Peer Effects in Financial Expectations

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I provide causal evidence that neighborhood financial expectations affect individual financial expectations. I instrument for neighborhood financial expectations with average financial expectations of neighbors' nonlocal family members. Consistent with social interaction driving this effect, I show that social individuals are more influenced by neighborhood financial expectations. Additionally, I provide evidence that individuals who expect their financial situation to improve are less likely to save. This suggests that surveyed expectations reflect actual expectations and that individuals act in accordance with their expectations. Finally, I show that individuals who take neighborhood expectations into account form more accurate expectations.

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1 Introduction

Investor beliefs influence trading activity, which in turn influences asset prices (Giglio et al. (2020)). Furthermore, investor beliefs are a key building block in economic models. It is crucial to understand underlying beliefs because these beliefs affect a variety of outcomes. For example, during the U.S. Civil War, the value of the greenback rose and fell based on public beliefs (McCandless (1996)). Similarly, diminished expectations of nuclear war cause individuals to save more (Russett and Slemrod (1993)), and CFO's expectations of earnings growth explain corporate investment plans and actual investment (Gennaioli, Ma, and Shleifer (2016)). Furthermore, large political shifts such as Prohibition (Brittanica (2019)) or the legalization of same-sex marriage (Ball (2015)) occurred on the heels of shifts in public opinion. In this paper, I study one potential determinant of individual beliefs: peers.

Peers have been shown to influence a variety of economic outcomes.[1] However, there is less evidence on whether peers affect underlying beliefs. To my knowledge, this paper is the first to provide causal evidence of peer effects in one specific type of belief: financial expectations. In this study, financial expectations refer to surveyed individual-specific beliefs about one's future financial situation. These beliefs are important because they are a key

[1]Previous work has documented peer effects in stock market participation (Hong, Kubik, and Stein (2004); Brown et al. (2008); Kaustia and Knüpfer (2012)), asset purchases (Ivković and Weisbenner (2007) and Bursztyn et al. (2014)), hours worked (Weinberg, Reagan, and Yankow (2004)), housing decisions (Bailey et al. (2018)), and financial literacy (Haliassos, Jansson, and Karabulut (2020)).

building block in economic models and are related to individual behavior, e.g. savings decisions.

A number of theoretical papers study social transmission of beliefs.[2] However, an important next step in social finance is to empirically test whether and how beliefs are socially transmitted. This paper provides evidence of a simple mechanism that individuals use to form beliefs: people update their beliefs based on the beliefs of their peers. Additionally, I provide evidence that this mechanism is rational in the sense that individuals who are influenced by neighborhood financial expectations form more accurate financial expectations.

There are many reasons that an individual might take the beliefs of her neighbors into account when forming her own financial expectations. For example, the beliefs of one's neighbors might provide information about the local labor market, local housing market, or the overall economy. While this information may be available from other sources, it is often easier to obtain information from word-of-mouth communication. As Ellison and Fudenberg (1995) point out, economic agents "often choose not to perform studies or experiments, but instead rely on whatever information they have obtained via casual word-of-mouth communication." Individuals often rely on this sort of information when making a variety of decisions ranging from choosing a mechanic to purchasing a vacation rental. Consistent with my rationality

[2]See Burnside, Eichenbaum, and Rebelo (2016), Han, Hirshleifer, and Walden (2020), and Hirshleifer (2020)

results, Ellison and Fudenberg (1995) show that word-of-mouth communication may lead players to adopt superior strategies, particularly when each individual receives little information.

One of the main challenges in identifying peer effects is the reflection problem. In seminal work on peer effects, Manski (1993) describes a problem that arises when a researcher tries to infer whether the average behavior of a group influences the behavior of individuals in that group. This challenge is aptly named the reflection problem because it is akin to trying to interpret the almost simultaneous movements of a person and her reflection in the mirror.

The reflection problem is particularly relevant in this paper because individuals are not randomly assigned to neighborhoods. Therefore, observed correlation between an individual's financial expectations and the financial expectations of her neighbors could reflect the fact that neighbors have similar environments. Additionally, even if one can rule out environmental effects, it is difficult to determine whether an individual's financial expectations are driven by a response to her peers' financial expectations or by shared exogenous characteristics, such as wealth, marital status, or race.

In order to identify social influence, I use an instrumental variables strategy similar to that of Brown et al. (2008), who find evidence of peer effects in stock market participation. I instrument for the average financial expectations of an individual's neighbors with the average financial expectations of neighbors' nonlocal family members. Whereas the average financial expec-

tations of these nonlocal family members are likely to be correlated with the financial expectations of an individual's neighbors,[3] there is much less reason to think that the individual's financial expectations will be directly influenced by the expectations of her neighbors' nonlocal family members. The instrumental variable should only affect an individual's financial expectations indirectly; through social interaction with her neighbors.

Even with the instrumental variables approach, it is possible that individuals stochastically self-select into neighborhoods based on traits that are correlated with financial expectations and are similar among family members. For example, individuals, their neighbors, and their neighbors' nonlocal family members are likely to have similar wealth. Therefore, if wealth is correlated with financial expectations, it might be driving my results. To address these alternate explanations, I include individual fixed effects, year fixed effects, and time-varying controls. The individual fixed effects control for observable and unobservable individual characteristics that are fixed over time, such as race, gender, and risk tolerance; the year fixed effects control for sample-wide time trends; and the time-varying controls rule out specific observables, such as wealth and education, that could be driving my results.

Using this approach, I find evidence of substantial peer effects in financial expectations. A one standard deviation increase in neighborhood financial expectations leads to a 2.36% increase in individual financial expectations.

[3]Family members are a particularly influential set of individuals. For example, Case and Katz (1991) show that family adult behaviors are strongly associated with similar youth behaviors.

To put this in perspective, a one standard deviation increase in the financial expectations of an individual's family is associated with an 8.64% increase in the individual's financial expectations. Therefore, the magnitude of the neighborhood effect is nearly 27% as large as the magnitude of the family effect.

Survey responses from the British Household Panel Survey (BHPS) allow me to study direct proxies for beliefs as opposed to trying to infer beliefs from economic outcomes. Recent work has shown that survey measures of investor expectations are reflections of widely shared beliefs. These beliefs have important asset pricing implications and are negatively correlated with model-based expected returns (Greenwood and Shleifer (2014)).

