Staff Paper

Impacts of Social Capital on Investment Behavior Under Risk

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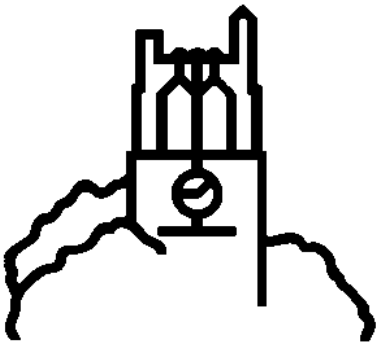

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Introduction

Implicit in most applications of the expected utility (EU) model is the assumption that only the decision maker's own income matters. Moreover, studies that estimate risk preferences typically measure how individuals respond to changes in the level and likelihood of having their own income altered (Young). The focus on own income in the EU model is consistent with the assumption most often applied in the neoclassical economic paradigm; namely, that the identity of participants in an economic exchange does not affect the outcome (Telser and Higinbotham).

Recently, a burgeoning social capital literature has emphasized that relationships alter economic outcomes. For example, Siles, Hanson, and Robison found that positive relationships increased probability of loan approval in some cases by over 50 percent. Likewise, Perry and Robison found that farm land rarely trades outside a circle of close friends and family while Robison, Myers, and Siles (RMS) found that farmland is discounted by nearly 8 percent when traded among friends and is rarely exchanged between persons in an unfriendly relationship. These results suggest that social capital, residing in relationships, influences both access to the farmland markets and the terms at which farmland is financed and traded.

Missing from the literature is any mention of how the social capital influences investment under risk. The intent of this article is to investigate the linkage. In what follows, the social capital literature and its applications are reviewed. Then social capital models are related to other models of relationships, including altruism and club models. Next, a theoretical model that incorporates social capital and risk is introduced and hypotheses are deduced. Finally, survey results are used to test the conclusions of the deductive model and the results are summarized.

The findings of this paper are not unexpected. The introduction of risk into economic models increased their complexity and the ambiguity of their results. To resolve the ambiguity, more individual specific data is required, including individual and group risk preferences. Likewise, introduction of social capital into economic models further increases their complexity and the ambiguity of their results. To resolve the increased ambiguity in social capital models requires data specific to relationships and one's social capital.

An Introduction to Social Capital

Hanifan introduced the concept of social capital in 1916. Since then, several scholars have contributed to the popularity of the term and concept including, Bourdieu, Coleman, Fukuyama, Narayan and Pritchette, Portes, Putnam, Robison and Schmid (1991), and Woolcock. Even before these wrote about social capital, many social scientists were aware of the concept even though they may have called it something else. For many, social capital is like old wine in a new bottle, an old concept dressed up in a new name. What is different now is that many social scientists and problem solvers recognize their shared interest in social capital and are talking about it with each other and across disciplines.

As scientists and practitioners from different disciplines and problem areas have shared their applications and understandings of social capital, a richer paradigm with increased usefulness has emerged. The increased usefulness of the social capital paradigm has been illustrated by its widespread applications to such diverse topics as educational achievements (Coleman), conspicuous consumption (Frank), health care (Woh), crime and violence (Etzioni),environmental degradation (Lanz), advertising (Tye), community development (Flora,

C. and Flora, J.), economic growth (Knack and Keefer), information technology (Montague), trade (Fafchamp, Minten), discrimination (Loury), and poverty reduction (World Bank).

One predictable outcome of social scientists and practitioners from diverse backgrounds sharing a common paradigm has been the emergence of different definitions of social capital. Robison, Schmid, and Siles (RSS) review alternative definitions and propose the following: "Social capital is a person's or group's sympathy toward another person or group that may produce a potential benefit, advantage, and preferential treatment for another person or group of persons beyond that expected in an exchange relationship."

The following are consequences of social capital as defined above. Persons or groups have social capital when they are the objects of another person or group's sympathetic feelings. Persons or groups provide social capital when they have sympathetic feelings toward another person or group. Those who have social capital have access to resources from social capital providers on preferential terms compared to what might be expected in arms-length relationships.

Increases in social capital among groups and between individuals promote cooperative actions, alter terms and levels of trade, encourage exchanges, reduce free riding, internalize externalities, and increase investments in public or high exclusionary cost goods.

