The Idea of Social Capital

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Abstract

This paper is my attempt to make sense of the concept of social capital using game theory and production theory. It might become a chapter in my book on social regulation, or I might just leave it in this form on the Web, where I think that despite its rough edges it may be useful to people interested in the topic.

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Introduction

"Social capital" has been a popular metaphor in the 1990's in not one but three fields: economics, political science, and sociology. It is, of course, an old idea that society has built up a stock of institutions that we should take care to preserve. Edmund Burke takes this as his central idea in *Reflections on the Revolution in France*, where he says to the Revolutionaries,

> "...the people of England well know that the idea of inheritance furnishes a sure principle of conservation and a sure principle of transmission, without at all excluding a principle of improvement. It leaves

> acquisition free, but it secures what it acquires.... You had all these advantages in your ancient states, but you chose to act as if you had never been molded into civil society and had everything to begin anew. You began ill, because you began by despising everything that belonged to you. You set up your trade without a capital."[1]

But although previous generations may have worried about how social capital links to economic output, modern economists left the topic alone until the 1990's, and earlier generations did not have available the statistical tools that we do nowadays. In this essay I will try to explain the idea of social capital and the problems encountered in trying to use it. I will not solve any of those problems, but I hope to provide useful clarification.

James Coleman stimulated modern attention to social capital with his 1990 magnum opus, *Foundations of Social Theory* and his 1993 Presidential Address to the American Sociological Association.[2] He died in 1995, however, and the figure now most associated with social capital is Harvard University political science professor Robert Putnam. The theme of Putnam's work is the importance of civic associations– associations of people who live close to each other and interact personally. In the metaphor captured by the title of his book and article, *Bowling Alone*, if neighbors play in bowling leagues together the interaction is useful not only for entertainment but for the discussion it naturally engenders about neighborhood affairs and for the contacts it creates for later personal or civic profit. If people stop bowling in leagues and start bowling alone they may enjoy the bowling just as much, but society is poorer. The amount of social capital has declined.[3]

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[1]Edmund Burke,*Reflections on the Revolution in France* (1790) Www.knuten.liu.se/∼bjoch509/works/burke/reflections/reflections.h tml (September 13, 2001).

[2]James Coleman, *Foundations of Social Theory*, chapters 10-12 (Cambridge: Harvard University Press, 1990); James Coleman, "The Rational Reconstruction of Society: 1992 Presidential Address," *American Sociological Review*, 58:1-15 (February 1993).

[3]Robert Putnam, *Bowling Alone: The Collapse and Revival of American Community* (New York: Simon and Schuster, 2000); Robert Putnam, "Bowling Alone: America's Declining Social Capital," *Journal of Democracy,* 6: 65-78 (January 1995), http://muse.jhu.edu/demo/journal_of_democracy/v006/putnam.html (11/25/01). Quoting from the article:

Social capital is not created by just any kind of association. The association does not have to be civic-minded— bowling leagues are not. But it has to be local, so people meet and discuss things other than the association's immediate purpose. The Environmental Defense Fund does not qualify, because it is too specialized, and its members hire professionals (via their contributions) to do its work. Nor does an Internet bowling discussion list. Its members from all around the world may increase their bowling expertise, and even the spirit of the brotherhood of man, but they will not discuss whether their neighborhood needs a traffic bump. More controversially, social capital theorists suggest that the association should be collegial rather than hierarchical (or "horizontal" rather than "vertical") if it is to increase social capital, because it is in a collegial organization that neighbors make the contacts that have spillovers to outside activities.[4]

In *Making Democracy Work: Civic Traditions in Modern Italy*, Putnam demonstrates a strong correlation between the number of civic associations in different regions of Italy and the quality of their governments.[5] The World Bank has become very interested in the implications for economic development, and has sponsored a number of studies which show the importance of participation in associations.[6] Perhaps civic associations are as important for the Third World as education and technology. But social capital

"Between 1980 and 1993 the total number of bowlers in America increased by 10 percent, while league bowling decreased by 40 percent. (Lest this be thought a wholly trivial example, I should note that nearly 80 million Americans went bowling at least once during 1993, nearly a third more than voted in the 1994 congressional elections and roughly the same number as claim to attend church regularly. Even after the 1980s' plunge in league bowling, nearly 3 percent of American adults regularly bowl in leagues.)"

[4]This is more controversial because a hierarchical organization can be very effective for addressing local issues. Catholic churches, for example, are often hierarchical, but the priest is for that very reason in a good position to rally his congregation to solve any of a number of problems not related to church activities and to act as a clearinghouse for community information.

[5]Robert Putnam with Robert Leonardi and Raffaella Y. Nanetti, *Making Democracy Work: Civic Traditions in Modern Italy* (Princeton, N.J. : Princeton University Press, 1993).

[6]See the World Bank's "Social Capital Home Page," which contains a survey of the literature and links to working papers from inside and outside the Bank. http://www.worldbank.org/poverty/scapital/ (11/25/01).

is not just important for developing countries. In *Bowling Alone*, Putnam argues that participation in civic associations has declined significantly over the twentieth century in America, raising the possibility of adverse effects on government, the economy, and social ills. Francis Fukuyama, in his *The Great Disruption*, gives close attention to the decline in social capital and the surge in social problems in the 1960's.[7] Whether the decline in social capital be caused by television, the increase in the percentage of working women, or some other cause, it has political relevance.

The more immediate task, however, is to pin down the idea of social capital so we can use it properly. There is something important out there, but what precisely is it? There is general agreement that we want to get at the idea that in some societies people give more cooperation to each other and inflict less harm than in other societies. One approach is to measure how much people belong to civic associations. Another is to use surveys to measure how much they trust other people. Still another approach is to look at variables such as crime rates. We could measure one of these proxies for social capital and see if it predicts variable of interest such as government quality or economic well-being.

Before measuring and predicting, however, let us backtrack to the theoretical problem: what is social capital and why should it be useful for anything?

Defining Social Capital

The first point to clear up is how the idea of "social capital" relates to the idea of simple "capital". Let us start with why economists find "capital" a useful idea.

