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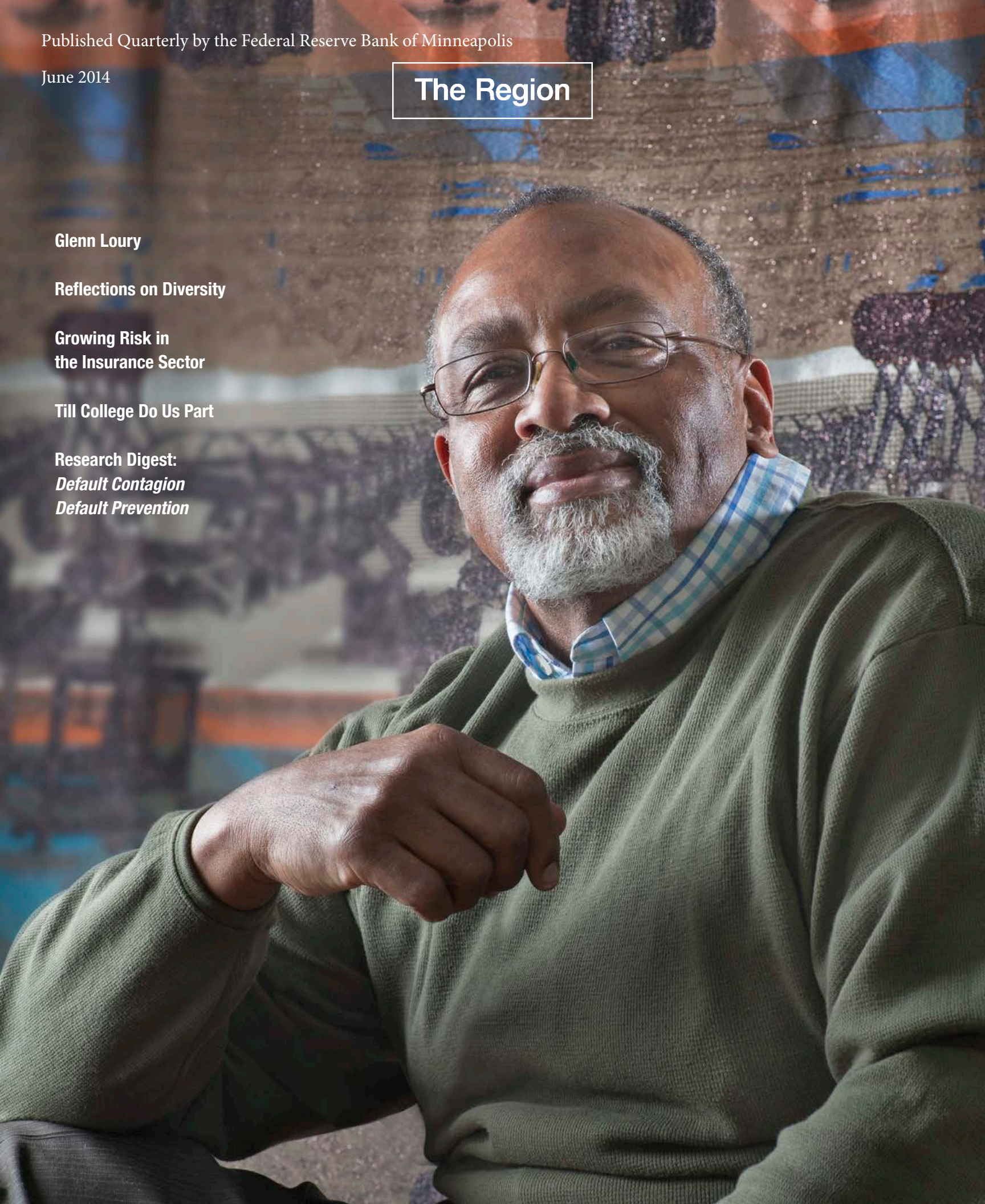

Glenn Loury

Reflections on Diversity

Growing Risk in the Insurance Sector

Till College Do Us Part

Research Digest:
Default Contagion
Default Prevention

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NINTH DISTRICT NOTES

Reflections on Diversity

Narayana Kocherlakota

President
Federal Reserve Bank of Minneapolis

Editor's note: This column is based on remarks presented at the Asian Heritage Dinner sponsored by the Council on Asian Pacific Minnesotans held May 9, 2014, in St. Paul.

I would like to thank state Senator Alice Johnson and Executive Director Sia Her for the invitation to attend the 2014 Asian Heritage Dinner. I am honored to participate in this prestigious event.*

My talk tonight will consist of some reflections on diversity. I'll first talk about the regional diversity that lies at the heart of the Federal Reserve System. I'll talk next about my journey to my current position and the role that international diversity played in that journey. Finally, I'll close with some thoughts on the role of *workplace* diversity.

My remarks represent my own views, which are not necessarily those of anyone else in the Federal Reserve System.

The Federal Reserve System: A regionally diverse central bank

I'll begin by telling you a few things about my organization, the Federal Reserve System. I will be highlighting the role of regional diversity in the Federal Reserve's formulation of economic policy.

Relative to other central banks around the world, the Federal Reserve System is highly decentralized. The Federal Reserve Bank of Minneapolis is one of 12 regional Reserve Banks that, along with the Board of Governors in Washington, D.C., make up the Federal Reserve System. Our bank represents the ninth of the 12 Federal Reserve districts and includes Montana, the Dakotas, Minnesota, northwestern Wisconsin and the Upper Peninsula of Michigan.

This basic structure has a long history. In fact, this year is the centennial of the opening of the 12 Reserve Banks and the start of the work undertaken by the Federal Reserve System. It's been a fascinating hundred years, with many twists and turns along the way. I'm sure that many of you have questions about that journey. The answers to all of your questions—and probably more—are on a new website that the Fed has created at federalreservehistory.org. I encourage you to visit this site to learn more about the people, places and events that have shaped Federal Reserve history.

* Thanks to Dorothy Bridges, Duane Carter and David Fettig for their assistance with these remarks.