The BHPS also has data that can be used to infer an individual's level of social connectedness. In a similar vein to Ivković and Weisbenner (2007), I use three sociability proxies to evaluate alternative explanations for my results. If, for example, my results were driven by regional shocks, then one would expect sociability to have no influence on the magnitude of peer effects. Similarly, if my results were driven by common characteristics, such as education or income, one would not expect peer effects to vary with changes in sociability. However, I find that peer effects are stronger for individuals who are more socially connected. This evidence supports the hypothesis that individuals are influenced by their neighbors' financial expectations and is difficult to reconcile with competing explanations.

Next, I use savings data from the BHPS to test the joint hypothesis that

survey responses reflect actual beliefs and that individuals act in accordance with these beliefs. I find that individuals who expect their financial situation to improve are less likely to save than individuals who expect their financial situation to worsen. This evidence is consistent with the joint hypothesis stated above.

Lastly, I test whether these observed peer effects are rational. I construct a measure of financial expectation error by calculating the absolute difference between an individual's financial expectations and her realized change in financial situation. I find that individuals with small financial expectation errors display a statistically significant peer effect, while individuals with large expectation errors do not. Therefore, individuals seem to be making good use of information when they take their neighbors' financial expectations into account.

This paper contributes to four streams of literature. First, it extends the literature on peer effects by providing evidence of causal peer effects in financial expectations. This evidence is complementary to the work of Ahern, Duchin, and Shumway (2014), who find positive peer effects in risk aversion.

Second, this paper contributes to the literature on belief formation. I provide evidence that individuals use the financial expectations of their peers as an input when forming their own financial expectations. Therefore, theoretical models of belief formation should consider social interactions because they are an important microfoundation for individual beliefs.

Third, this paper contributes to the household finance literature by study-

ing the rationality of peer effects in financial expectations. I provide evidence that individuals who display peer effects form more accurate financial expectations. Therefore, individuals can benefit by updating their beliefs based on the beliefs of their peers.

Fourth, this paper extends the social finance literature by providing evidence of social transmission of financial expectations. Thus, my results support the premise of theoretical papers that model the process by which ideas are transmitted (Burnside, Eichenbaum, and Rebelo (2016) and Han, Hirshleifer, and Walden (2020)).

2 Data Description

My data come from a panel survey of U.K. residents called the British Household Panel Survey (UK Data Service (2018)). This survey was carried out by the ESRC UK Longitudinal Studies Centre with the Institute for Social and Economic Research at the University of Sussex. The BHPS is an annual survey of each adult (age 16+) member of a nationally representative sample of more than 5,000 households. Descriptive statistics for BHPS variables of interest can be found in Table 1.

The BHPS was administered in annual waves from 1991 to 2008. In each of the 18 waves, the same individuals were re-interviewed. Additional subsamples were added to the BHPS in 1997 and 1999. After 2008, the BHPS became part of a new survey called Understanding Society. However, this

new survey does not contain many of the variables that are crucial for my analysis. Therefore, I focus on data from the first 18 waves.

The survey waves were administered at least six months apart, so repeated measurement issues are unlikely to bias my results. The stated aim of the BHPS is to maximize the advantages of panel data to permit research into a wide range of social science topics.[4]

Many questions in the BHPS were asked in every wave. These are referred to as "core" questions. The first core variable I use is FISITX. This variable allows me to measure an individual's financial expectations. Respondents were asked the following question: "Looking ahead, how do you think you yourself will be financially a year from now, will you be...(1) Better off than you are now, (2) Worse off than you are now, Or (3) About the same?" Additionally, respondents were allowed to answer "Don't know" on any of the survey questions. I code individual financial expectations as 1 if an individual believes she will be better off, 0 if an individual believes she will be about the same, and -1 if an individual believes she will be worse off.

I use a second core variable (FISITC) to evaluate the rationality of peer effects in financial expectations. This variable measures the change in each individual's financial situation over the last year. I calculate an individual's financial expectation error as the absolute value of the difference between FISITX and next year's FISITC. This measure captures the absolute difference between an individual's financial expectations and her realized change

[4]For additional information on specifics of this survey, see Taylor et al. (2018).

in financial situation.

Next, I use three variables as proxies for sociability. The first, FRNA, is a variable that measures the frequency with which an individual talks to her neighbors. The second, LKNBR, equals one if an individual likes her neighborhood and zero otherwise. The third, ORGM, equals one if an individual is a member of a local organization and zero otherwise.

The BHPS also has data on individual savings behavior. Respondents were asked the following question: "Do you save any amount of your income for example by putting something away now and then in a bank, building society, or Post Office account other than to meet regular bills?" I construct a dummy variable (SAVE) that equals one if individuals save and zero otherwise.

Finally, I utilize demographic information on each individual. The BHPS includes demographic information such as annual income (FIYR), job industry (JBSIC), education level (QFEDHI), marital status (MASTAT), race (RACE), and interview area (IVIA). The first five variables are included as controls. The last, interview area, is used to determine which individuals are neighbors. Because each interviewer covers a specific geographic area, individuals in the same interview area live near each other. When an individual moves out of an interview area, she is assigned a new interviewer and a new interview area.

2.1 Neighborhood Financial Expectations

In order to construct neighborhood financial expectations, I use two variables: interview area (IVIA) and financial expectations (FISITX). Interview area allows me to determine which individuals are neighbors because each interviewer covers a specific geographic area. Therefore, individuals in the same interviewer area live in relatively close proximity to one another and are more likely to have social interactions with one another than individuals in two different interview areas.[5]

Overall, there are 250 interview areas which cover the roughly 10,000 participants in the initial BHPS sample. This means that the average interview area consists of 41 people who live near each other. Near is a relative term because the geographic size of interview areas varies with population density. For example, within the region of inner London there are 13 different interview areas. However, in the entire region of Wales there are only 12 different interview areas. This makes sense because the populations of inner London and Wales were comparable in 1991. Furthermore, this layout of interview areas is actually beneficial for studying social interactions. Compared to individuals who live in densely populated cities, individuals who live in rural areas are more likely to interact with people who live further away.

