Staff Paper

SOCIAL CAPITAL, THE TERMS OF TRADE,
AND THE DISTRIBUTION OF INCOME

Lindon J. Robison,
Robert J. Myers, and
Marcelo E. Siles

Staff Paper No. 99-22 August 1999

Department of Agricultural Economics
MICHIGAN STATE UNIVERSITY
East Lansing, Michigan 48824

SOCIAL CAPITAL, THE TERMS OF TRADE, AND THE DISTRIBUTION OF INCOME

by

Lindon J. Robison
E-Mail: robison@msu.edu

Robert J. Myers
E-Mail: myersr@msu.edu

Marcelo E. Siles
E-Mail: siles@msu.edu

AEC Staff Paper No. 99-22

August 1999

Lindon J. Robison and Robert J. Myers are Professors in the Department of Agricultural Economics; and Marcelo E. Siles is the Director of the Social Capital Initiative in the Institute of Public Policy and Social Research and an Assistant Professor in the Center for Integrative Studies for Social Science at Michigan State University, respectively.

ABSTRACT
(30 pages)

Social capital, a person or group's sympathy or sense of obligation for another person or group, assumes relationships can alter the terms of trade and the likelihood of trades between individuals. Other important economic consequences of social capital result from its ability to internalize externalities. This paper introduces social capital into the neoclassical model to derive forecasts of how relationships will alter the minimum-sell prices of farmland and the likelihood of trades between persons with different relationships. Also deduced in this paper is the effect of social capital on the level and dispersion of benefits from trade. Empirical evidence from a 1,500 farmland owner-operator survey is analyzed and provides support for the social capital paradigm.

SOCIAL CAPITAL, THE TERMS OF TRADE, AND THE DISTRIBUTION OF INCOME

Introduction

Social capital is defined by Robison, Schmid, and Siles (RSS) as:

. . . a person or group's sympathy or sense of obligation for another person or group.[1]

Alternative definitions of social capital are summarized in Woolcock. RSS argue that the meaning of social capital lacks precision because many of its proposed definitions include expressions of its possible uses, where it resides, and how its service capacity can be changed. Hence, these definitions differ across disciplines and make interdisciplinary communication difficult. The RSS definition is an effort to describe social capital in a way that communicates across disciplines by separating its definition from discussions of its uses, where it resides, and how its service capacity can be changed.

Social capital in some ways is "old wine in a new bottle." The old idea is that social relations can be a resource for or constraint on action. Social capital is similar to "esprit de corps," a spirit of devotion and enthusiasm among members of a group for one another. Veblen referred to what we now identify as social capital as an intangible asset and Adam Smith accurately described social capital in the following words:

> *Every man feels his own pleasures and his own pains more sensibly than those of other people. After himself, the members of his own family, those who usually live in the same house with him, his parents, his children, his brothers and sisters, are naturally the objects of his warmest affections.*

Social capital introduces several changes into the standard economic analysis that assumes symmetric and arm's length social relationships. First, social capital allows for sympathetic (antipathetic) relationships that are not always symmetric. Allowing sympathetic (antipathetic) relationships that are not always symmetric redefines externalities. An externality is created when a consequence is imposed by one agent on another agent without due compensation. An externality is internalized when the externality is experienced vicariously by the externality creating agent.

A person or group of persons that is the object of another person or group of persons' sympathy has social capital and can expect to receive preferential treatment because its experiences are internalized by the social capital provider(s). Sympathetic agents, social capital providers, respond not only to their own incentives but also to the consequences of their actions on other persons or group of persons who are the object of their sympathy. Sympathetic agents may create organizations and institutions that provide preferential treatment to others, but only people experience sympathy and thus only people can provide social capital.

In the sections that follow, several important results are deduced from including social capital in economic models, including the following. A sympathetic agent will allocate resources beyond his/her own profit maximizing output when there are benefits (costs) to the objects of his/her sympathy. An absence of social capital will lead an agent to behave as though his/her preferences were selfish. If social capital is strong enough to induce an agent to weigh his/her own income and another agent's equally, then the agent will allocate resources to maximize the total income of both agents. Finally, asymmetry in relationships creates exploitation opportunities that may produce inefficient resource allocations. For example, a "spoiled kid" employed by his or her parents and who enjoys their sympathy may not be required to produce the same output as nonrelated workers employed by the parents. This capacity to produce inefficiencies in the allocation and reward of productive factors is one of the interesting effects of social capital. Another interesting aspect of social capital is that it possesses most of the capital-like properties associated with other forms of capital, and therefore is capable of inclusion in a formal economic model.[2]

What Social Capital Adds to the Economic Paradigm

The point of social capital is the following. Agents rationally attempt to meet not only economic and physical needs, but social ones as well. These social needs include the need for validation, the need to experience caring, and the need for knowledge of connections between actions and physical and social outcomes. Economic and physical needs are fulfilled by the consumption of goods and services provided by physical, financial, and human capital. Social needs are fulfilled by consuming social services supplied by social capital that resides in relationships. Thus, the study of rational choice theory must consider not only physical, financial, and human capital but also social capital because rational agents seek to satisfy both physical and social needs.

While the traditional measures of profit and wealth may provide adequate proxies for economic services in many traditional economic models, they contain no arguments that represent an agent's social needs, nor the mechanism through which these needs are satisfied. Thus, traditional profit and utility maximization models fail to account for social motives that often substitute for, and sometimes complement, the pursuit of economic goals.

Perhaps one reason economists have failed to incorporate social goals into traditional models is because including them can complicate mathematical results. While some models such as principle agent, transaction cost, club models, and altruism models may allow outcomes to mimic those obtained from social capital models, they do so inadequately because they do not recognize that social capital assets reside in relationships in which resources are invested and disinvested, and that provide services valued by agents.

The paradigm of social capital offers an opportunity to cooperate with other social sciences that recognize the importance of social relations. What this cooperation requires is for economists to recognize that agents allocate their resources to achieve both economic and social goals. The social capital paradigm allows us to consider relationships as a form of capital that can be used to achieve both economic and social goals. It further enhances economic analysis by recognizing that social capital, like other forms of capital, can be an endogenous variable that can be changed through investment (disinvestment), maintenance, and use in ways consistent with well-accepted maximization principles.

Modeling Social Capital

There are two ways to incorporate social capital into the neoclassical economic model. One way is to assume that social needs are supplied by social services that are produced in a social capital factory. In this approach, to obtain more social capital services requires increased social capital investments. Here the challenge is to describe the social capital factory and the connection between social capital (the factory) and the production of social capital services.