Perhaps the most fundamental question in economics, from the time of Adam Smith to the present, is what produces wealth. The most basic tool for addressing that question is the production function: the relation between

[7] Francis Fukuyama, *The Great Disruption* (New York: The Free Press, 1999).

inputs and outputs. The classic production function is

$$Output = f(Land, Labor, Capital)$$

This equation may not look like much, but already it is saying that if you wish to know how much output there will be of the goods you care about, the important thing is to find out how much land, labor, and capital you have with which to produce it. These three inputs can represent three very general classes of inputs. Labor denotes human time and effort, land denotes not just real estate but natural resources generally, and capital denotes goods that are produced in order to produce other goods in the future.

At its simplest, the production function is for an individual enterprise, linking, for example, the amount of corn produced to the acres of land, hours of labor, and number of tractors available to the farmer. With some study, the economist could figure out the shape of the function $f(\cdot)$ and give the farmer useful advice: "If you sell one of your tractors and buy an extra 10 acres with the money, you will end up producing more corn." The advice would be accurate to the extent that the production function's shape and inputs were conceived accurately and that nothing else important changed over time. The prediction would be wrong if the amount of seed corn had to increase with the acreage, since seed corn was left out of our production function; and it would be wrong if rainfall decreased sharply, since that, too, was left out.

An aggregation production function could also be found, for the entire corn industry,by adding up the acres, hours, and tractors for all farmers. This, too, could lead to useful conclusions: "If 10 percent fewer tractors are used but labor and land are unchanged, corn output will fall by 5 percent." Aggregating at the level of the industry, however, reduces the sharpness of the production function. Not all tractors are identical. Not only are they different models, but they also differ in how old they are. Our predictions will be wrong if the 10 percent reduction in tractors consists of just the oldest ones.

One solution is to disaggregate the concept of capital into different kinds of capital–John Deere tractors, Case tractors, old tractors, new tractors, and

so forth– so that our production function had more than the three arguments of capital, labor, and land. If possible, we would like to keep the production function simple, however, since what we aspire to is a useful tool rather than descriptive realism. The common solution is different: to measure capital in terms of its dollar value— in this case, adding up the market values of all the tractors used. This comes closer to the business definition of capital, which includes not just physical assets but also such things as cash for day-to-day transactions and inventories of goods for sale. These forms of capital share the property of being the result of someone's investment, of their having refrained from consumption earlier so they could have more production today.

Using the idea of the aggregate production function, we can even think about a national production function. Gross domestic product– measured as the value of everything produced and sold in the market– is the output from a country's use of land, labor, and capital (it is "gross" because some of the land and capital gets used up in the process but we do not subtract it from GDP). We might apply econometrics to data to estimate the US production function to be

$$Output_{US} = 9 * capital^{.3} * labor^{.7} * land^{2}.$$

And so we can say that for a country to have more GDP, it needs to have more labor, land, and capital.

But that is false. The converse is true– if a country has more labor, land, and capital we can confidently predict that it will have a bigger GDP. But one country might have much higher GDP than another country even if its labor, land, and capital is no higher. We do not think that the United States has more output than India just because it has more inputs– though that does, of course, explain a sizable chunk of the difference. And if we applied the same econometric methods to Indian data we might find our estimated production function was

$$Output_{India} = 4 * capital^{.3} * labor^{.7} * land^{2}.$$

The two countries have different "total factor productivity," or, put more simply, they have different production functions. That is unsatisfactory,

though. It would be neater and help us explain the world better if we had one production function that applied to all countries, just as it is better to have one function for falling objects based on gravity and friction instead of a different function for each object based on its different friction level. The two functions above, for example, might tempt us to think that there is some omitted fourth input, X, and a general function

$$Output = X^2 * capital^{.3} * labor^{.7} * land^2.$$

If all we do is call call "the residual" then we have not advanced our knowledge at all. Calling it "social capital" would be no better without further evidence, since without evidence label is less justified than "being in North America," "being too hot," or any other casual guess supported by a conventional wisdom. If we can identify and measure X, however, we would be able both to attach it to a particular theory and to make predictions of output for other countries based on what we have estimated using the U.S. and India data.

Economists have identified four other factors omitted from the production function: technology, government, human capital and– we will indeed come to it eventually– social capital.[8]

India and the United States have different technologies in the sense that people have different knowledge of how to turn inputs into outputs. One way to look at this is that the two countries have different production functions. Another way would be to view the two countries as having different stocks of an input called "Technology".

The two countries also have different governments, where by government I mean not just the politicians in place, or even the constitutions, but all the laws, regulations, and other government policies. Government plays a huge role in how inputs translate into outputs. Rather than putting it in the

[8]The differences in productivity across countries and the degree to which the difference is declining is the subject of the "convergence literature". A representative article from this literature is Andrew Bernard and Charles Jones, "Comparing Apples to Oranges: Productivity Convergence and Measurement Across Industries and Countries," *American Economic Review*, 86: 1216-1238 (December 1996).

production function, however, economists ordinarily treat government policy as a set of outside constraints.

A third difference between India and America is education levels. This is where the major modification has been made to the trio of land, labor, and capital. Education looks a lot like capital investment. People reduce current consumption so they can get schooling and increase their output later. This increases the value of their labor, but the effect is more like that of an increase in capital. Investment in education reacts to stimuli much as investment in physical capital. If interest rates rise, for example, or borrowing becomes more difficult, we would expect less education to be acquired, while if salaries of college graduates jump we would expect to see more college graduates. Thus, the idea of "human capital" has become standard in economics— and, indeed, the value of the human capital in a country like the United States is much greater than the value of the land. (Think of the sum total of land rents versus the sum total of the wage premia from grade school education on up!) Theodore Schultz won the Nobel Prize for his pioneering work on human capital, and the idea has been widely accepted at least since his 1961 American Economic Association Presidential Address.[9]

If we are trying to predict a person's future earnings, ignoring his investment in human capital will lead us to underestimate the value. Thisis true at the national level too. Understanding human capital, we are not so surprised that Germany and Japan recovered so quickly from the devastation of their physical capital in the Second World War. The survivors had abundant human capital, even though the factories had been destroyed by bombing or made obsolete by the end of the demand for tanks and guns.