For each individual, I calculate neighborhood financial expectations as the average financial expectation of one's neighbors in a given year. Because

[5]Interview areas are comparable in size to Metropolitan Statistical Areas (MSA). This definition of neighborhood is widely used in empirical studies in economics and finance, e.g. Brown et al. (2008).

financial expectations are either positive (1), negative (-1) or neutral (0), the average financial expectations of one's neighbors can be thought of as the proportion of neighbors who are optimistic about next year's financial prospects minus the proportion of neighbors who are pessimistic. Therefore, this variable provides a good measure of the average financial expectations in an individual's neighborhood.

2.2 Sociability Proxies

I construct three sociability proxies using responses from the BHPS. The first proxy is most closely related to neighborhood sociability because it measures the frequency with which an individual talks to her neighbors. This variable equals one if an individual talks to her neighbors most days of the week; two if she talks to them once or twice a week; three if she talks to them once or twice a month; four if she talks to them less than once a month; and five if she never talks to her neighbors. This proxy directly measures how socially connected an individual is to her neighbors. Unfortunately, this is not a core question on the BHPS. Therefore, data availability for this proxy is limited to a subset of survey waves.

The second proxy measures whether or not an individual likes her neighborhood. This proxy is based on a core question in which respondents were asked the following: "Overall, do you like living in this neighbourhood?...(1) Yes, (2) No." The intuition behind this proxy is that an individual who likes her neighborhood is more likely to have social interactions with her neigh-

bors. Alternatively, an individual who dislikes her neighborhood is probably not very socially connected to her neighbors. Clearly, this is an imperfect measure of sociability, but it is at least likely to be correlated with sociability. Additionally, this variable is the only sociability proxy that is a core question, meaning that this question was asked in each of the 18 survey waves.

The third proxy for sociability is based on an individual's involvement in local organizations. The BHPS asks respondents to identify whether or not they belong to local organizations such as: trade unions, environmental groups, parents assocations, tenants groups, religious groups, voluntary service groups, and sports clubs. This proxy is a dummy variable that equals one if a respondent is a member of any organization and zero otherwise. It has clear sociability implications. If a person is a member of a local organization, she is more likely to be socially connected. Unfortunately, these organization questions are not core questions. Therefore, data availability for this proxy is limited.

3 Identification Strategy

My hypothesis is that an individual's financial expectations are influenced by the financial expectations of her neighbors. The difficulty in testing this hypothesis is described in detail in Brown et al. (2008), but it comes down to an inability to control for unobserved time-varying factors. The panel dataset allows me to control for individual and year fixed effects. There-

fore, my method rules out time invariant factors and sample-wide trends. Furthermore, I control for observed time-varying variables, such as wealth, that could explain the correlation between individual financial expectations and average neighborhood financial expectations. However, it is still possible that unobserved time-varying factors, such as changes in a community's information set, could explain my results. Thus, in order to identify causal peer effects in financial expectations, I need to find a source of exogenous variation in the financial expectations of an individual's neighbors. I use the financial expectations of neighbors' nonlocal family members as a source of exogenous variation.

Because survey respondents are not randomly assigned to neighborhoods, I use an instrumental variables strategy to find exogenous variation in neighborhood financial expectations. I instrument for neighborhood financial expectations with the average financial expectations of neighbors' nonlocal family members. This instrument is likely to be correlated with the financial expectations of an individual's neighbors[6], but it is not likely to be correlated with the financial expectations of the individual, except through the individual's social interactions with her neighbors.

Homophily is a key concern in studies of peer effects. Individuals, their neighbors, and their neighbors' nonlocal family members likely exhibit similarity along various unobservable dimensions, e.g. political beliefs, religion, and race. If these unobservables are the true drivers of my results, then the

[6]Case and Katz (1991) show that family behaviors are strongly correlated.

instrument might fail the exclusion restriction. While I cannot fully address homophily due to the nonrandom assignment of individuals to neighborhoods, the included controls address many alternative explanations. The individual fixed effects control for time-invariant individual characteristics such as religion and race; the year fixed effects control for sample-wide trends such as nationwide economic optimism; and the time-varying controls (wealth and education) rule out specific alternative explanations. In addition to the above controls, the reverse causality results in Figure 1 provide evidence against homophily.

I utilize the unique nature of my dataset to develop an instrument that relies on the financial expectations of neighbors' nonlocal family members. The BHPS is conducted at the individual and household level. This allows me to determine which individuals in my sample have ever been a part of the same household.

For the purpose of this study, a family member is someone who lived in the same household as a given individual at some point previously in the sample. Therefore, a nonlocal family member is likely to be a divorced spouse, an adult child, a sibling, or anyone else who at one point lived in the same household as the individual but has since moved to a different interview area.

In order to construct the instrument, I begin by identifying each family member who is no longer living in the same interview area. Next, for a given year, I calculate the average financial expectations of each person's nonlocal

family members. Finally, I calculate the average financial expectations of the nonlocal family members of each individual's neighbors.

4 Results

4.1 Panel Regressions

In order to determine whether there is a relationship between individual financial expectations and neighborhood financial expectations, I run two panel regressions. The first regression, reported in Column (1) of Table 2, is a simple regression of individual financial expectations on neighborhood financial expectations with no additional controls. The second regression, reported in Column (2), includes wealth, individual fixed effects, and year fixed effects as controls. Throughout the analysis, standard errors are clustered at the neighborhood level.

Both specifications show a highly significant, positive relationship between individual financial expectations and neighborhood financial expectations. Including the additional controls decreases the magnitude of the coefficient by over 50%. However, this is expected because individual and year fixed effects remove a substantial amount of variation. What is more striking is that there is a strong relationship between individual and neighborhood financial expectations, even after controlling for individual and year fixed effects. One standard deviation in the residualized treatment variable is 0.097. Therefore, a one standard deviation increase in neighborhood fi-

nancial expectations is associated with a 2.45% (0:097 0:253) increase in individual financial expectations.

In order to determine if these magnitudes are economically meaningful, I consider the effects of a particularly influential set of individuals: family members.[7] Next, I compare the peer effects in financial expectations to the family effects in financial expectations. Table 3 presents results from a regression of individual financial expectations on the average financial expectations of the individual's family members. I include controls for wealth, individual fixed effects and year fixed effects.

