How and why investor confidence decline across years in the U.S. Stock Market?

A study of Investor Confidence in the U.S. Stock Market based on bayesian model

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Abstract

This study explores the dynamics of investor confidence in US stock market from 2000 to 2020 for institutional and individual investors. To determine declining trend in confidence levels over the years and factors contributing to higher confidence among institutional investors, Bayesian modeling approach was conducted. It was found a strong negative time confidence relation which is mitigated by economic events and market volatility. This study demonstrates the extent of further investigation needed pertaining to the psychological and contextual determinants of investor sentiment in the stock market.

Introduction

The US stock markets which are one of the main indicators of the overall economical state of the country represents the sentiments of both large financial institutions and ordinary people. Using confidence indices several years of interest – from the year 2000 to the year 2020 demonstrate some interesting patterns. The U.S. One-Year Confidence Index plays a crucial part here as an indicator of investors' opinions and their expectations of market actions. For instance, the results show that institutional investors, who are usually endowed with optimum resources and research tools, possess higher levels of confidence than individual ones. Such a situation gives rise to several questions regarding the causes of investor perception and market differentials.

That is why in this analysis we attempt to predict the decline scenario of the USA. Annual Confidence Indicators for both institutional investors and for individuals. In this case, through quantitative analysis of the historical data, we seek to find out the level of degradation of confidence within the specified period. The estimand in our case ignores trends and concentrates on the difference in the indices and underscores the constancy of divergence between institutional and individual attitudes. Thus, this comparison not only indicates the differences in the level of confidence in the market condition but also in the wider perspective stresses on the overall nature of the behaviour of market agents, and their decision-making processes.

This is supported by the results, that seems to tell a continuously decreasing tendency at both the US and global levels. Historical & Forecasted One-Year Confidence Index of institutional and individual investors covering the period of 2000-2020. Even so the confidence level is comparatively low in the current years institutionally it is consistently higher in the years gone by. Global stock market was volatile because of different economical events, for instance, economical crisis in 2008 and the pandemic COVID-19 in the current period. The data shows that though both groups struggled institutional investors had more tools to cope with the uncertainty hence, the continued confidence in the market.

Analyzing investor confidence has a number of considerations, which are discussed below. It not only affects investment approach but also affects the quality of the market and economic development. Increased self confidence of institutional investors ensured success enhances market engagement, result in escalating

of prices and hence economical growth. On the other hand, however, decreased confidence of individual investors as known to finance may lead to carefulness and reduced spending.

The remainder of this paper is structured as follows. Data section gives an overview of the data used as well as descriptions of Measurement and key variables. Model sections introduces the bayesian model used. Results section show the results based on the model output. At last, we discuss some details in the Discussion section.

Data

Overview

We use the statistical programming language R [R Core Team (2023)] with main packages [Wickham H (2019) and Wickham H (2023)]. Our data [Yale School of Management (2024)] apply U.S. Stock Market Confidence Indices dataset which has been compiled with by using great care by the Investor Behavior Project at Yale University, provide rich information about the minds of American investors during the years. Professor Robert Shiller methodically accumulates data obtained with the help of questionnaire survey since 1984. These include the analysis of sentiment of investor across critical junctures of the market such as the famous market crash of 1987. Ongoing surveys since 1989 have provided an array of data encompassing nearly three times that equal to any other study set to assess investor sentiment and perceptions. The uncertainties involved in expressing confidence level in stock market shares are clearly opposed to the general simplicity in consumer confidence indices. Business people are operating in a complex environment mostly seeing the market as a battlefield where they have to be quick to get the most out of it. This multifacesset is strengthened by daily monitoring of stock performance and the presence of media coverage that adds a psychological perspective to the investment process. Thus, investor confidence is a wider concept than the consumer confidence which is reflected in the index and embraces feelings, thoughts and actions of an investor in contrast to a more simple decision in case with a consumer. Data collection techniques also reveal changes through uses of samples from both rich and institutional investors. From 1989 through 1998, the wealthy individual investors were obtained from W. S. Ponton Inc., and from high-income Americans, a random sample was taken thereafter. Money Market Directory of Pension Funds and Their Investment Managers remains the major source of Institutional investors sampled over the period. The large number of participants, on average more than one hundred in each interval, also guarantee the robustness of data collected.