Finally we come to social capital. Even if India had the same land, labor, capital, human capital, and technology as the United States, and even if we imported the American government, would the two countries have the same GDP? The hypothetical is a hard stretch, but most people think not. There are difference between countries that we have not yet captured. They

[9]Theodore Schultz, "Investment in Human Capital," *American Economic Review* 51: 1-17 (March 1961).

are related to such things as the willingness of people to keep their promises, to risk being taken advantage of by other people, and to refrain from using their energies to take advantage of other people instead of producing for themselves. It is not even clear which way the effect of social capital would go. American pride in our Tocquevillean heritage of voluntary associations and Puritan work ethic makes us think we have an advantage in social capital, but crime is also a massive problem for us, one whose cost to the economy has been estimated at over one trillion dollars per year.[10]

It is to the social component of productiveness that we put the label "social capital". As with technology, one approach would be to say that India and the United States have different production functions, while another is to say they have different levels of a variable called social capital. With respect to technology, economists have taken both approaches, in different contexts. In theoretical models, it is common to assume that firms have different cost functions when modelling, for example, how they compete in output, but in models of innovation it is common to assume that firms have technology levels that they seek to increase. In empirical models both approaches are also used. Sometimes economists restrict themselves to estimating production functions for a single country because international differences do not permit aggregation, but sometimes they use data on patents to compare countries' levels of innovation. We would like to be able to say with confidence that one firm, individual, or country has more social capital than another in analogy to having better technology, but that leaves open the question of whether we can usefully measure social capital as a single magnitude. If we can– so that social capital is more like human capital than it is like government– that will permit empirical work to use broad statistical analysis rather than being restricted to case studies.

The analogy between social capital and what we might call "physical" capital (to distinguish it from social and human capital) is based on the idea that both are stocks rather than flows, and that they both can either rise or fall over time. Think back to Edmund Burke: an institution is something

[10]The estimate is from David Anderson, "The Aggregate Burden of Crime," *Journal of Law and Economics*, 42: 611-642 (October 1999).

durable that we inherit, but it can also be improved or degraded over time depending on how we take care of it. On the other hand, there are three important differences between social and physical capital.

First, to increase physical capital requires that we invest, refraining from current consumption. This is not so clear for social capital, which is often a byproduct of other activities. Social bonds— whether from associations, trust, or social norms— tend to be created without deliberate investment and to strengthen with use. Physical capital gets worn out with use ("depreciates"), but social capital becomes worn out if it is *not* used. To be sure, first creating a social bond can be as costly as physical investment, and so people do speak of "investing in friendships", but we would not, for example, expect as much of a fall in social capital as in physical or human capital if interest rates were to rise.[11]

The second difference is that social capital by its very nature has spillovers onto other people. If I increase my social capital by joining my neighborhood association, I have affected that of all my neighbors who are members too— I hope by increasing rather than reducing the association's value. Even the neighbors who are not members benefit if the association becomes more effective. On the other hand, if the association devotes itself mainly to securing city funds, the spillover onto the rest of the city might well be negative.[12]

These spillovers make social capital especially difficult to measure. We cannot just add up each person's individual social capital to find aggregate social capital, the method we use for physical capital. Part of the value to me of my social capital to me might be that it helps me to take wealth from from you, either by crime or by government transfer. Criminal gangs and

[11]Human capital also can have this feature of "use appreciation", if I may coin a term. Some skills are learned on the job and are forgotten if they are not practiced. Even physical capital can have the feature. As a new mechanical device is used, more is learned about how it works, and often this knowledge can be written down, so it is capital- specific rather than operator-specific. The learning curve is about capital as well as labor.

[12]Recall that it is the *negative* effects of associations that is the theme of much of the Chicago School work on regulation and of Mancur Olson, *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities* (New Haven: Yale University Press, 1982).

rent-seeking lobbies are social capital for the people who belong to them. Nor is the extent to which my social capital helps you part of my individual social capital's value. When a neighborhood volunteer patrol prevents a stranger from being mugged, most of the value is to the stranger, not to the person patrolling.

The third difference is that social capital, unlike physical capital, is not traded in the marketplace. A person cannot go out and sell his social capital. In this it is like human capital. Rather than selling outright, the owner must rent it out in conjunction with his labor or combine it with capital to earn a return to self- employment. Untangling how much of the return is owed to labor, how much to human capital, and how much to social capital is difficult.

At the same time, the differences can be exaggerated. A business's organization is very much like physical capital. The business consciously invests time and budget into making it. The organization depreciates, becoming obsolete over time (if not with use). The firm's value might be primarily its organizational form, not its material assets or its employees. And there would not be any spillovers to outside, except the pecuniary one of the firm having lower costs and hence lower prices.

One more point should be made in connection with social capital and production functions. It could be that social capital is important to output, but only because it affects other inputs. For example, a high level of social capital in a country might lead to more investment in physical capital because property rights are more secure. If that is the case, then social capital should not be an independent argument in the production function, because its effect is entirely captured by the levels of the other inputs. If social capital is just an input into physical capital, without increasing the productivity of a given level of capital, then it is very important to economic growth, but it will not help explain that portion of growth unexplained by capital, labor, and land. As we will see later, the work of Knack and Keefer (1997) suggests this may be the case.

I have tried to show why so many good scholars are intrigued by the

notion of social capital, and to relate it to the notion of capital generally. Clearly there are problematic differences, but some of the problems also arise in human capital and have not stopped it from being a useful concept. If we can come up with a well-defined and measurable variable for social capital, then our theory of how wealth is produced will be much improved. I have not yet addressed how social capital is supposed to work, however. Let us now proceed to that.

Social Capital as a Way to Transmit Information

As the term is used in the economics literature, social capital has two functions: information transmission and solving prisoner's dilemmas. Information transmission is the simpler of these. If Joe talks with Tom, he has the opportunity to give Tom information and to receive it too. The information could be about a job opening, a trick to make a computer work better, or a dishonest person to avoid. Information is difficult to price, but the solution is to have a reciprocal relationship in which Joe is willing to pay the time cost of telling things to Tom because Tom tells him enough things in return to make it worthwhile. Once Joe and Tom are talking, it is very easy for them to give each other information, and the information will make them both more productive. The biggest cost is getting to know each other in the first place, setting up the meetings, and spending time in the meetings. This is the investment in social capital. Once that is done, the actual transmission of information is practically costless.

