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2 **Supplementary Information for**

3 **The Joint Dynamics of Investor Beliefs and Trading During the COVID-19 Crash**

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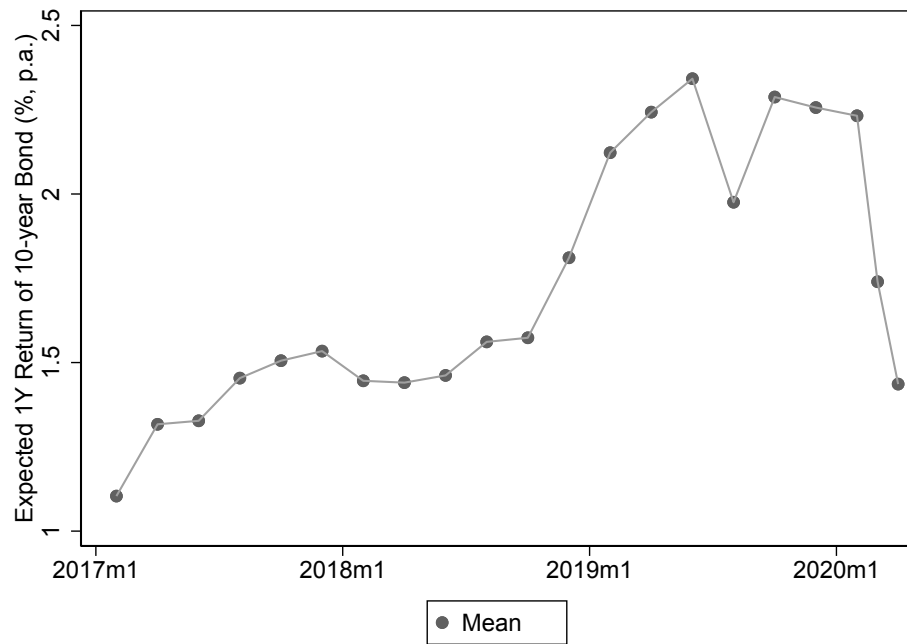
7 **This PDF file includes:**

8 Figs. S1 to S20

9 **1. Additional Results**

10 **Summary.** In this Appendix, we present screenshots of one complete survey flow. In this iteration of the flow, questions about
11 expected stock returns were asked ahead of questions about expected GDP growth; the survey implementation randomizes
12 across these two blocks of questions. We begin by reviewing the invitation email sent to individuals from Vanguard. We also
13 include the time series of average answers to the question on expected 1-year returns of ten year government bonds.


Fig. S1. Average Expected Bond Returns



Note: Figure shows average beliefs about 1-year expected returns of 10-year government bonds across all respondents in each wave of the GMSU-Vanguard survey.

Fig. S2. Invitation Email

Subject:	[TEST]We need your help, Jane Doe
From:	Vanguard (vanguard@eonline.e-vanguard.com)
To:	oea_test@yahoo.com;
Date:	Monday, February 13, 2017 10:58 AM



Vanguard would like your input

Dear Jane Doe:

Vanguard is conducting a study to understand how investors are thinking about the future of the stock market, the economy and interest rates.

We are inviting you to provide us with your thoughts by completing a short survey. This survey should take less than ten minutes to complete.

This survey is not a test of your knowledge. Rather, it asks only about your beliefs and expectations. Importantly, it does not ask for any personal financial information.

The results of the survey will be used for research purposes only. This survey is not sales-related in any way. Your responses will be reported in aggregate with other responses. We plan to publish the results in an article or research report on vanguard.com.

To participate in the survey, please click here.

[Take the survey](#)

We'd also like to send you this survey up to six times in the coming year, to see if your beliefs are changing. If you want to be removed from this study, you have the option to click the unsubscribe link below.

If you have any questions about this survey, please call **800-662-2739** and refer to this code: **EXP**.

Thank you for participating, and for sharing your thoughts with Vanguard.

Regards,

Stephen Utkus
Principal
Vanguard

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455 Devon Park Drive | Wayne, PA 19087-1815 | vanguard.com
EXP

Fig. S3. Survey Flow 1

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radius



Dear Investor,

Thank you for participating in this study.

At Vanguard we are interested in understanding investor views on the future of the stock market, the economy and interest rates. We plan to create an investor sentiment index to share these findings with the investing public.