Measurement

The data starts with a large-scale event in the market that has an influence on the actions of investors in the market. For example, investigation of economic or political risks, such as deepening economic crises, or geopolitical instabilities, requires capturing of changes in investor attitude in systematic surveys. To capture such sentiments, researchers pay great attention to developing questionnaires made out of questions likely to produce responses on expectations for the future, perceived risk levels, and investment horizon. This qualitative data is then quantised and converted into structured one which makes calculation of investor's confidence level easier.

After survey data have been collected, every single response is coded to guarantee validity and inter-observer reliability while consideration is taking to possible prejudice and pattern responses. Academic or researchers are able to add up the responses and thus are able to create confidence indices that forms the variables in the data set. For instance, the U.S. One-Year Confidence Index is obtained by taking mean of responses within fixed time horizons as it provides periodic feedback of investor perception. This transform process is important because it turns perceptions that may be bias into data that is factual and the final data set gives investors the dynamics of the confidence over time. Scientists can thus map observed regularities to elements of a predefined structure that will help provide a more extensive framework for the general economy and finance domains.

Outcome variables

US one year confidence index

Figure 1 illustrates the outcome variable US one year confidence index over time, it was clearly to find that there are decline trends of the US one year confidence index with increasing of years. But it is little hard to find differences between the trends of US one year confidence index for US Institutional and Individual. Model section would help us to investigate the problem.

Figure 1: Confidence Index of Stock Market Over time for both US Institutional and Individual

Predictor variables

Figure 2 illustrates the outcome variable US one year confidence index grouped by different types of US Institutional and Individual, it was clearly to find that there are didfferences between the two types of US one year confidence index, it indicates the distribution of US one year confidence index are different for US Institutional and Individual and it seems US Institutional has a higher level average US one year confidence index of stock market compared with US Individual.

	Individual					Institutional				
	mean	sd	min	max	median	mean	sd	min	max	median
Confidence	75.24	8.83	58.16	95.62	75.00	76.35	6.40	56.82	92.59	76.47

Table 1. Summary statistics of US one year confidence index grouped by US Institutional and Individual