Social capital has been criticized by some who claim that it really isn't capital, because there is no one definition that all scientists and practitioners accept, and because it cannot be measured (Arrow, Solow, Durlauf). In contrast, RSS argue that social capital really is capital based on what most consider to be capital requirements (Smithson). Social capital has the potential to provide services and still maintain its identity (we can ask a friend for a favor and still preserve our friendship). Social capital is distinct from its services; (sympathetic feelings

provided one's friends are distinct from the favors provided). Social capital is durable (we can have friends for long periods of time and sometimes for life). Most consider the potential services of social capital to be valuable (we value friendships and make costly efforts to maintain them). Social capital is flexible (we find the services of friends valuable in a variety of settings). Social capital is partly fungible (we may ask a friend to obtain help for us from his/her friends that we may not know).[1] And, social capital sometimes substitutes or complements other forms of capital (our friends may help us improve the services we derive from other forms of capital). In essence, it is possible to view social capital as a well-defended capital conceptthat can be placed in the capital pantheon that includes other forms of capital such as physical capital, financial capital, human capital, cultural capital, and natural capital.

Modeling Social Capital

Social capital characterizes sympathetic relationships between economic agents that generates the potential for preferential treatment that may alter the terms and levels of trade. The primary assumptions underlying social capital are that: 1) individuals may build sympathetic relationships that have value; and 2) that the strengths of these relationships vary across agents. Earlier, existing models of altruism and/or club behavior are also capable of modeling exchanges where relationships can influence economic behavior. What distinguishes social capital from altruism and club models is its attempts to specify the nature of these relationships based on kernels of commonality between agents that are either earned or inherited. The notion is that social capital originates between agents who share similar views and interests, agents who have shared similar experiences, or agents who are somehow related. In all cases, the formation of

social capital requires the exchange of socio-emotional goods. The advantage of social capital is its ability to model the impacts of various types of relationships on economic behavior.

Define the social capital coefficient K_{ij} as the degree to which agent *i* sympathizes or internalizes the well being of agent *j*. In most instances, this coefficient is bounded by zero and one, signaling agent *i*'s sympathy for agent *j*. However, agent i may have neutral ($K_{ij} = 0$), or antipathetic ($K_{ij} < 0$) feelings toward *j*. The coefficient K_{ij} represents *j*'s social capital since *j*'s ability to influence *i*'s decisions is related to *i*'s resources and the degree to which agent *i* internalizes *j*'s well being.

Social capital coefficient can be used to derive the distinct motivations included in social capital models. Consider, for example, agent *i* utility function defined over own and other incomes and social capital coefficients. The result is the utility function described in (1).

$$\max_{x} U_i = \left[\pi_i(x),\ U_j(\pi_j(x)),\ K_{ij}(x),\ K_{ij}(x)\right] \tag{1}$$

Agent *i*'s utility function described in (1) is assumed to be restricted by the availability of resource *x*.[2] Here U_i and U_j are increasing and concave utility functions; and π_i and π_j are utility attributes, such as income. In general, agent *i* will choose *x* according to the following condition:

$$\frac{\partial U_i}{\partial x} = \frac{\partial U_i}{\partial \pi_i}\frac{\partial \pi_i}{\partial x} + \frac{\partial U_i}{\partial K_{ii}}\frac{\partial K_{ii}}{\partial K_{ii}} + \frac{\partial U_i}{\partial K_{ij}}\frac{\partial K_{ij}}{\partial x} + \frac{\partial U_i}{\partial K_{ji}}\frac{\partial K_{ji}}{\partial x} = 0 \tag{2}$$

Agent *i* chooses *x* in a way to maximize utility described in (1) by setting the sum of marginal utilities in (2) equal to zero. The first term is the marginal utility from own income and is identical to the standard first-order condition in the neoclassical model assuming selfish

preferences. The second term is the marginal utility from increases in the agent *j*'s utility as a results of changes in *j*'s income. This is the pure altruism term and the sign and magnitude of the term will depend on value of K_{ij}, or agent *j*'s social capital. Thus, the first two terms characterize the typical altruism model.[3] Social capital concepts can be used to further specify the structure of the model as will be demonstrated later.

The remaining three terms are related to changes in the level of social capital. The third term is marginal utility from changes in how agent *i* feels about himself. This term is closely related to Etzioni's concept of a person's moral dimension where agent *i* possesses a profile of the ideal self based on values learned from parents, religious figures, people admired, and other sources.

