

# Social Capital, Networks, and Economic Wellbeing

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*Judith K. Hellerstein and David Neumark*

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## Summary

Scholars and policy makers alike are increasingly interested in understanding how social capital shapes people's economic lives. But the idea of social capital is an amorphous one. In this article, economists Judy Hellerstein and David Neumark define social capital as networks of relationships among people who are connected by where they live or work. Thus social capital, in contrast to human capital, resides in the connections among people rather than their individual characteristics.

The authors draw on survey evidence, case studies, and administrative data to document that social capital networks play an important role in improving wellbeing, especially in terms of better labor market outcomes. Labor market networks, they write, provide informal insurance or risk sharing, and they facilitate the transfer of information (about job opportunities for individuals, and about potential employees for businesses). Moreover, networked individuals' choices and outcomes affect others in the network, a phenomenon known as *peer effects*.

The evidence suggests that when it comes to getting a job, networks are especially important to low-skilled workers and immigrants. Hellerstein and Neumark also report some limited evidence on how neighborhood networks may shape children's health and educational outcomes. Throughout, they discuss how policy might strengthen (or inadvertently weaken) the beneficial effects of networks.

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The term *social capital* is used in casual social discourse, as well as in policy and academic discourse, to refer to something that can improve economic wellbeing and is beyond the productive capacity and skills of individuals. Everyone seems to recognize social capital as present when it's indeed present, and absent when it's indeed absent. But because social capital is defined in different ways, we run the risk of naively attributing many economic and social problems to its absence and proposing that simply increasing social capital might help. Unless we precisely identify the problems and pinpoint the mechanism by which specific forms of social capital can ameliorate them, we tend to get vague diagnoses and untested, ill-formed policy proposals.

One definition of social capital is the “networks of relationships among people who live and work in a particular society, enabling that society to function effectively.”<sup>1</sup> This definition encompasses what people mean by social capital in many contexts, but it's still narrow enough to be useful in identifying and studying social capital. In particular, it highlights two key features. First, it refers to *connections*, and thus shifts the focus from the characteristics of individuals and families to the ties between them. Second, it emphasizes that social capital is present not simply when individuals are connected to one another—through what can be described as networks—but rather when the relationships that undergird these networks lead to productive social outcomes. In that sense, social capital is *productive capital*, in the same way that economists think of physical capital or human capital (the accumulated skill that makes an individual productive) as productive capital.

Social capital, under this definition, is still very broad. Networks can be formed along virtually any of the many societal dimensions in which people interact—neighborhoods, workplaces, extended families, schools, and so on. In this article, we focus on networks whose existence fosters social capital in one specific way: by facilitating the transfer of information that helps improve the economic wellbeing of network members, especially (but not exclusively) via better labor market outcomes. Much evidence shows that networks play this important role in labor market outcomes, as well as in other outcomes related to economic wellbeing. In reviewing this evidence, we pay particular attention to how networks can help less-skilled people, who typically come from lower socioeconomic backgrounds. We also discuss the measurement of social capital, including new empirical methods in machine learning that might provide new evidence on the underlying connections that do—or might—lead to productive networks.

Throughout, we discuss the policy implications of what we know so far about networks and social capital. Two key questions arise: How can public policy encourage the formation of social capital in the form of network connections that transmit information to improve socioeconomic outcomes? And how can policymakers use existing networks to create social capital that leads to more effective public policies? The burgeoning research on networks hasn't focused sharply on policy; still, we draw lessons where we can, and we emphasize what we consider the important questions that remain.

## Networks and Labor Market Outcomes

The labor market is perhaps the key area in which networks are known to affect social outcomes. Broadly speaking, networks can

play three roles in the labor market. First, they can provide informal insurance or risk sharing to protect against adverse shocks in the labor market from a layoff or other unexpected drop in earnings.<sup>2</sup> Second, when people who are networked together participate in the labor market, we may see the impact of *peer effects* among those network members. (Peer effects occur when the choices or outcomes of one networked person directly affect the choices or outcomes of another member of the network.<sup>3</sup>) Third, networks can facilitate the transfer of information in the labor market, where individuals face barriers to learning about job opportunities and employers face barriers to learning about potential employees.

Here we're concerned primarily with this third role for labor market networks. We don't focus on risk-sharing networks, which have more to do with what happens outside the labor market in response to adverse labor market events, rather than with what improves success within the labor market. And peer effects are covered by Gordon Dahl elsewhere in this issue.<sup>4</sup> That said, it can be hard to separate peer effects from information transmission in networks; as a result, some of the research we discuss doesn't draw a hard and fast distinction.

In this section we review the evidence on how networks can improve information flows between employees and employers, and can also improve the employment and wages of network members. We believe this evidence establishes that labor market networks can be an important source of social capital that helps create strong labor force attachment and higher wages, thus making them critical for the wellbeing of families and children.

### Evidence on Labor Market Networks

Early evidence on labor market networks established that many people search for and

find jobs through informal connections to others, in contrast to the usual job search models set down by economists. However, this research didn't demonstrate that the relationship between networks and labor market outcomes is causal.

A famous 1974 book by sociologist Mark Granovetter, *Getting a Job: A Study of Contacts and Careers*, is widely viewed as having launched the scholarship on the importance of networks in labor markets.<sup>5</sup> Granovetter interviewed men in Newton, MA, who were in managerial, professional, and technical jobs and who had switched employers in the previous five years. He documented that networks helped many of these men find their current jobs, and that those whose network contacts, or *ties*, had led them to their current jobs earned more and had greater job satisfaction. About half the workers interviewed found their jobs through a social contact, and many more through a work contact. (Similar early evidence exists for less-skilled jobs.<sup>6</sup>)

Survey evidence has since confirmed Granovetter's findings. Economists Yannis Ioannides and Linda Datcher Loury reviewed evidence indicating that job searchers rely heavily on networks of friends, relatives, and acquaintances as part of their job search strategies.<sup>7</sup> One of their findings, to which we return below, is that the use of informal network contacts is more common among some groups, such as less-educated job searchers. But Ioannides and Datcher Loury found little evidence of racial (black-white) differences in the use of network contacts in job search. Thus, the evidence they review only partially supports the belief that traditionally disadvantaged populations in the United States are more likely to use networks when searching for jobs.