The results from this regression show a positive, statistically significant relationship between individual financial expectations and average family financial expectations. To compare the magnitude of the family effect to the magnitude of the peer effect, I calculate the standard deviation in the residualized treatment variable as 0.379. A one standard deviation increase in the financial expectations of one's family is associated with an increase of 8.64% (0:379 0:228) in one's own financial expectations. Therefore, the neighborhood effect from Table 2 is roughly 28% as large as the family effect.

These results provide evidence that the financial expectations of individuals are correlated with the financial expectations of their neighbors. Furthermore, this correlation is not entirely driven by time-invariant individual characteristics or by sample-wide trends. Even after including individual

[7]This test is similar to the test of parental influence on stock market participation in Brown et al. (2008).

and year fixed effects, the relationship is statistically and economically significant. Therefore, if unobserved factors are driving these results, they must be time-varying or neighborhood specific.

4.2 Reverse Causality

Based on these panel regressions alone, it is not necessarily true that individuals take their neighbors' financial expectations into account when forming their own financial expectations. It is also possible that individuals move to neighborhoods where people have similar financial expectations. In this case, reverse causality could be driving the results.

While financial expectations might not be the primary factor that influences neighborhood choice, it is possible that people unintentionally choose to live near people with similar financial expectations. For example, individuals might move to an area based on the prospects of the local housing market. Other individuals in that area are likely to have similar positive beliefs about the local housing market. If neighbors have similar beliefs about the local housing market, they might also have similar beliefs about future financial prospects.

I test for reverse causality by running four subsample regressions. Individuals are split into subsamples based on how long they have lived in the same neighborhood. If an individual moves or is newly added to the survey, she would be placed into the subsample that is associated with zero years in the neighborhood. In each of these regressions, I use the same specification

as in Column (2) of Table 2.

If individuals are indeed taking neighborhood financial expectations into account when forming their own financial expectations, then one would expect the coefficients to get larger the longer an individual lives in the same neighborhood. This is because when an individual first moves to a neighborhood, she might not know her neighbors very well. However, as years go by, she will likely get to know her neighbors better and be more influenced by their financial expectations.

On the other hand, if reverse causality is driving the observed relationship, we would expect the coefficients to either stay flat or get progressively smaller the longer an individual lives in a neighborhood. To see this, consider an individual who moves to a neighborhood because residents of that neighborhood have similar financial expectations to her own. This similarity should be strongest immediately after the move. As time passes, if there is no social transmission of beliefs and ideas, people's financial expectations will either maintain the same level of correlation or start to diverge. This would manifest itself as either flat or decreasing coefficients on neighborhood financial expectations.

Figure 1 provides evidence against reverse causality. As discussed previously, if reverse causality were driving the results, one would expect the coefficients for year 0 and year 1 to be the highest, with either flat coefficients or a steady decline in the years that follow. Instead, the results suggest that an individual is increasingly influenced by her neighbors' finan-

cial expectations the longer she lives in the neighborhood. The coefficient on neighborhood financial expectations is largest for individuals who have lived in the same neighborhood for three or more years. This is consistent with the social transmission of financial expectations among neighbors.

In peer-effect studies, homophily is a key concern. Because individuals tend to be attracted to people who are similar to themselves, it is likely that individuals in the same neighborhood are similar along various unobservable dimensions, such as political beliefs, religion, or race. If these common unobservables were driving my results, then one would expect to see coefficients of similar magnitudes regardless of how long an individual has lived in a neighborhood. While homophily cannot be fully ruled out in a setting without random assignment into peer groups, the results from Figure 1 provide evidence against homophily and in support of the social transmission of beliefs.

4.3 First-Stage Regression

In order to provide causal evidence that individuals are influenced by their neighbors' financial expectations, I utilize an instrumental variables strategy. Table 4 provides results from the first-stage regression of average financial expectations of one's neighbors on average financial expectations of neighbors' nonlocal family members. Because the instrument is highly correlated with neighborhood financial expectations, it meets the first criterion for an instrument in two-stage least squares.

In Column (1) of Table 4, I report the coefficient from a baseline specification with no other controls. In Column (2), I control for wealth, individual fixed effects, and year fixed effects. This second specification will ultimately be included in the two-stage least squares. In both specifications, there is a highly significant relationship between neighborhood financial expectations and the financial expectations of neighbors' nonlocal family members. The t-statistic for the second specification is 3.66. The corresponding F statistic is 13.40, and the Kleibergen-Paap rk Wald F statistic is 15.11. These statistics indicate that the instrument is sufficiently powerful.[8]

4.4 Reduced Form Regression

Angrist and Krueger (2001) argue that it is important to report reduced-form estimates because these estimates are unbiased. Therefore, reduced-form estimates can mitigate concerns about weak instruments. Table 5 reports estimates from a reduced-form regression of individual financial expectations on the financial expectations of neighbors' nonlocal family members. Column (1) of Table 4 reports results from a baseline specification with no other controls. Column (2) reports results from a specification in which I control for wealth, individual fixed effects, and year fixed effects.

Results from the reduced-form regression provide evidence for the causal

[8]The BHPS data likely fails the i.i.d assumption necessary for the Stock and Yogo (2005) critical values. Therefore, Baum, Schaffer, and Stillman (2007) recommend using the older "rule of thumb" which says that the F statistic should be at least 10 to avoid weak-identification issues.

relationship of interest. In both specifications, the sign of the coefficient is positive and statistically different from zero, albeit only marginally significant in the second specification. Thus, the financial expectations of neighbors' nonlocal family members should be a valid instrument for neighborhood financial expectations.

4.5 Instrumental Variable Regression

Table 6 reports the main set of results using my instrumental variables strategy. The dependent variable of interest is the average financial expectations of an individual's neighbors. Standard errors are clustered at the neighborhood level to allow for correlation within neighborhoods. To strengthen my identification, this specification controls for wealth, individual fixed effects and year fixed effects.

I include individual fixed effects because there are likely observable and unobservable individual characteristics that could be correlated with neighborhood financial expectations and individual financial expectations. Some examples include: race, marital status, and education. Additionally, I control for year fixed effects because there could be sample-wide trends in financial expectations. For example, during the 1990's, the dot-com bubble might have caused the entire sample to be more optimistic about the future. The inclusion of year fixed effects means that I am no longer using year variation in any variable to identify my key effect of interest. Thus, sample-wide time trends in economic variables are not driving my results. Finally, I control for

wealth because this is a time-varying variable that could be correlated with both individual financial expectations and neighborhood financial expectations.