The Federal Reserve System is grounded in a decentralized regional structure. This decentralized regional structure ensures that national policymakers have access to information about local economies—information that is often more forward-looking than lagged aggregate data. But, just as importantly, the regional structure also promotes intellectual diversity in the way policymakers think about the economy.

Over the course of its long history, the Federal Reserve System has performed many economic functions. In my view, its regional diversity improves its effectiveness with respect to virtually all of those functions. However, tonight I'll focus on one of the most important: monetary policy. Eight times per year, the Federal Open Market Committee—the FOMC—meets to set the path of interest rates over the next six to seven weeks. All 12 presidents of the various regional Federal Reserve banks—including me—and the governors of the Federal Reserve Board participate in these meetings.

How does its regional structure help the Federal Reserve System make better monetary policy? The answer lies in the nature of the regional Bank presidents' contributions during FOMC meetings. During the course of the meetings, the presidents typically comment on the behavior of their district economies—in my case, the economies of the six states that make up the Ninth District. This region-specific information helps to provide a granular, more forward-looking foundation for the making of national monetary policy.

Where do the presidents get this region-specific information? There are many answers to this question. But we are especially indebted to the members of our boards of directors and advisory councils, who use their extensive contacts in the local community to provide us with valuable economic intelligence. The Reserve Banks know that our district economies are all complex systems, and so we need "intel" from a wide range of perspectives. Accordingly, the Reserve Banks work hard to ensure that the members of our boards and advisory councils come from many walks of life—farming, banking, Fortune 500 companies, nonprofits, labor unions and start-ups to name but a few—and many parts of our districts.

So, the 12 presidents contribute to monetary policy deliberations by providing local economic intelligence about their districts. But the presidents also often make comments about economic research being done within their Banks that helps shed light on national economic conditions. Hence, the geographic diversity within the System is important for another reason: It generates valuable intellectual diversity across the System. For example, back in the 1970s, the Minneapolis Fed Research department played a key role in fostering the "rational expectations revolution" that has helped transform the making of monetary policy around the world. I'd love to take a few hours to explain this important development in policymaking—but it's a Friday night. The relevant point is this: Would these economists have played this same role had they been working in Washington, or anywhere else in the System, for that matter? I believe that the answer to this question is no. The ideas in the Research department were generated by synergistic interactions between Minneapolis Fed economists and University of Minnesota economists—synergies that owed a lot to the geographical proximity between the two institutions.

To sum up: My organization, the Federal Reserve System, is grounded in a decentralized regional structure. This decentralized regional structure ensures that national policymakers have access to information about local economies—information that is often more forward-looking than lagged aggregate data. But, just as importantly, the regional structure also promotes intellectual diversity in the way policymakers think about the economy.

My diverse beginnings

I'll now turn to a different set of reflections on diversity—reflections about my journey to my current position.

I was born in Baltimore, Maryland, but my parents moved me to Canada when I was less than a year old. I suspect that they did not consult extensively with me first! For most of my childhood, I grew up in Winnipeg, which is about 300 miles northwest of here as the

crow flies, before returning to the United States to attend college. I've lived in my home country ever since.

Both of my parents spent most of their professional careers as professors of statistics at the University of Manitoba. Given their example, it is probably not surprising that I ended up becoming a professor myself—albeit in economics, rather than statistics. After getting my doctorate, I worked in a number of economics departments around the country, including the University of Minnesota for most of the 2000s. Along the way, I was a researcher at the Federal Reserve Bank of Minneapolis in the mid-1990s. I maintained a close working relationship with the Research department following that stint.

Many organizations, including my own, emphasize that they aim to attract and retain a diverse workforce. Of course, as we just discussed, the word diversity has many meanings. But certainly, when we talk about a "diverse" workforce, we typically mean to include gender and ethnic diversity. In the case of the Federal Reserve Bank of Minneapolis, part of the mission of our Office of Minority and Women Inclusion is to promote exactly that kind of diversity within our workforce.

In early 2009, it was announced that Gary Stern, the long-time president of the Bank, would be retiring soon. Many of you will remember that, in early 2009, we were in the depths of the Great Recession. I was highly motivated to serve my country as best I could in this hour of need, and so I applied for the job. I was fortunate enough to win the approval of the Minneapolis Fed's board of directors and the Board of Governors in Washington, and so I became president in October 2009. The job has, to put it mildly, been a highly rewarding one.

This description—with its emphasis on my training and experience—captures much of what matters about my journey to my current position. Nonetheless, I also feel that it glosses over something important. That missing piece can be summed up in a question that I often get: Why do you have such an unusual name?

The answer to this question is that my father was Asian Indian—and was, more specifically, from the state of Andhra Pradesh. (I add that specificity because it matters: My last name is very much identified with that particular state—a state that has roughly one-fourth the population of the United States.) My father immigrated to the United States in 1960 to attend graduate school in statistics, which is where he met my mother. My mother is of European descent. She grew up in a suburb of Pittsburgh, Pennsylvania, and her parents were both born in the United States. My parents got married when they were in grad school, and so I was able to attend my father's Ph.D. graduation ceremony. I probably didn't appreciate the event as much as I should have. In my defense, I was only nine months old.

My parents' household was—automatically—a diverse household. It was diverse in terms of food—something that mattered a lot to me as a child. It was diverse in terms of our family and friends. Perhaps most importantly, it was diverse in terms of ideas. As a child, I read the lives and words of American heroes like Abraham Lincoln. But I also read the lives and words of Indian heroes like Mohandas Gandhi. In this way, I learned at a young age that two different cultures can give us at least two different ways to think about a problem. I learned too that both of those different ways can provide valuable insights, even if they seem to be in conflict. Perhaps as a consequence, I tend to follow many tracks—almost at once—in my thinking about problems. I have found this multipronged approach to problems helpful in many facets of my life. But it does have the potential to create communication challenges!

I can sum up the overall impact of my beginnings in this way. When I was a child, and especially when I was a teen, my parents seemed, well, old-fashioned. I suspect that I was not the first or the last child or teen to feel that way! But, looking back, I realize that, in many ways, my upbringing in the 1960s and 1970s was surprisingly well-designed for the 21st century that was to come. In particular, our internationally diverse household was ideal preparation for our increasingly diverse country and interconnected world.