Survey evidence can help establish how people use labor market networks, and how often. But for many reasons, such evidence may fail to answer the fundamental question of whether these networks have broad-ranging positive causal impacts on labor market outcomes. First, survey respondents who report using network contacts to find jobs may be fundamentally different from those who don't use them, making it difficult to identify the causal link between use of networks and labor market outcomes such as employment or wages. Second, cross-sectional surveys, which collect information about outcomes at only one point in time, don't offer much information about the importance of networks in securing employment for those who are currently not working, or in securing higher wages for those who are working. Third, survey evidence on the use of networks doesn't tell us much about how networks operate. Network contacts may be useful because they provide information to job searchers about available jobs generally or about jobs with those contacts' own employers.<sup>8</sup> Or network contacts can provide information about potential employees to employers who are hiring (that is, *referrals*).<sup>9</sup> To develop a behavioral understanding of labor market networks, and to consider how policy might improve the productivity of labor market networks in facilitating productive job search, it's important to disentangle these different roles for networks.

### Experimental and Observational Evidence on Referrals

Because survey evidence has limitations, most recent research on labor market networks either turns to observational data on labor market outcomes for people who are (or seem to be) connected by networks,

or uses experimental methods to create or manipulate the functioning of networks in the real world. Some of this work—especially recently—pays careful attention to identifying the causal channels by which networks operate, which can more clearly demonstrate the effects of networks on labor market outcomes. This research establishes direct evidence that network connections can lead to productive hiring, including evidence on this effect for lower-skilled workers in the United States. For employers, the productivity of network hiring is measured as higher output and/or profit. When these outcomes aren't measured, the productivity of networks is often inferred when workers hired via networks earn higher wages and/or experience less job turnover than other workers.

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Experimental studies, by their very nature, are narrow in scope. But when carefully designed and executed, such studies cleanly isolate the mechanisms by which networks affect outcomes.

A recent series of linked experiments by economists Amanda Pallais and Emily Sands tested whether referrals made by workers contain information about the quality of referred workers.<sup>10</sup> The setting for their study is an online platform through which the authors hired workers in the Philippines to perform small online tasks. In the first

stage of the experiment, the researchers hired experienced workers. They then asked these workers to refer others for additional tasks. In the second stage, they hired the referred workers as well as other, non-referred workers to do these additional tasks. The referred workers were more productive than the non-referred workers. This was true whether or not the tasks involved team production with workers from the first stage, and whether or not the referred workers' productivity became known to the worker who made the referral, suggesting that the productivity differences in this study aren't generated by peer effects.

Economists Lori Beaman and Jeremy Magruder provide related evidence from an experiment in Kolkata, India.<sup>11</sup> They note that networks are common in developing countries as a way for members to insure each other against labor market risk, and that referrals to network members for job vacancies are also common: 45 percent of employees report having helped a friend or relative find a job with their current employer. For their research, Beaman and Magruder recruited participants and paid them to complete some basic tests of cognitive ability and to perform certain tasks for two hours. They then offered the participants monetary incentives for referring others to perform tasks, paying some based on the productivity of the workers they referred, and others a flat fee per referral. Participants who were paid based on the productivity of their referrals were much more likely to refer a co-worker than a family member.

The evidence from these studies shows that workers can refer other productive workers to employers. But labor market networks need not enhance productivity for employers.

Workers who refer family members are using their network connections to help their family members get hired, presumably enhancing the welfare of their family network but at the cost of not referring co-workers who could have been as productive or more so. Thus, employers may need to offer incentives for referrals of more-productive workers. This evidence illustrates our earlier point that network connections aren't necessarily social capital. In some cases, network connections could simply affect who gets jobs among equally productive workers. They could even (as in some of these studies) lead to referrals of less-productive workers.

Two other studies on referrals pertain to lower-skilled workers in the United States. One examines data from a single US financial services company, with information on whether an applicant to the firm was referred by a current employee of the company.<sup>12</sup> The authors tested for differences in outcomes between referred and non-referred workers, examining the probability of being hired, initial wages if hired, and subsequent wage growth and turnover. They found that referrals convey information that employers use in gauging the productivity of new employees. Applicants who were referred to the company were more likely to be hired, were paid higher wages early in their tenure at the firm, and had lower turnover. All of these referral effects were stronger for workers who were applying for and hired into lower-skilled positions at the firm. This suggests that the company finds it harder to screen lower-skilled applicants without the extra information conveyed by a referral. It also implies that networks may be especially important for workers who are more disadvantaged.



However, another finding from this study paints a less optimistic picture of the role networks may play in affecting labor market outcomes for more disadvantaged workers. In particular, the researchers found clear evidence of *homophily* in referrals; that is, current employees were more likely to refer individuals whose age, gender, race, and ethnicity were similar to their own. It's not surprising that referral networks are segmented at least partially along these dimensions, likely reflecting workers' social contacts. But when companies rely on referrals for hiring (and, at least as in this study, pay referred workers more), these referrals can lead to positive outcomes only for networked workers, perpetuating a cycle of disadvantage for those outside the network.<sup>13</sup>

The second study is a larger-scale examination of how referral networks affect less-skilled sectors in the United States.<sup>14</sup> The authors used administrative data from nine firms in three industries (call centers, trucking, and high-tech/IT), covering millions of job applicants and hundreds of thousands of hired workers. They found that on many dimensions, the productivity of referred workers was similar to that of non-referred workers, although the referred workers were better on a couple of dimensions. But in the lower-skilled sectors (call centers and trucking), where workers' contributions to profits are measurable, referred workers often had lower turnover and were cheaper to recruit, and hence added more to firm profits.

### Networked Individuals and Labor Market Outcomes

The research on referrals described above begins with the identification (or,

in experiments, the creation) of firms that hire, and then studies outcomes for workers hired via referrals versus other channels. This research can't capture outcomes for the workers who weren't hired by these firms (perhaps because they lacked a referral). Thus, although these studies examined how employers and the workers they hire benefit from the information provided by referrals, they don't gauge whether networks provide useful information about available job opportunities to job seekers. Understanding how labor market networks can help job seekers requires a research design that starts by identifying groups of individuals—including the non-employed—who are networked together. Once these groups are identified, it becomes possible to study labor market outcomes for these networked individuals across many dimensions, among which finding a job is particularly important.