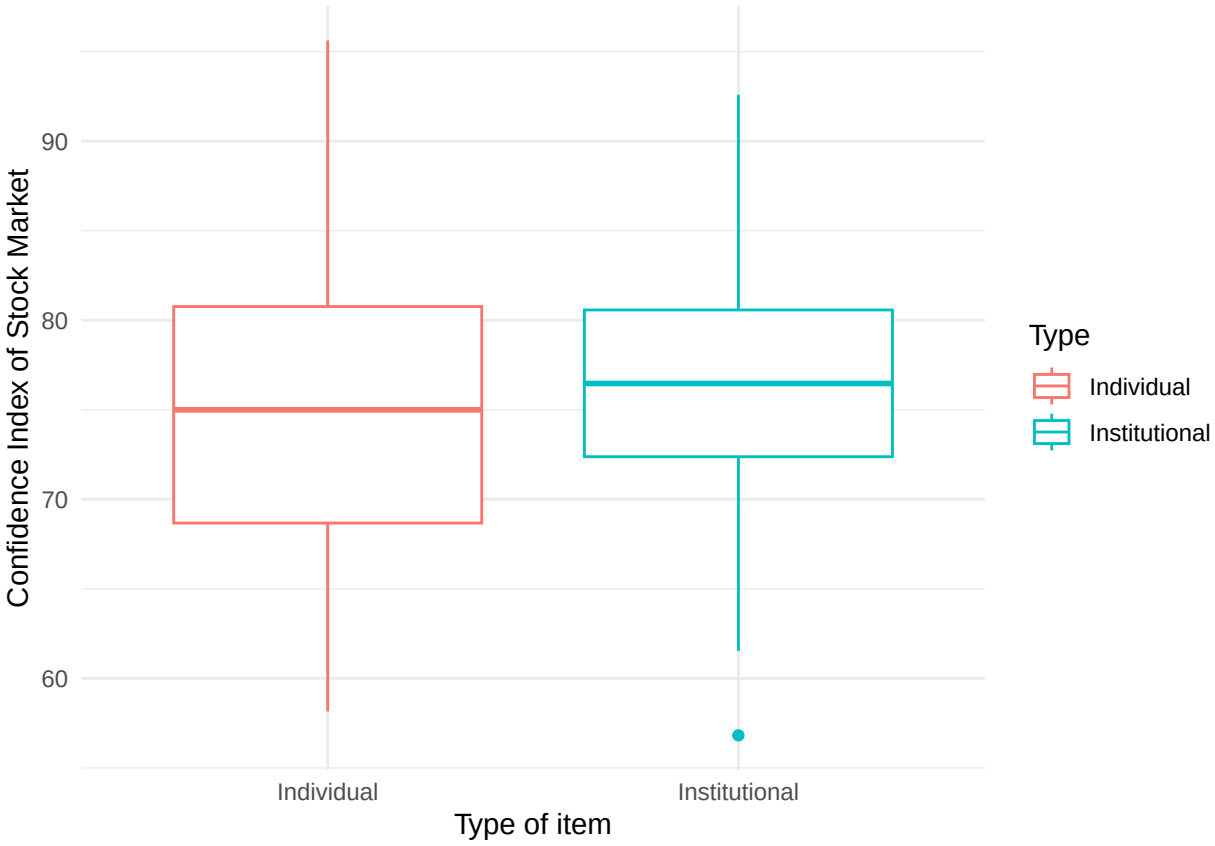

Figure 2: Confidence Index of Stock Market grouped by US Institutional and Individual

Table shows the U.S. One-Year Confidence Index differences between individual and institutional investors. The confidence mean for individual investors is approximately 75.24, SD equals 8.83, and the median close to 75. It must be noted that their performance scores when it comes to growth and evolution of their venturesimentary vary from 58.16 to 95.62. On the other hand institutional investors have better average score of 76.35, standard deviations of 6.4 and a median of 76.47. Their confidence scores are 56.82 to 92.59. These statistics show that institutional investors are more accurate and have slightly higher reliability than the individual investors This clearly shows that the investor sentiment differs.

Model

To investigate of the declining trend of U.S. confidence indices for both the individual and institutional investor, we undertake a Bayesian model analysis. This strategy enables us to compare the level of investor confidence over time and or between the institutional and the individual investors. The details of the model explain the variations in levels of confidence and serve as a reliable key to understanding investors' attitudes over the years.

Here we briefly describe the Bayesian analysis model used to investigate Background details and diagnostics are included in [Appendix Model-details].

Model set-up

Let y_i represent the confidence index. Incorporated in the model is a linear predictor. Here, β_i is an indicator of the trend line of the confidence index reducing year in year out. The symbols $gamma_i$ refer to the impact of investor type which targets individual and institutional investors.

$$y_i|\mu_i, \sigma \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$
$$\mu_i = \alpha + \beta_i + \gamma_i \tag{2}$$
$$\alpha \sim \text{Normal}(0, 1) \tag{3}$$
$$\beta \sim \text{Normal}(0, 1) \tag{4}$$
$$\gamma \sim \text{Normal}(0, 1) \tag{5}$$
$$\sigma \sim \text{Exponential}(1) \tag{6}$$

We run the model in R [R Core Team (2023)] using the `rstanarm` package of [Goodrich B (2023)]. We use the default priors with SDs to be smaller to be 1s as the variation across confidence index with years are changed slowly one year after another year from `rstanarm`.

Model justification

The coefficients to be expected are negative for the variable representing time β_i against the confidence index y_i with an implication that U.S. confidence indices of stock market reduces with increase of years. Further, we also postulate that γ_i pertaining to institutional investors is higher than that of the individual investors because institutions invest more resources in analysis. The specified structure of this model corresponds to hypotheses formulated and offers clear analytical concepts to study changes of investors' confidence in US stock market.

