TITLE:

IMPACT OF GLOBAL FINANCIAL CRISIS ON MENTAL WELL-BEING

1. Introduction

A global recession and its coincidental stock market crash correspond to a period of sudden adverse large fall in GDP and stock prices. They have negative rippling impact on the economy as they disrupt businesses and wipe out assets and savings of stockholders. Beyond the impact on the economy, studies have also shown that they have significant impact on the well-being of individuals. For instance, Snyder and Evans (2006) studied the effects of a legislative change affecting United States (U.S.) Social Security payments and find that individuals receiving lower incomes had significantly lower mortality rates. In addition, Sullivan and Van Wachter (2009) find that job displacement led to significant increases in short- term mortality risk as well as smaller increases in long-term mortality risk.

However, such studies examine the 'physical' aspect of an individual's well-being, leaving a gap in the literature on the 'mental' well-being. Hence, we seek to fill this gap and investigate if there might be a relationship between a recession and a stock market crash on individuals' mental well-being. We have established evidence of declining mental health using data on suicide rates in the Global Financial Crisis (GFC) and the 2008 stock market crash. We have chosen to study the stock market crash that occurred during the GFC in 2008 for two reasons - relevance and magnitude.

2. Theory

In the event of a stock market crash, the large fall in stock prices reduces the market value of equities in one's wealth portfolio and consequently, reduces an individual's wealth. The larger the equity holdings, the greater the impact on one's wealth arising from a stock market crash.

A recession causes similar wealth effect. A recession results in a fall in disposable income and wealth.

Through the wealth channel, both a recession and a stock market crash will lead to the decline in the value of individuals' wealth.

Existing literatures have shown that the mechanisms that relate wealth and income, and mental well-being includes (1) the stress and reduced capacity to cope related to low income and wealth; and (2) the predisposition to declining socioeconomic status due to possible genetic factors, hospitalizations related to mental illness, and/or loss of work (Sareen, Afifi, McMillan, Asmundson, 2011). This reduction in wealth is inevitable in the case of a corresponding stock market crash.

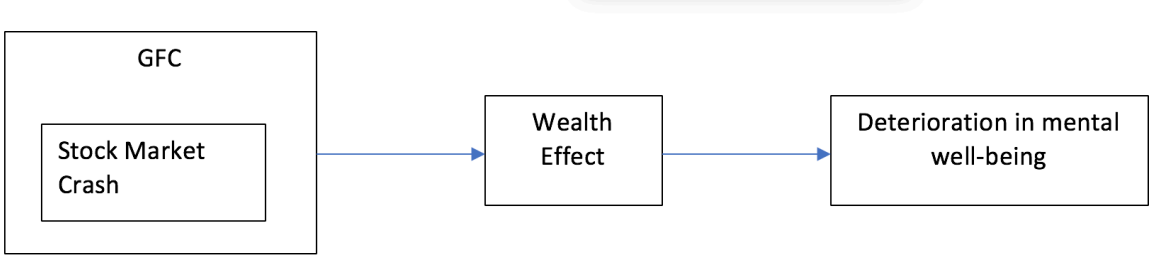

Figure 1: Channels affecting mental well-being

3. Importance of managing mental health and the role of the stock market

There is a myriad of implications of poor mental health in society. Broadly, these problems can be classified into economic and social, where economic problems are the symptoms of the manifestation of deeper underlying social problems. A manic-depressive stock market portrays amateurish psychological behaviours due to the lack of emotional discipline (Shiller, 2000). Markets are dependent on the interrelationship between the expectations of different parties. When society as a whole is exuberant, investment activity tends to increase, consumption levels rise, and businesses flourish. Correspondingly, these sentiments are reflected in the stock market activity. In the event of a stock market crash, however, there are two-pronged effects on investors' sentiments - pure wealth effect which directly affects mental health, and irrational herding, which exacerbates the crash and creates excess volatility (Baddeley, 2010). Prolonged depressing sentiments will dampen hiring activity, economic investment, and growth, leading to a reduction in material and mental well-being over time.