Information transmission has beneficial effects on third parties. Once he learns something from Joe, Tom can pass it along to Sam. Sam has thus obtained a benefit from Joe, but Sam has no direct opportunity to reciprocate. He does have an indirect opportunity, because Sam can pass information to Tom, who can pass it to Joe. The spillovers are complicated, but this is the kind of problem amenable to theoretical modelling by economists.[13]

[13]See Venkatesh Bala and Sanjeev Goyal, "A Noncooperative Model of Network Formation," *Econometrica*, 68: 1181-1229 (September 2000), which looks at network formation as a game and tries to see whether networks shaped like stars or wheels will arise naturally.

Game Theory and Social Capital

What is probably more important than information transmission as a purpose of social capital is to solve social dilemmas. The social capital literature revolves around the idea that societies in which more people trust each other become wealthier. Game theory provides a useful framework for thinking about trust. I will next discuss the two games most important for understanding social capital: the Prisoner's Dilemma and the Coordination Game.

In the Prisoner's Dilemma, two prisoners, named Row and Column, are being interrogated separately. If both confess, each is sentenced to eight years in prison; if both deny their involvement, each is sentenced to one year. If just one confesses, he is released but the other prisoner is sentenced to ten years. Table 1 gives the payoffs, with arrows showing a player's preference between actions. The payoffs are negative numbers because more years in prison are worse for a player– his ideal in this game is to come out with a payoff of 0.

Table 1: The Prisoner's Dilemma

		Column		
		Deny		Confess
	Deny	-1,-1	→	-10, 0
Row:		↓		↓
	Confess	0,-10	→	**- 8,-8**

Payoffs to: (Row, Column)

Each player has a dominant strategy. Consider Row. Row does not know which action Column is choosing, but if Column chooses Deny, Row faces a Deny payoff of -1 and a Confess payoff of 0, whereas if Column chooses Confess, Row faces a Deny payoff of -10 and a Confess payoff of -8. In either case Row does better with Confess. Since the game is symmetric, Column's incentives are the same. The equilibrium is (Confess, Confess), and the equilibrium payoffs are $(-8, -8)$, which is worse for both players than

$(-1, -1)$. Sixteen, in fact, is the greatest possible combined total of years in prison.

Economists immediately think of the Prisoner's Dilemma when they see people behaving in ways that hurt them all. The game crops up in many different situations, including oligopoly pricing, auction bidding, salesman effort, political bargaining, and arms races. Consider fidelity in marriage, modelled as a Prisoner's Dilemma in Table 2. I chose numbers to represent the ranking of payoffs, so the man's payoff from Unfaithful (5) is bigger than his payoff from Faithful (4). In equilibrium, both players are Unfaithful, even though they would both prefer (Faithful, Faithful).

Table 2: Marriage as a Prisoner's Dilemma

		Woman		
		Faithful		*Unfaithful*
	Faithful	4,4	→	-5, 5
Man:		↓		↓
	Unfaithful	5, -5	→	**-2,-2**

Payoffs to: (Man, Woman)

Marriages do not always or even usually end up with both spouses being unfaithful, any more than conspirators in real life end up always confessing to the police. The games in Tables 1 and 2 show that the players have a problem, though. To solve it they need to somehow change the rules of the game. That is where social capital enters. Institutions and social norms can change the rules. The love match, criticism from friends and relatives, moral education, and laws against adultery are all ways different societies have tried to change the payoffs in the Marriage Game so that Faithful has a higher payoff than Unfaithful.

Table 3 shows civil society generally as a Prisoner's Dilemma. Each citizen must decide whether to help his fellow-citizen at some cost to himself, or hurt him. The game is exactly the same as the Marriage Game except for the labels. "Help" and " Hurt" represent the myriad of ways that people interact. They represent "Pay Taxes" and " Evade Taxes"; or "Be Honest"

and “Lie”; or “Do Nothing” and “Steal”; or “Donate” and “Do Nothing”; or “Perform Your Contractual Duty” and “Breach”.

The contract setting illustrates an important effect of the Prisoner’s Dilemma: if it isn’t solved, people will act to avoid the game. Rather than contracts being made and always breached, they will not be made in the first place. But that, too, is a loss. Civil society has contracted a little, and the people are acting more like a collection of individuals, having lost the gains from cooperation.

Table 3: Civil Society as a Prisoner's Dilemma

		Citizen 2		
		Help		*Hurt*
	Help	4,4	→	-5, 5
Citizen 1:		↓		↓
	Hurt	5, -5	→	**-2,-2**

Payoffs to: (Citizen 1, Citizen 2)

Changing the payoffs by means of social institutions is not the only way to escape the Prisoner's Dilemma. Another way is repetition of the game. If the game is repeated indefinitely, then Citizen 1 might choose Help now in the hope that his charity will induce Citizen 2 to choose Help in the future. Citizen 1 prefers a payoff of 4 in each of many repetitions than 5 now but -2 in each of the future repetitions. If Citizen 2 thinks the same way, they will both choose Help, and the dilemma is solved.

It is a bit more complicated than that, of course. If Citizen 1 chooses Help in each repetition of the game and Citizen 2 does not reciprocate, Citizen 1's strategy has backfired. Citizen 1 needs to use a strategy more like one of the following pair:

The Grim Strategy
1. Start by choosing *Help*.
2. Continue to choose *Help* unless some player has chosen $Hurt$, in which case choose $Hurt$ forever.

The Tit-for-Tat Strategy
1. Start by choosing *Help*.
2. Thereafter, in repetition n choose the action that the other player chose in period $(n-1)$.

Both of these strategies have the properties of being nice— they start with Help—but retaliatory—they respond with Hurt if the other player plays Hurt. Tit-for-tat also has the useful feature of being forgiving—if the other player goes back to playing Help, the player using tit-for-tat goes back to playing Help too. If someone choose Hurt by accident occasionally, Tit-for-

tat can restore cooperation, which the Grim Strategy cannot.

