the impact of the financial crisis on happiness at least to some extent *directly* results from personal unemployment, financial loss, and the "psychic cost of recession."

Health and Happiness

Kahneman et al. (2004) and Stone and Shiffman (1994) found that measures of emotional experiences are correlated with life satisfaction. Argyle (1999), Blanchflower and Oswald (2004), and Frey and Sultzer (2002) demonstrated that healthier people are happier. Okun et al. (1984) found that self-reported health and happiness correlated by 0.32 on average. Graham (2009) provides evidence that around the globe, across cultures and

countries (the United States, Latin America, Russia), self-reported health has the strongest coefficient among all (otherwise sociodemographic) variables explaining happiness.

The relationship between health and happiness is not one-directional. Blanchflower and Oswald (2004) point out that there is a self-reinforcing cycle: (Un)happier people are (un)healthier and (un)healthier are (un)happier. On the other side of causality, Roysamb et al. (2003) and Takkouche, Regueira, and Gestal-Otero (2001) found that happier people reported better perceived health and fewer physical symptoms. Diener and Chan (2010) provide a comprehensive review of the field. Their notion of subjective wellbeing contains three factors: high-level positive emotions (including happiness), low-level negative emotions (including anger and fear), and life satisfaction. Diener and Chan (2010) establish that especially in originally healthy populations, subjective wellbeing has predictive power over physical health and longevity. Happy people are healthier and live longer, and unhappy people have more diseases and live a shorter life.

Psychologists repeatedly find that good relationships are important for happiness. Friends, family, and other social connections have been long recognized as sources of joy, happiness, and personal satisfaction (Campbell, Converse, and Rodgers 1976; Buss 2000; Seligman 2002). In fact, relatedness has often been found to be the most or close to the most important factor in subjective well being (Argyle 1987; Myers 1999). Stress research often considers the quality of relationship with friends and family as a buffer for coping with stress, so a good relationship can shelter one from the negative consequences of chronic stress (House 2002).

Theory: How Emotions Impact Physical Health

There is ample empirical evidence on the physiological pathways from emotional to physical health (Kiecolt-Glaser et al. 2002). There are also numerous population studies documenting the same regularity (Hemingway and Marmot 1999; Williams and Schneiderman 2002). This time we are concerned about the theoretical progress in explaining these transmission mechanisms from emotional to physical health. Two schools of practice and knowledge help to explain how individuals are affected when faced with major life events. The first, Traditional Chinese Qigong and its application in Traditional Chinese Medicine (TCM), has been practiced continuously for more than 5,000 years. The second, stress research applied to emotions, has its intellectual roots in Aristotle's work but has developed in its current form mainly since 1990.

In Traditional Chinese Qigong, and its application in TCM, the central concept is Qi (usually translated as *life force*). According to TCM, the

experience of extreme negative emotion causes immediate damage to a person's Qi. If not treated, the accumulation of negative Qi in the body over time manifests as physical diseases. (See more in *The Medical Classic of the Yellow Emperor* 2001.) It is not only an ancient theory; such practice of healing and prevention has been present through thousands of years.

Growing contemporary literature in stress research applied to emotion also testifies for the association between emotional health and disease (see reviews of the literature in Booth-Kewley and Friedman 1987; Herbert and Cohen 1993; Krantz and McCeney 2002; Watson 1988). It is rooted in the works of Hans Selye (1956).

David Lazarus created the analytical framework he called "appraisal and coping" to understand stress (Cooper and Dewe 2004). A contemporary summary of appraisal theory of emotions can be found in Sceerer, Schorr, and Johnstone (2001). Lazarus proposed that emotions are generated in the process of "appraisal" of environmental change, the same process that generates stress (2001). The word *appraisal* in common language invokes a conscious decision process; however, emotions arise as a response to changes often instantaneously, such as being startled by a clap of thunder.

Happiness Is a Good Measure of Welfare and Utility

The concepts of utility and welfare are cornerstones of economic theory. Neoclassical economic theory employs an *objectivist* approach, measuring utility according to the individual choices related to the consumption of goods, services, and leisure. However, there is a long history of challenges to this view (Frey and Stutzer 2002). Instead of relying on observed consumption (*decision utility*), a subjective approach has been shown to be useful in complementing the measure of wellbeing more directly ("experienced utility" as coined by Kahneman et al. 1997). Today individual wellbeing is measured by asking people about their self-reported happiness or life satisfaction in surveys, and the results are consistent and reliable (Ehrhards, Saris, and Veenhoven 2000; Sandvik, Diener, and Seidlitz 1993).