Many recent studies that use observational data of this kind have documented similar labor market outcomes for individuals who are plausibly networked together across one of a host of formal or informal relationships. The results establish that labor market networks often deliver improved labor market outcomes for job seekers, including higher employment and wages, lower turnover, and faster re-employment after layoffs. At the same time, this research establishes that these networks have limitations, including stratification along ethnic or racial lines, possibly implying that minorities have less access to the benefits of labor market networks.

These studies don't consider all (or even a large number of) possible network links among potential workers. Rather, they typically take advantage of data sets in which workers are observed to be connected along

one potential network dimension. Once networks have been defined and identified in the data, the research usually proceeds by testing for correlated labor market outcomes—employment status, workplaces, wages—among network members. Finally, researchers try to isolate the extent to which the network connections actually cause the correlated outcomes, attempting to rule out the possibility that the correlated outcomes of network members are spurious by-products of network members' shared observable and unobservable characteristics. These attempts at establishing a causal impact in improving labor market outcomes are central to testing whether such network connections represent social capital.

Recent research on the impact of online social networks like Facebook and LinkedIn constitutes one example of the opportunistic use of potential network connections. For example, economist Laura Gee uses Facebook to test whether Granovetter's *weak ties* or *strong ties* are more valuable for finding jobs.<sup>15</sup> (Weak ties are connections with those more likely to have different contacts, rather than the same contacts—say, a casual friend.) The evidence indicates that more jobs come from weak ties than from strong ties, simply because individuals have more weak ties, but that any individual connection is more helpful to job finding if it's a strong tie.

Research on online social networks and the labor market is still in its early stages, but might in the future provide policymakers with fruitful information. That said, the role of online social networks in transmitting information (or misinformation) is, understandably, controversial, so useful policy interventions may be difficult to design and implement. Given the uncertainty

surrounding these issues, we focus on network connections based in the physical world. These networks are generally well understood, can be influenced by policy, and may be especially relevant for less-skilled workers.

One example of this type of research is a study of World War I veterans that was based on an unusual data set: men who served in a particular infantry division and for whom information was later recorded in the 1930 US Decennial Census.<sup>16</sup> Census data on the veterans' residential neighbors provided a baseline from which to compute the *excess similarity* of outcomes among those who served together. When a peer from the veterans with whom a person served gained employment, the likelihood of another veteran's employment increased by 0.8 percentage points. Because the veterans didn't choose their infantry division, we can be more confident that the study identifies the true effect of the network on outcomes, rather than the effect of some correlated factor that underlies both the creation of the network and later outcomes. On the other hand, the study has no direct or indirect evidence of information flows between members of the network, so the evidence could represent peer effects.

Other work on labor market outcomes in observational data where individuals are grouped together in networks includes studies of workers displaced from the same firm, of people who attended the same educational institution, and of people from similar racial or ethnic groups.<sup>17</sup> Most of the studies find that a networked member's employment is boosted by the employment of others in the network, although, as in the study of World War I veterans, the mechanism isn't clear. Indeed, we suggest

that evidence based simply on membership in the same racial or ethnic group is particularly unlikely to reflect information flows.

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Recent work has focused intensively on the geographic or spatial dimension of networks. Because residential segregation by race, ethnicity, and socioeconomic status is so pervasive in the United States, it's particularly important to understand how networks defined by residential proximity can affect labor market outcomes. Such evidence is also important because social capital in neighborhoods can be affected in meaningful ways by the institutions in those neighborhoods (schools, places of worship, libraries, and the like), and potentially by government intervention as well.

It's reasonable to assume that information about jobs will flow between people living in the same neighborhood, and much of the evidence we and others have assembled is consistent with this. Perhaps most importantly, information that flows between neighbors about jobs may be especially relevant to less-skilled workers, for whom job markets are more local and where job search may rely more on informal methods.

Our evidence supports this hypothesis as well.

Economists Patrick Bayer, Stephen Ross, and Giorgio Topa found evidence of neighborhood-based networks that affect labor market outcomes.<sup>18</sup> They used confidential US Census data from the Boston area that identifies the census blocks where individuals live and the census blocks where they work. In urban areas, census blocks are like regular city blocks (they can be larger in suburban and rural areas), and thus they identify groups of individuals who live in close proximity and are very likely to interact as neighbors, thereby potentially forming a network.

Bayer and his co-authors find that individuals living in the same census block are more likely to be employed in workplaces that are also in a common census block than are individuals living in nearby areas (the same *block group*) but not the same block. Assuming that networks are stronger within blocks than within block groups, and that the unobserved characteristics of workers are similar within blocks and block groups (assumptions that the data appear to justify), this evidence suggests that residence-based labor market networks affect hiring.

As additional evidence, the authors estimate models that ask whether the relationship between residential and workplace proximity is stronger among pairs of people for whom a network connection is more plausible, such as people of the same race, people who have school-age children the same age, and so on. Some of the results provide this kind of supporting evidence. For example, living on the same block has a stronger effect on working on the



same block among people with young or adolescent children of the same age (but not children aged 18 to 24, since having children of this age probably doesn't lead to social interactions among parents). Having a similar education level (say, both people are high school graduates) also has positive effects, which might make sense if those with only a high school degree have labor markets that are more local, or rely more on informal networks, than do college grads. On the other hand, there appears to be no evidence of homophily along racial or ethnic lines.

Our own past work also assesses evidence on the importance of labor market networks among neighbors, using matched employer-employee data for the entire United States.<sup>19</sup> The data provided evidence on whether neighbors work at the same business establishment (and not simply on the same block). Because the data identify co-workers in the same establishments, this evidence is more directly linked to information flows about specific jobs among residents than in Bayer, Ross, and Topa's study, though the findings are consistent across the two studies.

We developed an index of labor market network isolation that captures the extent to which employees of a business establishment come disproportionately from the same sets of residential neighborhoods (*census tracts*). The index is measured relative to the residential locations of other employees who work in different establishments in the same census tract. Thus the index measures the excess concentration of workers from the same residential neighborhoods in specific business establishments, beyond what would be expected if workers were assigned randomly to any business in that same census tract.