The fourth is the marginal utility of changes in agent *j*'s social capital provided by agent *i*. Again the notion of social capital suggests $\frac{\partial U_i}{\partial K_{ij}} > 0$ but $\frac{\partial K_{ij}}{\partial x}$ may be >(<)(=) 0 . The fifth term is the marginal utility from changes in agent *i*'s social capital provided by agent *j*. As before $\frac{\partial U_i}{\partial K_{ij}} > 0$ but $\frac{\partial K_{ji}}{\partial x}$ may be >(<)(=) 0. The last two terms reflect agent *i*'s preferences for providing sympathetic feeling for agent *j* and vice versus.[4] The social capital terms between agent *i* and agent *j* allow us to model the impact of each agent's "taste for association" that is suggested in certain models of club behavior (Sandler and Tschirhart). Adding additional specification to the model will allow us to further examine the impacts of social capital on a number of issues.

Modeling Behavior Under Risk

RMS recently introduced social capital into farmland models to demonstrate its role in establishing minimum sell prices under certainty. Their efforts support the models predictions

that social capital embedded in relationships alters both the terms and level of trades. What has not been modeled, nor tested, is the influence of social capital on risky investment. To introduce risk into social capital and test empirically the model's predictions is the focus of what follows. We begin with the social capital model developed by RMS.

Our focus here will be to extend the RMS model of social capital to explore how social capital can alter responses to risk. Consider the case where agent *i*'s actions impact agent *j*'s income distribution. For simplicity assume agent *j*'s social capital is fixed at K_{ij} and that agent *i*'s utility is generated as

$$V = U_i(w_i(x)) + K_{ij}U_j(w_j(x)) \tag{3}$$

where U_i and U_j are increasing and concave utility functions; w_i and w_j are the wealth level realized by each agent; and x is some action chosen by agent *i* that might impact his own wealth as well as agent *j*'s wealth. So agent *i*'s level of satisfaction depends on both his utility level from wealth and agent *j*'s utility level from wealth.

Consider the situation where the agents operate in a world with risk characterized by a single bad event. Let $\pi_i(x)$ and $\pi_j(x)$ be the income levels under certainty which could depend on the choice of x. Now agent *i*'s wealth level can be written as

$$\begin{aligned} w_i(x) = w_i^N(x) &= \pi_i(x) && \text{if no bad event occurs} \\ w_i^L(x) &= \pi_i(x) - L_i(x) && \text{if bad event occurs} \end{aligned} \tag{4}$$

Likewise agent *j*'s wealth can be characterized as

$$
\begin{aligned}
w_j(x) &= w_j^N(x) = \pi_j(x) && \text{if no bad event occurs} \\
w_j^L(x) &= \pi_j(x) - L_j(x) && \text{if bad event occurs}
\end{aligned}
\tag{5}
$$

Finally, suppose that conditions (e.g. accidents, natural disasters, deaths) will be such that the bad events will occur with probability $p_i(x)$ and $p_j(x)$ which might also depend on x.

Agent i now chooses x to satisfy

$$
\begin{aligned}
\max_x E(V_i) &= p_i(x)\,U_i(w_i^L(x)) + (1 - p_i(x))\,U_i(w_i^N(x)) \\
&\quad + K_{ij}[p_j(x)\,U_j(w_j^L(x)) + (1 - p_j(x))\,U_j(w_j^N(x))]
\end{aligned}
\tag{6}
$$

So agent i behaves in a way to maximize own expected utility plus the weighted value of agent j's expected utility where the weight depends on the social distance between i and j.

Now consider the first-order condition that determines the optimal investment in x. To simplify notation, let $U_i^L = U_i(w_i^L(x))$, $U_i^N = U_i(w_i^N(x))$ and $\Delta_i = U_i^N - U_i^L$. Using similar notation define $\Delta_j = U_j^N - U_j^L = U_j(w_J^L(x)) - U_j(w_j^N(x))$. The optimal level of x can now be determined by satisfying

$$
\frac{\partial U_i^N}{\partial x} - p_i\frac{\partial \Delta_i}{\partial x} - \Delta_i\frac{\partial p_i}{\partial x} + K_{ij}\left[\frac{\partial U_j^N}{\partial x} - p_j\frac{\partial \Delta_j}{\partial x} - \Delta_j\frac{\partial p_j}{\partial x}\right] = 0 \tag{7}
$$