OUR THREE OBJECTIVES

This chapter has three objectives. The first objective is to establish whether the financial crisis has had a significant impact on the happiness of a well-educated, highly motivated, middle- and high-income group of international managers and business students. The second question we want to

answer is whether the crisis has impacted these people's broadly interpreted health. The third research question follows naturally: How are health and happiness related during times of financial crisis? We approach the third question in cross section and in time series. In a cross-sectional model, the question becomes: What is the role of health domains in shaping happiness during a crisis? In a time series setup the question is: How do changes in different domains of health contribute to the gain or loss of happiness? Our aim is to illuminate the discussion about the causal model (Diener et al. 1999) by conducting a longitudinal study that highlights the impact of health indicators on happiness during a time of severe financial crisis.

We Created Our Happiness and Health Domain Indices

We examined three major databases—the World Values Survey database, the Eurobarometer database, and the Gallup-Healthway database—that are commonly used for happiness research. We found that none of them were suitable to address our research questions; therefore, we designed our own survey.

The question on happiness we asked was: "Rate your current level of happiness during the last month as Poor (1), Fair (2), Good (3), or Excellent (4)." We asked for a one-month period because we wanted to collect information that was sensitive enough to capture changes during the crisis. People who are surveyed actually do consider the time frame asked in the question (Diener and Larsen 1984; Watson, Clark, and Tellegen 1988); so, by requesting an answer for a one-month period, we hoped to avoid having respondents average out the crisis and noncrisis time periods and answer a lifetime satisfaction level.

As mentioned earlier, we took inspiration from the famous WHO definition of health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (WHO 1948). Whenever we use the word *health,* we mean this *comprehensive* health. Accordingly, the *domains of health* we distinguish in our study are emotional health, physical health, social relationship health, and economic health. Emotional health: Extraordinary reactions of human beings to unexpected health-related events are categorized by the ancient Chinese as seven emotions: excessive joy, anger, worry, deep thought, grief, fear, and shock. These particular emotions are widely utilized in China and some other parts of Asia and have been important practical tools in Traditional Chinese Medicine for preventive, diagnostic, and healing purposes (*The Medical Classic of the Yellow Emperor* 2001; Kaptchuk 2000). In TCM, any of these emotions—when they are excessive—can bring about diseases in the

TABLE 1.1 Comparison between the Terms of TCM's Extreme Emotions with the Negative Affect of the Positive and Negative Affect Scale (PANAS)

TCM	PANAS Negative Affect
angry	hostile, scornful, grouchy
worried	distressed
lost in deep thoughts	blue, drowsy
grief-stricken	sad, sorry, apologetic
fearful	fearful
shocked (startled)	astonished, nervous, jittery

organs to which they correspond. The list of extreme emotions from thousands of years of TCM corresponds closely with the list of negative effects from modern psychology, as measured by Watson, Clark, and Tellegen (1988) and displayed in Table 1.1. Emotional health and negative affect are concepts similar to that of psychological distress used by other researchers. We measured the emotional health index of an individual as the intensity of six emotions, without excessive joy.

Physical health: We measured physical health using the self-reported perceived health status in terms of feeling of fitness, pain or discomfort, quality of sleep, frequency of doctor's visits, and overall rating of health. According to TCM, pain, difficulties with sleeping, and lack of fitness are all signs of imbalance in the Qi circulation and quantity and quality of the Qi in the body, so these are all signs of physical disease formation or progression. (See more traditional literature on the Four Examination Methods of Traditional Chinese Medicine attributed to Bian Que in *Shi Ji* (1995) and *The Medical Classic of the Yellow Emperor* 2001). Contemporary stress research also recognizes these signs as stress symptoms (Benson and Klipper 2000; House 2002). The perceived physical health symptoms we used in our survey are similar to the symptoms of clinical depression defined by modern psychology. According to the American Psychiatric Association (1994), symptoms of depression include changes in weight, insomnia, fatigue, and diminished interest or pleasure. Our concept of physical health is similar to the notion of intensity of physical symptoms, somatic symptoms, level of physiological distress, physical health complaints, and reported physical symptoms—categories used by other researchers.

Social relationship health: We collected data about the quality of participants' social relationship health in three realms of their lives: at work, with family, and with friends. Our construct of social relationship health is related to the content of friendship (Graham 2009), quality of interpersonal

relationships, social support, and social affiliations (Stansfeld 2006), and might be linked to social capital (Putnam 2000).

Economic health: The reason we use the terminology *economic health* is to distinguish it from income and wealth variables that are often used in literature. We included an individual's work status and level of difficulty with paying the bills in our index. Economic health is a concept close to the ideas of economic hardship (Ahnquist, Fredlund, and Wamala 2007), material wellbeing (Csikszentmihalyi 1999), and financial fitness used by other researchers.

In addition to the variables that combine to create these four health domain indices, we gathered multiple sociodemographic data.