Another way to introduce social capital into the neoclassical economic model, the method we follow here, is to assume that people satisfy social needs through vicarious experiences–something like watching an engrossing movie in which the viewer becomes involved with the actors, experiencing vicariously their successes and disappointments. In this approach to modeling social capital, agent *i* experiences another agent, *j*'s, well-being vicariously. The appropriate model would be one that includes *j*'s experiences, weighted by a social capital coefficient describing the nature and the strength of *i*'s relationship with *j*, directly into agent *i*'s utility function.

When agent *j* is the object of agent *i*'s sympathy, then agent *j* has social capital and agent *j*'s well-being appears in agent *i*'s utility function. When agent *i*'s social capital services are supplied by his/her social capital that resides in agent *j*, then agent *i* may view investment in social capital that resides with *j* as a means of increasing his/her supply of social capital services.

Complicating this entire process are the results accepted by many that social capital substitutes for other kinds of capital and produces economic benefits as well as social capital services. For example, agent *i* may offer to agent *j* preferential terms of trade. This offer may have an effect on *i*'s financial well-being, may produce beneficial vicarious experiences, and may increase both *i* and *j*'s social capital.

Finally, one could argue that vicarious experiences satisfy a need. This argument has some support from evidence that we choose the location and intensity of our vicarious experiences. For example, it is well known that winning football teams attract more fans than losing ones. One explanation is that the vicarious experience of watching one's home team succeed is more rewarding than watching a losing team. Furthermore, we may often intensify our experiences of watching a winning football team by wearing the school colors, cheering for the home team, and other actions, all of which result in the home team's increase in social capital.

In what follows, we intend to make some introductory steps in modeling the vicarious experience associated with social capital. Assume two economic agents *i* and *j* whose respective incomes are $\pi_i(\alpha_i)$ and $\pi_j(\alpha_i)$ where α_i is a resource controlled by agent *i* with external consequences for the income of agent *j*. An example might be an agricultural producer whose efforts to control pests on his own farm alter his neighbor's pest population. We also assume that agent *j* has social capital k_{ij} supplied by agent *i*. For the moment, k_{ij} is considered to be exogenous, such as might be the case if social capital were inherited or based on genealogy or other conditions related to one's birth. For illustrative purposes, we assume *i*'s utility function depends on a linear combination of i and j's profits, with the weight on j's profit being determined by the social capital coefficient k_{ij}. Agent i's problem then becomes:

$$\max_{\alpha_i} \; U_i \; [\pi_i(\alpha_i) + k_{ij}\pi_j(\alpha_i)] \tag{1}$$

where $U_i[\cdot]$ is any increasing and concave function, $\pi_i(\alpha_i)$ and $\pi_j(\alpha_i)$ are increasing and concave in α_i, and $\pi_i(\alpha_i)$ reaches a maximum value at $\pi_i(\bar{\alpha}_i)$.

This preference specification is clearly restrictive because it requires social capital (and the associated vicarious sensing) to enter the utility function in a very special (linear) way. The linear specification is used because it allows interesting results to be easily derived. Many of the main results in this paper follow through for a more general representation of preferences, $U_i \; [\pi_i(\alpha_i), \pi_j(\alpha_i); k_{ij}]$, but the derivations are more complex.[3]

We assume $-1 < k_{ij} < 1$. Values of $k_{ij} > 1$ imply agent i has more concern for how his/her actions affect agent j's income than how they affect his/her own income, which seems unreasonable. Values of $k_{ij} < 1$ imply agent i would seek to reduce j's income even if the cost to himself/herself is greater than the loss to j, which also seems unreasonable. Either attitude would threaten agent i's survival in the long run.

Many readers will note that equation (1) is similar to a standard altruism model with the welfare of one agent depending on the welfare of another. The difference here, however, is that we characterize the vicarious sensing in terms of a social capital coefficient and examine what happens to the use of α_i, terms of trade, and the distribution of income, as k_{ij} takes on different values.

It should be clear in equation (1) that agent i's choice of α_i has consequences for agent j's income. Furthermore, equation (1) implies agent i's utility function has the following properties. First, isoquants for equation (1) can be expressed as:

$$C = U_i\ [\pi_i(\alpha_i) + k_{ij}\,\pi_j(\alpha_i)] \text{ or } U_i^{-1}\ [C] = \pi_i(\alpha_i) + k_{ij}\,\pi_j(\alpha_i) \tag{2}$$

where C is a constant utility level. Second, the slope of the isoquants of the model in income space can be represented as:

$$\frac{d\pi_i}{d\pi_j} = -k_{ij} \tag{3}$$

Equation (3) implies that agent i would exchange income with agent j at the rate of $\frac{1}{k_{ij}}$. For $0 < k_{ij} < 1$, this implies i would reduce his/her own income by one unit if it increased k's income by $\frac{1}{k_{ij}}$.

The Influence of Social Capital on the Terms of Trade

Much of the recent empirical work in economics and social capital has to do with demonstrating that social capital alters the terms of trade. For the most part, these results show that those with social capital receive preferential terms of trade. What follows is a theoretical model predicting that increases in social capital improve the likelihood of trade and the terms of trade for social capital owners.

Assume agent i owns a resource represented by ζ that he/she is considering selling to agent j at a minimum-sell price of p_{ij}^s. The effect of the resource transfer on i and j's profits can be expressed as $-\Delta\pi_i(\zeta) = \pi_i(\alpha_i) - \pi_i\left(\alpha_i + \zeta\right) < 0$ and $\Delta\pi_j(\zeta) = \pi_j\left(\alpha_j + \zeta\right) - \pi_j\left(\alpha_j\right) > 0$, respectively, where α_i (α_j) represents agent i's (j's) resource base without ζ included. Agent i's minimum-sell price is a price that leaves him/her on the same iso utility line before and after the sale. This can be written using ζ as:

$$\pi_i\left(\alpha_i + \zeta\right) + k_{ij}\,\pi_j(\alpha_j) = \pi_i\left(\alpha_i\right) + p_{ij}^s + k_{ij}\left[\pi_j\left(\alpha_j + \zeta\right) - p_{ij}^s\right] \tag{4}$$

Solving for agent i's minimum-sell price as a function of k_{ij}, we obtain:

$$p_{ij}^s = \frac{\Delta\pi_i(\zeta) - k_{ij}\Delta\pi_j(\zeta)}{1 - k_{ij}} \tag{5}$$

If agent j's social capital is zero, agent i's minimum-sell price offered to agent j, p_{ij}^s equals his/her opportunity cost of selling the asset, $\Delta\pi_i(\zeta)$. If agent j has social capital, then agent i's minimum-sell price to j is unlikely to equal his/her opportunity cost of $\Delta\pi_i(\zeta)$. To determine how agent j's social capital alters agent i's minimum-sell price, we differentiate to obtain the effect of a change in social capital on the minimum-sell price. The result is:

$$\frac{\partial p_{ij}^s}{\partial k_{ij}} = \frac{\Delta\pi_i(\zeta) - \Delta\pi_j(\zeta)}{(1 - k_{ij})^2} \tag{6}$$

Note that the qualitative effect of a change in social capital on the minimum-sell price for k_{ij} depends on the sign of the numerator in equation (6). The sign of the numerator in equation (6) equals the difference in agent i and agent j's opportunity cost of using the asset ζ. If $\left[\Delta\pi_i(\zeta) - \Delta\pi_j(\zeta)\right] < 0$ (> 0), we say agent j has a comparative advantage (disadvantage) in the use of ζ and an increase in social capital reduces (increases) agent *i*'s minimum-sell price to agent *j*.