The evidence indicates that residence-based labor market networks play an important role in hiring. For white workers, the excess concentration of workers in specific establishments is about 10 percent of the maximum amount of sorting that *could* occur if networks were completely sorting workers across nearby establishments (an unreasonable expectation, but a useful benchmark). This figure is somewhat higher for black workers when we look at comparable tracts, and nearly twice as high when we compare blacks and whites in small establishments (which we do because the way the sample is constructed leads to disproportionate underrepresentation of small establishments for blacks). That is, overall, our evidence indicates that networked hiring is more important for blacks than for whites. Networks are also more important for less-skilled workers, which we would expect for network connections among residential neighbors, given that low-skilled labor markets tend to be local. And residence-based networks are considerably more important for Hispanics, for whom the excess concentration of workers from the same neighborhoods in the same business establishments is about 22 percent of the maximum.

Finally, this excess concentration is twice as high for Hispanic immigrants and those with poor English skills than it is for non-immigrant Hispanics. This suggests that informal labor market networks are particularly important for workers who aren't as well integrated into the labor market and have difficulty learning about job availability, and for whom employers may have less reliable information.

This study offers clear evidence that networks help funnel workers into jobs with specific

employers. But data limitations associated with the observational data preclude distinguishing whether networks break down the information barriers faced by workers or employers (or both).

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Consistent with our earlier suggestion that hiring via networks may perpetuate disadvantage for some groups, other research finds that labor market networks may be racially or ethnically based. When they are, reliance on informal referrals in a predominantly white labor market, for example, benefits whites at the expense of other groups.<sup>20</sup> The simple fact that some networks are based on neighborhood of residence implies racial stratification. Beyond that, however, our study finds evidence of racial stratification of networks even within neighborhoods. And if networks among co-residents are racially stratified, then the likelihood that a black employee would work with a neighbor regardless of race should be smaller than the likelihood that a black employee would work with a black neighbor. The evidence points to much weaker network connections between black and white neighbors than between black neighbors; specifically, when we disregard the race of neighbors and co-workers, the empirical importance of networks falls by more than 40 percent. (There is other evidence of racially or ethnically stratified networks in both the

United States and Europe.<sup>21</sup>) Thus it appears that labor market information is less likely to flow between black and white co-residents than between co-residents of the same race.

The studies we've discussed so far examine how residential labor market networks may affect employment. As we've said, though, an important question from the point of view of social capital is whether the jobs that appear to have been found through network connections result in more-productive job matches.

We recently studied whether individuals who work in the same establishment and are networked together via residential proximity (living in the same census tract) have better labor market outcomes.<sup>22</sup> If networks help direct workers to establishments and/or jobs in which they're productively matched, then these networked workers should earn more and leave those firms less often than do non-networked workers, as predicted in theoretical models.<sup>23</sup>

Using a measure of neighborhood network connectedness that's closely related to the index in our first study, we estimated models with controls designed to isolate the impact of a worker's neighborhood network among his or her co-workers on wages and turnover.<sup>24</sup> The controls included measures of how many networked neighbors work for other employers nearby, and a rich set of controls that capture all the unchanging features of both workers and employers (these are known as *fixed effects*, and might capture such things as workers' individual productivity, or technology that affects their productivity).

One of our key findings is that workers with more neighborhood network connections at work have lower turnover, suggesting that information flows in the network get workers valuable jobs. We observed this network effect

both for connectedness to one's neighbors generally and for connectedness to neighbors of the same race or ethnic group.

But it could be that turnover is low when networks are strong simply because workers enjoy working with fellow network members, and not because the job is a productive match for the worker. Thus we also examined how earnings vary as a function of network strength among one's co-workers. We found that the overall neighborhood network measure had a positive effect on earnings. But when we measured network connectedness only within race and ethnicity, we saw a negative effect. This suggests that workers value working with neighbors of the same race and ethnicity so that they're willing to earn lower wages to do so. But the finding that network connectedness to all workers raises wages (and lowers turnover) suggests that networks are more than just workplace amenities, and that they lead to more productive job matches for workers.

Economist Ian Schmutte focuses on the relationship between neighborhood networks and wages.<sup>25</sup> Also using US matched employer-employee data, he defines a worker's network as individuals who live in the same census block; like Bayer and colleagues, he uses the slightly broader census block group as a comparison. He finds that when an individual is networked to others who work for high-wage employers, that individual is more likely to change jobs to move to a higher-wage employer. Only part of this effect occurs through job changing to a networked neighbor's employer, which suggests that the results reflect a blend of network and peer effects. Schmutte also demonstrates that local referral networks

have a stronger effect for immigrants than for the native-born, which is at least consistent with the idea that immigrant groups face more barriers to information about high-wage employers.

Finally, in our most recent work on this topic, we examined the role neighborhood networks play in securing re-employment for workers who experience mass layoffs.<sup>26</sup> A tremendous amount of evidence shows that displaced workers suffer long-term consequences from mass layoffs, including years of subsequent low (or no) earnings and higher mortality, as well as worse long-term outcomes for their children. Thus the potential role of networks in helping workers recover from mass layoffs can be important for long-term economic wellbeing, including across generations.

We used matched employer-employee data to examine the likelihood of re-employment for US workers who lost jobs in mass layoffs (such as plant closings) from 2005 to 2012—the period before, during, and right after the Great Recession. We found that neighborhood networks meaningfully increased the likelihood that workers would be re-employed in the calendar quarter following the layoff, often by finding jobs with their neighbors' employers. This was true in models that used extensive sets of variables to control for sorting and worker heterogeneity, making it much more likely that the results reflect the causal effects of networks.

The evidence that workers found jobs with their neighbors' employers, in particular, indicates information flows between residents about jobs at their workplaces—whether it was simply information about job availability or actual referrals. Moreover, the jobs found at neighbors' employers lasted

longer and paid more, consistent with the theory that network connections lead to more-productive job matches—which we interpret as a reflection of networks as social capital. Finally, and importantly, this evidence is driven by lower earners (those making less than \$50,000 per year), presumably reinforcing the idea that labor markets are more local for lower-skilled workers, whose job search relies more on informal methods.

### More on Networks and Immigrants

Some of the evidence discussed so far shows that immigrant networks are especially important in the labor market. This conclusion is reinforced by a series of studies that specifically examine immigrant networks.