OUR FINANCIAL CRISIS–IMPACT MODEL

Many studies of happiness struggle to disentangle causalities from reverse causalities (CMEPSP 2009). Since we are documenting the impact of an external event—the global financial crisis of 2008—as a "natural experiment," changes in the domains of health and happiness are clearly due to the initial external shock of the financial crisis.

Usually in similar studies, researchers have great difficulty entangling the emotional and physical disturbances, since these phenomena can form a mutually reinforcing cycle. This results in technical problems of econometric modeling and the calls for simultaneous equations, due to the problem of endogeneity. However, in the case of our study, the financial crisis is certainly an external event; the crisis outbreak is not influenced by any survey participants' emotions or physical health. Hence, everything we measure is caused by the financial crisis. It is true even though we cannot exclude the ignition of self-reinforcing mechanisms over time; for example, it might happen that the crisis causes emotional problems, and in turn emotional disturbances later on lead to physical symptoms, like pain that will, in turn, further worsen emotional conditions.

Our Model of Happiness Consists of Two Equations

$$\text{Happiness}_{it} = \alpha_t * \text{Emotional health}_{it} + \beta_t * \text{Physical health}_{it} + \gamma_t * \text{Relationship health}_{it} + \delta_t * \text{Economic health}_{it} + \varepsilon_{it}, \quad (1)$$

where Happiness_{it} is the value of happiness of person i in period t; and Emotional health_{it}, Physical health_{it}, Relationship health_{it}, and Economic

health_{it} are the values of the respective health index variables for person i in period t. We estimated Equation (1) for each of the five periods separately, using the entire data set of all survey responses at each period t. We did not make any restrictive assumptions about the levels of the coefficients and allowed the coefficients to change over time.

The second equation expresses changes in happiness as a function of change in any or all of the health indices between period t and period $t\text{-}j$:

$$\begin{aligned}\Delta\text{Happiness}_{it,t\text{-}j} = {} & \acute{\alpha}_{t,t\text{-}j} * \Delta\text{Emotional health}_{it,t\text{-}j} + \acute{\eta}_{it,t\text{-}j} \\ & * \Delta\text{Physical health}_{it,t\text{-}j} + \acute{\imath}_{it,t\text{-}j} * \Delta\text{Relationship health}_{it,t\text{-}j} \\ & + \acute{\upsilon}_{it,t\text{-}j} * \Delta\text{Economic health}_{it,t\text{-}j} + \varepsilon_{it,t\text{-}j},\end{aligned} \tag{2}$$

where $\Delta\text{Happiness}_{it,t\text{-}j}$ is the change in happiness level of person i between period t and $t\text{-}j$; and $\Delta\text{Emotional health}_{it,t\text{-}j}$, $\Delta\text{Physical health}_{it,t\text{-}j}$, $\Delta\text{Relationship health}_{it,t\text{-}j}$, and $\Delta\text{Economic health}_{it,t\text{-}j}$ are the changes in the levels of the respective health variables for person i between period t and $t\text{-}j$. We estimate Equation (2) from the subset of the full database and include only the answers of those who provided a complete set of answers both in period t and in period $t\text{-}j$. We also allowed the change in coefficients between different pairs of periods.

We estimated the two equations from two databases, where the second database is a subset of the first. We treated happiness as a latent continuous variable; however, we can observe only a discrete choice, the participants' selection of happiness out of four possible answers (coded as one to four, the higher number meaning more favorable conditions always), so we used the ordered Probit model to estimate Equations (1) and (2). For more on similar model setup, see Di Tella and MacCulloch (2008).

Survey Participants and Timing

We surveyed people who at some point took graduate-level finance or economics courses from the authors. The large majority of these former students were in the past part-time master's of business administration (MBA) or other business-related graduate-degree students. By the time of the survey most of them had completed their degree and thus they were working professionals. These participants were selected because we wanted to ensure high-quality data and we wanted to conduct a longitudinal study by asking the same people the same questions over time, and we felt it was more likely that our former students would submit to multiple surveys. The surveys did not include any of our current students, even though some were still at school.