Results

Our results are summarized in table:

Table 2. Explanatory models of US confidence index of stock market

	First model
(Intercept)	1636.68
	(69.89)
time	-0.78
	(0.03)
TypeInstitutional	1.11
	(0.49)
Num.Obs.	566
R2	0.475
R2 Adj.	0.471
Log.Lik.	-1777.516
ELPD	-1781.4
ELPD s.e.	22.0
LOOIC	3562.8
LOOIC s.e.	43.9
WAIC	3562.8
RMSE	5.59

Discussion

Discussion of Model Results

The analysis of such options for modeling identified several significant qualitative characteristics of the dynamics of US confidence indices for both individual and institutional investors over the years from 2000 to 2020, according to the results of applying the developed model here. A median estimate of -0.8 for the time variable which means that confidence level indicates a negative trend with time. This finding is an indication that the level of investor confidence has been on the decline, in our study period from 2000 to 2020. The underlying causes for this trend would be the various economics events and market conditions such as the credit crunch in 2008, persistent conflicts in the geopolitical front and of course the recent outbreak of the Covid 19 virus. All these events may be explained to have caused an improvement of uncertainty and volatility in the market reducing investors confidence. Also, the model accompanies this conclusion with more confidence as a result of estimating the type sketch with a median of 1.1 among the institutional investors, as compared to individual investors. This outcome is due to the fact that institutional investors have superior resources and analyzed capabilities, as well as superior information. Such advantages help them to manage complexity of the operating market environment and create a less volatile and more positive outlook. This difference can also be explained by psychological factors as well Depending on the circumstances, people gain lose confidence in themselves and their abilities. Although market participants have similar goals of used funds in securities, institutional and individual investors may have different behaviors when market is in downturns, institutional investors may consider it as a good chance to invest, while individual investors, who are easily to be affected by their feelings and current losing state, may consider the same thing cautiously or uncertainly. Therefore, over time and confidence indices adjust their values showing that the difference between individual and institutional investors moves apace.

Why confidence decline across years of US stock market

Confidence index decline in the US stock market across years have been occasioned by factors that have defined the economy from the year 2000 to 2020. The first one was 2008 financial crisis which not only produced extreme vulnerability but also led to the shift in perspectives on the stability of the stock market. As many people's capital was wiped out during this period there was general antipathy towards the financial

system. Even the recovery that came since the financial crisis happened at a poor rate which makes the people lose confidence. Indices of economic performance changed, unemployment figures did not go down and many people experienced low wage productivity. This uncertainty must have translated to investors' mindset since people started to doubt the stability of the market. Further, negative news were further fueled by the increasing use of social media like TikTok, Facebook, Youtube.

Equally influential were Geopolitical risks including trade policies, policy stability and conflicts in different areas of the world. The traditionally stable financial markets of the USA and other developed countries witnessed more fluctuations due to the occurrences like the U.S. presidential election of 2016 and the ongoing discussions over economic policies that added more uncertainty factors for investors in assessment of related strategies. It becomes hard to invest under such conditions, thus making this environment characterized by unpredicted decline the perfect cycle that prolongs low confidence. These multiple factors explain how the confidence of the Americans in their stock market has declined over years with fluctuations and changing tendencies as seen in the following diagram.

Why US institutional investors have more confidence compared with individuals

Overall though, institutional U.S. investors tend to be more confident than the individual investors for several important reasons involving the factors that enter into their decision making processes and market outlooks. A very big strength that institutional investors have is access to a lot of resources and information. This further depth of analysis helps them to make wise decisions with their investments, and generate a greater feeling of security in about their investments. This diversification helps to ease up the risk faced by fluctuations in the market since it can distributes investments in many asset classes and sectors. Also, the different amount of experience and expertise of institutional investors determines its confidence level. Most institutional investors, such as pension funds, mutual funds and insurance companies, along with some investing on behalf of others, have clearly defined investment strategies and risk management approaches.

Weaknesses and next steps

Besides findings, there are some weaknesses that we use historical data, which might not reflect as fully as possible the evolvement of investor sentiment in response to a completely unknown event - as was the case with the COVID-19 pandemic. Also, there could be potential bias in survey data. Factors, social desirability or recent market experiences for example, can skew the perceptions of confidence, affecting the responses from individual and institutional investors. Besides, the work mostly relies on quantitative measure that might neglect the qualitative element capable of offering richer understanding of an investor's behavior and sentiment.