	Low & Middle-Income Countries			High-income Countries			World		
Billion (USD)	Direct Cost	Indirect costs	Total cost of illness	Direct Cost	Indirect costs	Total cost of illness	Direct Cost	Indirect costs	Total cost of illness
2010	287	583	870	536	1088	1624	823	1671	2493
2030	697	1416	2113	1298	2635	3933	1995	4051	6046

Table 1: Cost of mental illness

Mental illness has shown to affect employees' motivation in the workplace and decreases aggregate productivity in the world economy. World Health Organization (WHO) and independent university studies have stated with broad consensus that mental illnesses have resulted in adverse economic impact. One particular study has shown that an additional poor mental health day is correlated with a 1.84% lower per capita real income growth rate, or $53 billion less total annual income, across the United States from 2008 to 2014. (Davlasheridze et. al, 2018). However, the indirect economic costs are possibly much larger. Table 5 illustrates the gravity of the total economic burden of mental illness on the economy. The organization expects total economic costs to more than double by 2030 from $2.4 trillion to $6 trillion (Harvard School of Public Health, 2011).

With 49.3% of US citizens holding stocks in 2016, the next stock market crash may perpetuate distress across the entire economy as individuals' wealth may be perceived to be diminished and negative sentiments take over (Wolff, E. N, 2017). This will not only lead to a fall in economic output due to recession but also the exacerbation of direct and indirect economic costs as a result of increased instances of mental illness.

4. Methodology

In quantifying the impact of GFC, we define GFC as the recession and stock market crash that occurred in 2008, which are proxied by changes in GDP per capita and changes in S&P 500 annualized returns respectively.

In determining the mental well-being of individuals, we utilised suicide rates (per 100,000 people) and percentage of adults with serious depressive episodes over a 30-day period before and after GFC as proxies. The datasets are obtained from Organisation for Economic Co-operation and Development (OECD) and Centers for Disease Control and Prevention (CDC) database respectively.

Our estimation strategy uses a simple linear time trend model to assess excess suicides that occurred during the GFC - suicide deaths above the level that would be expected if historical trend continued. In determining the base historical trend, we assume suicide rates will trend at a constant pre-crisis rate had there been no GFC. We take the average of the difference in suicide rates across the pre-GFC period (2000 - 2007) before establishing a linear trend starting with the year 2000.

To further support our study, we also use 'percentage of adults with serious psychological distress over the past 30 days' from the National Centre for Health Statistics. Similarly, we assumed that the percentage of adults with serious psychological distress over the past 30 days will trend at a constant pre-crisis rate had there been no GFC.

We have selected the U.S. as our study of interest as the U.S. was at the epicentre of the crisis. More importantly, we are able to access a wider range of data for our analysis. To establish the relationship between a stock market crash and individuals' mental well-being, we use the S&P 500 as an indicator of the stock market crash.

5. Empirical Results

Global Financial Crisis in 2008 witnessed an unprecedented large decline in GDP per capita and a large stock market crash. This is displayed through the 2 graphs as shown below.

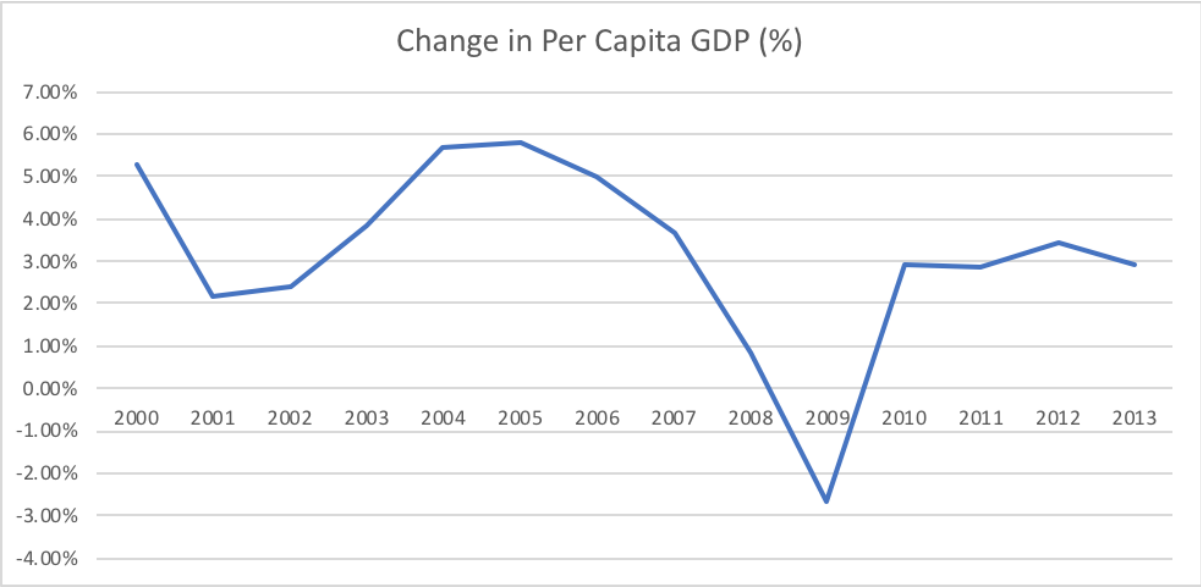

Figure 2: United States % Change in Per Capita GDP (2000-2013)