The repetition solution to the prisoner's dilemma has two problems. First, it requires caring about the future. If a player knows he is approaching the last repetition and the other player will surely start playing Hurt, he, too will play Hurt. Or, if the player cares little enough for the future, he will prefer the present payoff from Hurt to future gains from cooperation.

The second problem is that the repetition solution depends on expectations. If Citizen 1 expects Citizen 2 to play Tit-for-Tat, he is willing to play it himself. But if he expects Citizen 2 to simply play Hurt every period, Citizen 1 will himself play Hurt. Thus, the combinations (Help, Help) and (Hurt, Hurt) can both result from self-fulfilling expectations.

The choice between the two equilibria of (Help, Help) and (Hurt, Hurt) is, in fact, an example of the second game important for understanding social capital: Table 4's Coordination Game. Two drivers approaching each other must choose whether to drive on the Right side of the road or the Left. The highest payoffs for both are if they both drive on the Right. I am imagining that they are both right- handed and driving on the Right is best for right-handed drivers; whether this is really true, I don't know. They also both have positive payoffs, if not quite so high, if they both drive on the Left. If one of them drives on the Right and the other on the Left, however, they crash into each other, for payoffs of (-50,-50).

Table 4: The Coordination Game

		Driver 2		
		Right		*Left*
	Right	2,2	→	-50, -50
Driver 1:		↓		↓
	Left	-50, -50	→	**1,1**

Payoffs to: (Driver 1, Driver 2)

In the Coordination Game, unlike the Prisoner's Dilemma, there is no conflict between the players' interests. (Right, Right) is best for both of them.

But whether that pair of actions is achieved depends on their expectations. If Driver 1 expects Driver 2 to choose Right, he will choose Right himself. But what if Driver 1 expects Driver 2 to choose Left? Then Driver 1 will choose Left. And if Driver 2 knows Driver 1 has that expectation, Driver 2 will confirm it by himself choosing Left. Thus, (Right, Right) and (Left, Left) are both equilibria. (A third equilibrium is for each to choose Right with probability 51/103, but I will not discuss that here.)

The problem in the Coordination Game is thus to get desirable expectations, which will be self-confirming once they are established. Communication is an obvious way to do this. The two players simply talk to each other and agree that they will both choose Right. In some settings, however— including two drivers heading towards each other at 60 miles per hour– communication is not practical. A convention is needed. Custom might provide that convention, or a law, or even just a proclamation by the government or some private person.

Return now to the repeated Civil Society As a Prisoner's Dilemma, with its multiple equilibria of (Help, Help) and (Hurt, Hurt). The problem is to get expectations right; the choice between the two equilibria is a coordination game. Communication might solve it, or convention. The difference is that other features of the game— repetition and caring for the future— must also be present for there to be multiple equilibria in the first place rather than just the dismal (Hurt, Hurt) of the unrepeated game.

Plato did not mention the Prisoner's Dilemma in *The Republic*, but he was attacking the same problem. Traditional philosophers of civil society thought mainly about solutions that changed the payoffs in the Prisoner's Dilemma when they thought about how to get people to behave themselves— moral education, religion, and laws. The 1990's literature on social capital is mainly about solutions that increase repetition and communication. If people go bowling with other people in their neighborhood, to use Robert Putnam's celebrated example, they will have more incentive to help each other and less incentive to hurt each other. Information about who helps and who hurts will spread quickly, and nobody will want to be excluded from a social network

which both has direct advantages (the fun of bowling) and signals reliability ("they keep him on the bowling team, so he must be a good guy").

Law is a simple way to deal with many prisoner's dilemmas. We use criminal law to punish stealing and civil law to punish breach of contract. But in many settings it is too costly for a court to determine who chose Help and who chose Hurt. That is even true to a large extent for stealing and breaching. Thus, the other solutions are crucial.[14] A society which has solved more prisoner's dilemmas will be happier and wealthier. We can say that such a society is "earning a return on its social capital," and that a less successful society "might do well to invest in social capital". The great problem is to figure out how such investment can be undertaken.

Measuring Social Capital

Having thought about why trust is useful, let us now return to the problem of measuring social capital. Physical capital can be measured in natural units such as number of tractors,though that does not allow aggregation across types of capital. Or, it can measured using the market value– the dollar value of tractors. In government statistics and business accounting, it is measured a third way: using investment and depreciation. Each year the dollar value of new investment is added to the existing dollar value of capital, and an estimate of the amount of depreciation (based on the expected lifetime of the assets) is subtracted. The investment/depreciation method is not so accurate as using market value, since it takes into account capital gains and losses only crudely, but it is easier to measure.

None of these three methods is well suited to measuring social capital. Social capital has no natural physical units. It is not traded in the market-

[14]The classic reference on this is Stewart Macaulay, "Non-Contractual Relations in Business," *American Sociological Review,* 28: 55-70 (February 1963). Macaulay points out that most business relationships are based on trust and reciprocity rather than contracts enforceable in court. See also the more theoretical article of Benjamin Klein & Keith Leffler "The Role of Market Forces in Assuring Contractual Performance," *Journal of Political Economy,* 89: 615-41 (August 1981), which shows how reputation can be based on reciprocity.

place (at least, not independently of a person's labor). And investment in it is not carried out by dollar purchases, and often is not costly at all. The problem is not that social capital does not have a dollar value. In theory, we could compare two societies and say that Society X would be willing to pay 200 billion dollars to have as high a level of social capital as Society Y. This is why economists at the World Bank are so interested in social capital; if they can find a way to spend money to increase it, they would be as happy to do that as to build dams and roads. And there is some promise in putting dollar values on individual social capital projects such as setting up agricultural mutual-help associations. But I have not seen attempts to measure an aggregate dollar value of social capital.[15]

Another measurement approach, which I mentioned earlier, is to find proxy variables that are correlated with social capital. Rather than finding a dollar measure for social capital, we look for a proxy variable, a variable that takes high values when the level of social capital is also high. Suppose the true production function for a country is the one from our earlier example,

$$Output = X^2 * capital^{.3} * labor^{.7} * land^2,$$

where X is indeed Social Capital. Suppose, too, somewhat whimsically, that we know that it happens that in every country,

$$X = a * B,$$

where B is the number of bowling teams. If we cannot measure X and a directly, but we can measure B, then the production function could be rewritten as

$$Output = (a * B)^2 * capital^{.3} * labor^{.7} * land^2,$$

[15] A useful starting point would be to try to estimate the value of a single business's social capital (or perhaps, "organizational capital"): the excess of its value over the value of its material and informational assets. The market value of a company commonly differs from its book value (estimated by the same investment/depreciation method used in national income accounting), but much of the difference is due to capital gains and losses on assets, which would have to be subtracted to measure social capital.