Equations (5) and (6) imply the following results which are summarized in Figures 1 and 2 and Table 1.

In Figure 1, agent *i* has a comparative advantage in the use of the asset. If agent *j* enjoys agent *i*'s sympathy (antipathy), then agent *i* will charge agent *j* a price above (below) his or her own opportunity cost, $\Delta\pi_i(\zeta)$, to discourage (encourage) agent *j*'s purchase. In Figure 2, agent *j* has a comparative advantage in the use of the asset. If agent *j* enjoys agent *i*'s sympathy (antipathy), then agent *i* will charge agent *j* a price below (above) his or her own opportunity cost, $\Delta\pi_i(\zeta)$, to encourage (discourage) agent *j*'s purchase. If k_{ij} is zero (no social capital), then *i*'s minimum-sell price is his/her opportunity cost $\Delta\pi_i(\zeta)$ regardless of the comparative advantage of agent *j* to agent *i*.

The results of Figures 1 and 2 are also described in Table 1 and the likelihood of a sale is discussed. A necessary condition for a sale to occur when $k_{ji} = 0$ is $p_{ij}^s < \Delta\pi_j(\zeta)$; i.e., when agent *j* faces a minimum-sell price below his or her own gains from trade.

The middle row in Table 1 needs little explanation; the minimum-sell price equals agent *i*'s opportunity cost when the prospective buyer is a stranger and the sale depends on the buyer having a comparative advantage equal to or exceeding that of the seller in the use of the resource. The first row considers the likelihood of a sale to a friend. In this model, the seller recognizes that total income would be reduced, remain the same, or be increased by the sale to a friend depending on the comparative advantage of the buyer. A sale is likely only when *j* has the comparative advantage, in which case *i* offers *j* a discount below his or her opportunity cost to encourage the sale. A sale is unlikely when agent *i* holds the comparative advantage because agent *i*'s minimum-sell price is always above agent *j*'s opportunity cost.

The last row considers the sale of the asset to an enemy. In this case, utility of the seller may be increased if the income of the buyer is reduced by his/her paying a price p_{ij}^{s} greater than his or her opportunity cost $\Delta\pi_j(\zeta)$. Thus, the seller offers a discount when holding a comparative advantage and a premium when holding a comparative advantage. However, only when the buyer holds a comparative advantage is a sale likely and even then may not occur if agent *j* can purchase the same resource from a stranger or a friend.

The conclusion is that the sale of "ζ" is unlikely to occur when the seller has antipathy toward the buyer, even when the buyer has an arm's length relationship toward the seller. In addition, sales are likely to occur between friends and strangers only when the buyer has a comparative advantage in the use of the asset.

From agent *j*'s perspective, we might consider his/her maximum-bid price, p_{ji}^{b}, to also be a function of social capital; in this case agent *i*'s social capital is k_{ji}. In such a model, we could easily deduce a maximum-bid price equal to:

$$p_{ji}^{b} = \frac{\Delta\pi_j(\zeta) - k_{ji}\,\Delta\pi_i(\zeta)}{1 - k_{ji}} \tag{7}$$

and:

$$\frac{\partial p_{ij}^{b}}{\partial k_{ji}} = \frac{\Delta\pi_j(\zeta) - \Delta\pi_i(\zeta)}{\left(1 - k_{ji}\right)^2} \tag{8}$$

suggesting that the maximum-bid prices increase with k_{ji} as long as *j* has a comparative advantage.

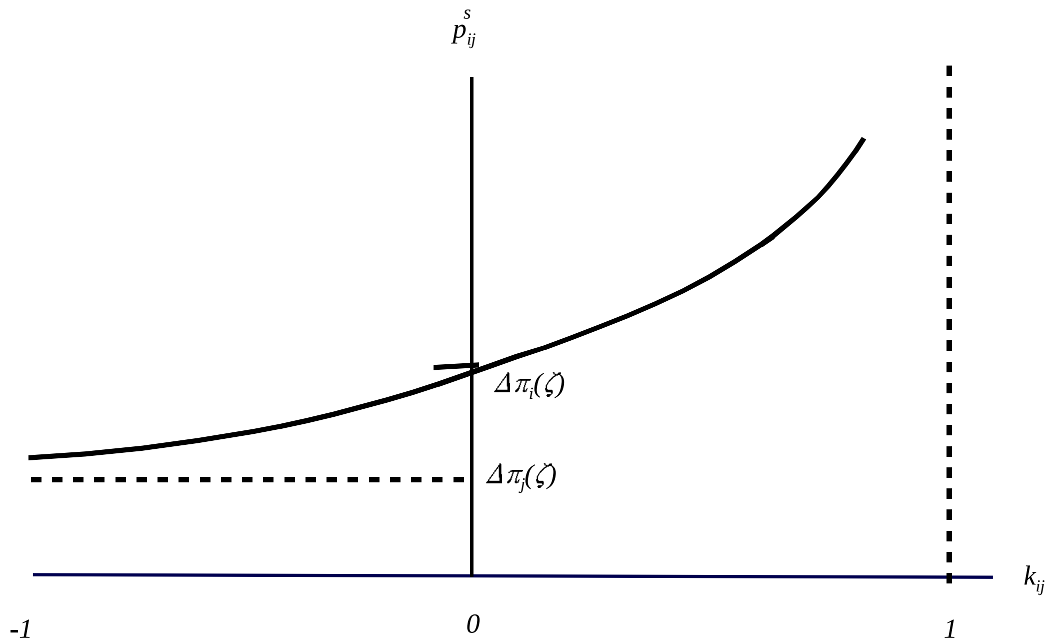

***Figure 1.** Agent i's Minimum-Sell Price p_{ij}^{s} as a Function of k_{ij} When He/She Has a Comparative Advantage in the Use of the Asset, $\Delta\pi_i(\zeta) > \Delta\pi_j(\zeta)$.*