Some final reflections on workplace diversity

I've talked about two kinds of diversity. The first kind is the regional and economic diversity that lies

at the heart of the Federal Reserve System. The second kind is the international diversity that lay at the heart of my parents' household. But you will observe that I implicitly argued that both kinds of diversity are valuable in large part because they are associated with a diversity of ideas.

That brings me to some final thoughts about diversity and, more specifically, diversity in the workplace. Many organizations, including my own, emphasize that they aim to attract and retain a diverse workforce. Of course, as we just discussed, the word diversity has many meanings. But certainly, when we talk about a "diverse" workforce, we typically mean to include gender and ethnic diversity. In the case of the Federal Reserve Bank of Minneapolis, part of the mission of our Office of Minority and Women Inclusion is to promote exactly that kind of diversity within our workforce.

The emphasis on this aim in public communications is mostly beneficial. But it can have an unfortunate side effect. Some observers could be led to think that diversity is an ultimate objective of the organization, and so there is an implicit trade-off between achieving a diversity objective and achieving the other goals of the organization. I don't see any such trade-off. Rather, I believe that an organization like the Minneapolis Fed will be less effective at achieving its core missions unless it is able to attract and retain a diverse workforce. I'll put this as an economist: I do not see diversity as an objective unto itself. Rather, like the electricity that powers our building or the computers that fill our offices, diversity is simply a fundamental input to our being able to achieve our goals.

Why won't we be effective without a diverse workplace? There are many answers to this question. But, again, I think one of the main answers is about ideas. Ultimately, a person's ideas are a culmination of his or her journey through life. We will have access to more and better ideas if our employees have a large number of distinct life journeys. And we need those more and better ideas if we are to be effective in solving the various public policy challenges that we confront.

Thanks for listening. R

Growing Risk in the Insurance Sector

Developing risk in the life insurance industry requires prudent policy response to prevent broader economic damage

Ralph S. J. Koijen
London Business School

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Monetary Advisor
Federal Reserve Bank of Minneapolis

Introduction

The financial crisis of 2008 exposed important vulnerabilities in the banking sector. In its aftermath, considerable academic effort has been devoted to better understanding banking risks, and policymakers around the world are developing new regulations to contain those risks.

Our recent and ongoing work shows that there are also important risks in the insurance sector. Although these risks have been growing rapidly over the past 15 years, they have received relatively little attention from academics and regulators. If unaddressed, these risks could cause severe problems. Insurance is a large share of the financial sector. For example, U.S. life insurance liabilities amounted to $4.1 trillion in 2012, compared to $7 trillion in U.S. savings deposits. Moreover, as the largest institutional investors in the corporate bond market, insurance companies serve an important role in real investment and economic activity.

We begin this note by describing the growing risks and highlight some early symptoms, based on evidence during the financial crisis. We follow with a discussion of possible economic consequences of trouble in the insurance sector. Finally, we highlight points of attention for policymakers and discuss recent developments in global insurance markets.

Two sources of risk in the life insurance sector

Two developments over the past 15 years have fundamentally changed the risk profile of U.S. life insurers. The first is growing demand for minimum-return guarantees in variable annuity products, due to the shift from defined-benefit to defined-contribution plans. The second is the increasing use of "captive reinsurance," which was triggered by tighter capital requirements for life insurance policies after 2000.

Variable annuities are long-term savings products whose underlying assets are invested in traditional mutual funds. In exchange for additional fees, life insurers guarantee a minimum rate of return on the mutual funds. In 2012, assets under management in U.S. variable annuity accounts amounted to $1.6 trillion.

The long-term nature of these guarantees presents significant challenges for both valuation and risk management. The combination of a low-interest-rate environment and poor risk management generated large losses during the financial crisis. Some companies responded by closing existing accounts to new investment and reducing the generosity of newly offered guarantees. Other companies, such as Hartford and John Hancock,


Waiting
for the
other
shoe...
Insurance
Banking

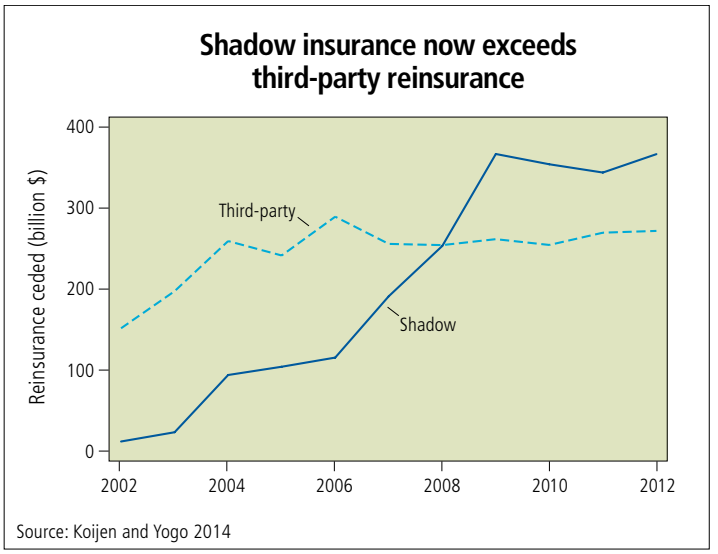
We find that liabilities moved to "shadow reinsurers," a subset of captives that are the least regulated and are unrated by the A.M. Best Company, grew from $11 billion in 2002 to $364 billion in 2012. Total shadow insurance now exceeds total third-party reinsurance, which is $270 billion.

exited from the market entirely. Since insurance liabilities are not "marked to market" (i.e., regularly reevaluated at fair market value), worse losses could yet occur, especially if the low-interest-rate environment continues.

Captive reinsurance is a second area of the insurance sector where risk has increased over the past 15 years. New regulations (known as Regulations XXX and AXXX) forced life insurers to hold more capital against life insurance policies issued after 2000. In response, states like South Carolina and Vermont passed laws that allow life insurers to set up off-balance-sheet entities, known as "captives," subject to more advantageous accounting standards and capital regulation. By moving liabilities from operating companies that sell policies to captives, a holding company as a whole can reduce its required capital and increase leverage.