Over the two years, starting from 247 e-mail invitations, and adding an average of 75 new e-mails every six months as students graduated from our classes, overall we had 471 valid e-mail addresses. We sent all potential participants an invitation via e-mail asking for their voluntary participation in this survey. Willing respondents were directed to an online survey web site where they filled out the questionnaires anonymously, although there was an option to provide their name. As a result, the survey participants never filled out the questionnaires in each other's presence so they could not influence each other in any foreseeable or likely way. We collected data over four different time periods: The first survey was sent on October 14, 2008, followed by surveys sent on May 9, 2009, October 18, 2009, and May 14, 2010. Therefore, we collected information about five time periods:

- Spring 2008: Pre–financial crisis
- Fall 2008: September 14 to November 10, 2008
- Spring 2009: April 9 to June 9, 2009
- Fall 2009: September 18 to November 16, 2009
- Spring 2010: April 14 to June 6, 2010

Spring 2008 information was collected retrospectively, together with information about fall 2008, to establish a benchmark. In our first survey we asked the participants when they thought the financial crisis began and asked them to answer the questions to the best of their recollection of certain experiences at that time. The participants' answers that defined the beginning of the crisis varied between the summer of 2007 and the fall of 2008, with both the mean and the median time April 2008. Therefore, in the following we refer to precrisis as spring 2008. It is customary to ask questions retrospectively (Snyder and Pace 2002; Kessler 2006; Kaiser 2007). We use our retrospective data with caution, remembering that respondents may underreport spring 2008 happiness (Miron-Shatz, Stone, and Kahneman 2009). The survey questions for all other periods, other than spring 2008, asked about the participants' experience in the most recent month. The demographic characteristics of respondents are shown in Table 1.2.

The typical survey participant is a 34-year-old male. More than half of the participants live in the United States, European Union, and Canada combined; the rest reside mainly in the Far East: China, India, Hong Kong, Indonesia, Malaysia, Singapore, Taiwan, plus a few other (mainly Middle Eastern) countries.

Table 1.3 shows that the survey participants are highly educated, with most (80 percent) having completed a master's or doctoral degree. Family sizes are small, as an average of only 1.4 dependents live in the same household with the survey participants. Among the respondents, 34 percent

TABLE 1.2 Geographic Location, Gender, and Age Distribution

Country of Residence	Percentage
The United States	48.49
Non–United States	51.51
Country of residence in the West (the United States, Canada, European Union) or in the East (China, India, Hong Kong, Singapore, Taiwan, Indonesia, Malaysia) or Other (mainly Middle Eastern countries)	
East	29.10
West	58.19
Other	12.71
Gender	
Female	22.82
Male	77.18
Age group	
20–29	35.45
30–39	45.48
40–49	13.04
50–60	6.02

TABLE 1.3 Education, Family Size, Mortgage Obligation, Business Ownership, and Perceived Relative Financial Position

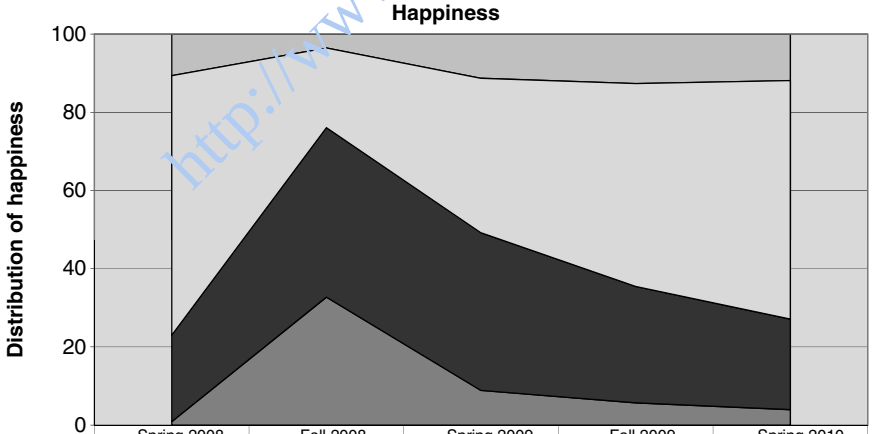
Highest Degree Earned	Percentage
Bachelor's degree	19.73
Master of science in finance	25.75
Other business master's degree	41.47
Other master's degree	10.37
Doctoral degree	2.68
Number of dependent family members	
0	31.10
1	26.76
2	20.07
3	14.38
More than 3	7.69
Participant has a mortgage	
Yes	34.11
No	65.89
Family owns a business	
Yes	28.52
No	71.48

currently pay a mortgage, and the families of 28 percent of the participants own a business.

RESULTS

The survey shows a highly significant shock in the happiness distribution between precrisis spring 2008 and the most intensive time of the crisis, fall 2008, as shown in Figure 1.1. Happiness greatly deteriorated from spring 2008 to fall 2008 for our survey participants. Fall 2008 saw the dramatic rise of those who were very unhappy, and the disappearance of those who were very happy. As we mentioned, this is probably an underestimation of the negative impact, due to asking the questions retrospectively. On a medium term, from spring 2008 to spring 2010, the percentage of those who reported the lowest degree of happiness increased 37 times. The overall distribution of happiness, however, seems to have largely recovered its precrisis form by fall 2009. This is the first major finding from our data.