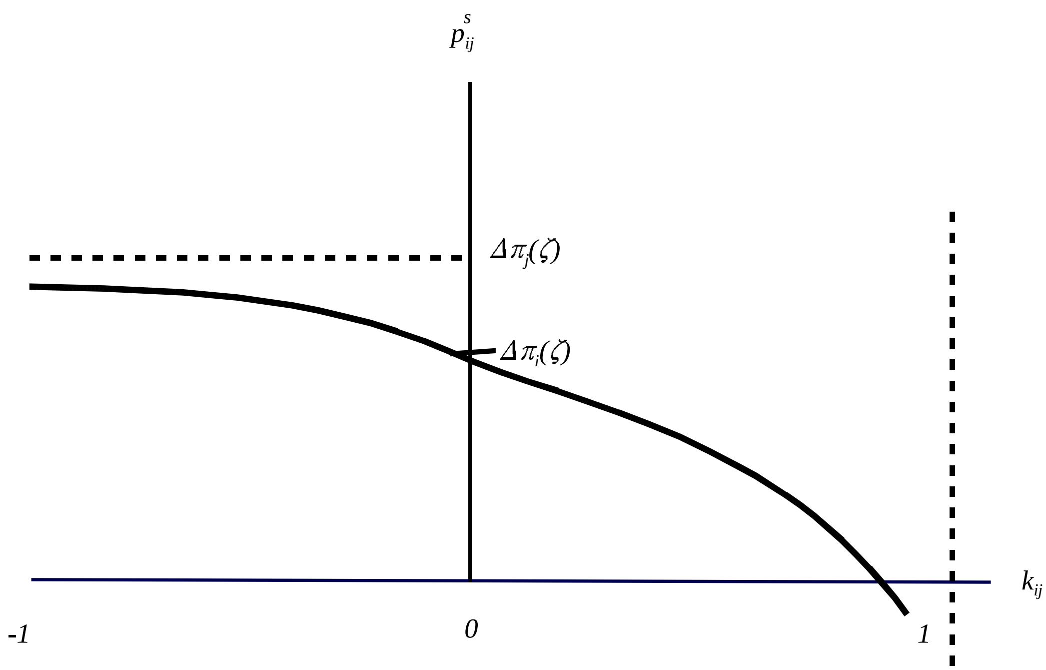

***Figure 2.** Agent i's Minimum-Sell Price p_{ij}^{s} as a Function of k_{ij} When Agent j Has a Comparative Advantage in the Use of the Asset, $\Delta\pi_i(\zeta) < \Delta\pi_j(\zeta)$.*

Table 1. Minimum-Sell Price as a Function of Social Capital and Comparative Advantage

Values for Social Capital Coefficient	Comparative Advantages		
	$\Delta\pi_i(\zeta) > \Delta\pi_j(\zeta)$ (agent *i* has comparative advantage)	$\Delta\pi_i(\zeta) = \Delta\pi_j(\zeta)$ (neither *i* nor *j* have comparative advantage)	$\Delta\pi_i(\zeta) < \Delta\pi_j(\zeta)$ (agent *i* has comparative advantage)
$k_{ij} > 0$	$\Delta\pi_j(\zeta) < \Delta\pi_i(\zeta) < p_{ij}^s$ Agent *i* offers "ζ" for sale to a friend at his/her opportunity cost plus a premium and a sale is *unlikely*.	$\Delta\pi_j(\zeta) = \Delta\pi_i(\zeta) = p_{ij}^s$ Agent *i* offers "ζ" for sale to a friend at his/her opportunity cost. Agent *j* is indifferent about the opportunity and a sale is *unlikely*.	$p_{ij}^s < \Delta\pi_i(\zeta) < \Delta\pi_j(\zeta)$ Agent *i* offers "ζ" for sale to a friend at his/her opportunity cost less a discount. Agent *j* is facing a price below his/her opportunity cost and a sale is *likely*.
$k_{ij} = 0$	$\Delta\pi_j(\zeta) < \Delta\pi_i(\zeta) = p_{ij}^s$ Agent *i* offers "ζ" for sale to a stranger at his/her opportunity cost. Agent *j* is facing a price above his/her opportunity cost and a sale is *unlikely*.	$\Delta\pi_j(\zeta) = \Delta\pi_i(\zeta) = p_{ij}^s$ Agent *i* offers "ζ" for sale to a stranger at his/her opportunity cost. Agent *j* is indifferent about the opportunity and a sale is *unlikely*.	$p_{ij}^s = \Delta\pi_i(\zeta) < \Delta\pi_j(\zeta)$ Agent *i* offers "ζ" for sale to a stranger at his/her opportunity cost. Agent *j* faces a price below his/her opportunity cost and a sale is *likely*.
$k_{ij} < 0$	$\Delta\pi_j(\zeta) < p_{ij}^s < \Delta\pi_i(\zeta)$ Agent *i* offers "ζ" for sale to an enemy at his/her opportunity cost less a discount. Agent *j* faces a price above his/her opportunity cost and a sale is *unlikely*.	$\Delta\pi_j(\zeta) = \Delta\pi_i(\zeta) = p_{ij}^s$ Agent *i* offers "ζ" for sale to an enemy at his/her opportunity cost. Agent *j* is indifferent about the opportunity and a sale is *unlikely*.	$\Delta\pi_i(\zeta) < p_{ij}^s < \Delta\pi_j(\zeta)$ Agent *i* offers "ζ" for sale to an enemy at his/her opportunity cost plus a premium. Agent *j* faces a price below his/her opportunity cost but likely above the purchase price offered by another agent with the identical asset but who does not consider *j* to be an enemy. A sale is *possible* but *unlikely*.

In addition, a table similar to Table 1 could be created to describe terms of trade offered by the buyer. The conclusions would be comparable with those derived for Table 1. Buyers are unlikely to purchase from their enemies and will purchase from their friends and strangers only when they (the buyers) have a comparative advantage.

We next examine the conditions under which trades are likely to occur when buyer and seller both own (lack) social capital. To make the analysis manageable, we assume social capital symmetry; i.e., $k_{ij} = k_{ji} = k$. Symmetry is a reasonable assumption since asymmetry would permit exploitation that might lead to changes in the social capital provided by the exploited agent until $k_{ij} = k_{ji}$. Symmetry in social capital coefficients might therefore be viewed as a long-run equilibrium condition.