We find that liabilities moved to "shadow reinsurers," a subset of captives that are the least regulated and are unrated by the A.M. Best Company, grew from $11 billion in 2002 to $364 billion in 2012.[1] Total shadow insurance now exceeds total third-party reinsurance, which is $270 billion (see the accompanying chart). Companies using shadow insurance, which tend to be the industry's largest, capturing half the market share, moved 25 cents of every dollar insured to shadow reinsurers in 2012, up from 2 cents in 2002.

Although we can estimate the size of the shadow insurance sector based on publicly available data, its risks are much more difficult to estimate. In 2013, the New York State Department of Financial Services raised several important concerns regarding the financial structure of captives, based on regulatory data not available to us.[2] Among them is the fact that conditional letters of credit, which are ultimately backed by the parent instead of



an outside financial institution, are often used as collateral. This raises concerns that captives could be underfunded and that they are exposed to the same sources of risk as the parent.

The insurance sector during the financial crisis

AIG immediately comes to mind as an example of an insurance company that failed during the financial crisis. On a smaller scale, Hartford and Lincoln National also received support from the U.S. Treasury through the Troubled Asset Relief Program (TARP). Many more (e.g., Allstate, Genworth Financial, Protective Life and Prudential Financial) applied for TARP but were ultimately rejected or withdrew their applications. Companies like AIG had banking as part of their holdings, but others had only insurance. Hence, the conventional wisdom that the core insurance business is unaffected by macroeconomic shocks is far from true, especially in light of the two risks just discussed.

We find further evidence for financial constraints in the life insurance industry, based on the pricing of their policies in the retail market.[3] In normal times, life insurers price annuities and life insurance at a markup profit of 6 percent to 10 percent relative to actuarial value. During the financial crisis, they reduced the price of these policies and sold them at large losses (-19 percent for annuities and -57 percent for life insurance).

This extraordinary pricing behavior was due

to financial constraints and perverse incentives created by regulation. During the financial crisis, life insurers were able to record their newly issued policies at far below market value, due to an arcane regulation known as Standard Valuation Law. This created an incentive for life insurers, particularly those that were constrained, to sell products that lost money in reality but created accounting profits. Both rating agencies and state regulators assess insurance companies based on accounting equity, which made accounting profits valuable during the financial crisis.

For a brief period around November 2008, we find an enormous shadow cost of 96 cents per dollar of statutory capital. That is, the average insurance company was willing to reduce economic profits by 96 cents to raise a dollar of accounting equity. This cost varies considerably across insurance companies and was as high as $5.53 per dollar of statutory capital. The insurance subsidiaries appear to have been constrained because their parents (applying for TARP) were also constrained and because regulation prevented efficient movement of capital within a holding company.

Possible consequences of trouble in the insurance sector

What are the possible economic consequences of trouble in the insurance sector? Without the luxury of historical experience and hindsight, we speculate on three potential channels by which trouble in the insurance sector could spread to the rest of the economy.

First, insurance companies are interconnected to banks through their funding arrangements in reinsurance transactions. Banks issue letters of credit to collateralize reinsurance between an insurance company and a captive. Hence, a systemic shock to the insurance sector could trigger a sudden demand for credit that constrains the banking sector. Second, even the perception that insurance companies are at risk could suddenly reduce the demand for insurance products. Households would be forced to bear additional risk, which has important consequences for precautionary savings and welfare.[4]

Finally, insurance companies are the largest institutional holders of corporate bonds. If insurance companies were forced to shrink their balance sheets, the demand for some types of bonds would decline. If firms were unable to seamlessly substitute into other sources of funding, there could be an important impact on real investment and economic activity.

Implications for insurance regulation

A common theme of our work is that regulation has major effects on all important functions of the industry, including pricing, underwriting, reinsurance, product design and investment activity. Therefore, regulation is not only important for our understanding of insurance markets; it must be properly designed to ensure both efficient function and future stability of the sector. Two institutional features of the insurance sector introduce unique challenges to its regulation.

Insurance companies are the largest institutional holders of corporate bonds. If insurance companies were forced to shrink their balance sheets, the demand for some types of bonds would decline.

First, insurance companies can take significant risk on the liability side, as demonstrated by the rapid growth of variable annuities and captive reinsurance over the past 15 years. These risks developed due to accounting standards and capital regulation that are less developed and more inconsistent than the asset side of the balance sheet. Much improvement is necessary with respect to accounting standards and capital regulation for guaranteed investment products and captive reinsurance.

Second, life insurance liabilities are not prone to runs in most countries. Therefore, capital requirements that apply to banks, especially short-term risk constraints designed to prevent runs, may not be appropriate for insurance companies. In fact, short-term risk constraints can actually increase the long-term risk of insurance companies, if asset markets are mean reverting (i.e., high returns follow low returns, on average). We believe that insurance companies should be evaluated based on long-term value-at-risk measures that are extensions of short-term measures for banks.

Of course, measurement of long-term risk is challenging and potentially sensitive to reasonable variation in modeling assumptions. A fundamental problem with the insurance industry is that no one knows the market value of liabilities, and the data necessary for doing such a calculation are far from complete in the public financial statements. We see the recent trend toward captive reinsurance as a step in the wrong direction. Complete and transparent financial statements are essential for rating agencies, investors and academics.

Finally, we would like to see more active discussion between academics and regulators on the costs and benefits of regulation. Tighter capital regulation reduces the likelihood of failure, but it also raises prices and shrinks the size of consumer financial markets. These effects can be large. For example, we estimate that in the absence of shadow insurance, life insurance prices would rise by 18 percent and the life insurance market would shrink by 23 percent (Koijen and Yogo 2014). We hope that our findings will contribute to the current policy debate on whether to ban shadow insurance as well as impose new capital requirements for systemically important insurance companies under the Dodd-Frank Act.