It is clear from (7) that agent i no longer simply maximizes expected utility from own income but instead maximizes a weighted average of our expected utility and agent j's expected utility

where the weight again depends on agent *j*t's social capital. Rearranging (7) we see that agent *i* chooses *x* so that

$$(8) \qquad \frac{\partial U_i^N}{\partial x} + K_{ij}\frac{\partial U_j^N}{\partial x} = \left(p_i\frac{\partial \Delta_i}{\partial x} + K_{ij}p_j\frac{\partial \Delta_j}{\partial x}\right) + \left(\Delta_i\frac{\partial p_i}{\partial x} + K_{ij}\Delta_j\frac{\partial p_j}{\partial x}\right)$$

In other words, agent *i* choose *x* so that the weighted marginal utility from own income and agent *j*'s income equals the expected loss in marginal utility from the occurrence of the bad outcome and the change in the probability of bad outcome occurring. Here the bad outcome impacts behavior through both changes in own income and agent *j*'s income, again depending on agent *j*'s social capital.

We can use (7) to further examine the impacts of social capital on agent *i*'s responses to risk. Taking the total derivative we find

$$(9) \qquad \frac{dx}{dK_{ij}} = \frac{-\frac{\partial U_j^N}{\partial x} + p_j\frac{\partial \Delta_j}{\partial x} + \Delta_j\frac{\partial p_j}{\partial x}}{H}$$

where *H* is the derivative of (7) with respect to *x* and is negative by the second-order condition. Equation (9) tells us what impact an exogenous change in K_{ij} will have on agent *i*'s investment. In general the sign of (9) is ambiguous and can not be signed without imposing more structure on the problem facing agent *i*. To further explore the sign of (9) we use the definition of Δ_j and (5) to rewrite (9) as

$$(10) \qquad \frac{dx}{dK_{ij}} = \frac{-\left[\frac{\partial U_j^N}{\partial w_j^N} - p_j\left(\frac{\partial U_j^N}{\partial w_j^N} - \frac{\partial U_j^L}{\partial w_j^L}\right)\right]\frac{\partial \pi_i}{\partial x} + p_j\frac{\partial U_j^L}{\partial w_j^L}\frac{\partial w_j^L}{\partial x} + \Delta_j\frac{\partial p_j}{\partial x}}{H}$$

It is clear from (10 that there are three factors that play a key role in determining the impact of agent *j*'s social capital on agent *i*'s investment in *x*: 1) *income effect*, the change in agent *j*'s income resulting from a change in *x*, $\frac{\partial \pi_j}{\partial x}$; 2) *loss effect*, the change in the magnitude of loss as a result of a change in *x*, $\frac{\partial L_j}{\partial x}$; and 3) *risk effect*, the change in the probability of a loss for agent *j* as a result of a change in *x*, $\frac{\partial p_j}{\partial x}$. Characterizing the nature of each of these factors for the particular problem facing agent *i* can help us understand the role of social capital in the investment decision a risky asset.

Result 1. If increasing the investment in *x* by agent *i* increases (decreases) *j*'s income, then the **income effect** from an increase in social capital coefficient K_{ij} causes an increase (decrease) in the optimal investment level of *x*. The magnitude of the income effect increases with the magnitude of the potential loss to agent *j*.

To demonstrate the income effect, consider the effect of an increase in *x* on agent *j*'s income in isolation (i.e., $\frac{\partial L_j}{\partial x} = \frac{\partial p_j}{\partial x} = 0$). When $\frac{\partial \pi_j}{\partial x} > (<)\ 0$ an increase in the use of *x* causes an increase (decrease) in the level of agent *j*'s income.

Because $\frac{\partial U_j^N}{\partial w_j^N} - p_j\left(\frac{\partial U_j^N}{\partial w_j^N} - \frac{\partial U_j^L}{\partial w_j^L}\right) > 0$, we see from (8) that $\frac{dx}{dK_{ij}} > (<) = 0$ as $\frac{\partial \pi_j}{\partial x} > (<) = 0$. In other words, if *x* increases agent *j*'s income, then an increase in social

capital (i.e., increase in K_{ij}) will increase investment in x. However if x decreases agent j's income, then an increase in social capital will decrease the investment in x.

Finally because the difference between $\frac{\partial U_j^N}{\partial w_j^N}$ and $\frac{\partial U_j^L}{w_j^L}$ increases as the magnitude of the loss increases we see from (10) that the magnitude of the impact of an increase in social capital on the investment in x will increase with the magnitude of the potential loss.