Trades occur when the maximum-bid price is greater than or equal to the minimum-sell price, $p_{ji}^{b} \geq p_{ij}^{s}$. We refer to the difference between the maximum-bid price and minimum-sell price $p_{ji}^{b} - p_{ij}^{s}$ as trade surplus or a measure of the increased value to agents *i* and *j* available for distribution as a result of trade. As the surplus increases, the greater is the benefit from trade. The surplus equation can be expressed as:

$$p_{ji}^{b} - p_{ij}^{s} = \frac{\left[\Delta \pi_j(\zeta) - \Delta \pi_i(\zeta)\right] (1 + k)}{1 - k} \tag{9}$$

Clearly, the surplus increases with *j*'s comparative advantage, and also increases as social capital between the two agents increases provided agent *j*'s has a comparative advantage:

$$\frac{\partial \left(p_{ji}^{b} - p_{ij}^{s} \right)}{\partial \left[\Delta \pi_j(\zeta) - \Delta \pi_i(\zeta)\right]} > 0 \tag{10a}$$

and:

$$\frac{\partial\left(p_{ji}^{b} - p_{ij}^{s}\right)}{\partial k} > 0 \qquad (10b)$$

There is no trade surplus when the comparative advantage associated with the use of ζ remains with agent *i*. Furthermore, the surplus diminishes even if *j* has comparative advantage if $k < 0$. An important conclusion emerges from these results; namely, that increases in social capital lead to higher surpluses and increase the likelihood of trades when the buyer has a comparative advantage. For agents lacking social capital, surpluses only arise from relative differences in comparative advantages.

Empirical Tests of the Importance of Social Capital in Land Transactions

Fifteen hundred farm owner-operators located in Illinois, Michigan, and Nebraska were surveyed to determine the influence of relationships on the selection of trading partners and terms of trade for farmland exchanges. Those surveyed were selected by random sampling techniques designed to sample across the geographic distribution of farmland in each state. The survey method followed that recommended by Dillman including a pre-survey post card describing the survey and its purpose to respondents, mailing the survey, following the survey mailing with a post card encouraging the respondents to mail in their questionnaires, and a second mailing of questionnaires to non-respondents.

Approximately 604 usable questionnaires were returned representing a 40 percent response rate. The response rates by state were 38.8 percent, 48.6 percent, and 33.4 percent for Illinois, Michigan, and Nebraska, respectively. Qualifying the respondents for the survey were ownership of farmland and experience buying and selling farmland. Respondents reported that

82.2 percent, 88.7 percent, and 89.0 percent in Illinois, Michigan, and Nebraska, respectively, had sold farmland. Respondents also reported that 30.4 percent, 24.3 percent, and 24.6 percent in Illinois, Michigan, and Nebraska, respectively, had sold land.

Respondents on average were 57 years old, supported 1.96 dependents financially, and belonged to 1.31 organizations including parent-teacher organizations or school boards, church organizations, service clubs, local government organizations, or environmental organizations. The highest level of educational achievement for over half of those surveyed, 54 percent, was a high school degree. Nearly one-quarter of those surveyed had completed a college degree or graduate degree. Forty-three percent of those surveyed had after-tax household income of less than $30,000. Over 8 percent of the population earned after-tax household income of $70,000 or more. Other details of the survey can be found in Siles et al.

The first goal of the survey was to establish a benchmark land price not influenced by relationships against which prices influenced by social capital could be measured. So, the questionnaire began by describing farmland for sale with the following characteristics: (1) The farmland is average quality non-irrigated crop land and is being offered for sale in either 20-, 40-, or 80-acre units. There are no buildings or other improvements on the land. (2) The farmland is located in the buyer's area near serviceable roads and within 5 miles of a town of nearly 5,000 persons. The land is not considered to have residential site value. (3) The buyer intends to use the land for farming and will provide his/her own financing. (4) The seller will pay 5 percent of the farmland sale price for commissions and other legal fees associated with the sale. (5) Payment for the sale of the land will be provided by the buyer to the seller in the form of a cashier’s check at the time of sale closing. (6) The land being sold is not adjacent to where the seller lives.[4]

To establish the base price against which other prices could be compared, respondents were asked the value professional appraisers and tax assessors would estimate the land to be worth. Then, they were asked to list the lowest price they would accept from a complete stranger who intends to farm the land and whose agent would arrange for and guarantee that the terms of the sale were fulfilled. The values expected to be placed on the land by professional appraisers and tax assessors and respondents' minimum-sell price to a stranger are reported in Table 2.

Table 2. Average Land Values Estimated by Professional Appraisers, Tax Assessors, and a Seller's Minimum-Sell Price to a Stranger

	Illinois	Michigan	Nebraska	3-State Average
Professional Appraiser	$2594.66	$1366.59	$1035.88	$1676.69
(Number of Respondents)	(193)	(232)	(159)	(586)
t-Statistic	41.48	17.14	17.74	34.14
Tax Assessor	$1984.22	$1088.18	$817.70	$1295.74
(Number of Respondents)	(181)	(228)	(159)	(566)
t-Statistic	29.43	17.54	22.50	32.49
Stranger	$2793.42	$1413.69	$1086.00	$1785.88
(Number of Respondents)	(195)	(227)	(160)	(582)
t-Statistic	35.32	18.05	17.89	33.64

Farmland was valued higher in Illinois than either Michigan or Nebraska. In addition, the minimum-sell price to strangers was higher in all three states than the value respondents expected that professional appraisers or tax assessors would place on the land. Finally, respondents on average expected that professional appraisers would value farmland more than tax assessors.

The main part of this study asked respondents to assume they were selling their land and a complete stranger had offered them the price they wrote down earlier, their minimum-sell price to a stranger. Then, the respondents were asked to assume that several other potential buyers approached them with an offer to buy their land. Finally, the respondents were asked to indicate their minimum-sell price to a friendly neighbor, an unfriendly neighbor, an influential person in their community, and a friendly relative. The responses to these hypothetical offers are reported in Table 3.

Table 3. Average Minimum-Sell Prices When the Buyer Is a Friendly Neighbor, an Unfriendly Neighbor, an Influential Person, or a Friendly Relative

	Illinois	Michigan	Nebraska	3-State Average
Friendly Neighbor	$2644.71	$1334.22	$1011.29	$1686.45
(Number of Respondents)	(194)	(223)	(159)	(576)
t-Statistic	34.76	17.04	17.28	32.63
Unfriendly Neighbor	$3174.17	$1782.66	$1315.17	$2114.81
(Number of Respondents)	(178)	(209)	(149)	(536)
t-Statistic	17.88	14.66	13.74	24.39
Influential Person	$2826.41	$1542.48	$1166.73	$1876.63
(Number of Respondents)	(194)	(220)	(156)	(570)
t-Statistic	34.50	16.23	14.08	31.78
Friendly Relative	$2603.49	$1315.27	$993.06	$1664.77
(Number of Respondents)	(195)	(222)	(157)	(574)
t-Statistic	35.06	16.84	17.10	32.55

The average minimum-sell prices are reported by respondents from Illinois, Michigan, and Nebraska. Respondents would accept the lowest price from their friendly relatives, $1,664.77. They would accept a similar price from their friendly neighbors, $1,686.45. The minimum-sell price to an influential person was greater than the minimum-sell price to a stranger, $1,876.63. In contrast, the highest minimum-sell price, reported respondents, would be required of unfriendly neighbors, $2,114.81–making it unlikely for the sellers to complete a sale to an unfriendly neighbor.