During the Global Financial Crisis (GFC), from 2008 – 2010, there was a sharp decline in the change in per capita GDP (-2.66% between 2008 and 2009).

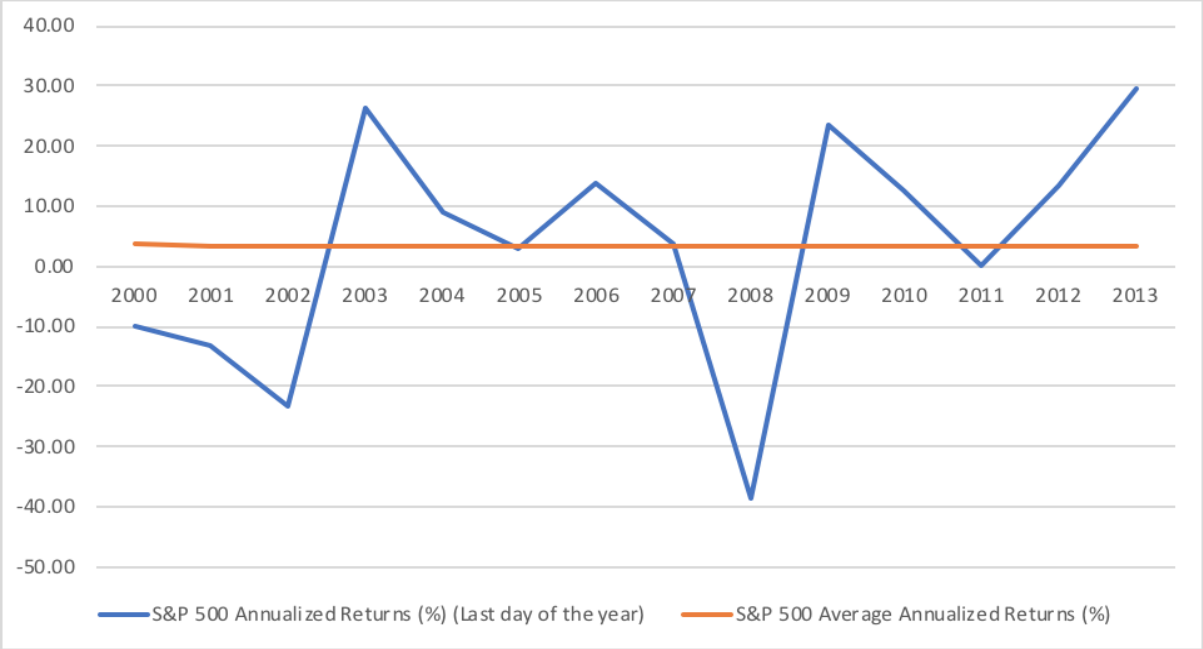

Figure 3: S&P 500 annualized returns (2000-2013)

By using the S&P 500 annualised returns as an indicator of stock market performance, Figure 3 depicts the stock market crash during the GFC in 2008, a negative annualized return of -38.49%.