Implications for global insurance markets

The same risk factors that we have identified in the United States are present in other countries. Life insurers in continental Europe (e.g., Germany and Italy) and Japan have sold large amounts of guaranteed investment products. The low-interest-rate environment poses a severe challenge for these life insurers.[5] Since their liabilities are not marked to market, neither the existing losses nor future risks are immediately transparent.

The European reinsurance market is large, but the data necessary for measuring the size of the shadow insurance sector are not publicly available. Under the 2005 Reinsurance Directive, reinsurers can domicile anywhere in the European Union and can assume reinsurance from any other country. For capital and tax reasons, many reinsurers are domiciled in Luxembourg and Ireland. It is not yet clear how Solvency II, the new European regulation planned for 2016, will address potential loopholes in capital regulation.

Our work (Koijen and Yogo 2013) also has important implications for discount rates that would be used for insurance liabilities under Solvency II. One proposal would allow insurance companies to increase the discount rate during bad times, essentially implementing procyclical capital requirements. The experience from similar regulation in the United States suggests that this proposal would distort both the pricing of insurance policies and the size of insurance markets. R

Endnotes

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—PRESIDENT OBAMA

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Glenn Loury

Glenn Loury is an exceptional scholar, with important work in income inequality, public finance, discrimination, game theory, natural resource economics and other areas. He is also African American, a rarity in economics. While race has neither defined nor limited Loury's scholarship, there is no question that it has influenced his path. His doctoral dissertation examined the dynamics of income inequality and argued that "continued racial economic disparities … reflect the social and economic consequences of historical inequity."

His model of income distribution included "social capital," a notion that skills and earning potential are highly dependent on family and community background. "An individual's social origin," he wrote in 1976, "has an obvious and important effect on the amount of resources which are ultimately invested in his development." That background, in turn, is shaped by history, which—in the United States—includes the enduring legacy of slavery and segregation.

Income distribution is thus determined in part by factors with long residual impact well beyond individual effort and innate ability. "The eradication of racial income differences [therefore requires] compensatory efforts," wrote Loury, "within both the educational sphere and the world of work."

It was a powerful argument, and his skill in making it led to positions at Northwestern, then at the University of Michigan and, in 1982, at Harvard, its first African American economist with tenure. After a decade, Loury moved to Boston University, and since 2005, he has held a chair at Brown University in economics and social sciences. His research over these years has deepened within economics, earning him honors and wide recognition in the field; it has also broadened far outside economics.

That divergence was predictable, suggests Nobel laureate Robert Solow, his MIT thesis adviser. "It was clear to me [in the mid-'70s] that he would be an outstanding economic theorist. But I think it was equally clear to both of us that there would be enormous pressures on him, as an eminent black in a highly technical, uniformly white field, to spend energy on other roles."

Indeed, Loury writes and speaks widely on topics as diverse as spirituality, U.S. incarceration, slavery reparations and self-censorship in political discourse. Despite this passionate participation in ongoing social debates, Solow observes, he continues "to produce cool analytical economics."

In the following interview, Loury covers a mere sliver of his wide-ranging scholarship.

PHOTOGRAPH BY PETER TENZER

Region: You're best known, of course, for your work on income distribution, racial inequality and discrimination, so I'll want to focus much of our conversation on that research. But I hope we can also cover your research on why Pigouvian taxes alone can't deal efficiently with externalities, on game theory and on exhaustible resources. And I'd be remiss as a Fed employee if I didn't ask about rotating savings and credit associations.

Loury: OK, this is going to be fun.

SOCIAL CAPITAL AND EMPLOYMENT DISCRIMINATION

Region: I suspect we won't get to all that material, but let's begin with your research on labor market discrimination and social capital, if we could.

Eminent economists before you—Gary Becker and Ken Arrow, for example—had studied employment discrimination, of course. Becker, I believe, considered discrimination based on employer tastes; Arrow based his theory on the impact of limited information regarding worker productivity.

In your dissertation, you proposed a new approach that focused on the importance of "social capital"—the term you used for family and community background—for skill acquisition and future earnings potential. Could you describe that approach and what it suggested about economic policy to alleviate racial discrimination in the workplace and improve income distribution? And, specifically, what it implied for policies to ensure equality of opportunity.

Loury: My principal point of departure when writing that dissertation in 1975 and 1976, building on the work of Gary Becker, was to "socialize" the human capital investment decision. That is, I wanted to take explicit recognition of the fact that the acquisition of human capital occurred in a social context.

The insight there was that not all of these external influences on the costs and benefits of acquiring human capital are marketable, traded commodities. Indeed, many of these are not "commodities" at all. Some of these external effects, I argued at that time, come about as a consequence of the preexisting social relationships between people within families, social groups of various kinds, identity groups and racial "communities." (I put that word in inverted commas because I don't mean only a geographically extended space. I mean a set of *social* networks.)

My idea was that these networks mediate the spillovers from the human capital investment one individual makes onto the costs and benefits of similar investments of other individuals within the same network. And that effect was not well-represented in the classical Beckerian framework. It was not only Becker, of course, who wrote about human capital; it was [Theodore] Schultz, [Jacob] Mincer and others as well. This school of thought simply posited—and I mean this not as criticism, but as observation—that, in effect, these human capital investments affecting their productivity were based on inputs that people could buy at a price if the returns justified their acquisition.

What I was after in my dissertation was to explain why it is that the African Americans might lag behind, in an extended way, even after the equal opportunity regime of the Civil Rights bill was put into place. I was trying to say, "That's not enough. Equal opportunity of that sort, while welcome and long overdue, is not enough to remedy the long-term inequality problem."

You could get stuck with the remnants of history because people are embedded in social networks, the nature of which reflects to some degree the effects of past discrimination. Some communities, because of their historical treatment, are impoverished with respect to the human development resources that people must have access to if they are to succeed in the labor market. I speak here not only of material resources, by the way. Also things like, what do the peer groups hold in esteem? What do people derive social benefits from accomplishing?