To determine the role of relationships on the selection of trading partners, survey respondents were asked their relationship to persons from whom they had purchased or to whom they had sold land. The results are reported in Tables 4 and 5.

Table 4. The Percentage of Farmland Sales to Buyers Who the Seller Viewed as a Friendly (Unfriendly) Neighbor, a Complete Stranger, a Relative, Influential Person, or a Legal Entity

The farmland sellers viewed the farmland buyer as a:	Illinois	Michigan	Nebraska	3-State Average
Friendly Neighbor (Number of Respondents)	30.19% (16)	29.23% (19)	39.13% (18)	32.32% (53)
Unfriendly Neighbor (Number of Respondents)	0.00% (0)	0.00% (0)	6.52% (3)	1.83% (3)
Stranger (Number of Respondents)	43.40% (23)	43.08% (28)	26.09% (12)	38.41% (63)
Relative (Number of Respondents)	15.09% (8)	20.00% (13)	26.09% (12)	20.12% (33)
Influential Person (Number of Respondents)	1.89% (1)	3.08% (2)	2.17% (1)	2.44% (4)
Legal Entity (Number of Respondents)	9.43% (5)	4.62% (3)	0.00% (0)	4.88% (8)
Percent	100.00%	100.00%	100.00%	100.00%
TOTAL	53	65	46	164

Table 5. The Percentage of Farmland Purchases from Sellers Who the Buyer Viewed as a Friendly (Unfriendly) Neighbor, Complete Stranger, Relative, Influential Person, or Legal Entity

The farmland buyer viewed the farmland seller as a:	Illinois	Michigan	Nebraska	3-State Average
Friendly Neighbor (Number of Respondents)	32.93% (54)	45.30% (106)	34.78% (56)	38.64% (216)
Unfriendly Neighbor (Number of Respondents)	3.05% (5)	1.28% (3)	2.48% (4)	2.15% (12)
Stranger (Number of Respondents)	18.90% (31)	15.81% (37)	17.39% (28)	17.17% (96)
Relative (Number of Respondents)	29.27% (48)	27.78% (65)	29.20% (47)	28.62% (160)
Influential Person (Number of Respondents)	1.83% (3)	2.14% (5)	3.11% (5)	2.33% (13)
Legal Entity (Number of Respondents)	14.02% (23)	7.69% (18)	13.04% (21)	11.09% (62)
Percent	100.00%	100.00%	100.00%	100.00%
TOTAL	164	234	161	559

Thirty-two percent of the purchases and 39 percent of the sales were to friendly neighbors. On the other hand, only 2 percent of purchases and 2 percent of sales were to unfriendly neighbors. Unfortunately, we do not know what percent of the potential land buyers and sellers were considered to be friendly or unfriendly neighbors. However, we expect most potential buyers and sellers are known persons.

The survey respondents appeared much more willing to sell land to a stranger, 38 percent, than to buy their land from a stranger, 17 percent. Finally, relatives were a significant percent of both the buyers, 20 percent, and sellers, 29 percent. Legal entities and influential persons accounted for only 7 percent of the purchases and 13 percent of the sales of farmland.

The results of this portion of the survey led us not to reject our maintained hypothesis that social capital increases the likelihood of trade since 52 percent of the sales and 67 percent of the sales were between friends and family.

Table 6 is the key empirical support for this study. It represents the paired sample *t*-tests of differences in minimum-sell prices to selected buyers. The mean differences and *t*-tests are reported for each pair of potential buyers. The most significant difference was between unfriendly neighbors and friendly relatives, $445.47. The smallest difference between minimum-sell prices was between friendly neighbors and friendly relatives, $23.67. Important to notice, however, was that in all cases there was a significant difference between the minimum-sell price offered a stranger and the price offered to friendly neighbors and family, unfriendly neighbors, and influential persons.

The results of Table 6 are illustrated graphically in Figure 3. Figure 3 provides a percentage metric describing the influence of social capital on minimum-sell prices.

Table 6. Three-State (Illinois, Michigan, and Nebraska) Paired Sample *t*-Tests of Differences in Minimum-Sell Prices to Selected Buyers (row minus column) with *t* Statistics in Parentheses

	Unfriendly Neighbor	Influential Person	Friendly Relative	Stranger
Friendly Neighbor t-Statistic	$-423.07 (-6.54)	$-179.03 (-8.98)	$23.67 (3.12)	$-99.94 (-11.95)
Unfriendly Neighbor t-Statistic		241.26 (3.78)	445.47 (6.84)	323.79 (5.05)
Influential Person t-Statistic			202.46 (9.34)	79.20 (3.97)
Friendly Relative t-Statistic				-124.57 (-11.70)