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As part of the Mexican Migration Project, sociologists Michael Aguilera and Doug Massey studied a sample of 2,000 Mexican migrants to the United States.<sup>27</sup> In their sample, 60 percent of documented immigrants and 71 percent of undocumented immigrants reported using friends or family to find work in the United States. For both types of immigrants, the

larger their social network, the better their labor market outcomes, holding fixed a host of workers' other personal characteristics. Moreover, undocumented immigrants who reported using distant relatives or friends to help them obtain jobs had better labor market outcomes—generally associated with finding a formal-sector job. Aguilera and Massey suggest that these better outcomes result from the social capital of these immigrants' networks, which funnel information to them about employers in the formal sector who are willing to hire workers without documentation.

More recently, economist Kaivan Munshi studied a larger sample of approximately 4,500 Mexican immigrants from the same data set as that used by Aguilera and Massey.<sup>28</sup> He also found that respondents used friends or family to find work at high rates, though he sees the networks as providing referrals to employers rather than information to workers about available jobs (based on evidence from surveys of immigrants in the United States). To isolate whether the network effects were causal, Munshi took advantage of the variation in rainfall in Mexico. New migrants enter the United States partly in response to rainfall fluctuations, which affect agricultural jobs. That creates random differences in the size of migrant cohorts, and hence the size of immigrant networks. The study uncovered a large role played by local existing migrant networks in the United States on labor market outcomes of new arrivals. In particular, migrants were more likely to be employed when the place to which they migrated had larger cohorts of previous migrants from their local Mexican community. The new migrants were also more likely to be working in better, nonagricultural jobs when they had more

network contacts already established in the labor market in their US locations.

### **Policy Implications**

The research on the effects of networks in labor markets makes the case that labor market network connections can improve labor market outcomes for the less skilled, even during difficult economic times. For example, we found that although high unemployment rates and low vacancy rates during the Great Recession made it much harder for laid-off workers to find new jobs, neighborhood labor market networks still remained productive.<sup>29</sup> So policies that strengthen the information flows or the size of local labor market networks may be especially important during times of economic hardship. In the concluding section, we'll discuss how policy might help accomplish these goals.

### **Networks and Learning**

Networks can serve to increase information flows that affect outcomes beyond the labor market, and hence the social capital role of networks can extend to other dimensions of economic wellbeing. Although these other roles for networks have received much less attention, there's clear evidence that networks can serve as conduits for information about health access, agricultural production methods, education, crime, and government subsidies. Much of this evidence is from developing countries, but the results uncovered may carry over to the United States—as is indeed evidenced by a limited amount of research on other kinds of network effects in the United States.

### **Health Interventions**

A recent randomized controlled trial in India examined how social networks can provide

information to improve health outcomes.<sup>30</sup> The researchers studied whether patients diagnosed with tuberculosis (TB)—a prevalent but underdiagnosed contagious disease—are more effective than health care workers at referring other potentially infected individuals for diagnosis and treatment. They demonstrated that peer referrals for TB screening are much more effective (in terms of the number of new cases identified and of cost-effectiveness), both because current TB patients have better information than health care workers do about who in their networks might have TB, and because current patients are more effective at persuading these potentially infected network members to visit health clinics for screening and treatment.

### **Agricultural Production**

A good deal of evidence from developing countries shows that information on agricultural production is transmitted through networks, with productivity-enhancing effects that are consistent with a social capital role. One study finds that neighboring pineapple farmers in Ghana are an important source of information about using fertilizer to increase productivity.<sup>31</sup> A study in Mozambique shows that information transmitted within networks is important for the adoption of sunflower as a crop.<sup>32</sup> And a study in India finds that information from neighbors about the productivity of high-yield seed varieties increased farmers' adoption of new technology.<sup>33</sup> The lessons of these studies should apply to other contexts where business owners, especially small business owners, use information from their network ties in the same industry to guide decisions about changing the nature of production or otherwise increasing their productivity and profitability.



## Networks and Government Programs

A small but compelling set of studies shows that networks provide information about government programs to individuals who are eligible to use those programs but might not otherwise know to (or how to) take them up. Increasing evidence suggests that social assistance and income-support programs that aid families and children can have longer-term intergenerational beneficial effects on poverty reduction, earnings, educational attainment, and child health.<sup>34</sup> These findings imply a public policy interest in encouraging eligible recipients to take up these programs, making it important to understand whether networks can reduce barriers to doing so.

Economists Marianne Bertrand, Erzo Luttmer, and Sendhil Mullainathan examine how non-English speaking women's participation in social assistance programs is affected by the women's local network of individuals who speak the same (non-English) language and live in the same urban geographic area.<sup>35</sup> They show that the probability of a woman receiving social assistance is greater when her geographic area contains a higher concentration of people who both speak her language and themselves receive social assistance—a relationship that holds even after controlling for overall social welfare receipt in the area and the concentration of people who speak the same language. The authors are clear that they can't formally distinguish peer effects from the information about social assistance programs that's transmitted through networks. But they argue that, given the institutional complexity embedded in many of these programs, it's likely that information transfers play at least some role in their findings. A related study finds

that information flows are responsible for the variation in the use of specific social assistance programs across networks of immigrants.<sup>36</sup>

There's also evidence that information flows within communities affect the take-up of the Earned Income Tax Credit Program (EITC), which provides refundable tax credits to low-income households. This large program reaches many families: 20 percent of households filing taxes and 44 percent of households with children, at an annual cost of around \$70 billion.<sup>37</sup> The EITC is credited with increasing labor supply among single women with children, improving infant and maternal health, improving children's test scores, and increasing educational attainment.