Next, we considered the behavior of the four health domain indices over time. First, their average values clearly changed over time (see Figure 1.2). Though we used sum values of the survey questions to form indices, average values are used in this figure for a better illustration. The highest value (four) represents the best condition in each variable that contributes



	Spring 2008	Fall 2008	Spring 2009	Fall 2009	Spring 2010
Excellent	10.62	3.54	11.29	12.66	11.86
Good	66.37	20.35	39.52	51.90	61.02
Fair	22.12	43.36	40.32	29.75	23.16
Poor	0.88	32.74	8.87	5.70	3.95

FIGURE 1.1 Change in the Distribution of Happiness Level Over Time

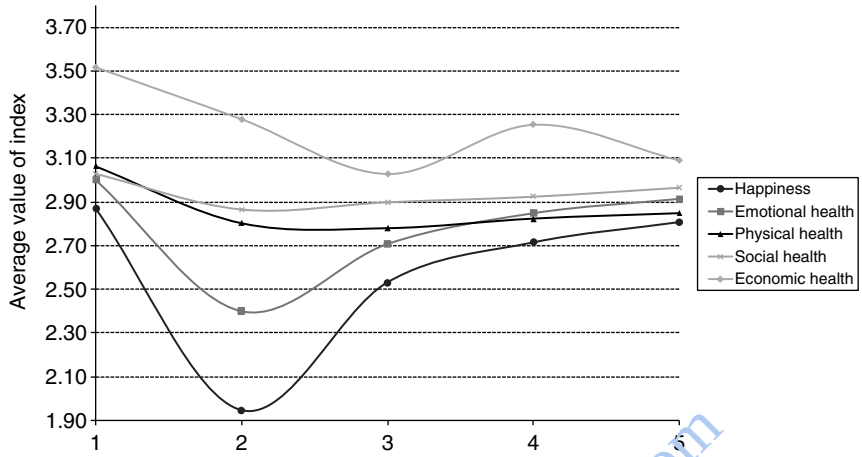


FIGURE 1.2 Average Happiness and Average Level of Health Indices
Note: Higher values denote better conditions. Maximum value is four, and minimum value is one.

to the index, and one represents the worst possible case. For example, if the emotional health index of person *i* at period *t* is one, this person frequently experienced each of the six emotions (excessive anger, worry, lost in deep thought, grief, fear, and feeling shocked) during the last month prior to the *t*th survey. An emotional health index of four would mean that this person never experienced any of these six emotions during the same month.

Figure 1.2 shows the immediate negative impact of the initial shock of September 2008 on all four health domain indices as well as on happiness. Afterward this negative impact began to diminish on some but not all health domains, although none of the average health domain values returned to their precrisis levels (spring 2008), even after two years (spring 2010). The economic health index had a temporary boost in fall 2009, which may be related to the sample characteristics: Those graduating in the summer get a job in the fall. It is important to note that physical health declined for an entire year and never recovered.

Therefore, the answer to our first and second questions is a resounding yes: The 2008 financial crisis has had an obvious immediate and medium-term impact on people's happiness as well as on their comprehensive health—including emotional, physical, social relationship, and economic health.

Estimates of Happiness Equations

In order to answer the third question, the relationship between health and happiness during and after the crisis, we used our microlevel happiness

TABLE 1.4 Happiness and Health, Ordered Probit Regression

	Dependent Variable: Happiness				
	Period 1	Period 2	Period 3	Period 4	Period 5
Independent Variable	Spring 2008	Fall 2008	Spring 2009	Fall 2009	Spring 2010
Emotional health	0.070	**0.085*****	**0.072****	**0.099*****	**0.105*****
	(0.044)	**(0.033)**	**(0.034)**	**(0.032)**	**(0.032)**
Physical health	**0.227*****	**0.130*****	**0.144****	0.001	**0.159*****
	(0.066)	**(0.049)**	**(0.055)**	(0.042)	**(0.048)**
Social health	0.078	−0.051	**0.374*****	**0.377*****	**0.262*****
	(0.080)	(0.064)	**(0.073)**	**(0.067)**	**(0.057)**
Economic health	−0.133	**0.123***	−0.086	**0.142****	−0.046
	(0.099)	**(0.070)**	(0.061)	**(0.063)**	(0.054)
Pseudo-R2	0.1574	0.1169	0.2694	0.2408	0.2340
Number of observations	112	112	124	158	177

Statistics in the cell: regression coefficient (standard error)
Boldface: ***Significant at 1 percent level, **Significant at 5 percent level, *Significant at 10 percent level

equation, and estimated the latent variable coefficients with ordered Probit regression analysis. First, we estimated the happiness equations in the extended form of Equation (1). Table 1.4 summarizes the results. The signs are all as expected (positive when statistically significant), and every health domain variable enters the equation significantly at some time period. Emotional and physical health are important determinants of happiness in four out of five periods. Social health is significant in three out of five, and economic health emerges in two periods as an explanation of the level of happiness. Therefore, we can conclude that health domains do influence happiness, so Equation (1) does in fact provide a useful framework with which to analyze the determinants of happiness in times of crisis.