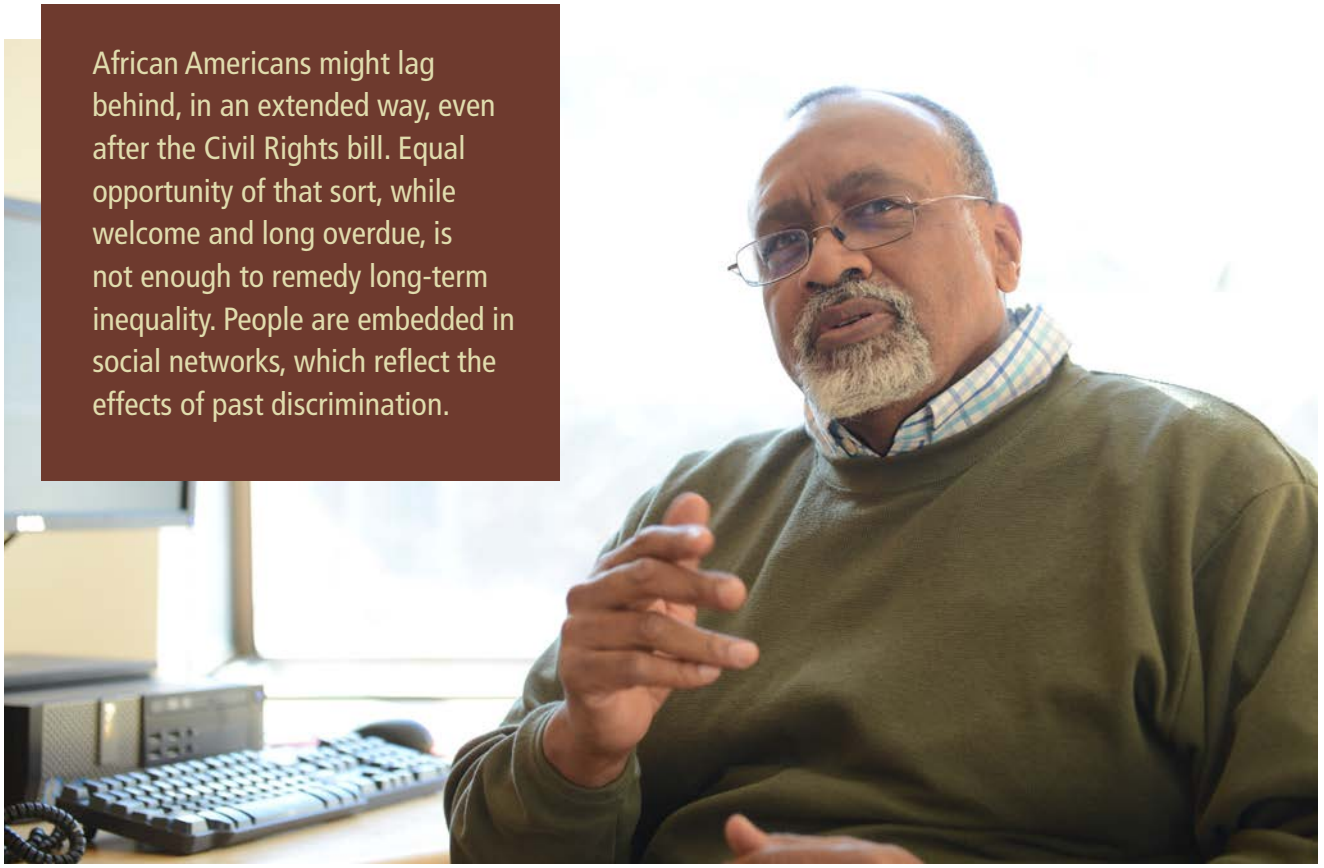
In short, I felt that the Beckerian characterization of employment discrimination as merely an impediment in the marketplace because some people have a taste for discrimination was a somewhat limited framework, on both the supply and demand side of the labor market.

On the demand side (employers, say), those tastes don't just come out of the air. They need to be accounted for in some way, so they're really a product of their history, which in the United States includes a history of slavery. Likewise, on the supply side, the nature of the social networks in which people are embedded that influence their costs and benefits from human capital acquisition also depend on history, identity, geography and so forth.

In the United States, race has a very particular valence in that history. It's not the same as gender or sexual orientation. I'm not saying that racial discrimination is better; I'm not saying it's worse. I'm just saying that race is *different* from some of these other variables, in the context of American history.

When European immigrant groups were fighting over the bottom rungs of the ladder with the black American migrant groups coming into U.S. industrial cities in the early part of the 20th century, that was a historically specific kind of contestation. I just thought that an abstract specification of an employer's disutility from hiring blacks, as Becker had argued in his influential book *The Economics of Discrimination*, didn't get to the core of what was going on.

That's the demand side of the labor market. On the supply side, I also thought that standard theory—human capital theory—didn't capture the full impact of discrimination because one consequence of discrimination was to deprive individuals in the maltreated group of an opportunity fully to develop their human potential.



African Americans might lag behind, in an extended way, even after the Civil Rights bill. Equal opportunity of that sort, while welcome and long overdue, is not enough to remedy long-term inequality. People are embedded in social networks, which reflect the effects of past discrimination.

Region: What does that imply for *policy* to alleviate employment discrimination based on race, in particular?

Loury: Well, I'm not sure, in terms of what particular bill should Congress pass. But in terms of how to *think* about policy, maybe the first thing it would say is, if I do see those deficits on the supply side, which I do, then do a proper accounting.

By that I mean, suppose I have a regression equation with wages on the left-hand side and a number of explanatory variables—like schooling, work experience, mental ability, family structure, region, occupation and so forth—on the right-hand side. These variables might account for variation among individuals in wages, and thus one should control for them if the earnings of different racial or ethnic groups are to be compared. One could put many different variables on the right-hand side of such a wage regression.