The coefficient of 0.512 on neighborhood financial expectations in Table 6 is the main result of this paper. This coefficient is statistically significant and suggests that a 10% increase in neighborhood financial expectations leads to a 5.12% increase in an individual's financial expectations. When interpreting results from a model with fixed effects, one must be careful to identify plausible counterfactual shifts in the independent variable because adding fixed effects removes a substantial amount of potential variation. In this case, given that one standard deviation in the residualized treatment variable is 0.046, a 10% increase is certainly plausible. Stated differently, a one standard deviation increase in the financial expectations of one's neighbors leads to a 2.36% (0:046 0:512) increase in one's own financial expectations.

To determine if these magnitudes are economically meaningful, I again consider the family effects in financial expectations. As previously shown, a one standard deviation increase in the financial expectations of one's family is associated with an increase of 8.64% in one's own financial expectations. Therefore, the causal peer effects in financial expectations are roughly 27% as large as the family effects in financial expectations. This is striking, considering that family members are very influential in individual decision-making.

4.6 Sociability Results

I provide additional evidence for the social transmission of beliefs using three proxies for sociability. Recall that the first proxy measures the frequency with which an individual interacts with her neighbors. The second proxy is a dummy variable that equals one if an individual likes her neighborhood and zero otherwise. The third proxy is a dummy variable that equals one if an individual is a member of a social organization and zero otherwise.

Figures 2 through 4 present point estimates and 95% confidence intervals from regressions using these three proxies for sociability. In each regression, I use the main instrumental variables specification from Table 6, but I split my sample based on each sociability proxy. For example, I present results from five subsample regressions to evaluate the first sociability proxy. Individuals are placed into each of the subsamples based on the frequency with which they interact with their neighbors. I use a similar methodology to split individuals into subsamples for the second and third sociability proxies.

Results for the first sociability proxy are reported in Figure 2. The coefficients on neighbors' financial expectations are largest for individuals who talk with their neighbors on a daily basis and smallest for individuals who never or rarely talk to their neighbors. In fact, the peer effect is only statistically significant for individuals who talk to their neighbors on a daily basis. These results provide evidence in support of the social transmission of financial expectations. Individuals who interact with their neighbors on a daily basis are the most likely to be socially connected to their neighbors.

Results from the second sociability proxy are reported in Figure 3. Based on these subsample regressions, it is clear that there is only a statistically significant peer effect for individuals who like their neighborhood. This evidence also supports the social transmission hypothesis because individuals who like their neighborhood are more likely to be socially connected with their neighbors than individuals who dislike their neighborhood.

Finally, Figure 4 provides results for the third sociability proxy. There is only a statistically significant peer effect for individuals who are members of local organizations. The peer effect for nonmembers is indistinguishable from zero. Again, this evidence supports the social transmission hypothesis because individuals who belong to local organizations are more likely to be socially connected to their neighbors than individuals who don't belong to any local organizations.

Overall, the sociability proxies provide evidence that supports the social transmission hypothesis and is difficult to reconcile with competing explanations. Individuals who are more socially connected are more influenced by the financial expectations of their neighbors. On the other hand, individuals who are not very socially connected display coefficients that are statistically indistinguishable from zero. This evidence provides an important insight into the mechanism driving peer effects in financial expectations.

One plausible alternative explanation for my results from Section 4.5 is that individuals, their neighbors, and their neighbors' nonlocal family members all share common information sources. For example, maybe individuals

are more likely to read the same newspapers and watch the same news channels as their neighbors and their neighbors' nonlocal family members. My instrumental variables strategy is not able to differentiate between this common information hypothesis and the social transmission hypothesis. However, the common information hypothesis does not explain the sociability results from Figures 2 through 4.

While one could still argue that these sociability proxies are instead proxies for shared information, information sharing is most likely to arise as the result of social interaction. For example, it is possible that individuals who talk to their neighbors more frequently are more likely to read the same newspaper as their neighbors. However, this increased propensity to read the same newspaper is likely due to increased social interaction. Therefore, social interaction would still be driving these results.

It is also possible that common characteristics are driving my results from Section 4.5. For example, individuals might be similar to neighbors' nonlocal family members based on race, wealth, or education level. Again, the sociability results from Figures 2 through 4 provide evidence that supports the social transmission hypothesis and is difficult to reconcile with this alternative explanation.

4.7 Expectations and Actions

One common criticism of survey expectations is that we cannot be sure if they are related to actual behavior. It is possible that framing affects survey

responses or that individuals do not actually mean what they say. In this section, I test the relationship between financial expectations and savings behavior using a methodology that is very similar to Cocco, Gomes, and Lopes (2020). The results provide evidence that individuals behave in a manner that is broadly consistent with their financial expectations.

I study the relationship between financial expectations and savings behavior by regressing the savings dummy variable (SAVE) on individual financial expectations. The savings dummy variable equals one if an individual saved money over the past year and zero otherwise. As before, I control for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level.

Results from Table 7 show a statistically significant, negative relationship between individual financial expectations and the savings dummy. This means that individuals who expect their financial situation to improve are less likely to save. Therefore, individual savings behavior is consistent with surveyed financial expectations. This finding provides evidence in support of the joint hypothesis that surveyed beliefs reflect actual beliefs and that individuals act in accordance with their beliefs.

4.8 Peer Effects and Rationality

Lastly, I analyze the rationality of these observed peer effects. It is possible that learning from the financial expectations of one's neighbors is a good idea. These expectations might provide information about the local labor

market or the local housing market. Furthermore, neighborhood financial expectations might provide information about the general direction of the economy.

On the other hand, it is also possible that individuals who update based on the beliefs of their peers are making a mistake. For example, neighborhood financial expectations might not provide any additional information about local market conditions. Furthermore, even if neighborhood financial expectations provide information, individuals might not correctly use this information. For instance, they might put too much weight on the financial expectations of their peers. This could lead to irrational herding behavior, especially if neighborhood financial expectations crowd out individual information.