Result 2. If increasing the investment in x by agent i increases (decreases) in magnitude of the potential loss faced by agent j, then the **loss effect** from an increase in social capital coefficient K_{ij} causes a decrease (increase) in the optimal investment level of x. The magnitude of the loss effect increases with the magnitude of the potential loss and likelihood of the loss occurring.

Consider the impact of x on the magnitude of the potential loss faced by agent j in isolation (i.e., $\frac{\partial \pi_j}{\partial x} = \frac{\partial p_j}{\partial x} = 0$). When $\frac{\partial L_j}{\partial x} > (<)\ 0$the amount of potential loss increases (decreases) as the investment in x goes up. Using (8) we see that $\frac{dx}{dK_{ij}} > (<) = 0$ as $\frac{\partial L_j}{\partial x} < (>) = 0$. If x decreases the potential loss, then an increase in social capital will increase investment in x. On the other hand, if x increases the size of the loss, an increase in social capital decreases the investment in x. Because $\frac{\partial U_j^L}{\partial w_j^L}$ increases as the size of the potential loss we see from (10) that the magnitude of the impact of social capital on the investment in x will increase with both the magnitude of the potential loss and the likelihood of the loss occurring.

Result 3. If increasing the investment in x by agent i increases (decreases) the likelihood of a loss to agent j, then the **risk effect** from an increase in social capital coefficient K_{ij} causes a decrease (increase) in the optimal investment level of x. The magnitude of the risk effect increases with magnitude of the potential loss.

To this, examine in isolation the impact of x on the likelihood of agent j experiencing the loss (i.e., $\frac{\partial \pi_j}{\partial x} = \frac{\partial L_j}{\partial x} = 0$). When $\frac{\partial p_j}{\partial x} > (<)\ 0$, an increase in the investment in x causes an increase (decrease) in the likelihood of the bad event occurring. From (10) we see that $\frac{dx}{dK_{ij}} > (<) = 0$ as $\frac{\partial \rho_j}{\partial x} < (>) = 0$. If investment in x decreases the probability that agent j will realize the bad event, then an increase in social capital will increase investment in x. However, if investment in x increases the likelihood of the bad event, then an increase in social capital causes a decrease in x. Because Δ_j increases with the size of the potential loss faced by agent j, we see from (10) that the magnitude of the impact of change in social capital on the investment in x will increase with magnitude of the potential loss.

Result 4. The impact on the investment of risky asset x by agent i resulting from a change in social capital coefficient K_{ij} depends on the combined income, loss, and risk effects. If a change in x causes the income, loss, and risk effects to impact investment x in the same direction, then the impact of change in social capital on the optimal investment in x can be determined unambiguously. Otherwise, the magnitudes of each effect are necessary to determine the investment response to a change in social capital.

The combined income, loss, and risk effects in (10), determine the effect of a change in the social capital coefficient K_{ij} on risk investment x. Consider the case where the choice of x has no impact on agent j's income level but increases the probability of the bad event and the magnitude of the loss (i.e., $\frac{\partial \pi_j}{\partial x} = 0$, $\frac{\partial L_j}{\partial x} > 0$, $\frac{\partial p_j}{\partial x} > 0$). Under these conditions (10) shows that the investment in x will decline as social increases, $\frac{dx}{dK_{ij}} < 0$. Here agent i reduces the investment x because, as social capital increases, he/she places more weight on the increase in potential loss to agent j and the increase in the likelihood of agent j experiencing a loss, as a result of his/her actions. Now suppose that increases in the investment in x decreases the likelihood of a loss for agent j and increase j's income (i.e., $\frac{\partial \pi_j}{\partial x} > 0$, $\frac{\partial L_j}{\partial x} = 0$, $\frac{\partial p_j}{\partial x} < 0$. Here (10) shows that agent i will increase his investment in x as social capital increases, $\frac{dx}{dK_{ij}} > 0$, in order to both increase agent j's income and reduce the risk of loss to agent j.