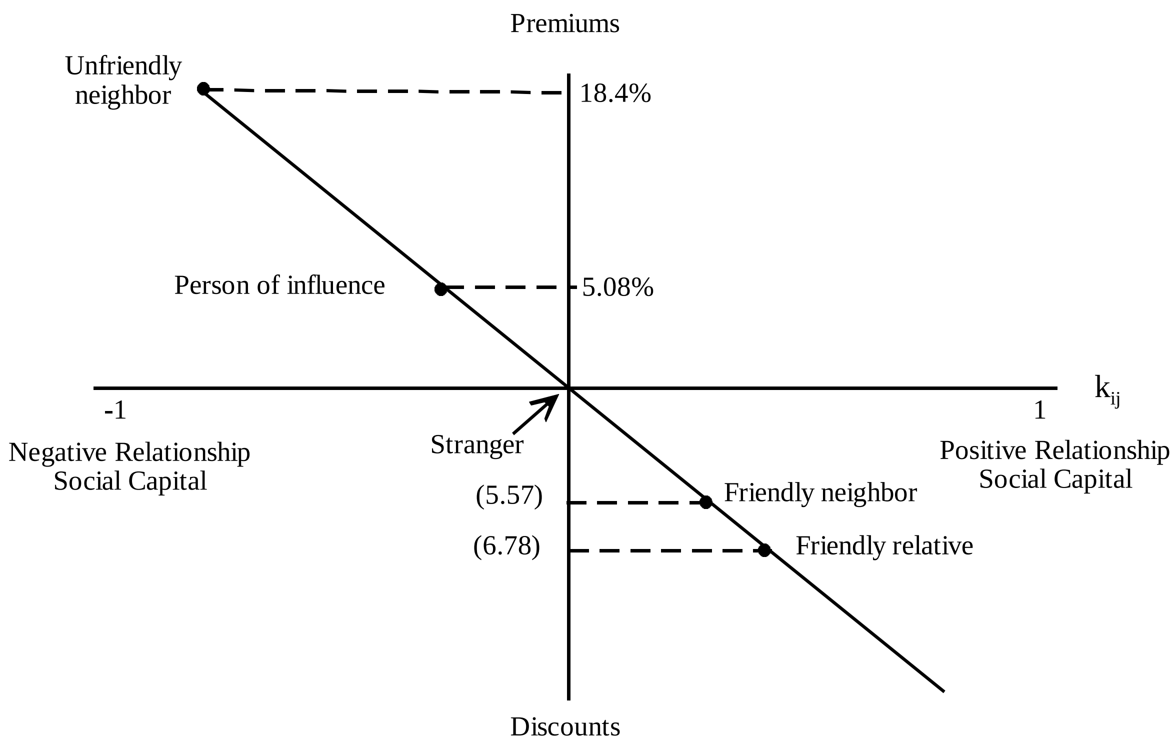

Figure 3. Premiums (Discounts) that Depend on Buyer's Relationship to the Seller or the Buyer's Social Capital with the Seller

Social Capital and Income Distributions

Perhaps the most significant result of introducing social capital into the neoclassical model that reflects selfishness of preferences is that externalities may be internalized depending on the distribution of social capital. Furthermore, internalizing externalities has the effect of altering terms of trade for agents who own social capital. The theoretical and empirical results of the previous section address this point.

In this section, a second implication of internalizing externalities is explored; how changes in social capital change the distribution of income. We expect a connection between changes in social capital and changes in income distribution for the following reasons. If changes in social capital alter the terms of trade and terms of trade alter income distributions, then changes in social capital must alter income distributions. What follows explores this important issue.

A social capital utility function for agent i with desirable properties was described in equation (1). The utility maximizing solution for α_i in the simplified utility function can be written as:

$$\text{(11)} \qquad \frac{du\left[\pi_i(\alpha_i) + k_{ij}\,\pi_j(\alpha_i)\right]}{d\alpha_i} = \frac{\partial \pi_i(\alpha_i)}{\partial \alpha_i} + \frac{k_{ij}\,\partial \pi_j(\alpha_i)}{\partial \alpha_i} = [\alpha_i] = 0$$

For $0 < k_{ij} < 1$, equation (11) implies that $\left|\frac{\partial \pi_j(\alpha_i)}{\partial \alpha_i}\right| > \left|\frac{\partial \pi_i(\alpha_i)}{\partial \alpha_i}\right|$ and that $\frac{\partial \pi_j(\alpha_i)}{\partial \alpha_i}$ and $\frac{\partial \pi_i(\alpha_i)}{\partial \alpha_i}$ are opposites in sign. Furthermore, it follows that sign $\left[\frac{\partial \pi_j(\alpha_i)}{\partial \alpha_i} + \frac{\partial \pi_i(\alpha_i)}{\partial \alpha_i}\right]$ equals sign $\frac{\partial \pi_j}{\partial \alpha_i}$.

Assume that the second-order conditions are satisfied, namely that $\frac{\partial[\alpha_i]}{\partial \alpha_i} < 0$. Then, totally differentiating the first-order condition and setting it to zero obtains the result that:

(12) $$\frac{\partial[\alpha_i]}{\partial \alpha_i} \, d\alpha_i + \frac{\partial \pi_j(\alpha_i)}{\partial \alpha_i} \, dk_{ij} = 0$$

and:

(13) $$\frac{d\alpha_i}{dk_{ij}} = \frac{\dfrac{-\partial \pi_j(\alpha_i)}{\partial \alpha_i}}{\dfrac{\partial[\alpha_i]}{\partial \alpha_i}} \gtreqless 0 \qquad \text{for} \quad \frac{\partial \pi_j(\alpha_i)}{\partial \alpha_i} \gtreqless 0$$

Equation (13) states that when increases in α_i increase (decrease, have no effect on) *j*'s profit, then increases in k_{ij} increase (decrease or have no effect on) *i*'s allocation of α_i. Stated another way, sign $\left(\frac{d\alpha_i}{dk_{ij}}\right)$ equals sign $\left(\frac{\partial \pi_j}{\partial \alpha_i}\right)$. The importance of this result will become evident in the next section.

Increases in Social Capital and Changes in Income Distributions

Consider the economic consequences on the sum of agent *i*'s and *j*'s income and the difference in their incomes as *j*'s social capital that resides with agent *i* is increased.

The total incomes of agents *i* and *j* are equal to $\pi_T = \pi_i(\alpha_i) + \pi_j(\alpha_i)$. Maximizing π_T with respect to α_i produces the result:

(14) $$\frac{d\pi_T}{d\alpha_i} = \frac{\partial \pi_i(\alpha_i)}{\partial \alpha_i} + \frac{\partial \pi_j(\alpha_i)}{\partial \alpha_i} = 0$$

Assume that agent i has chosen his/her utility maximizing level of α, namely α^*. Next, consider the effect on α^* of an increase in k_{ij}. As j's social capital increases, the effect on total income can be expressed as:

(15) $$\frac{d\pi_T}{dk_{ij}} = \left[\frac{\partial \pi_i(\alpha^*)}{\partial \alpha^*} + \frac{\partial \pi_j(\alpha^*)}{\partial \alpha^*}\right]\frac{\partial \alpha^*}{\partial k_{ij}}$$

Equation (15) can be signed because sign $\left(\frac{d\alpha}{dk_{ij}}\right)$ equals sign $\left(\frac{\partial \pi_j}{\partial \alpha}\right)$ and because sign $\left(\frac{\partial \pi_j}{\partial \alpha}\right)$ equals sign $\left(\frac{\partial \pi_i}{\partial \alpha} + \frac{\partial \pi_j}{\partial \alpha}\right)$. To describe the possible values associated with equation (15) we describe three possible external consequences of agent i's choice of α on agent j. These possible externalities are described in Table 7.

From Table 7, we deduce that increases in social capital increase total income whenever i's actions produce external consequences for agent j. This important result suggests that income policies must pay attention to investments in social capital as well as other forms of capital.