To assess the rationality of these observed peer effects, I compare each individual's financial expectations (FISITX) with the realized change in that individual's financial situation the following year (FISITC). Financial expectation error is calculated as the absolute value of the difference between FISITX and FISITC. Next, I split individuals into two groups based on their financial expectation error for each year. Individuals in the "small" subsample have errors that are smaller than the median error, and individuals in the "large" subsample have errors that are larger than the median error. Lastly, I run subsample regressions using the main instrumental variables specification from Table 6.

Figure 5 presents point estimates and 95% confidence intervals from these

subsample regressions. As can be seen from the figure, individuals with small financial expectation errors display a statistically significant peer effect in financial expectations. Individuals with large errors do not. Therefore, individuals are displaying at least a degree of rationality and seem to be making good use of information when they take their neighbors' financial expectations into account.

5 Conclusion

Historically, shifts in beliefs have caused substantial changes in outcomes as varied as individual savings, corporate investment plans, currency value, marriage norms, and Prohibition. Furthermore, investor beliefs are fundamental in economic models and have been shown to influence asset prices. I provide evidence of causal peer effects in one particular type of belief: financial expectations.

In order to address the reflection problem (Manski (1993)), I combine an instrumental variables strategy with individual and year fixed effects. I instrument for neighborhood financial expectations with the average financial expectations of neighbors' nonlocal family members. I show that a one standard deviation increase in neighborhood financial expectations leads to a 2.36% increase in individual financial expectations. This result is economically meaningful because it amounts to approximately 27% of the family effect in financial expectations.

Using three proxies for sociability, I provide additional evidence that social transmission is the mechanism driving this result. I find that socially connected individuals are more influenced by their neighbors' financial expectations. These results are consistent with the social transmission hypothesis and are difficult to reconcile with competing explanations.

Next, I test the joint hypothesis that surveyed financial expectations reflect actual beliefs and that individuals act in accordance with these beliefs. Consistent with this joint hypothesis, I show that individuals who expect their financial situation to improve are less likely to save than individuals who expect their financial situation to worsen.

Lastly, I provide evidence that individuals form more accurate expectations when they take their peers' financial expectations into account. This evidence suggests that individuals are behaving rationally when they form expectations based on the expectations of their peers.

These findings help to explain how beliefs spread through a population. If individuals form beliefs based on the beliefs of their peers, it is plausible that a relatively small shock to the financial expectations of a few particularly connected individuals could lead to a multiplier effect that shifts the beliefs of an entire population.[9] This in turn could explain the existence of booms and busts that seem unrelated to observable fundamentals. The recent surge in the stock prices of Gamestop and AMC provide salient examples of the

[9]Hirshleifer (2020) provides an example of a model in which bias iterates socially and induces a multiplier.

potential price impact of a small number of socially well-connected investors.

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Table 1: **Descriptive Statistics.** The table below provides descriptive statistics for the individuals interviewed in the first wave of the British Household Panel Survey. The only exception is the "Talks to neighbors" variable, which is from the 1997 wave of the BHPS.

	mean	sd	min	max
Age	45.73	50.62	16	102
Male	0.47	0.50	0	1
Married	0.59	0.49	0	1
Financial expectations	0.12	0.62	-1	1
Talks to neighbors (1997)	2.01	1.04	1	5
Likes neighborhood?	0.87	0.34	0	1
Org. member	0.54	0.50	0	1

Table 2: **Panel Regression.** The table below provides results for the panel regression of individual financial expectations on neighborhood financial expectations. Column (1) reports baseline results with no additional controls. Column (2) reports results from a specification that controls for wealth, individual fixed effects, and year fixed effects. There are fewer observations in Column (2) because the individual fixed effects force me to drop roughly 6,000 singleton observations. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

	(1)	(2)
	No Controls	Additional Controls
Neighborhood financial	0.518	0.253
expectations	(31.73)	(17.12)
Observations	236,763	230,962
Adj. R-squared	0.015	0.262
Individual FE	NO	YES
Year FE	NO	YES
Time-varying controls	NO	YES

t statistics in parentheses

$p < 0.10$, $p < 0.05$, $p < 0.01$

Table 3: **Family Effects Regression.** The table below provides results for the regression of individual financial expectations on average financial expectations of the individual's family members. This specification controls for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

	(1)
	Financial expectations
Financial expectations of	0.228
family members	(37.62)
Observations	194,030
Adj. R-squared	0.2775
Individual FE	YES
Year FE	YES
Time-varying controls	YES

t statistics in parentheses

$p < 0.10$, $p < 0.05$, $p < 0.01$

Figure 1: **Regression coefficients based on years lived in the neighborhood.** The figure below shows point estimates and 95% confidence intervals for the coefficients from four regressions of individual financial expectations on neighborhood financial expectations. The regressions are subsample regressions, where subsamples are split based on the number of years an individual has lived in her neighborhood. All regressions control for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