We can use this new production function to test whether social capital indeed is our mysterious X. If output rises with bowling leagues, X is social capital; if it does not, then X is something else such as technology.

Care must be taken with this new production function. It is not literally true, in the sense that if we used government policy to increase B, that would increase output according to what the function says. The reason is that the relationship $X = a * B$ would change. It might happen that $a = 50$ initially, because bowling leagues are 1/50 of social capital, but if we double the number of bowling leagues, that will not double the rest of social capital. (If it does, then our new function is indeed valid for making policy, and B is more than just a proxy.) Instead, the multiplier a will change to be about 25.

One commonly used variable is drawn from the General Social Survey, which every year or two has asked 1,500 to 3,000 people in the United States the number of types of associations to which they belong.[16] The problem with this as a proxy for social capital is that it is narrow. If we find that people in Ohio belong to many associations, that might be a sign of high social capital. It might also, however, be a sign that people in Ohio do not trust anybody who is not a member of the same association as they are, so the very prevalence of associations is a sign of lack of other kinds of social capital. Putnam and others, however, have found the associations variable to be correlated with many other social variables. One example is the study of individual social capital by Edward Glaeser, David Laibson, and Bruce Sacerdote.[17] Rather than beginning with aggregate social capital, they look at what explains the number of associations to which individual people belong. They find that people belong to more associations if they are well-educated, middle-aged, and nontransitory, just as one might expect

[16]National Opinion Research Center, *General Social Survey*, annual from 1975 to 1991, biennial from 1994 to 2000,
http://www.norc.uchicago.edu/projects/gensoc.asp (November 24, 2001).

[17]Edward L. Glaeser, David Laibson, and Bruce Sacerdote, "The Economic Approach to Social Capital," National Bureau for Economic Research Working Paper No. W7728, issued in June 2000,
http://papers.nber.org/papers/W7728.pdf (September 20, 2001).

from rational investment on their part. They do not try to determine how much richer people are as a result of their belonging to more associations, but measuring the individual return to social capital is a logical extension of their approach.

A different proxy commonly used for social capital is drawn from the World Values Survey, which was conducted 1981-84, 1990-93, and 1995-97 (and will be done again on a regular basis).[18] It asked 1,000 people in each of 40 countries the following question:

> "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?"

A problem with the trust question is that it is subjective, and different respondents interpret it differently. In addition, it is hard for a person to know how trusting he really is unless he must actually decide whether to take a trusting action and put himself at risk. Glaeser, Laibson, Scheinkman and Soutter found that Harvard students who answered the World Values Survey question by saying that most people can be trusted were actually not especially trusting in experimental games (though they were more trust*worthy* in those games).[19] The trust variable has nonetheless been used with interesting results. Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny find that a country's level of trust as measured this way is correlated, conditioning on income per capita, with any number of desirable things, including noncorrupt government, civic participation, good infrastructure, and even low inflation.[20] What gives rise to these correlations is an open question, but they show that the trust variable has some predictive power and hence some meaning.

[18] *World Value Survey, 1981-84 and 1990-93* (ICPSR 6160) Ann Arbor, Michigan: Inter-University Consortium for Political and Social Research, 1994, http://wvs.isr.umich.edu/ (November 25, 2001).

[19] Edward Glaeser, David Laibson, Jose Scheinkman and C. Soutter, "Measuring Trust," *Quarterly Journal of Economics*, 115: 811-846 (August 2000).

[20] Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, "Trust in Large Organizations," *The American Economic Review, Papers and Proceedings*, 87: 333-338 (May 1997).

One of the best-known studies of social capital, that of Stephen Knack and Philip Keefer, uses cross-country data to try to explain economic growth (as opposed to the level of GDP) using both an association variable and two more subjective variables from the from the World Values Survey.[21] One of the subjective variables is the Trust variable used by La Porta et al. and the other, which they call "Civic", is based on the degree to which the respondent disapproved of actions such as "claiming government benefits which you are not entitled to."[22] Knack and Keefer find that Trust and Civic both are significant explanatory variables for GDP growth, though their significance disappears if investment is added to the regression, suggesting that Trust and Civic help growth by increasing investment in physical capital. The sample size, like La Porta et al.'s, is only about 30 countries, which makes it remarkable that even Trust and Civic show up as significant. They also find that the number of associations to which respondents belonged is insignificant, however, even when Trust and Civic are not included in the regression equation. They note that although Trust and association membership do have a strong bivariate correlation, conditioning on income and education that correlation disappears— that is, it seems the correlation is accidental because both are independently correlated with income and education.

A different kind of proxy would be to use some variable measured at the aggregate level such as the number of bowling leagues in a state or the crime rate in a county. There is a problem with this that also lurks in the background of the association variable: distinguishing inputs from outputs. Numerous associations might be as much the output from social capital (viewed as a tendency to cooperate) as the input to a production function. This is even clearer with respect to crime. We would like to determine production functions for non-economic goods such as crime as well as for economic ones. Ideally, we would discover how inputs such as police, laws, income, and ed-

[21] Stephen Knack and Philip Keefer, "Does Social Capital Have an Economic Payoff? A Ccross-Country Investigation," *Quarterly Journal of Economics*, 112: 1251-1289 (November 1997).

[22] The other actions used to construct the Civic variable are "avoiding a fare on public transport," "cheating on taxes if you have the chance," "keeping money that you have found," and "failing to report damage you've done accidentally to a parked vehicle."

ucation generate the output of crime, rather than using crime as our base variable and using it to predict other social outputs. Finding that some variable such as crime helps explain economic output measures would nonetheless be an interesting result.