Future research should try to build the robustness of findings through longitudinal studies that span a larger period including shifts post pandemics. Furthermore, investigation into the place of psychological factors related to investor behavior would be fruitful. Future studies might extend the range to look at differences in reported confidence levels among different markets and cultures such as China stock market.

Appendix

Additional data details

Model details

Posterior predictive check

In figure 3 we implement a posterior predictive check. This shows the posterior distribution of parameters are also close to the normal distribution indcating a valid baysesian model specification.

In figure 3 we compare the posterior with the prior. This shows that there are indeed different changes of the posterior distribution of parameters compared with the prior ones, this means the baysesian model fits the data and obtained new distribution of parameters which are useful in this case.

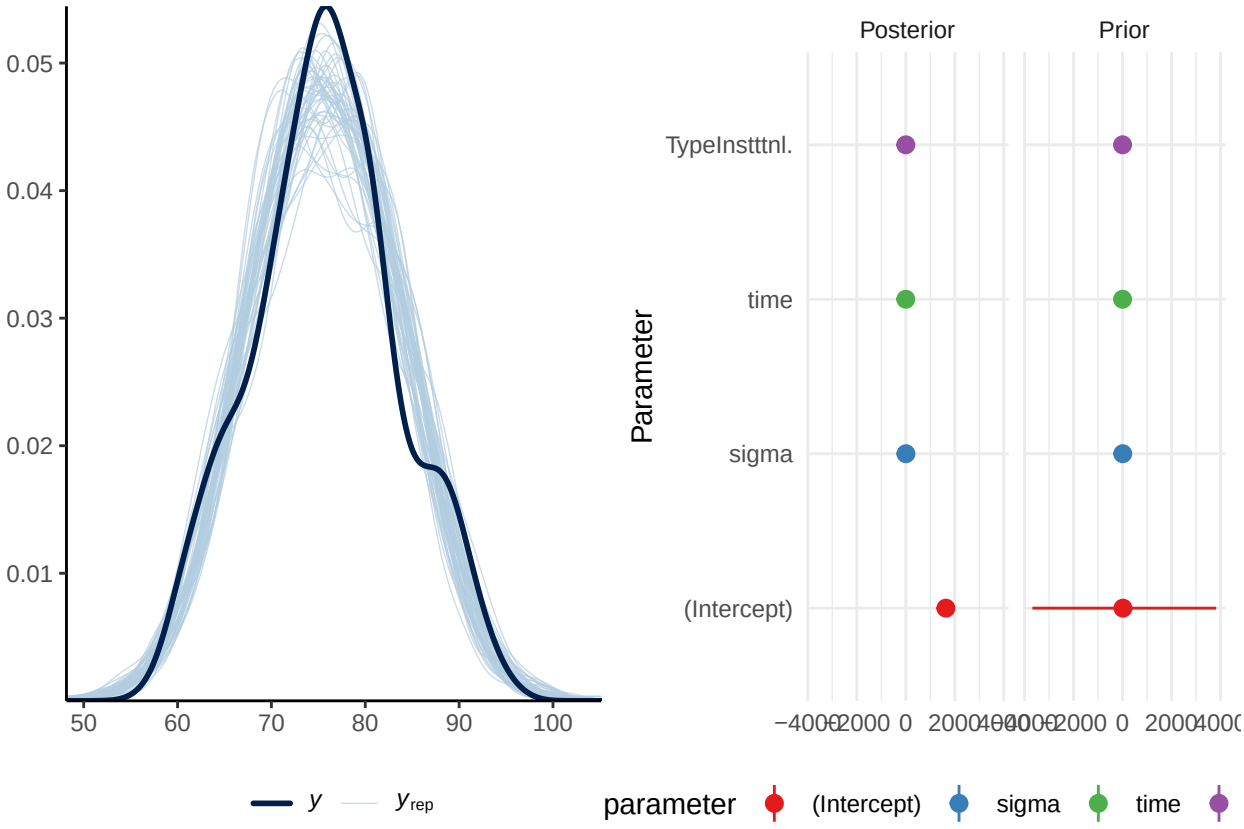

Figure 3: Examining how the model fits, and is affected by, the data, Posterior prediction check,Comparing the posterior with the prior

Diagnostics

Figure 4 left side is a trace plot. It shows that all of the parameters are converged after some iterations indicate the estimated results are reliable.