Table 1.4 further reveals that, as the financial crisis was unfolding, different health domains became important over time, influencing happiness. Physical health, which was the most important determinant of happiness precrisis, remained almost consistently important. Emotional health became important after September 2008, and remained critical throughout. Social health became important during spring 2009, and remained

important afterward. Economic health is cyclical, which may be due to the placement of new graduates in the fall.

We estimated Equation (2), the change in happiness over time, with an ordered Probit model using only the data from those participants who filled out multiple rounds of surveys to estimate the regression coefficients for the appropriate period-to-period changes. Table 1.5 reveals that happiness changed due to shifting factors as the crisis unfolded. These internal dynamics seem to be nonlinear, since the financial crisis had a differentiated impact on each health domain, and each health domain affected the change in the happiness level at a different time. For each period, there was only one, and usually a different, health domain responsible for the changes in happiness level. The major decline in happiness from spring 2008 to fall 2008 was due to the instantaneous damage of the crisis to emotional

TABLE 1.5 Change in Happiness Due to Change in Health, Ordered Probit Regression

	Dependent Variable: Change in Happiness				
	Period (1–2)	Period (2–3)	Period (3–4)	Period (4–5)	Period (1–5)
Independent Variable	Spring 2008 to Fall 2008	Fall 2008 to Spring 2009	Spring 2009 to Fall 2009	Fall 2009 to Spring 2010	Spring 2008 to Spring 2010
Change in emotional health	**0.111**** (**0.036**)	0.021 (0.042)	0.064 (0.040)	0.038 (0.050)	0.035 (0.062)
Change in physical health	0.087 (0.065)	**0.138*** (**0.074**)	0.060 (0.059)	0.009 (0.057)	**0.172**** (**0.079**)
Change in social health	−0.036 (0.078)	0.029 (0.076)	**0.169**** (**0.085**)	**0.454***** (**0.098**)	0.113 (0.130)
Change in economic health	0.130 (0.092)	−0.049 (0.114)	−0.120 (0.088)	−0.102 (0.088)	0.100 (0.148)
Pseudo-R2	0.0838	0.0522	0.0916	0.1549	0.1368
Number of observations	112	52	65	83	37

Statistics in the cell: regression coefficient (standard error)
Boldface: ***Significant at 1 percent level, **Significant at 5 percent level, *Significant at 10 percent level
Note: Columns 2 through 5 of Table 1.4 refer to the change between two particular time periods, as expressed by Equation 2, as t = {2, 3, 4, 5} and j = 1. Column 6 refers to Equation 2, as t = 5, j = 4.

health. From fall 2008 to spring 2009, the main reason for the change in happiness level was the change in physical health, while some health domains improved and some further declined. From spring 2009 to fall 2009, as well as from fall 2009 to spring 2010, social relationship health played the key role in explaining the change (or, rather, the lack of further decline) in happiness.

Taking a medium-term view, when we compare the beginning of our observation period with the end, over the course of two years, we find that physical health deterioration is the key and the only variable responsible for the loss of happiness over the entire observation period (see Table 1.5, column "Period (1–5)").

Since not every participant filled out every survey, we tested whether those who responded to consecutive surveys represent well all of the contemporaneous survey respondents. We found that between consecutive periods, repeat respondents gave similar answers to their nonrepeat peers (at 5 percent significance level). There was only one exception: The frequency of doctor visits in spring 2009 and fall 2009 was different for the two groups. Therefore, the results based on the repeat respondents, presented in Table 1.5, can be generalized to nonrepeat survey participants. The conclusions from the estimation of Equation (2) are valid for the entire cohort (more than 100 people each period) and not only the subgroup of repeat respondents.

Now we are in a position to answer the third question of our study, whether there is a link between health and happiness during crises. The answer is a resounding yes. All health domains were critical for happiness at some point in time for our survey participants. As the crisis unfolded, there was a special dynamic between health domains and the immediate deterioration and partial recovery of happiness. Emotional problems were the first responses to crisis; later, the buffer effect of good social relationships played a bigger role. Physical health deterioration was gradual, but it had a significant medium-term effect on loss of happiness.

Variations of Our Model

We tested the robustness of our model by three different methodologies: Creating a sociodemographic benchmark model of happiness; adding all four health domain indexes to the sociodemographic model; and alternatively, without sociodemographic data, just adding only one health domain index at a time to explain happiness and change in happiness. The results establish that our model of Equations (1) and (2) is fairly robust.