Two other methods: expert subjective measure (Fukuyama low, middle high trust countries). Experiments (Reader's Digest study).

Neglected Topics: Businesses, Families, Norms, and Social Outputs

It may seem unfair to make extra requests of a literature that is still unsure of how to define its key variable, but I will do so anyway. I would like to raise several topics that I think are central to the idea of social capital but have not received enough attention.

First: BUSINESSES. They are civil associations too.

A second lacuna in the social capital literature is that most common of civic associations: the family. Although families are partly hierarchical in their interactions, they are local associations with active participation of their members, and they clearly are are important both for information transmission and for solving prisoner's dilemmas. The family is the obvious building block for civil society and government has often been viewed as something like a large family (or, conversely, the family as something like a small government). Nor is this just the view of older thinkers such as Edmund Burke and Confucius; evolutionary biology devotes much attention to solving prisoner's dilemmas, and its focus is on how this helps an animal's genes– that is, members of its family.[23] Human behavior, too, may be based on behavior to family members, and it is from that base that we seek to expand virtues such as altruism to people outside the family.[24]

[23] A good overview is Robert Trivers's *Social Evolution* (Menlo Park, California: The Benjamin Cummings Publishing Company, 1985). See especially Chapters 4 ("The Group Selection Fallacy"), 6 ("Kinship"), and 15 ("The Evolution of Cooperation").

[24] An alternative explanation for human altruism, which Trivers discusses at p. 388, is that it arises from an instinct for reciprocal altruism.

Almost everyone is born into a family, but the size and strength of families differs considerably across time and place. To an American, what comes immediately to mind is the increase in divorce rates from 1960 to 2000. Perhaps just as important, however, is the degree to which families stay in one area geographically (something never as true in America as elsewhere), the extent to which cousins and more distant relatives are included, and the sheer number of children (a family of ten grown children has more opportunity for mutual aid than a family of two).

Glaeser and his co-author report that over half of the General Social Survey respondents belong to just zero or one association.[25] Thus, including a person's family in the number of associations to which he belongs would would typically more than double the number. If everyone belonged to a family, the omission of that variable would not matter. But for many people— especially adults— belonging to a family is as nominal as belonging to the state church is for someone in a modern European country. The overwhelming majority of citizens may belong to the state church but never attend a church service except for weddings and funerals. Similarly, many adults are out of contact with parents and siblings, not to mention uncles and cousins. Even children are often out of contact with their fathers, and a family with just one parent will not be as effective a civic association, other things equal.

Data are available on the size and marital status of families. The World Values Survey also has questions relevant to the strength of families. One of them is the extent to which the respondent trusts his family. La Porta et al., responding to a suggestion by Fukuyama that strong families are bad for large organizations, regress the market share of the 20 largest firms on trust in family and trust in general, finding that it is negatively correlated with trust in family and positively correlated with trust in general.[26] It would be useful to try to combine the two trust variables, since there is no reason to think that families would be less useful than other civic associations, even if they do substitute for alternative memberships.

[25] Glaeser et al., Appendix Table 1. 30% belong to zero, 26 % to one, 18% to two, 11% to three, and 15 % to more than three.

[26] La Porta et al., pp. 335-336.

Another topic, which if not neglected by the social capital literature, at least needs better integration, is social norms. In the 1990's a literature on norms mushroomed in law and economics, parallel to the literature on social capital but largely separate from it. The norms literature has had the same problem of defining its key variable and even more trouble in measuring it. Indeed, so daunting is the task of measuring the strength and number of norms that nobody has tried to create a numerical variable. Instead, empirical work is largely based on case studies and anecdotes.[27]

Social norms are clearly part of social capital. To some extent their existence is correlated with that of trust and of civic associations. If norms work, people can trust each other. If people belong to civic associations, they can more easily detect wrongdoing and enforce norms against each other. But norms are distinct from the other two ideas. If norms are strong, people may be very careful with each other, but only so that if others are predaceous they can bring the norms' penalties to bear against them. And if norms are strong, associations may be unnecessary. Internalized norms, especially, do not need associations for enforcement, and lack of civic associations might be just as much a sign of a well-ordered society as lack of police. To reduce opportunism, encouraging moral education may be just as easy and effective as encouraging civic associations.

This brings us back to the topic of the family. Families devote a huge amount of time to teaching norms to children and are notorious for the in-

[27]Examples from the literature are: Robert Ellickson, *Order without Law: How Neighbors Settle Disputes*, (Cambridge: Harvard University Press, 1991); Lisa Bernstein, "Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry," *Journal of Legal Studies*, 21: 115-158 (June 1992); Elinor Ostrom, "A Behavioral Approach to the Rational-Choice Theory of Collective Action," *American Political Science Review*, 92:1-22 (March 1998); Richard Posner and Eric Rasmusen "Creating and Enforcing Norms, with Special Reference to Sanctions," *International Review of Law and Economics*, 19: 369-382 (September 1999). Much of the work focuses on the relation between private norms and public laws, e.g. Robert Cooter, " Models of Morality in Law and Economics: Self-Control and Self-Improvement for the 'Bad Man' of Holmes," *Boston University Law Review*, 78:903-930 (June 1998); Avery Katz, "Taking Private Ordering Seriously," *University Pennsylvania Law Review*, 144: 1745-1763 (May 1996); Eric A. Posner, "The Regulation of Groups: The Influence of Legal and Nonlegal Sanctions on Collective Action," *University of Chicago Law Review* 63: 133-197 (Winter 1996).

tensity with which they enforce norms even against adults. Data from the World Values Survey might be useful in measuring this. One question asks which of a variety of qualities a child should be encouraged to learn at home, a variety including good manners, independence, hard work, imagination, and unselfishness. Some qualities build social capital; others are more individually useful.[28]

The final topic is social outputs. So far, research has been concentrated on economic outputs such as GDP growth or political outputs such as the degree of government corruption.[29] More natural outputs of social capital are social outputs such as crime, divorce, child neglect, and drug use. These, like economic outputs, can be modelled using production functions, as has been clear from the work of Gary Becker and those coming after him.[30] Moreover, they are an important part of wealth. What do people value? If asked, most people will not answer "money" (not even economists!). Their responses may not be truthful, but in our daily lives we do not act as if money is the only goal, or even the most important one. We do not marry the richest potential spouse or take the most lucrative job. This is quite consistent with economic rationality; economic theory fully grants that nonmaterial goods are as important as material ones. Yet we behave in policy making as if material possessions are what is most important. This is true of both liberals and conservatives. Conservatives focus their attention on redistribution of wealth and on incentives for wealth production. Liberals focus their attention on inequality of wealth. Both neglect nonmaterial influences on happiness.