Recent work using detailed tax data offers evidence that local information about the EITC encourages take-up of the program.<sup>38</sup> The study examines EITC claims by self-employed taxpayers, who—in contrast to wage-earners—have some ability to manipulate their reported income to maximize EITC payments. The authors present two compelling types of evidence that neighborhood information flows can change individuals' knowledge of the EITC system. First, the self-employed are more likely to maximize their EITC after moving to a zip code where other self-employed individuals also maximize their EITC, while self-employed people who move from those zip codes to zip codes where fewer engage in similar behavior continue to maximize their EITC. This asymmetric response suggests that information is transmitted across taxpayers within the high-EITC neighborhoods, in contrast to local variation being driven by local tax preparers, or by local policy to encourage people to claim

the EITC (such as San Francisco's Working Families Credit, which pays a one-time credit to families that claim the federal EITC). Second, when self-employed taxpayers have their first child and become eligible for a significant EITC benefit, those who live in places where fewer self-employed taxpayers maximize their EITC also don't maximize, while the opposite is true in high-maximizing locations. Similarly, another study, which analyzes data on the intensity of Facebook connections across counties, also finds evidence that information networks operate to change EITC-claiming behavior among the self-employed.<sup>39</sup>

### Networks and Children

Labor market networks that increase employment and earnings, and informational networks that facilitate productive outcomes outside the labor market, can improve the wellbeing of children in affected families. A small amount of evidence suggests that learning through networks can directly benefit children.

Some qualitative research shows that childcare centers in high-poverty neighborhoods can serve as *resource brokers*, helping families gain access to external organizations like businesses, nonprofits, and government agencies.<sup>40</sup> (Other work documents a similar phenomenon for different kinds of institutions, such as beauty salons in immigrant neighborhoods and churches in black neighborhoods, although in these cases the evidence doesn't pertain to benefits to children.) Sociologist Mario Small and his co-authors write that "the childcare center is arguably the most

important neighborhood institution for low-income mothers."<sup>41</sup> In some cases, these centers deliver informational or educational benefits to children, such as information on treating asthma, preventing lead poisoning, reducing domestic abuse, negotiating school enrollment, and instructing children on fire safety. Other benefits are direct services, such as free health care, speech therapy, or dental work. Small's work explicitly documents both formal informational interventions in these settings—such as parent workshops with government agency workers, bulletin board postings, and referrals of parents to outside organizations—and informal information sharing. It also documents informal connections between parents, such as those forged on field trips and in parent association meetings.

Moving from qualitative to quantitative evidence, a recent study implemented and examined an intervention explicitly aimed at increasing social capital among parents of children in Head Start.<sup>42</sup> The experiment randomly assigned children to Head Start classrooms based on two different treatments associated with greater potential for making connections among parents who live near one another—one based only on residence in the same neighborhood, and the other that added an explicit attempt to pair parents in the same classroom to support each other and share in solving problems (like assistance in picking up a child). The evidence pointed to gains in social networks in the treatment groups (for example, an increase in the size of the self-reported social network, or in willingness to ask a fellow parent for help). There's also evidence that both treatments increased classroom attendance in the winter, when attendance was lowest (with

positive but not statistically significant effects on attendance over the whole year).

## Policy Implications

In our view, the most concrete evidence on the potential for using networks to spread information comes from research in developing countries on health interventions and agricultural productivity. We suspect that the same kinds of productivity-enhancing information-sharing could work in the United States. The evidence on networks among parents at childcare centers is also intriguing, especially as it relates to disadvantaged neighborhoods; we should search for more information and evidence about neighborhood institutions that can play a similar role.

The evidence on the EITC speaks directly to policy effectiveness rather than wellbeing. But it's important to note that roughly 25 percent of households eligible for the EITC don't claim it.<sup>43</sup> Given that networks can increase information about the EITC, and that receiving the EITC improves outcomes for families, it's possible that EITC claims could be increased by disseminating information about the program through local networks, leading to improved socioeconomic outcomes for eligible low-income households. More generally, using community-based networks to increase information about the availability of and application process for social assistance programs—whether income-based programs like the EITC or in-kind transfer programs like Medicaid or the Supplementary Food Assistance Program (formerly known as Food Stamps)—has the potential to increase the use of these programs by households in need, which could lead to important increases in the wellbeing of both adults and children.

## Understanding and Measuring Social Capital in Networks

We've seen significant evidence documenting that social capital plays an important role in networks, and evidence that networks play a key role in facilitating information transfers among network members. But how can we measure the extent of this social capital? How can research understand network boundaries and membership? And can research identify the underlying factors that build strong social capital in networks? In this section, we consider these difficult questions.

In one respect, we've already offered a method for measuring social capital in communities—by providing measures of the extent and strength of networks that are productive in creating better job matches, as in some of the studies discussed above.<sup>44</sup> But the more standard approach is to study readily available proxy variables that are hypothesized to measure the strength of social capital in communities.

For example, economists Anil Rupasingha, Stephan Goetz, and David Freshwater have created a widely used and regularly updated index of social capital across US counties.<sup>45</sup> Their Social Capital Index is based on four variables previously used as proxies for local social capital: voter turnout and response rates to the US Census, both interpreted as measures of trust and civic participation; the number of nonprofit establishments (using data from the National Center for Charitable Statistics); and the per-capita number (as reported by the US Census Bureau in its County Business Patterns data) of business establishments for 11 industries thought to increase cooperation and trust (like bowling alleys, as in Robert Putnam's work).<sup>46</sup> The authors justify the four variables underlying

their index as derived from the work of “scholars from various disciplines (who) have reached a degree of consensus on this issue and have put forward a list of factors that contribute to social capital formation in a community.”<sup>47</sup>

The Social Capital Index is based on a statistical tool known as *principal components analysis* that weights the variables so as to best capture the variation in the four variables combined. The authors define their index as the most important of the principal components in their analysis; its weighted combination of four social capital variables creates the highest variance across US counties.

The researchers argue that the county-level variation in their index captures social capital produced by individuals and families who live and work in those counties. As evidence, they show that their index is related to county-level demographic characteristics such as ethnic homogeneity, education levels, and the proportion of households with children, some of which are hypothesized to be factors in the creation of social capital. Other studies, in turn, use this index, along with other variables, as measures of social capital that are inputs into the production of socioeconomic outcomes. For example, economist Raj Chetty and his co-authors found more intergenerational upward mobility in geographic areas with higher measures of the index, which they interpret as an effect of social capital.<sup>48</sup>

The fact that researchers differ in interpreting social capital measures as inputs or outputs reinforces the challenges of measuring social capital. As an example, consider the variables that underlie Rupasingha, Goetz, and Freshwater’s index.