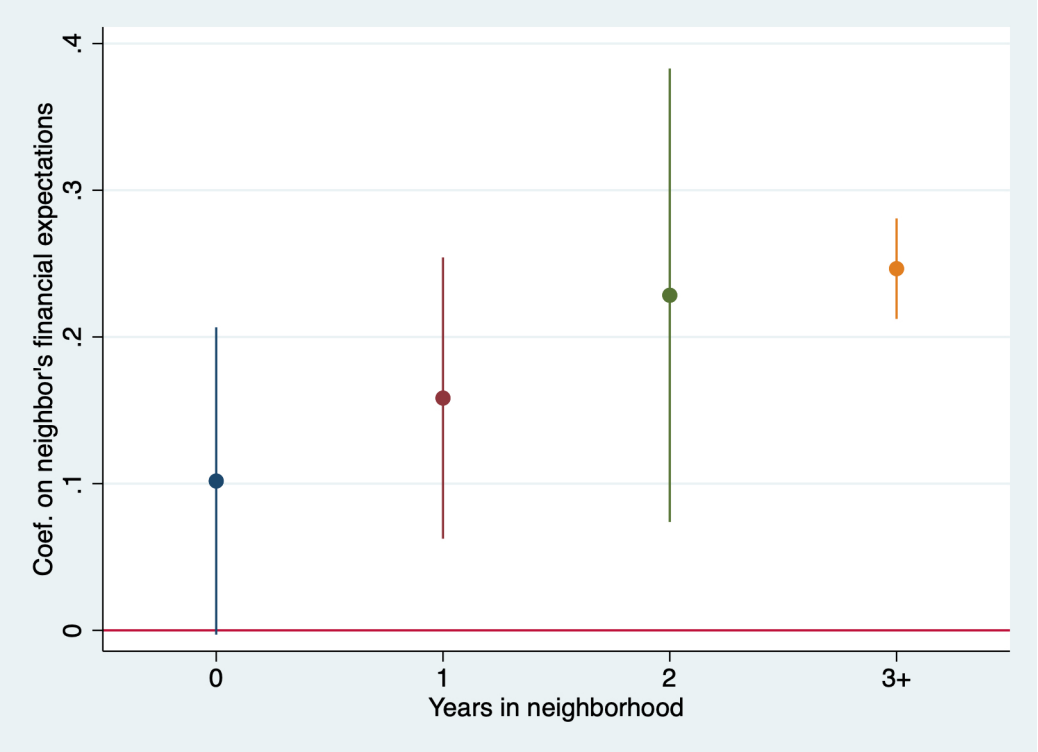

Table 4: **First-Stage Regression.** The table below provides results for the first-stage regression of average neighborhood financial expectations on average financial expectations of neighbors' nonlocal family members. Column (1) reports baseline results with no other controls. Column (2) reports results from a specification that controls for wealth, individual fixed effects, and year fixed effects. There are fewer observations in Column (2) because the individual fixed effects force me to drop roughly 6,000 singleton observations. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

	(1)	(2)
	No Controls	Additional Controls
Financial expectations of	0.341	0.099
nonlocal family members	(7.04)	(3.66)
Observations	236,666	230,864
Adj. R-squared	0.020	0.385
Individual FE	NO	YES
Year FE	NO	YES
Time-varying controls	NO	YES

t statistics in parentheses

$p < 0.10$, $p < 0.05$, $p < 0.01$

Table 5: **Reduced-Form Regression.** The table below provides results for the reduced-form regression of individual financial expectations on average financial expectations of neighbors' nonlocal family members. Column (1) reports baseline results with no other controls. Column (2) reports results from a specification that controls for wealth, individual fixed effects, and year fixed effects. There are fewer observations in Column (2) because the individual fixed effects force me to drop roughly 6,000 singleton observations. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

	(1)	(2)
	No Controls	Controls
Financial expectations of	0.274	0.0508
nonlocal family members	(5.55)	(1.91)
Observations	236,666	230,864
Adj. R-squared	0.001	0.260
Individual FE	NO	YES
Year FE	NO	YES
Time-varying controls	NO	YES

t statistics in parentheses

$p < 0.1$, $p < 0.05$, $^{>}$ $p < 0.01$

Table 6: **Instrumental Variables Regression.** The table below provides results for the instrumental variables regression of individual financial expectations on average neighborhood financial expectations. I instrument for neighborhood financial expectations with the average financial expectations of neighbors' nonlocal family members. This specification controls for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

	Financial expectations
Neighborhood financial expectations	0.512
	(3.04)
Observations	230,868
Individual FE	YES
Year FE	YES
Time-varying controls	YES

t statistics in parentheses

$p < 0.10$, $p < 0.05$, $p < 0.01$

Figure 2: **Interaction Frequency.** The figure below shows point estimates and 95% confidence intervals for the coefficients from instrumental variables regressions of individual financial expectations on neighborhood financial expectations. The regressions are subsample regressions, which are split based on how often an individual talks to his or her neighbors. All regressions control for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

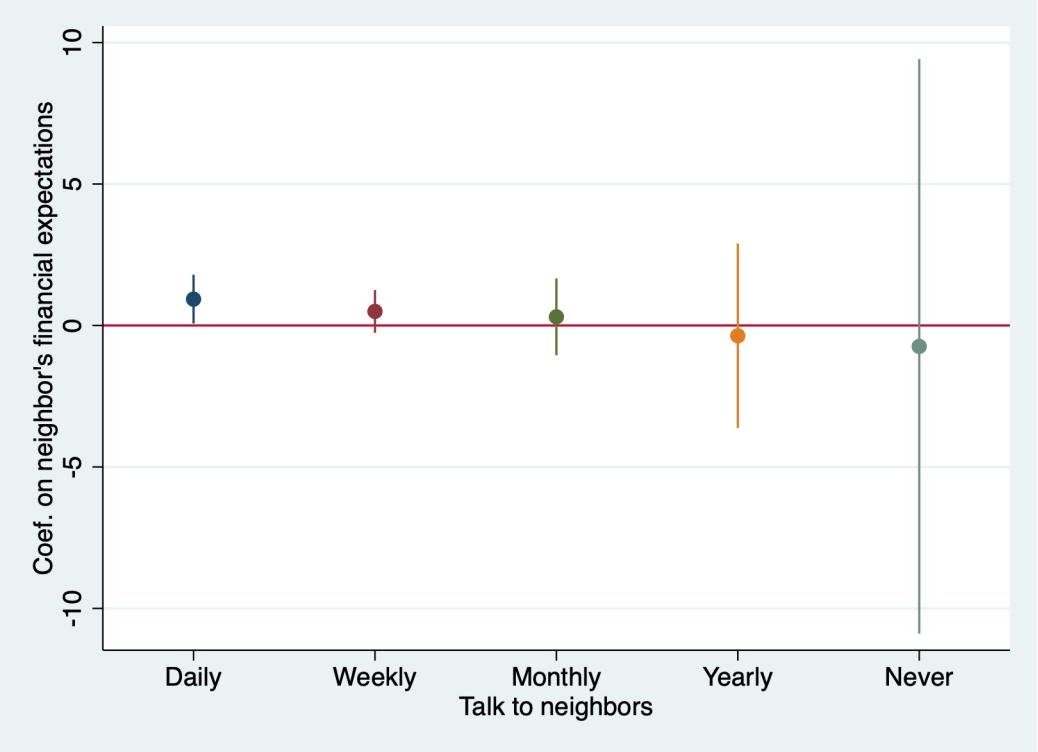

Figure 3: **Opinion of Neighborhood.** The figure below shows point estimates and 95% confidence intervals for the coefficients from instrumental variables regressions of individual financial expectations on neighborhood financial expectations. The regressions are subsample regressions, which are split based on whether or not an individuals like his or her neighborhood. All regressions control for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