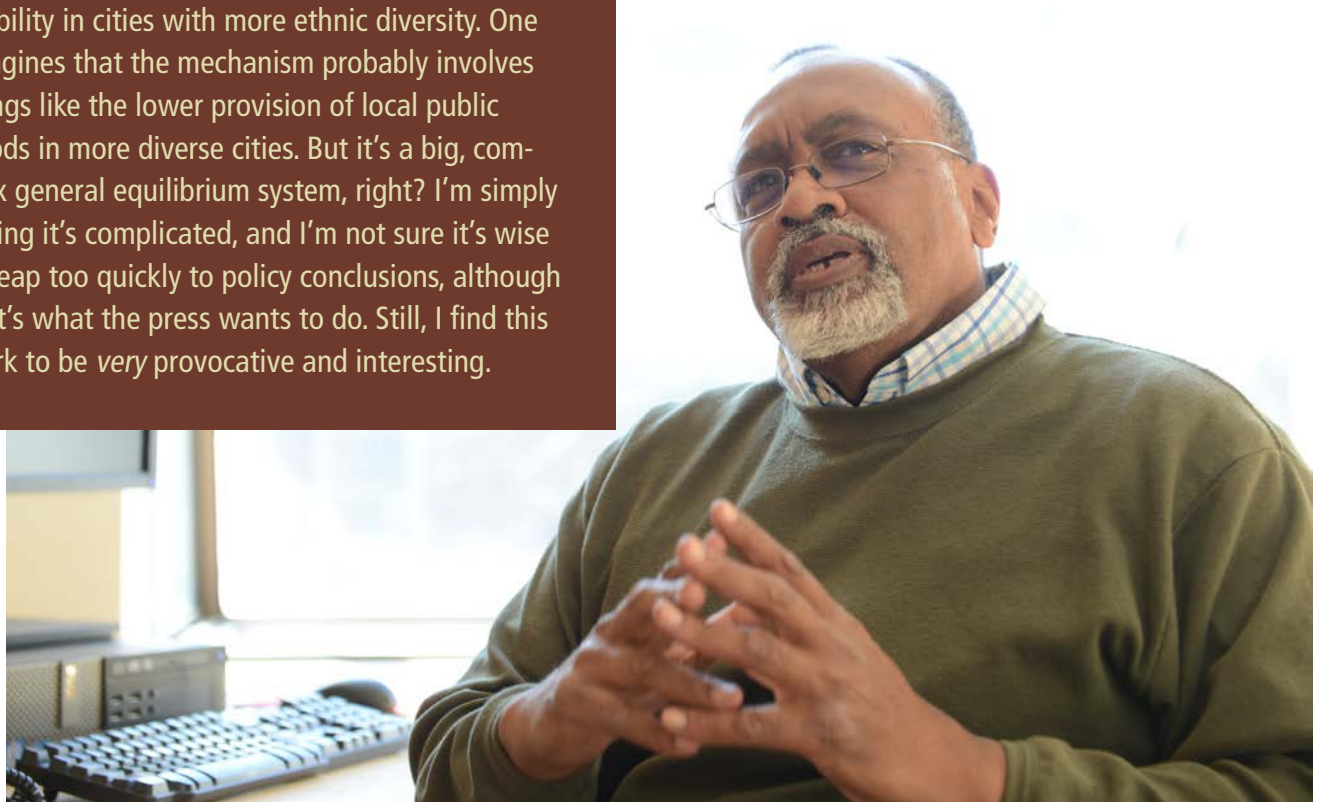
Well, many of those right-hand-side variables are determined within the very system of social interactions that one wants to understand if one is to effectively explain large and persistent earnings differences between groups. That is, on the average, schooling, work experience, family structure or ability (as measured by paper and pencil tests) may differ between racial groups, and those differences may help to explain a group disparity in earnings. But those differences may to some extent be a consequence of the same structure of social relations that led to employers having the discriminatory attitudes they may have in the work place toward the members of different groups.

So, the question arises: Should an analyst who is trying to measure the extent of "economic discrimination" hold the group accountable for the fact that they have bad family structure? Is a failure to complete high school, or a history of involvement in a drug-selling gang that led to a criminal record, part of what the analyst should control for when explaining the racial wage gap—so that the uncontrolled gap is no longer taken as an indication of the extent of unfair treatment of the group?

Well, one answer for this question is, "Yes, that was *their* decision." They *could* have invested in human capital and they didn't. Employer tastes don't explain that individual decision. So as far as that analyst is concerned, the observed racial disparity would not be a reflection of social exclusion and mistreatment based on race.

Region: They simply chose not to complete high school, or go to college, for example.

Chetty and colleagues are finding lower social mobility in cities with more ethnic diversity. One imagines that the mechanism probably involves things like the lower provision of local public goods in more diverse cities. But it's a big, complex general equilibrium system, right? I'm simply saying it's complicated, and I'm not sure it's wise to leap too quickly to policy conclusions, although that's what the press wants to do. Still, I find this work to be *very* provocative and interesting.



Loury: Right. But another way to look at it is that the racially segregated social networks in which they were located reflected a *history of deprivation* of opportunity and access for people belonging to their racial group. And that history fostered a pattern of behavior, attitudes, values and practices, extending across generations, which are now being reflected in what we see on the supply side of the present day labor market, but which should still be thought of as a legacy of historical racial discrimination, if properly understood.

Or at least in terms of policy, it should be a part of what society understands to be the consequences of unfair treatment, not what society understands to be the result of the fact that these people don't know how to get themselves ready for the labor market. That's the spirit of what I was trying to get at in 1976.

"EQUALITY OF OPPORTUNITY" PROJECT

Region: Let me ask you about another piece of research, not your own. I'm sure you're aware of the Harvard/Berkeley "Equality of Opportunity" project.

Loury: Raj Chetty and his colleagues.

Region: Exactly. They've just published an NBER paper on "The Geography of Intergenerational Mobility in the United States."[1]

They found that greater "social capital" was second highest among the five factors best correlated geographically with higher income mobility. The other top factors were areas with less residential segregation, less income inequality, better primary schools and greater family stability.

What are your general thoughts on these empirical findings?

Loury: I just saw Raj Chetty give a lecture at Brown—literally, two weeks ago—on this very paper. Of course, by now it has been widely discussed in the press. I have not, I must say, gone through their paper carefully, though I think I will with my students in a graduate seminar I'm teaching this semester.