Increases in Social Capital and Changes in Income Differences

Next, consider the effect of an increase in social capital on the difference between π_i and π_j measured as the square of income differences:

Table 7. The Effects on Total Income of an Increase in Social Capital

Sign $\frac{\partial \pi_i(\alpha)}{\partial \alpha}$	Sign $\frac{\partial \pi_j(\alpha)}{\partial \alpha}$	Sign $\frac{\partial \pi_i}{\partial \alpha} + \frac{\partial \pi_j}{\partial \alpha}$	Sign $\frac{\partial \alpha}{\partial k_{ij}}$	Sign $\left[\frac{\partial \pi_i}{\partial \alpha^*} + \frac{\partial \pi_j}{\partial \alpha^*}\right] \frac{\partial \alpha^*}{\partial k_{ij}}$
0	0	0	0	**0**
+	-	-	-	+
-	+	+	+	+

(16) $$\pi_D = \left(\pi_i - \pi_j\right)^2$$

As *j*'s social capital increases, the effect on π_D can be found by differentiating equation (16) to: obtain:

(17) $$\frac{d\pi_D}{dk_{ij}} = 2\left(\pi_i - \pi_j\right)\left(\frac{\partial \pi_i}{\partial \alpha^*} - \frac{\partial \pi_j}{\partial \alpha^*}\right)\frac{\partial \alpha^*}{\partial k_{ij}}$$

The sign of equation (17) can be established with the aid of Table 8 and earlier derived results. The essence of the results in Table 8 is that increases in social capital reduce (increase) differences in income when agent *j* has less (more) income than agent *i*.

Table 8. Changes in Differences of Income in Response to Increases in Social Capital

Sign $\frac{\partial \pi_i}{\partial \alpha^*}$	Sign $\frac{\partial \pi_j}{\partial \alpha^*}$	Sign $\left(\frac{\partial \pi_i}{\partial \alpha^*} - \frac{\partial \pi_j}{\partial \alpha^*}\right)$	Sign $\frac{\partial \alpha^*}{\partial k_{ij}}$	Sign $(\pi_i - \pi_j)$	Sign $(\pi_i - \pi_j)\left(\frac{\partial \pi_i}{\partial \alpha} - \frac{\partial \pi_j}{\partial \alpha}\right)\frac{\partial \alpha}{\partial k_{ij}}$
0	0	0	0	+	**0**
+	-	+	-	+	**-**
-	+	-	+	+	**-**
0	0	0	0	-	**0**
+	-	+	-	-	**+**
-	+	-	+	-	**+**

In a recently published study, Robison and Siles use U.S. Census data for 1980 and 1990 to test for influences of social capital on income distributions by states. To measure social capital, they collected data on non-economic social indicator variables that are generally accepted measures of social capital. These social capital indicator variables were grouped into four categories: family integrity variables, educational achievement variables, litigation variables, and labor force participation variables. Their studies provided support for the deductions made in this paper that under fairly general conditions, increases in social capital among members of a social capital defined network reduce income disparity and increase average income by internalizing what otherwise would be considered to be externalities.

Conclusions

Including social capital in the neoclassical utility maximizing model allows us to model the important effects relationships of sympathy (antipathy) have on terms of trade and likelihood of trades. The capital-like properties of social capital have been described elsewhere. The important point is that these capital-like properties allow economists to model social capital much like they might model the economic consequences of other forms of capital.

What social capital provides are social services of value, much like physical, human, and financial capital provide economic services of value. Since social services may complement or substitute for financial services, their effects cannot be modeled in isolation without imposing seriously limiting assumptions. Thus, the interdependent nature of social and economic services in utility maximizing models suggests significant opportunities for cooperation between economists and other social sciences.

An empirical effort was made and reported in this paper to test the implications on terms of trade and likelihood of trades deduced from a simplified social capital model. The empirical results supported the deductions reached in the social capital model–namely, that increases in social capital improve the likelihood of trades between friends and family when the buyer has a comparative advantage in the use of the traded asset.

Additional deductions showed that increases in social capital have important and predictable consequences on the income distribution of social capital rich networks–increases in social capital increase the average income and reduce income differences. Empirical support for the linkages between changes in income distributions and changes in the distribution of income was reported elsewhere.

In conclusion, social capital offers economists a new tool. It redefines externalities, broadens the definition of what is considered rational behavior, recognizes an important resource whose management offers new policy options, and suggests the need for increased cooperation with other social sciences. As agricultural economists' roles are changing and the demand for their services is altered, it just well may be that including social capital in our traditional models may demonstrate our usefulness and increase our connectedness to meet the challenges of an increasingly complex world.

References

Narayan, D. and L. Pritchett. "Cents and Sociability: Household Income and Social Capital in Rural Tanzania." *Economic Development and Cultural Change*, 1998.

Robison, L.J. "In Search of Social Capital in Economics." Department of Agricultural Economics Staff Paper No. 96-102. East Lansing, MI: Michigan State University, December 1996.

Robison, L.J. and S.D. Hanson. "Social Capital and Catastrophic Risk Responses" in *Quantifying Long-Run Agricultural Risks and Evaluating Farmer Responses to Risk*. Proceedings of a Seminar sponsored by S-232, Jekyll Island, GA, March 24-26, 1993, pp. 34-61.

Robison, L.J. and A.A. Schmid. "Can Agriculture Prosper Without Increased Social Capital?" *Choices*, Fourth Quarter 1994, pp. 29-31.

Robison, L.J.; A.A. Schmid; and M.E. Siles. "Is Social Capital Really Capital?" Submitted to the *Journal of Economic Issues*, June 1999.

Siles, M.; L. Robison; D. Beveridge; and B. Johnson. "Farmland Exchanges: Selection of Trading Partners, Terms of Trade, and Social Capital." Draft, July 1999.

Smith, A. *The Theory of Moral Sentiments*. (First Published, 1759). Reprints of Economic Classics, Augustus M. Kelley, Publishers, New York, 1966.

Veblen, T. "On the Nature of Capital, Intangible Assets, and the Pecuniary Magnate." *Quarterly Journal of Economics* 22(1908): 104-136.

Woolcock, M. "Social Capital and Economic Development: Towards a Theoretical Synthesis and Policy Framework." *Theory and Society* 27 (April 1998): 151-208.

ENDNOTES

1. Sympathy as used here is consistent with the definition found in *Webster's Ninth Collegiate Dictionary*; namely, sympathy is an affinity, association, or relationship between persons or things wherein whatever affects one similarly affects the other.

2. See RSS and Prichell for a discussion of this point.

3. The social capital model could be further generalized by including social capital coefficients k_{ji} and k_{ii}. See Robison and Schmid for a discussion of the motivation for including these additional arguments. See also Robison and Hanson for application of the generalized model.

4. For a complete report of the land value survey, see Siles, Robison, B.J. ???