This is a short survey that should take you no more than 5-10 minutes to complete.

The survey does not collect any personal information. It relies on your general knowledge.

If you feel you are not familiar with a topic, that is fine. Please just give us your best prediction.

Please do not use the browser's navigation button to move through the survey.

Next

Fig. S4. Survey Flow 2



For these questions, we would like to know what you are expecting the future returns of the US stock market to be.

Next

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Fig. S5. Survey Flow 3

radius GLOBAL MARKET RESEARCH

What do you expect the return of the US stock market to be **over the next 12 months**?

Note: This expected return is the change in value, in percent, that you expect to receive **over the next 12 months** from investing in a portfolio that holds all stocks listed on the US stock market. It includes both dividends and capital gains/losses.

(Please answer only with a positive or negative numeric value, with at most 1 decimal.)

% over the next 12 months

Next

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Fig. S6. Survey Flow 4



What do you expect the **average** annual return of the US stock market to be **over the next 10 years**?

Note: This expected return is the change in value, in percent, that you expect to receive **each year on average over the next 10 years** from investing in a portfolio that holds all stocks listed on the US stock market. It includes both dividends and capital gains/losses.

(Please answer only with a positive or negative numeric value, with at most 1 decimal.)

% per year, over the next 10 years

Next

Fig. S7. Survey Flow 5

radius

In this question we present you with five possible scenarios for US stock market returns **over the next 12 months**:

The US stock market return will be...

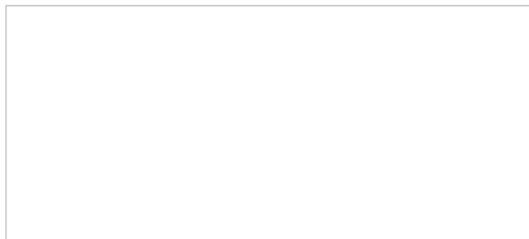
- Scenario 1: **more than 40%** over the next year.
- Scenario 2: **between 30% and 40%** over the next year.
- Scenario 3: **between -10% and 30%** over the next year.
- Scenario 4: **between -30% and -10%** over the next year.
- Scenario 5: **less than -30%** over the next year.

Please let us know how likely you think it is that each scenario will occur.

Please type in the number to indicate the probability, in percent, that you attach to each scenario. The probabilities of the five scenarios have to sum up to 100%. The graphic bar chart on the right updates automatically to reflect your answers.

(Please answer only with a positive numeric value, with at most 1 decimal.)

more than 40%	<input type="text"/>	%
between 30% and 40%	<input type="text"/>	%
between -10% and 30%	<input type="text"/>	%
between -30% and -10%	<input type="text"/>	%
less than -30%	<input type="text"/>	%
Total		0.0%



Remaining probability to fill in: 100.0%

Next

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Fig. S8. Survey Flow 6

radius

In this question we present you with five possible scenarios for US stock market returns **over the next 12 months**:

The US stock market return will be...

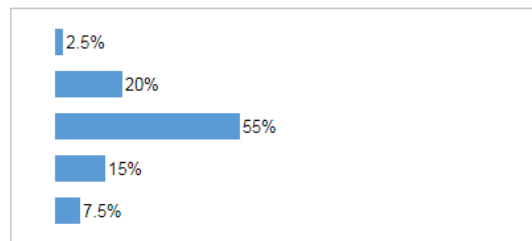
- Scenario 1: **more than 40%** over the next year.
- Scenario 2: **between 30% and 40%** over the next year.
- Scenario 3: **between -10% and 30%** over the next year.
- Scenario 4: **between -30% and -10%** over the next year.
- Scenario 5: **less than -30%** over the next year.

Please let us know how likely you think it is that each scenario will occur.

Please type in the number to indicate the probability, in percent, that you attach to each scenario. The probabilities of the five scenarios have to sum up to 100%. The graphic bar chart on the right updates automatically to reflect your answers.

(Please answer only with a positive numeric value, with at most 1 decimal.)

more than 40%	<input type="text" value="2.5"/>	2.5%
between 30% and 40%	<input type="text" value="20"/>	20%
between -10% and 30%	<input type="text" value="55"/>	55%
between -30% and -10%	<input type="text" value="15"/>	15%
less than -30%	<input type="text" value="7.5"/>	7.5%
Total		100.0%



Remaining probability to fill in: 0.0%

Next

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Fig. S9. Survey Flow 7

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How difficult were the questions about the stock market that you were just asked?