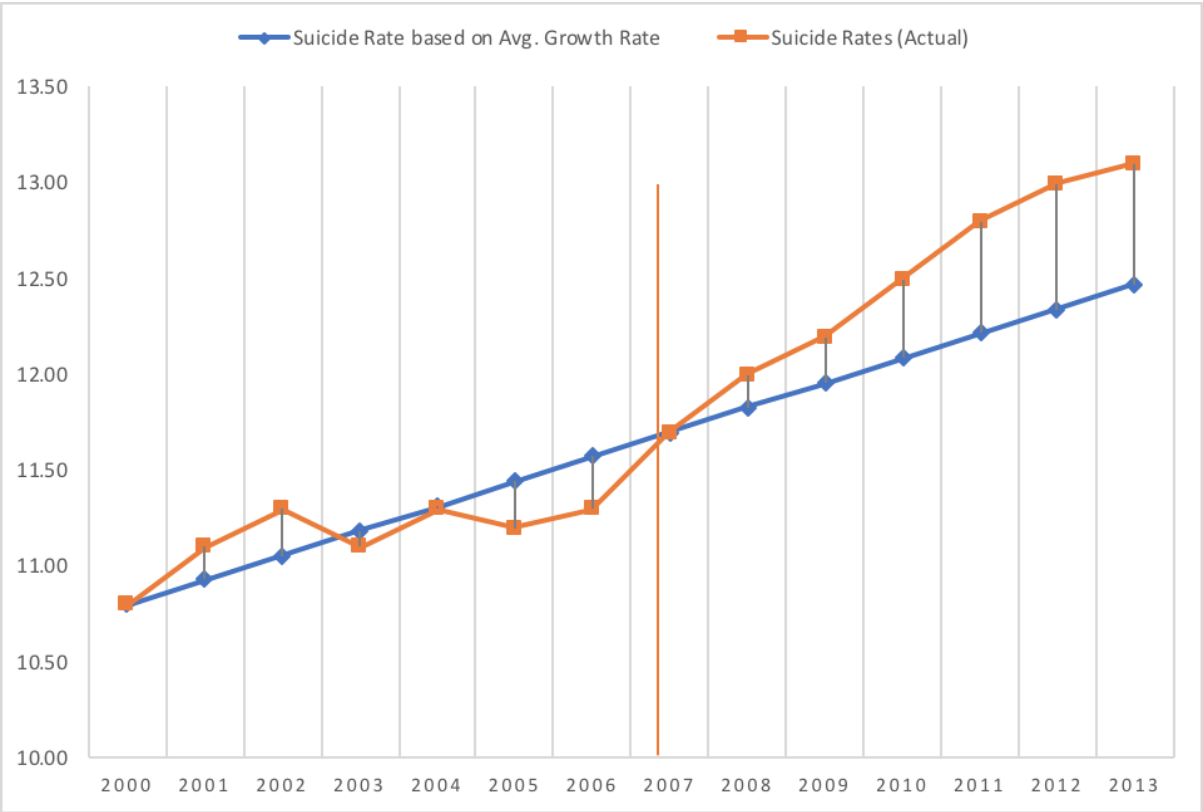

Figure 4: U.S. Suicide Rates (2000-2013)

	Value	Mean	Standard Deviation	95% Confidence Interval (-)	95% Confidence Interval (+)
Average Suicide Rate Pre-Crisis (2000 - 2007)	11.225	11.225	0.25	11.036	11.414
Average Historic Growth Rate Pre-Crisis (2000 - 2007)	0.13	0.13	0.21	-0.0298	0.288
Excess Deaths (2008 - 2012), (millions)	0.006420	0.001286	0.000666	0.005837	0.007003
Excess Deaths (2008 - 2012)	6420.00	1286.46	665.50	5836.66	7003.34

Table 2: U.S. Suicide Rates Statistical Summary

Referring to Figure 4 and Table 2, in the years before the crisis (2000 – 2007), the suicide rates in the U.S. was rising at an average rate of 0.13 per 100,000 persons. During the GFC in 2008, the suicide rate accelerated to an average rate of 0.25 per 100,000 persons between 2008 – 2012. This corresponds to an additional 6,420 deaths in 2008 – 2012. That is, the excess 6,420 suicide deaths can be attributed to the recession and stock market crash effect.