Sometimes the income, loss, and risk effects can work in opposite directions. For example, suppose that investment in x increases agent j's income but also increases the likelihood of the loss (i.e., $\frac{\partial \pi_j}{\partial x} > 0$, $\frac{\partial L_j}{\partial} = 0$, $\frac{\partial p_j}{\partial x} > 0$). Now (10) is ambiguous and we are unable to predict how an increase in K_{ij} will effect investment in x. Agent i now wishes to increase x to increase agent j's income, but is reluctant to do so because at the same time an increase in x will increase the probability that agent j will experience the loss. In many cases, to predict the effect of increase in K_{ij} on x we need to measure the magnitudes of terms in (10).

$$(11) \qquad \left[\frac{\partial U_j^N}{\partial \pi_j} - p_j\left(\frac{\partial U_j^N}{\partial \pi_j} - \frac{\partial U_j^L}{\partial \pi_j}\right)\right]\frac{\partial \pi_j}{\partial x} - \Delta_j \frac{\partial p_j}{\partial x} > (<) = 0$$

In other words, if the gain in marginal utility from an increase in agent *j*'s income is greater than (less than) the weighted increase in the likelihood of the bad event occurring, then the investment level will increase (decline).

In total there are 27 possible combinations concerning the signs of the income, loss, and risk terms. Each of the possible combinations and the corresponding impact of social capital investment in *x*, $\frac{dx}{dK_{ij}}$, are shown in Table 1. Fifteen of the possible cases produce an unambiguous social capital effect on the investment in *x*. In the remaining 12 ambiguous cases the magnitudes are required to determine the impact of social capital on the investment level.

Measuring Risk Responses

A simple empirical study was conducted to illustrate of the interaction between risk and relationships using a random sample of Michigan county extension agents. The agents were selected for the survey because a significant amount of their work requires travel and they are sometimes asked to provide transportation services. Thus they are accustomed to evaluating the risk of an automobile accident.

A telephone survey resulted in 90 usable responses. The respondents were asked to report the most miles they would drive someone under various risk conditions. Specifically, they were asked to report the miles of free transportation they would be willing to provide someone they didn't like ($K_{ij} <0$), a stranger ($K_{ij} = 0$), and a friend ($K_{ij} > 0$) under two different types of weather: (1) sunny with clear roads; and (2) bad weather with snow on roads that was not completely cleared. To control for other factors influencing their responses, survey respondents were also asked if they drove a 4-wheel drive vehicle, their gender, their age, and if they carried car and life insurance. In terms of (10), *x* represents the amount of free

transportation provided. When the extension agents provides the free transportation he/she is effectively transferring income to the passenger so $\frac{\partial \pi_j}{\partial x} > 0$. While the magnitude of loss is not likely impacted by the amount of transportation provided, $\frac{\partial L_j}{\partial x} = 0$, the likelihood of an accident may indeed increase, so that $\frac{\partial p_j}{\partial x} > 0$. From (8) we see that the impact of social capital on the amount of transportation provided is ambiguous in general and depends on condition (11). If (11) for the extension agent is >(<) = 0, then $\frac{dx}{dK_{ij}} >(<) = 0$. That is, if (9) is > 0, the income effect is greater (less) than the effect of increasing risk and the agent will provide increasing (decreasing) amounts of transportation as social capital increases (decreases).

The impact of respondent characteristics and relationships on the willingness to drive was analyzed using tobit regression since miles offered were bounded below by zero. The model regressed the level of miles offered on the respondent's relationship to the passenger, the road characteristics, whether the respondent owned a 4-wheel drive vehicle, the respondent's gender, and whether or not the respondent carried significant amounts of car and life insurance. The results of the tobit regression are reported in Table 2.

The constant term in Table 2 measures the miles offered if the request were from someone the driver dislikes, the weather is good, the driver is a female without a 4-wheel drive vehicle or insurance. We find that the number of miles the respondents are willing to drive a friend is greater than the number of miles they are willing to drive a stranger which, in turn, is greater than the distance they will drive someone they dislike. Respondents will drive a friend (stranger) an average of 119 (42) miles further than someone they don't like. These results show the income effect out weighs the risk effect for the agents (i.e., condition (11) is positive) and provide clear support of the notion that relationships influence the respondent's decision to provide transportation services.

On average, requests to drive under bad weather conditions (an exogenous shift in risk) reduce the offer by 60 miles. Meanwhile, the respondent's age has little impact on the willingness to drive. Male drivers on average would be willing to offer nearly 43 miles more than female drivers and owning a 4-wheel drive vehicle adds nearly 26 miles to the offer. Finally, carrying significant amounts of insurance adds nearly 20 miles to the distance respondents would be willing to drive. All of the coefficients in Table 2 were significant at the one percent level or higher except the constant term and the age variable.

