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Current Opinion in Behavioral Sciences

Social networks and financial outcomes

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Academic research on whether social networks influence financial outcomes is still undeveloped. The literature has typically focused on three major questions — whether social networks affect investor behavior, firm behavior, or intermediary behavior. Because the theoretical framework in finance is organized around an accepted set of paradigms, and because data on intermediaries and firms have been publicly available for a long time, the financial economics area has just started using big data in its analysis. This note describes the extant research in this area and outlines how the field is likely to evolve.

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Current Opinion in Behavioral Sciences 2017, **18**:75–78

This review comes from a themed issue on **Big data in the behavioural sciences**

Edited by **Michal Kosinski** and **Tara Behrend**

http://dx.doi.org/10.1016/j.cobeha.2017.08.010

Introduction

Economists typically analyze either cross-sectional, time series, or panel data that fits in a spreadsheet or a statistical database. While these approaches are gradually being replaced by big data analyses in other disciplines (see [1] for examples of econometric analyses using big data techniques), these approaches have not typically been used by financial economists who are interested in how social networks impact financial outcomes. The reason is because financial economists work with clearly defined theoretical priors. To test these priors does not always require extremely large datasets, which are more suited to situations where the model itself is uncertain.[1]

[1] Varian [26] differentiates between big data analysis and regular economic analysis in noting that the sheer size of big datasets may require more powerful data manipulation tools. There may be more potential predictors than appropriate for estimation, so variable selection is necessary. Large datasets may also allow for more flexible relationships than simple linear models. Finally, machine learning techniques such as decision trees, support vector machines, neural nets, and deep learning, may allow for more effective ways to model complex relationships.

Financial economists are usually concerned with three major research questions: how do investors choose to invest (a portfolio choice problem), how firms direct these investments to investment opportunities (a firm investment decision), and how intermediaries manage to match the lenders (investors) with the firms (borrowers). The questions of interest in this note are whether social relationships influence investor behavior (the portfolio choice problem or other financial decisions), firm behavior (the investment decision or other firm policy decisions), or the matching process.

The papers surveyed in this note typically use unusual micro-level data on social networks to address these questions. Examples of these types of data discussed in this note include characteristics for an entire population from country administrative registers (typically Scandinavian countries), insider trading networks, and loan level data from microfinance institutions.

Social networks and investor behavior

The first type of financial outcome relates to whether social networks affect portfolio choices made by investors. In particular, papers in this stream examine how information diffuses through social networks. Among the earliest papers in this field, Hong et al. [2] argue that social investors find the market more attractive when more of their peers participate. They use data from the Health and Retirement Study administered by the Institute for Social Research at the University of Michigan. This survey, first conducted in 1992, surveys approximately 7500 households who have a member born during the period 1931 through 1941, and asks whether people interact with their neighbors or attend church, a group that Hong, Kubik, and Stein call social households. They find that social households are substantially more likely to invest in the market than non-social households, controlling for wealth, race, education, and risk tolerance. Similarly, Ivković and Weisbenner [3] study the relation between households' actual stock purchases and stock purchases made by their neighbors using a popular data set of common-stock investments in 35,673 U. S. households made through a large discount brokerage in the period from 1991 to 1996. Till a few years ago, this dataset was largely the only dataset on actual portfolio choice by individuals in the United States. Ivković and Weisbenner [3] attribute approximately 25–50% of the correlation between households' stock purchases and stock purchases made by their neighbors to word-of-mouth communication.

More recent papers have drawn on other datasets, both survey and direct. For example, Changwony et al. [4]

examine information diffusion through two channels of social interaction: frequency of talking to neighbors and involvement in social groups using survey data from around 14,000 individuals in 5500 households covered by the British Household Panel Survey (BHPS). They find that weak ties (social group involvement) between individuals positively impacts overall stock market participation while strong ties (frequency of talking to neighbors) have no effect. Knüpfer et al. [5] use Finnish country population characteristics from Statistics Finland and the Finnish Tax Administration to show that workers who are adversely affected by the Finnish Great Depression in the 1990s, invest less in stock markets. The effects appear to travel through social networks: individuals whose neighbors and family members experienced adverse circumstances also avoid risky investments. Rau and Wardrop [6] examine how local bias, the predisposition of investors to invest in local firms, is affected by the physical distances from other types of investors, specifically super-investors (investors who invest extremely large amounts in specific investments), in influencing investment in a novel financial instrument, micro-bonds directly issued by the firm to its investors without a financial intermediary involved. Physical distances to these investors appears as, if not more, important to investment than the physical distance to the firm. One issue with these papers is that they do not provide direct evidence of person-to-person communication among investors. Ahern [7] provides some evidence of direct peer-to-peer communication, using a relatively small but novel hand-collected dataset to analyze the social relationships that underlie illegal insider trading networks. He shows that inside information flows through strong social ties based on family, friends, and geographic proximity. Inside traders earn striking returns of 35% over 21 days, with more central traders earning greater returns.

A second related question of concern to financial economists is whether the presence of social networks increases market efficiency, the speed with which information is incorporated into stock prices. Han and Yang [8] develop a rational expectations equilibrium model to explore this question and show that when information is exogenous, social communication improves market efficiency. However, social communication also crowds out information production due to traders' incentives to 'free ride' on their informed friends. Overall, social communication hurts market efficiency when information is endogenous. There is little empirical evidence on this issue.

A third question relevant to this research topic is how the network positions of the first individuals in a society to receive information about a new product affect its eventual diffusion. To answer this question, Banerjee et al. [9•] develop a model of information diffusion through a social network that discriminates between information passing (individuals must be aware of the product before they can adopt it, and they can learn from their friends) and endorsement (the decisions of informed individuals to adopt the product might be influenced by their friends' decisions), and apply it to the diffusion of microfinance loans, in a setting where the set of potentially first-informed individuals is known. They find that the centrality of the first-informed individuals in a village helps significantly in predicting eventual adoption.

A relatively unexplored issue in financial economics is whether firms can create peer influence and social contagion by designing viral features into their products and marketing campaigns. While there are no financial economics papers on this issue because financial data is usually highly confidential, a couple of marketing papers do use big data to analyze this question. Aral and Walker [10•], Aral and Walker [11] conduct randomized field experiments where they use viral messaging capabilities for 9687 recruited users on Facebook.com to exchange messages with their 1.4 million friends. They find that viral features generate econometrically identifiable peer influence and social contagion effects, with passive-broadcast viral features in particular, proving most effective in increasing peer influence and social contagion. Physical interaction between friends, measured by co-appearance in photos, does not have an effect. Manski [12] argues that self-selection bias makes it harder to draw inferences about the general population from a self-selected sample of recruited subjects. In addition, a generalizable analysis is limited to observations that are made without intrusion, since people's behavior may change when they know they are being observed.

To avoid the problem of self-selection and observation bias, Bapna and Umyarov [13••] use a randomized experiment that tests the existence of causal peer influence in the general population (3.8 million users) of the last.FM online social network. The experiment, which did not involve subject recruitment for experimentation, involved the researchers randomly selecting users from the group to receive premium subscription status. These users could not deny the gift or hide its status, ruling out any subject self-selection, impact of individual characteristics, or contextual (observed or unobserved) decisions that might confound the analysis. They find that peer influence causes more than a 60% increase in odds of buying the service due to the influence coming from an adopting friend. In addition, users with smaller numbers of friends experience stronger relative increase in their adoption likelihood due to influence from their peers compared to users with larger numbers of friends.

Researchers have also examined other financial choices by investors. For example, Miller [14] examines how social networks affect a household's bankruptcy decision. Social networks can provide information about the