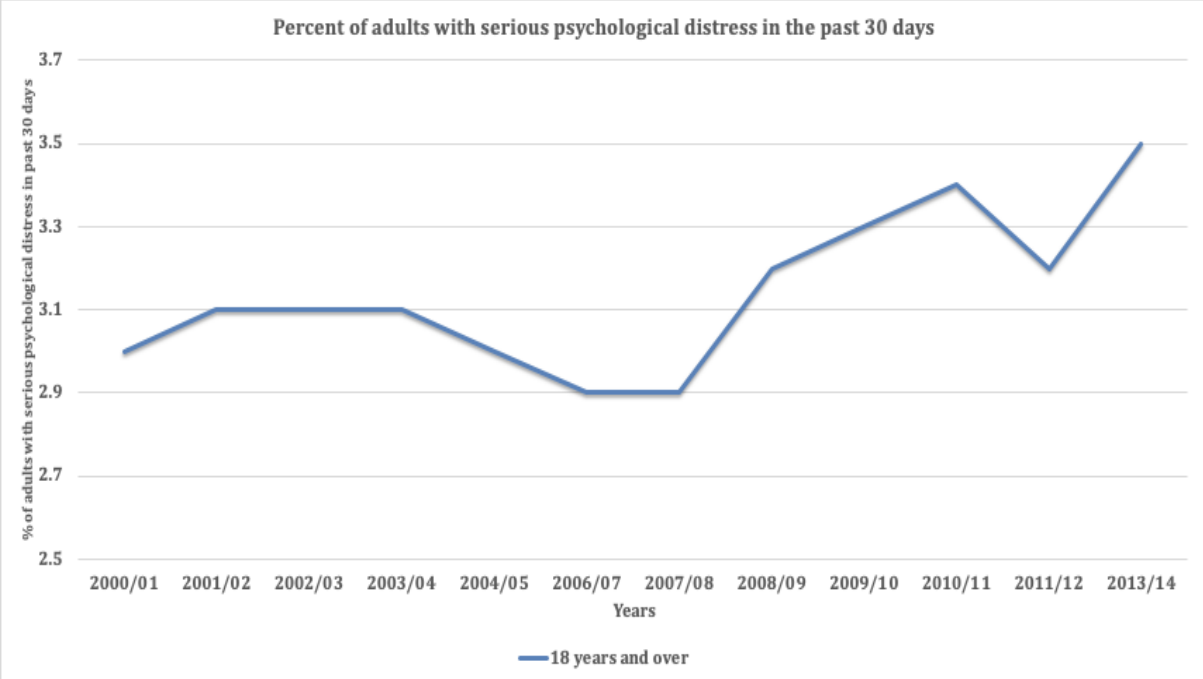

Figure 5: Percent of adults with serious psychological distress in the past 30 days (2000-2014)

To further justify the negative relationship between a recession and a stock market crash on mental well-being, we provide evidence on the statistics of the proportion of distressed individuals pre- and post- GFC in 2008. The average yearly growth rate pre-crisis (2000 - 2007) was at -0.54% whereas the average yearly growth rate post-crisis (2008 - 2014) was at 4.00%. From the graph above, as a result of the GFC, we observe a higher percentage of adults with serious psychological distress in the past 30 days.

This provides justification to the negative relationship between a stock market crash and a recession on individual's mental well-being which lays the foundation for our study.

6. Evaluation of existing policies and recommendations

Post-crisis, the U.S. government and the U.S. Central Bank have rolled out expansionary fiscal policies, conventional, and unconventional monetary policies to induce a rapid economic recovery (Carlin, 2015). In contrast to the Great Depression, quick policy reactions have contributed to the restoration of confidence and expectations. However, suicide rates continued to remain in excess over the pre-crisis period where there were excess deaths of 2000 individuals in 2013. This suggests that mental well-being did not recover together with the stock market and the economy.

This backdrop implies that there should be a more targeted response in restoring general mental well-being.

Firstly, we aim to address the negative impact of a recession and a stock market crash on mental well-being through the wealth effect on retirement plans. A research conducted by AgeUK has shown that those with the ability to control their finances generally feel calmer; better mental well-being. Hence, we believe that mitigating the fall in retirement savings as a result of a stock market crash can alleviate the deterioration of an individual's mental well-being. McFall (2011) finds that the average wealth loss between July 2008 and May/June 2009 was associated with an increase in planned retirement age of approximately 2.5 months. This indicates that that the stock market crash over the period of the GFC resulted in a fall in retirement savings. Mcfall also finds that pessimism about future stock market returns is found to amplify the impact of wealth losses on retirement timing.

Many surveys have raised concerns over Americans retirement savings. For example, Retirement Confidence Survey (RCS) for 2018 finds only a third of retirees very confident in their ability to live comfortably through retirement. This follows record lows from 2009 to 2013 (EBRI, 2018). In addition, based on a 2018 report by Northwestern Mutual's 2018 Planning and Progress Study, 21 percent of the 2,003 adults surveyed have no savings for retirement. Therefore, we propose a lifelong asset saving scheme for each U.S. individual, similar to that of a Central Provident Fund (CPF), from Singapore. The experience of Singapore provides an instructive case study for the potential of this approach. Loke and Cramer (2009) find that CPF was able to evolve into an effective and comprehensive life-long system of asset building and is well-received by the population.

Hence, with an effective saving scheme put in place, we strongly believe that it can alleviate the negative impact caused by a recession and a stock market crash through the wealth effect on individuals' mental well-being.