- Not at all difficult
- Not very difficult
- Somewhat difficult
- Very difficult
- Extremely difficult

Next

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Fig. S10. Survey Flow 8

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How confident are you with your answers to the questions about the stock market that you were just asked?

- Extremely confident
- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

Next

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Fig. S11. Survey Flow 9



In the next questions, we would like to know what you are expecting future economic growth in the US to be.
Again, even if you feel that you are not familiar with the topic, please give us your best prediction.

Next

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Fig. S12. Survey Flow 10



What do you expect the **average** annual growth rate of real GDP in the US to be **over the next 3 years**?

Note: Real Gross Domestic Product (GDP) is a measure of economic activity. Real GDP is the total real value of goods and services produced in the US in a year.

(Please answer only with a positive or negative numeric value with at most 1 decimal.)

% per year, over the next 3 years

Next

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Fig. S13. Survey Flow 11



What do you expect the **average** annual growth rate of real GDP in the US to be **over the next 10 years**?

Note: Real Gross Domestic Product (GDP) is a measure of economic activity. Real GDP is the total real value of goods and services produced in the US in a year.

(Please answer only with a positive or negative numeric value with at most 1 decimal.)

% per year, over the next 10 years

Next

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Fig. S14. Survey Flow 12

radius

In this question we present you with five possible scenarios for US real GDP **average annual growth rate, over the next 3 years**:

US real GDP average annual growth rate over the next 3 years will be...

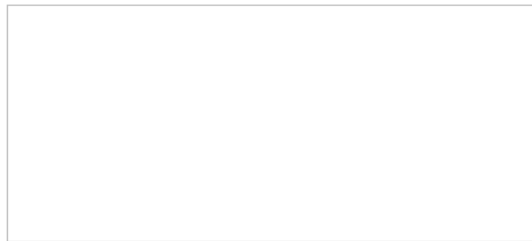
- Scenario 1: **more than 9%** per year.
- Scenario 2: **between 3% and 9%** per year.
- Scenario 3: **between 0% and 3%** per year.
- Scenario 4: **between -3% and 0%** per year.
- Scenario 5: **less than -3%** per year.

Please let us know how likely you think it is that each scenario will occur.

Please type in the number to indicate the probability, in percent, that you attach to each scenario. The probabilities of the five scenarios have to sum up to 100%. The graphic bar chart on the right updates automatically to reflect your answers.

(Please answer only with a positive numeric value, with at most 1 decimal.)

more than 9%	<input type="text"/>	%
between 3% and 9%	<input type="text"/>	%
between 0% and 3%	<input type="text"/>	%
between -3% and 0%	<input type="text"/>	%
less than -3%	<input type="text"/>	%
<hr/>		
Total	0.0%	



Remaining probability to fill in: 100.0%

Next

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Fig. S15. Survey Flow 13



How difficult were the questions about real GDP growth that you were just asked?

- Not at all difficult
- Not very difficult
- Somewhat difficult
- Very difficult
- Extremely difficult

Next

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Fig. S16. Survey Flow 14

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radius

How confident are you with your answers to the questions about real GDP growth that you were just asked?

- Extremely confident
- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

Next

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Fig. S17. Survey Flow 15

radius GLOBAL MARKET RESEARCH

In these final questions, we would like to know what you are expecting future returns on US bonds and future US interest rates to be.

Again, even if you feel that you are not familiar with the topic, please give us your best prediction.

Next

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Fig. S18. Survey Flow 16



Suppose that you were to buy a 10-year US Treasury bond today that makes all of its payments at maturity 10 years from now.

Suppose that you were to sell this bond a year from today. What do you expect the return from this bond investment to be **over the next 12 months**?

Note: This expected return is the change in price of the bond that you expect to occur during the next 12 months.

(Please answer only with a positive or negative numeric value with at most 1 decimal.)

% over the next 12 months

Next

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Fig. S19. Survey Flow 17

How difficult were the questions about bonds and interest rates that you were just asked?

- Not at all difficult
- Not very difficult
- Somewhat difficult
- Very difficult
- Extremely difficult

Next

Fig. S20. Survey Flow 18



How confident are you with your answers to the questions about bonds and interest rates that you were just asked?

- Extremely confident
- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

Next

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