Summary and Conclusions

Social capital can be used to model the impacts of different types of relationships on economic behavior. Previous models of social capital and its influence on economic transactions have focused on problems facing decision makers under certainty. The results in this paper extend previous work in this area by exploring the impacts of social capital on investment behavior under risk using an expected utility framework.

The results, as expected, suggest that social capital increases the complexity of the investment decision when the investment level influences the well being of the other agent with whom social capital exists. In the simply model considered here, the impacts of social capital on the investment decision depends on how the investment effects the other agent's income level (income effect), potential loss in case of a bad event occurring (loss effect), and the likelihood of a bad event occurring (risk effect).

In general the impact of social capital on investment under risk is ambiguous. However, the impact can be determined for many types of investments. For example, it is shown that if the investment has a positive income effect and negative loss and risk effects then an increase in

social capital will increase the level of investment. For some investments, the income, loss, and risk effects are offsetting we need additional information on preferences and the income, loss, and risk effects in order to determine the impact of social capital on the investment level.

To illustrate the impacts of social capital on behavior under risk, a sample of county extension agents were asked how much free transportation they would provide someone under risky driving conditions. The investment in driving involved an income transfer to the other agents, but also increased the risk of loss (in case of an accident) so the income and risk effects were offsetting. A prior, the impact of social capital on the amount transportation provided in this case is ambiguous and must be measured empirically. The results show the amount of transportation provided by the extension agents would increase as the level of social capital increases indicating that 1) social capital does impact economic behavior and 2) that the income effect outweighed the risk effect for this investment.

This paper provides a simple framework that can be used to incorporate the effects of social capital on economic behavior under risk. Future work in this area might focus on generalizing the risk model and/or incorporating other forms of social capital. In addition, it would be useful to empirically measure the impacts of social capital on many risky investment decisions in the agriculture sector.

Table 1. Impact of Social Capital on the Level of Investment

Factors			Change in Investment as Social Capital Increases
Income $\left(\frac{\partial \pi_j}{\partial x}\right)$	**Loss** $\left(\frac{\partial L_j}{\partial x}\right)$	**Risk** $\left(\frac{\partial p_j}{\partial x}\right)$	**Investment** $\left(\frac{\partial x}{\partial K_{ij}}\right)$
=0	=0	=0	=0
=0	>0	=0	<0
=0	<0	=0	>0
>0	=0	=0	>0
>0	>0	=0	?
>0	<0	=0	>0
<0	=0	=0	<0
<0	>0	=0	<0
<0	<0	=0	?
=0	=0	>0	<0
=0	>0	>0	<0
=0	<0	>0	?
>0	=0	>0	?
>0	>0	>0	?
>0	<0	>0	?
<0	=0	>0	<0
<0	>0	>0	<0
<0	<0	>0	?
=0	=0	<0	>0
=0	>0	<0	?
=0	<0	<0	>0
>0	=0	<0	>0
>0	>0	<0	?
>0	<0	<0	>0
<0	=0	<0	?
<0	>0	<0	?
<0	<0	<0	?

Table 2. Tobit Analysis of Respondents' Offer to Provide Transportation Services

Variable	Coefficient	t-Statistic	2-Tail Significance
Constant	-42.501	-.731	.0835
Friend	119.330	11.999	.0000
Stranger	41.747	4.141	.0000
Risk	-60.392	-7.648	.0000
Age	-.075	-0.174	.8621
Gender	42.677	4.029	.0001
4-Wheel Drive Vehicle	25.523	2.705	.0068
Insurance	19.885	1.151	.2497

Endnotes

1. Social capital is partly fungible because providing socio-emotional goods generally requires personalized social capital. A friend of a friend may provide us access to physical goods and services on preferential terms to please our common friend. However this same friend of a friend is likely unable to provide us socio-emotional goods because these require a personalized relationship that doesn't exist. Similarly, human capital is only partly fungible because we do not permit slavery or involuntary servitude.

2. The utility function could be specified in other ways. For example, it is possible that U_j contains the arguments π_i and $K_{ij.}$ In this case if *i* can act in a way to increase his/her social capital, K_{ji}, he/she may increase his/her potential for preferential treatment from agent *j*.

3. See O. Stark for a detail study of altruism and its applications to within family transfers.

4. For a more detailed discussion of the five motives see Robison and Schmid (1996).

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