It is customary to relate happiness to sociodemographic characteristics. Thus, we also estimated a series of models, using sociodemographic variables

as exogenous and happiness as an endogenous variable. Our socioeconomic model fit, measured by pseudo-R2, is comparable to other, similar models in the literature (Diener et al. 1999; DeNeve and Cooper 1998). Therefore, we found the quality and consistency of our data reassured.

We also tested the combination model; that is, we added our four health domain indices as exogenous variables in addition to the sociodemographic variables, and maintained happiness as an endogenous variable. The pseudo-R2 increased three to six times. This clearly indicated that including our health domain indices can significantly improve the predictive power of the happiness equation.

Further, we evaluated the relationship among the four health domains and their impacts on happiness. Thus, we ran the Probit models of Equations (1) and (2) with all possible combinations of the four health domain indices as exogenous variables, adding one index at a time—the total combination of 440 reduced models. The results show that adding a new health domain won't affect the significance level of the already included health domain(s) for 88 percent (Equation (1)) and 84 percent (Equation (2)) of the time. Since this impact is limited, it's reasonable to consider the four health domains to be independent.

As the four health domain indices' impact on happiness varied across the time periods, as shown in Tables 1.4 and 1.5, and they are largely independent, we concluded that the most representative generalized model of happiness across all time periods is the full model, with all four health domains included, as we proposed in Equation (1).

FINANCIAL CRISIS AS A MAJOR INTERNATIONAL TRAUMATIC EVENT

Our study clearly shows that financial crisis is detrimental to happiness in the short and medium term. In fact, 75 percent of our repeat respondents experienced loss of happiness during the fall of 2008 relative to the precrisis time of spring 2008. The average level of happiness declined by 32.1 percent among all survey participants from spring 2008 to fall 2008 (see Figure 1.2). How significant are these values?

How Much Happiness Was Lost in the Financial Crisis?

Graham (2009) documented that in a one-year period, during the economic crises in Russia (1998) and Argentina (2002), average happiness declined by 8.7 percent and 10.7 percent, respectively. The comparable annual value

TABLE 1.6 Comparison of Loss of Happiness of Hurricane Katrina Survivors with the Impact of the Global Financial Crisis

Post-Katrina Surveys*				Our survey	
[1] Percent as satisfied with overall quality of life as before Katrina	57%	[2] The same level of current life satisfaction as in the year before the hurricane	48%	Percent as happy in spring 2009 as in spring 2008	52%
[1] Percent less satisfied now than before Katrina with overall quality of life	39%	[2] Decreased level of current life satisfaction relative to the year before the hurricane	43%	Percent less happy in spring 2009 than spring 2008	37%

*Questions of pre-Katrina status asked retrospectively
[1]One year after Hurricane Katrina (Kaiser 2007)
[2]Five to eight months after Hurricane Katrina (Kessler 2006)

from our survey shows the decline of happiness between spring 2008 and spring 2009 is 11.8 percent, close to the happiness losses due to the Russian and Argentinean economic crises. In our survey, between spring 2008 and fall 2008, the semiannual happiness drop was actually 32.1 percent; that is almost three times the annual value of 11.8 percent. In fact, according to Gallup, December 11, 2008, was the unhappiest day of the year in the United States (Askitas and Zimmermann 2011). Therefore, it is very likely that our data actually understates the loss of happiness due to crisis, since we did not conduct quarterly surveys—which reminds us of the significance of higher-frequency data collection.

Second, in Table 1.6, we compare the lost happiness due to the 2008 financial crisis with that of direct survivors of Hurricane Katrina, one of the worst natural disasters of the United States.

How Much Did Health Deteriorate?

We found that, during the fall of 2008, worry, feeling shocked, and being afraid dominated the emotional structure of our respondents. These emotions can be linked to conditions of facing immediate and concrete existential threat, overwhelming danger, harm, and loss (Roseman 2001). A possible way to appreciate the magnitude of the immediate impact of the

TABLE 1.7 Comparison of the Immediate Emotional Health Impact of the 9/11 Terrorist Attack on Population not Living in the Vicinity of the Attack, within Half a Year, with the Emotional Health State of Fall 2008 of Our Survey Participants

9/11 Surveys*		Our Survey Results of Fall 2008	
Frequently** irritable	9%	Frequently** get angry	11%
Frequently or on average worried	30%	Frequently or on average worried	76%
Frequently or on average depressed	71%	Frequently or on average lost in deep thought	64%
Frequently or on average sad, sorry, apologetic	n/a	Frequently or on average grief-stricken	27%
Frequently or on average astonished, nervous, jittery	n/a	Frequently or on average feel shocked	55%
Frequently or on average have fear	44%	Frequently or on average have fear	55%
Poor or fair quality of sleep	33%	Poor or fair sleeping quality	61%
Trouble concentrating	49%	Poor or fair concentration	50%

*Snyder and Park (2002)

**"On average and frequently" means that on a scale of one to four, respondents selected three to four (bad and worst) conditions to describe their experience.

financial crisis on emotional health in September 2008 is to compare it with the emotional health status of the general U.S. public's response to the 9/11 terrorist attack, through Table 1.7.