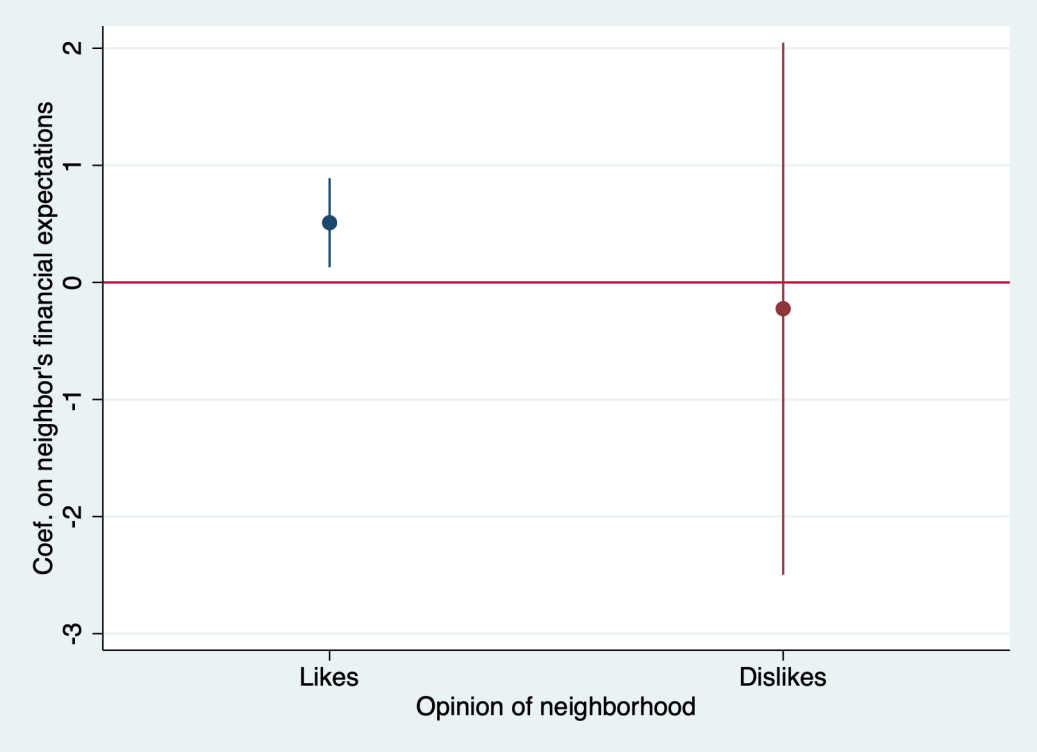

Figure 4: **Organization Membership.** The figure below shows point estimates and 95% confidence intervals for the coefficients from instrumental variables regressions of individual financial expectations on neighborhood financial expectations. The regressions are subsample regressions, which are split based on whether or not an individual is a member of a local organization. All regressions control for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

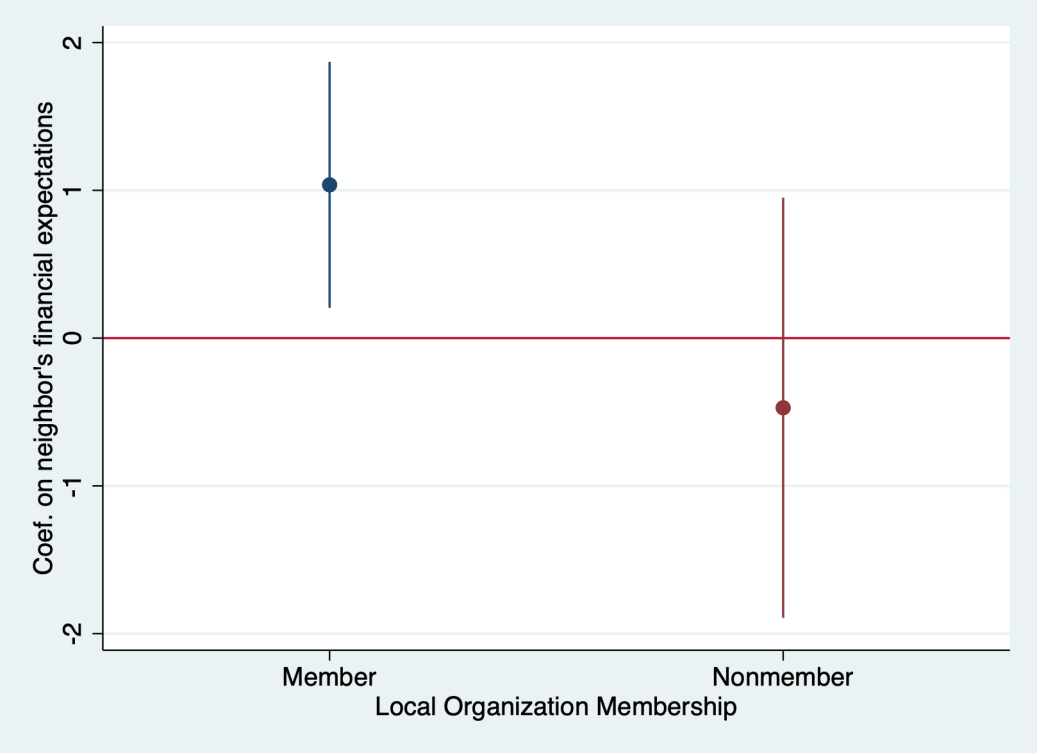

Table 7: **Savings Regression.** The table below provides results for a panel regression of a savings dummy variable on individual financial expectations. This specification controls for wealth, individual fixed effects, and year fixed effects. Standard errors are clustered at the neighborhood level. Additionally, the standard errors allow for heteroskedasticity.

	(1)
	Savings dummy
Financial expectations	-0.0111
	(-5.29)
Observations	230,962
Adj. R-squared	0.361
Individual FE	YES
Year FE	YES
Time-varying controls	YES

t statistics in parentheses

$p < 0.05$, $p < 0.01$, $^{>}$ $p < 0.001$