Yet are greater inequalities in social indicators than in economic indicators, and greater potential for improvements in government policy. What is the crime victimization rate for rich people compared to for poor? The ille-

[28] "1995-1998 World Values Survey Questionnaire," http://wvs.isr.umich.edu/wvs-ques3.html (November 25, 2001).

[29] Putnam's *Bowling Alone* is an exception: it looks at US state data on various social indicators.

[30] See, e.g., Gary S. Becker, Elisabeth M. Landes, and Robert T. Michael, "An Economic Analysis of Marital Instability," *Journal of Political Economy*, 85:1141-1187 (December 1977); Gary Becker, "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, 76: 169-217 (March/April 1968).

gitimacy rate? I have not seen that data, but we can see the relative inequality of economic versus social indicators even at the aggregated level of U.S. states. Table 5 shows the minimum, maximum, and 25th, 50th (median), and 75th percentiles for six indicators for the 50 states plus the District of Columbia. What is important for present purposes is the interquartile range– the gap between the 25th and 50th percentiles– since that shows the extent of variability among typical states. (I admit that I include the District of Columbia not just because it is there in my original data source but because it illustrates how extreme localities can be in these indicators. Its presence has little effect on the percentiles, however.)

Table 5: State Data on Economic and Social Health [31]

	Income per capita	Average teacher salary	% Finished college	Murders per 100,000	Divorces per 1,000	% Births Illegitimate
Minimum	19,608	28,552	17.3	1.1	2.2	16.7
1st Quartile	22,488	34,244	21.5	3.1	3.7	28.9
Median	25,895	37,405	24	5.1	4.5	32.9
3rd Quartile	28,968	42,833	27.1	8	5.2	34.9
Maximum	37,452	51,584	42.1	49.7	6.8	61.7

It is easier to see differences in variability in Table 6, in which the median for each variable is normalized to equal 100. Income per capita's interquartile range is from 87 to 112, compared to a range of 61 to 157 for murder. Social variables are not always more dispersed than economic variables— illegitimacy is suprisingly uniform across states, for example– but Table 6 does show that anybody interested in inequality, or in the potential for worse-performing states to change their policies to catch up to the others, ought to pay attention to social outputs as much as economic ones. The aim of social capital is not just to generate new Silicon Valleys.

[31] Sources: *The Statistical Abstract of the United States, 2000*, tables 24, 25, 33, 76, 150, 456, 648, and the state rankings website, http://www.census.gov/statab/www/ranks.html (11/25/01). Illegitimacy is from the Center for Disease Control, http://www.cdc.gov/nchs/births.htm (11/25/01), table 19.

Table 6: State Data, Normalized so the Median Equals 100

	Income	Teacher Salaries	Finished College	Murder	Divorce	Illegitimacy
Minimum	76	76	72	22	49	51
1st Quartile	87	92	90	61	82	88
Median	100	100	100	100	100	100
3rd Quartile	112	115	113	157	116	106
Maximum	145	138	175	975	151	188

If we do reach the stage of measuring the dollar value of social capital for a city, state, or country, its dollar effect on social outputs will not be a small part of that value. In theory, social outputs can be priced. People would give up some amount of income in order to reduce their probability of being divorced or murdered. We can even use market prices to try to value social outputs, since people move from place to place to escape social evils.[32] The chief difficulty is that it is harder to start by valuing individuals' social capital, the approach taken by Glaeser et al. Social outputs are mostly public goods. A person may join a neighborhood defence organization to control crime or a strict church to prevent divorce, but for social outputs even more than economic outputs joining associations and fostering norms have spillovers.

These three neglects— of family, norms, and social outputs— are as much opportunities for the social capital literature as deficiencies. Any way that we can acquire more leverage with which to attack the topic is useful, and it may be that the social capital measure for which we are searching will be found by paying attention to these things.

Concluding Remarks

Defining and measuring social capital is hard. Is it so hard that we should give up? The physicist Lord Kelvin said

[32]See, e.g., Richard Thaler, "A Note on the Value of Crime Control: Evidence from the Property Market," *Journal of Urban Economics*: 137-45 (January 1978).

> "When you measure what you are speaking about and express it in numbers, you know something about it, but when you cannot express it in numbers your knowledge about is of a meagre and unsatisfactory kind."[33]

Kelvin's statementis true enough to make us uncomfortable, but we must also remember the opinion of Aristotle, who tackled both physics and politics:

> "...it is the mark of an educated man to look for precision in each class of things just so far as the nature of the subject admits; it is evidently equally foolish to accept probable reasoning from a mathematician and to demand from a rhetorician scientific proofs."[34]

I see no reason to stop looking yet. There is wide agreement that networks and solving prisoner's dilemmas are important, and that if we give up studying them we will not understand either economics or civil society as well as we ought. I would not be surprised if at the end of the day we do abandon the idea of social capital as an aggregate variable that can be measured, and instead use the term loosely to refer to the collection of non-government institutions that help us live more satisfactory lives together. But we should take cheer from another of Lord Kelvin's opinions:

> "I can state flatly that heavier than air flying machines are impossible."[35]

[33]Quoted in D MacHale, *Comic Sections* (Dublin 1993), http://www-groups.dcs.st- andrews.ac.uk/∼history/Quotations/Thomson.html (November 24, 2001).

[34]Aristotle, *Nicomachean Ethics*, Book I, chapter 2, W.D. Ross, translator, http://classics.mit.edu//Aristotle/nicomachaen.html (November 24, 2001).

[35]http://zapatopi.net/kelvin/quotes.html (November 24, 2001).

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