High voter turnout and strong response rates to the US Census are more plausibly outcomes of what happens in communities that have strong social capital, rather than direct components of social capital, because it’s unclear what these measures produce in terms of socioeconomic outcomes. Thus the index may not capture variations that would be of interest to either policymakers or researchers hoping to create social capital that improves such outcomes.

A second challenge lies in determining which industries contribute to local social capital—which is somewhat subjective—and how to measure the geographic dispersion of these industries and aggregate across them. For example, data from the National Center for Charitable Statistics on the number of nonprofits in a county doesn’t distinguish among organizations in terms of their ability to create local social capital. It also misses some nonprofits, and places nonprofits with multiple locations at one central site, which for large organizations may be far removed from where they’re creating social capital. Finally, the county borders that Rupasingha, Goetz, and Freshwater use are driven by geography and the availability of data, not by the fundamentals of how people and organizations interact in communities.<sup>49</sup>

Our own recent work also takes a data-driven approach to understanding the factors underlying social capital in communities.<sup>50</sup> But our method of measuring social capital is tied more directly to a measure of *productive* social capital—specifically, the local labor market networks studied in some of our earlier research.<sup>51</sup> As we’ve discussed, this measure captures the extent to which people who live in the same census tract also work in the same establishments, and reflects the way neighborhood networks can decrease barriers

to information flows in the labor market for job searchers or for employers. Thus, we seek to understand which underlying social capital determinants work at the neighborhood level to create strong labor market networks that connect neighbors to workplaces and produce better labor market outcomes.

Our analysis focuses on which nonprofit industries that might boost social capital are in fact associated with stronger labor market networks. This analysis is done simultaneously with consideration of the role of measures of social capital based on past research. Given that many possible social capital measures can predict labor market connectedness at the neighborhood level, the study's key innovation is to use a machine learning algorithm called LASSO to identify which potential social capital determinants best predict variation in the labor market network measure. Like principal components analysis, the machine learning algorithm is a data-reduction technique. From the many possible social capital determinants that could contribute to strong labor market networks, only the most important ones are chosen, and they're chosen not by the researchers but by the algorithm. However, compared to past work, a fundamental difference is that social capital determinants are selected based on their ability to predict a measure of productive social capital—the measure of the strength of local labor market networks.

We incorporate four sets of social capital determinants as candidates for determining the strength of neighborhood labor market networks. The first set reflects the demographic and socioeconomic characteristics and the homogeneity of neighborhoods, which may capture cooperation and trust within neighborhoods

(but could also reflect the economic conditions of local labor markets). These measures include tract-level poverty rates, educational attainment, ethnic composition, commuting to work, and residential stability.

Because parental involvement in schools can raise social capital, the second set of social capital predictors captures information on the size and characteristics of local school districts.<sup>52</sup> These variables include the student/teacher ratio, how connected students are across schools in the district, and the proportion of students receiving free or reduced-price lunch.

The third set is closer to the measures discussed above that may reflect outcomes of the creation of social capital at the local level, more than inputs. As suggested by prior research, it includes voter turnout, prevailing political opinion, and ideological homogeneity.<sup>53</sup>

Finally, we chiefly aimed to build on past work suggesting that civic institutions, religious organizations, and other nonprofits contribute importantly to social capital.<sup>54</sup> To this end, we incorporated data from the National Establishment Time Series—a data set that hadn't previously been used to measure the number and composition of nonprofits by census tract. This data set contains the precise geographic location, employment numbers, and North American Industry Classification System codes for, essentially, all establishments in the United States. The data are recorded at the level of an establishment's physical location, thus overcoming some of the limitations of the data from the National Center for Charitable Statistics.

We used the National Establishment Time Series data to construct census tract-level



counts of the number of establishments in the nonprofit sector (including government institutions)—such as libraries, churches, civic associations, and community centers—that might facilitate the kind of social capital that builds labor market networks. We used a broad definition of the nonprofit sector, partly to account for data limitations and partly because some for-profit establishments in heavily nonprofit industries may perform similar functions when it comes to creating social capital. Despite restricting our attention to establishments in the nonprofit sector, the data still represented about 90 distinct industries. We used LASSO to identify the most important predictors of the strength of labor market networks from a very large set of potential determinants of social capital.

LASSO helped us select social capital predictors that explain two alternative but related labor market network indexes defined for residential neighbors in the same census tract. The first is the census-tract average of the individual labor market network index, used in our earlier work, for each worker in a census tract.<sup>55</sup> Because this measure captures how much workers living in the same neighborhood are connected with one another at work, on average, it is by definition limited to those who are employed. The second measure includes non-employed workers in the index, assigning each an individual network measure of zero because they don't work with any neighbors. Our results turned out to be robust across both indexes.

The analysis proceeded in two stages. In the first, the LASSO algorithm chose the set of social capital predictors that were most strongly associated with the census-tract network indexes. The second stage

estimated the magnitude of the effects of the selected social capital predictors on the network indexes.

We must interpret the results cautiously, since we didn't explicitly try to isolate the causal effects of the social capital predictors. Still, our analysis suggests that some of the more traditional measures used in research on social capital (such as residential stability and the share of residents with a college education) predict stronger labor market networks at the neighborhood level, while others (such as voter turnout) do not.

The results for nonprofit industries were most interesting. In a number of these industries, a concentration of establishments at the neighborhood level predicted strong local labor market networks. Moreover, the selected industries seem likely to create social capital either by providing public goods or by facilitating social contacts. These industries include churches and other religious institutions, fire and rescue services, schools, police departments, ambulance and rescue services, country clubs, mayor's offices, nursing homes, and amateur or recreational sports teams and clubs.

This study can also be viewed as a preliminary exploration of the role that machine learning could play in helping us understand the determinants of social capital in networks. Although we limited our focus to the nonprofit sector, it may well be that social capital is also created by the for-profit sector—for example, by neighborhood restaurants and gyms where people gather, or by local businesses that invest in their communities through volunteering or other kinds of outreach. A machine learning approach makes it entirely

feasible to take a more expansive look at which kinds of businesses create social capital.