In general, a stock market crash follows a stock bubble. Therefore, we suggest the following policies to reduce the likelihood of the formation of a stock market bubble and consequently, a stock market crash.

The financial accelerator, amplifying process of adverse economic shocks, exacerbated the fuelling of bubbles during the Global Financial Crisis in 2008 (Carlin, 2015). Placing emphasis on the importance of the difference between investment and pure speculation (gambling) will encourage thoughtful and rational investment decisions. The government could achieve this by educating stockbrokers and executives on the dangers of excessive irrational optimism by incorporating a comprehensive understanding of the market cycles as part of the Chartered Financial Analyst (CFA) program.

Along with the above two suggested policies to encourage prosocial behaviour, greater policy intervention is needed in schooling years from elementary to university. The government should place emphasis on cultivating mental fortitude in the early years while specific financial and economics education should be incorporated into the syllabus in the university curriculum.

In order to build a society with healthy mental well-being, studies published by the World Health Organization (WHO) recommended governments to enrich school curriculum to focus on the strengthening of mental resilience. In most societies, schooling is an integral part of their development years. (WHO, 2017) Values, knowledge, and schemas are developed in schools and individuals' responses towards crises are progressively constructed as they grow up. (Donald et. al, 2013) With overwhelming evidence that relevant targeted programmes in elementary, middle and high schools are effective in improving mental health, the government should redirect investments into such programs. (WHO, 2016)

Post-high school years, most individuals should ideally be equipped with the mental fortress to face hardship and developed emotional maturity. The next natural step is to espouse the theories behind market cycles. A crucial starting point to avoid psychological pitfalls due to herding behaviour is to first recognize its existence. Robert Shiller has contributed to the development of behavioural finance and economics. In their studies, Shiller along with Kahneman have highlighted the psychological reasons behind excess volatility in the stock market. We strongly believe that their theories can be used appropriately as educational materials. (Shiller, 2000)

7. Limitations

We have identified some limitations in our study.

Firstly, mental well-being lacks a clearly defined quantifiable definition. We believe that the best proxy for mental well-being is a collection of measurements of suicide rates, use of antidepressant drugs, detailed survey on mental health, counselling, and therapy consultation counts. However, given that many of these data are not readily accessible,

we are limited to the two measurements of suicide rates and Percent of Adults with Serious Psychological Distress in the past 30 days.

Secondly, more sophisticated statistical tools can be used to better control for confounders in determining the correlation effect of stock market crash and the mental well-being. For instance, the use of linear regression models and panel data will allow us to provide stronger analysis of our study.

Lastly, we address the assumptions made in our study.

As we have assumed that the rate of suicides and percentage of adults with serious psychological distress in the past 30 days will grow at their respective pre-crisis rates had there been no stock market crash, we disregard the impact of other influencing factors such as rise in unemployment and other related individual factors. In reality, these factors might have an important role in determining the mental well-being of individuals. To better address the omitted variable bias, we could run a linear regression accounting for such variables within the model.

Furthermore, we also made several crucial assumptions that will determine the effectiveness of the four policies we considered above. Firstly, for the incorporation of market to be effective, we assume that the current CFA program already brings about positive change to the views of CFA members through the curriculum. Key stakeholders such as stockbrokers and executives will only adhere to socially beneficial standards only if they truly understand the implications of not doing so. Next, for signals to be credible, the responsible institution has to be independent and is assumed to possess accurate knowledge of the valuation of the stock market. This may require decades of research and contrarian view in the market, which is difficult to come by. To deal with long-term supply side policies by changing the existing education system, we need to assume that the culture is receptive to such changes. Western societies are known to be more individualistic and Eastern societies to be more collectivistic (Gorodnichenko, 2012). Hence, it is clear that the approaches towards building mental resilience have to account for socially acceptable practices.

8. Conclusion

Whilst much emphasis has been placed upon the financial loss of individuals, less has been done for the mental aspect. The importance of societal mental well-being is of significant concern with numerous studies justifying the consequence of a fall in mental well-being on the economy and the society as a whole. Based on our observations that there exists a lack of policies dealing with the negative impact on well-being, we seek to offer policy suggestions to address this growing issue. This includes policies to improve pro-social behaviour as well as policies implemented in schooling years to strengthen mental resilience. We believe that more attention is required to tackle this growing problem and with appropriate policy nudges and intervention, the impact of a recession and a stock market crash on mental well-being can be limited.

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