Figure 4 right side is a Rhat plot. It shows a high value. This suggests that the variation of the outcome variable can be well explained by the predictors and the bayesian model.

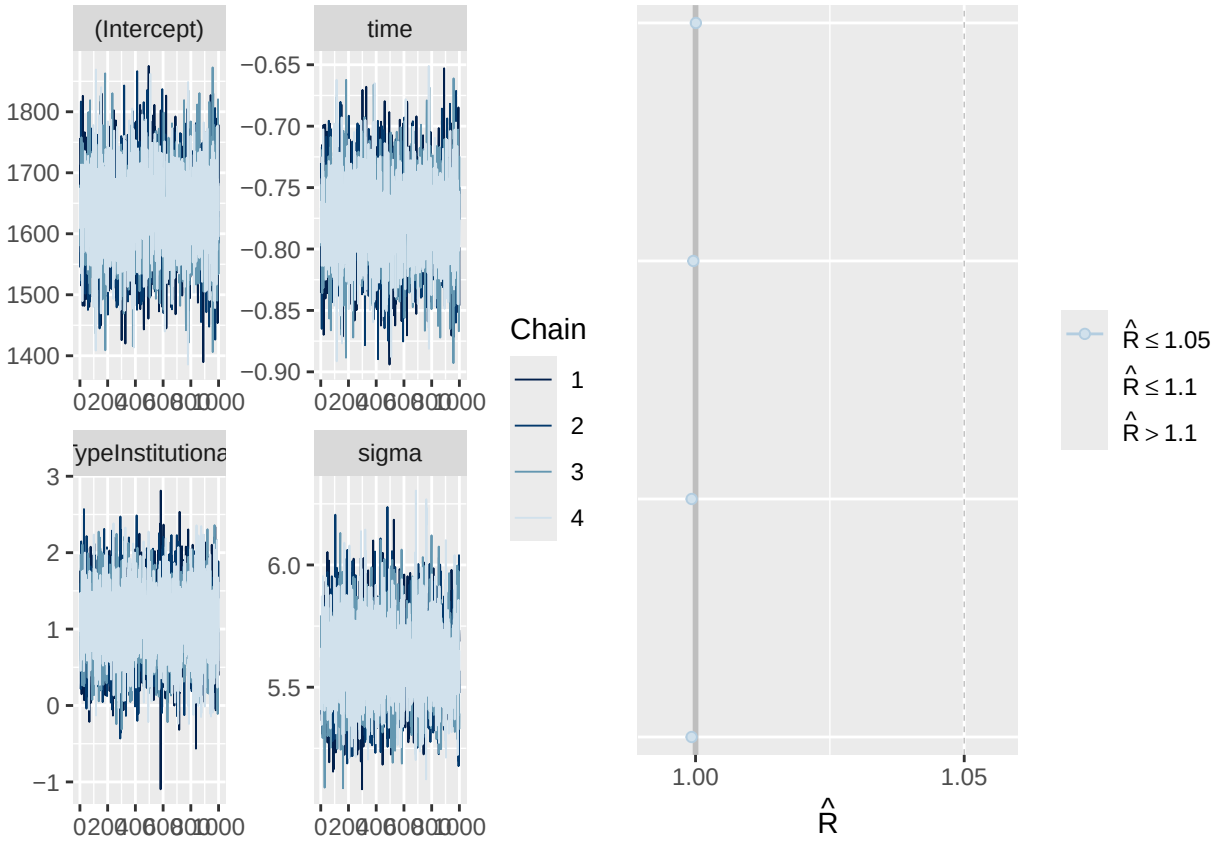

Figure 4: Checking the convergence of the MCMC algorithm, Trace plot, Rhat plot

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