Moreover, a key limitation of nearly all the studies reviewed in this article is that each one examines only a limited set of networks, and the boundaries of these networks are typically driven by the connections that can be measured in the data, rather than the connections reflected in the outcomes that interest the researchers. In reality, network boundaries are fluid. They can be shaped intentionally or unintentionally by the choices people make. Individuals can have ties to a host of different networks, many of which overlap and most of which shift over time and across people. What's more, individuals may have ties to only some of the people we identify as potential network members in the data—for example, they may have ties to only a subset of neighbors in their census tract. Given enough information on the different network links that individuals could have across the many dimensions of their daily lives, and information on most of the individuals in a potential network, machine learning techniques could be used to determine the composition and boundaries of networks, and to pinpoint which networks and which network connections are better than others at fostering the social capital that improves economic wellbeing. And, to be sure, this evidence could be complemented by the kind of qualitative evidence marshaled by sociologists Eric Klinenberg and Mario Small regarding the roles of neighborhood businesses and institutions.<sup>56</sup>

### Policy Implications

Our inquiry into what constitutes productive social capital raises more policy questions than it answers. For example, our study

predicting network strength, if interpreted as causal evidence (rather than simply predictive), might point to certain types of civic institutions that merit public support. Klinenberg, for instance, argues for increased support for what he calls *social infrastructure*—such as libraries, parks, and community gardens—to strengthen community interactions.<sup>57</sup> Though he relies largely on qualitative evidence, more sophisticated empirical methods could in principle guide the choice of priorities for public investments to increase social capital.

### Public Policy and Networks

We've already discussed some broad policy implications stemming from the existing research. In this final section, we turn to specific evidence on public policy and networks, most of which pertains to labor market networks.

A key question is what kinds of institutions and policies can help less-skilled workers find jobs (or find better jobs), especially when they're members of disadvantaged communities who may have limited access to job and employer contacts because of their social and residential isolation. We begin by asking the opposite question: What might weaken these connections? For example, informal evidence suggests that one reason the Moving to Opportunity program (a 10-year demonstration project in five large cities that helped randomly selected families move to wealthier neighborhoods) failed to improve labor market outcomes was the loss of informal labor market connections among those who moved.<sup>58</sup> One consequence of Moving to Opportunity was that it encouraged participants to move to areas where there were more jobs. But the program could have been rendered

ineffective or even counterproductive for the adults who moved if it severed ties to labor market networks among the movers, perhaps in part because it moved many black participants to areas with smaller minority populations.<sup>59</sup> The flip side is that similar programs might be more effective if they helped to develop labor market networks in the areas to which people move.

Similar issues arise regarding place-based policies that focus on creating jobs where disadvantaged people live. Economist Helen Ladd describes “the social isolation of many residents in distressed areas” that “results in incomplete knowledge of the labor market and limited exposure to people in the labor market who may serve as the informal contacts needed for successful job searches.”<sup>60</sup> Depending on how they’re designed, place-based policies (such as enterprise zones) that offer incentives for job creation in disadvantaged neighborhoods may or may not strengthen labor market networks in those areas. In particular, these policies may be ineffective at improving local labor markets because businesses in these neighborhoods may not hire locals. In a case study, sociologists Philip Kasinitz and Jan Rosenberg found that employers relied on hiring networks that excluded local, poor residents, and hired from networks of workers living farther away. (In part, Kasinitz and Rosenberg suggest that employers may have preferred to hire those who lived farther away out of fear that local residents would have trouble avoiding family problems while at work, and could be pressured by other local residents to help burglarize their businesses.)

Thus, policymakers must consider the geographic targeting of efforts to build networks and social capital, and think about

how to design policies to build social capital where it’s needed. For example, if enterprise zones are meant to help the disadvantaged neighborhoods that are the intended beneficiaries, it may be essential to offer incentives only for local hiring.

The Jobs-Plus program, sponsored in the late 1990s by the US Department of Housing and Urban Development and the Rockefeller Foundation, aimed to increase labor supply incentives for public housing residents in a number of US cities by reducing the rent hikes that accompany increases in earnings. Reflecting the problem identified by Ladd, Jobs-Plus tried to encourage the formation of labor market networks or to provide functions similar to those supplied by networks. Most sites had staff job developers responsible for cultivating relationships with local employers in an effort to place Jobs-Plus participants.<sup>61</sup> The program also employed residents as *court captains* or *building captains* who maintained contact with other participants, sharing information about employment opportunities. More generally, Jobs-Plus didn’t just try to change individual behavior. Instead, the program attempted to transform the community through a saturation strategy that targeted all non-disabled working-age residents of public housing projects. This effort was based on the network-related (and peer effect–related) theory that saturation can lead to tipping points, creating a critical mass of employed residents who succeed in the workforce. In theory, employed residents would “signal to others the feasibility and benefits of working, elevate and strengthen social norms that encourage work, foster the growth of work-supporting social networks, and ... contribute to still more residents getting and keeping jobs.”<sup>62</sup> The attempt to link residents to employment opportunities via job developers

and captains was also meant to provide participants with the labor market contacts many of them lacked.

Some evidence suggests that the Jobs-Plus program delivered higher earnings and employment for its participants.<sup>63</sup> But two key problems make it difficult to draw firm conclusions about the value added by the efforts to build labor market network connections. First, implementation of the network component of Jobs-Plus was spotty and encountered unanticipated difficulties. Second, it's hard to tell which specific program components delivered economic gains to participants.

More sobering is the qualitative evidence from reports on Jobs-Plus of problems encountered in trying to build and strengthen labor market networks, often related to the fear of referring an employee who would be unsuccessful, or worse.<sup>64</sup> But despite these difficulties, the description of implementation reveals numerous cases of job developers and sometimes captains finding ways to link residents to employment opportunities.

Finally, our discussion of learning about social assistance and income-support programs may point to the lowest-hanging fruit that policymakers can exploit to improve economic wellbeing. In particular, if we already have policies like the EITC and SNAP to deliver important improvements in economic wellbeing, then it would seem especially efficient for policymakers to look to network connections among potentially eligible recipients (as well as other ways of increasing information about how to apply for these programs). Should we view such policy encouragements as spurring social capital? We argue that the answer is yes, because these programs were deliberately created to serve those who are eligible—presumably with some calculation of positive benefits relative to the costs underlying the creation of the policy. Still, we imagine that a less controversial and more widely embraced goal is to enhance the capacity of networks to build social capital that leads to more productive workers and jobs, thereby reducing reliance on public support. That challenge, however, is more formidable.

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