In the two very different events, the 9/11 terrorist attack and the financial crisis as it was experienced in September 2008, the percentages of people who often or very often felt angry/irritated, depressed, or fearful are comparable. Both surveys document a similar increase in problems with concentration. Even more striking, about twice as many people were worried and had problems with sleeping due to the financial crisis than after the terrorist attack.

Physical health was also affected by the crisis. Table 1.8 compares Hurricane Katrina survivors and our survey participants' self-reported physical health status.

In summary, we can conclude that the current financial crisis can be called a major international traumatic event, since its impact on human health and happiness is comparable to the impact of the terrorist attack of 9/11 and one of the worst natural disasters of recent U.S. history, Hurricane Katrina. Financial crisis, therefore, should attract similar attention and efforts from societies that they make to avoid other large-scale traumas, like terrorist attacks and direct exposure of its citizens to major natural disasters.

TABLE 1.8 Comparison of Deterioration of Self-Reported Physical Health of Hurricane Katrina Survivors with the Impact of the Global Financial Crisis

Post-Katrina Surveys*				Our survey	
[1] Percent reported decline in physical health since Katrina	19%	[2] Percent reported that physical health deteriorated since Katrina	30%	Percent reported worse physical health in spring 2009 than in fall 2008	35%

*Questions of pre-Katrina status asked retrospectively
[1]One year after Hurricane Katrina (Kaiser 2007)
[2]Five to eight months after Hurricane Katrina (Kessler 2006)

CAN WE JUST WAIT FOR THE NEXT FINANCIAL CRISIS?

By collecting longitudinal survey results of MBA students and current working professionals who are our former graduate students in finance, we set out to determine whether the financial crisis has had a measurable effect on broadly defined health and happiness. We presented empirical evidence and theoretical foundations to support a very significant loss of happiness that is due to the financial crisis in a highly educated international group. Happiness is lost because of emotional and physical health deterioration resulting from the crisis. The short-term happiness and physical health losses are similar in magnitude to Hurricane Katrina survivors' experiences, and the emotional health impact of the financial crisis is comparable to the effect of the terrorist attack of 9/11 in the United States. Therefore, we should treat the financial crisis as a major international traumatic event.

A key finding of the study is the documentation of a propagation mechanism: Namely, the effect of the financial crisis on people's broadly defined health changes over time. A decline in emotional health is instantaneous when the crisis breaks out, resulting in an immediate loss of happiness. When the negative impact of the original shock of a financial crisis on emotional health begins to fade, the crisis has already damaged physical health. At this stage, a vicious cycle of deteriorating physical health and deteriorating happiness might begin.

The question of the most effective government intervention arises: Should government focus on crisis management or crisis prevention? The difference is that if a government waits until the crisis breaks out, and attempts to manage the crisis once it has already happened, emotional

health and happiness are already lost. Could a defensive strategy that aims to prevent mass losses of happiness become a new approach to financial market regulation? This is an important question, especially in light of the standards and expectations Aristotle raised. One of the key messages from the current research is that physical health and emotional health are critical to happiness, even more in times of crisis. To what extent do the current social and business environment and culture in general promote people's emotional, physical, social relationship, and economic health? These questions deserve to be seriously studied.

The next chapter develops a model and estimation of macroeconomic factors, including the outbreak of the 2008 Great Recession, on suicide rate for 27 Organization for Economic Cooperation and Development (OECD) countries as well as Latvia, Lithuania, and Slovenia. The rest of the book provides practical recommendations that can serve as guidelines to prevent stock market crises. Although the following chapters address stock markets, the recommendations have the potential to be utilized in any financial market. The measures we propose for quantifiable, adjustable, real-time oversight and regulatory variables are practical and can be implemented by any securities regulating agency. The goal of the recommendations is to improve the fairness and transparency of the financial markets, thereby perfecting the market equilibrium, protecting investors, and stabilizing the market. The ultimate goal is to prevent crises so that people's happiness and health can be protected and improved.

NOTES

1. This chapter was presented at the Western Economic Association International 86th Annual Conference, June 29–July 3, 2011, San Diego, California.
2. "Pyramid schemes . . . promise consumers or investors large profits based primarily on recruiting others to join their program, not based on profits from any real investment or real sale of goods to the public" (Valentine 1998).