So, of course, I won't want to comment on whether or not I think they got it right. But these are not neophytes. These are serious people, so I think it's certainly possible for me to take at face value much of what they're saying. And I thought Raj gave a very convincing presentation.

Region: Does their concept of social capital align with yours? I think they use Robert Putnam's measure.

Loury: Right, it is Putnam's concept, and Putnam, a very distinguished political

scientist, has been observing variations across U.S. cities in various measures of trust. You know, "Do I know my neighbor?" and the like. He looked at trust within as well as across racial groups and found it to be negatively associated with ethnic diversity at the city level, so that in places where you had a relatively larger presence of minority groups, you tended to find lower measured levels of trust.

Chetty and colleagues are finding lower social mobility in cities with more ethnic diversity. One imagines that the mechanism probably involves things like the lower provision of local public goods in more diverse cities; the quality of the schools kids attend may vary inversely with ethnic diversity measures across metropolitan areas and things of this kind. It is difficult to interpret some of these findings, since I'm not sure how one is supposed to think about regional variation in something like social mobility, given that people are moving around.

Nevertheless, they make an effort in their study to deal with selection effects. These questions came up in Raj's seminar presentation. But it's a big, complex general equilibrium system, right? The regions are all interconnected with each other.

They've tried, certainly. For example, they measured the location where the kids were when they were 14 to 17 years old, so then even if they move around later, they've still got the local effect identified at the formative period of their lives. I'm not sure this is adequate, though. You've got two or three leaps here. This is not the typical sneering economist who wants to just dismiss everything. I'm simply saying that it's complicated, and I'm not sure that it's wise to leap too quickly to policy conclusions from the work of Chetty et al., although I know that's what the press wants to do.

Still, I find this work to be *very* provocative and interesting. For family structure, for example, they looked at part of the sample where the mothers didn't have any children out of wedlock, and still, if these mothers were in an area where there was a higher local out-of-wedlock birth rate, then their children were less likely to experience movement from the bottom to the top of the income hierarchy. This was true even among kids who were born and raised in intact families.

So, they were arguing that there was an environmental effect that operates across a metropolitan area, even for families that were not specifically implicated in this particular behavior (i.e., out-of-wedlock childbearing). That's all very interesting. It really makes you think.

AFFIRMATIVE ACTION POLICIES

Region: You've written numerous papers on affirmative action over the years, and several recently with Roland Fryer. In a 2013 *Journal of Political Economy* piece, "Valuing Diversity," the two of you consider policy interventions to improve opportunities for the disadvantaged and you look, specifically, at dimensions of visibility and timing. So, whether affirmative action policies are "sighted" or "blind" and whether they intervene before or after worker productivity is basically established.

Loury: Precisely.

Region: Can you briefly describe your results and, particularly, the major difference in timing of intervention if policy is "blind" versus "sighted"? I was surprised by your finding that to be efficient under sighted affirmative action, policy should focus on job slots and *not* skills acquisition.

Loury: That is a very well-informed question. Thank you. You laid it out exactly.

So, I could only repeat what you just said, which is that we see two different dimensions along which you might usefully differentiate affirmative action policies. One is the stage in the process of developing a productive worker where the policymaker intervenes—either early or late in the cycle of development.

> One of our key insights is that under sightedness (again, overt discrimination in favor of a particular group), the very act of *boosting people's access to slots*—that is, putting a thumb on the scale in their favor at the point where they compete for positions—*implies a subsidy* to their acquisition of skills. If a later intervention is properly anticipated, then an earlier intervention may not be necessary; it may be redundant.

That is, one needs to consider whether you intervene with affirmative action at the point where the person is making an investment in human capital or at the point where people—having made their human capital investments: higher education and the like—are competing for access to opportunities. If you are trying to boost the status of a disadvantaged group, at which stage, early or late, should you intervene?

The other way in which we thought it useful to distinguish between policies, in a very broad-based sense, was, as you mentioned, whether they're "blind" or "sighted."

"Sighted" affirmative action policies are those where the policymaker is quite prepared to overtly favor some population group—say, African Americans in the United States. So, if you're interested in boosting the presence of African Americans in college, for example, are you prepared to have different admission standards for the African American applicant and the non-African American applicant? If so, then your policy would be what we call "sighted." If not, then your policy would be "blind."

Under a "blind" policy, a policymaker still wants to boost the status of some target beneficiary group, but does not want to engage in *overt* differential treatment. Such a policymaker would, therefore, need to look for indirect ways of accomplishing his aims—by, say, subsidizing for everyone those activities that are determined in advance to disproportionately favor the target population.

That's a very broad way of describing the framework of analysis that we develop in this paper. One of our key insights is that under sightedness (again, overt discrimination in favor of a particular group), the very act of *boosting people's access to slots*—that is, putting a thumb on the scale in their favor at the point where they compete for positions—*implies a subsidy* to their acquisition of skills.

Many people have the intuition that an affirmative action policy is not favoring skill investment when putting a thumb on the scale favoring some group in the competition for positions. But, in fact, it is, at least implicitly. *This* is the insight, if you will, because it implies that if a later intervention is properly anticipated, then an earlier intervention may not be necessary; it may be redundant. Indeed, that's what we show in the paper.

Now, this result—that we find quite interesting—requires the assumption I just referred to: that when making their decisions about how to invest in the development of their skills, people be farsighted enough to *anticipate* the consequences of their being favored at the point of slots allocation. That assumption will not be plausible in every case (youngsters can be unnervingly short-sighted ...).

Still, given this necessary assumption—that individuals subject to future affirmative action policies anticipate this accurately—then our result is of a piece with other intuitions that come out of applied microeconomics.

For example, in the area of industrial organization, there has been a classic problem with respect to vertical integration [whether the most efficient way for a monopolist to exercise his monopoly power is to raise the price for his input, or to integrate forward by acquiring downstream manufacturers]. The solution to this classic problem is that one wants any necessary distortion to be as close to the end of the chain-linked process of production as possible. *That's* the insight.

Another example comes from public finance. Diamond and Mirrlees, in their classic optimal taxation papers in a 1971 *AER*,[2] proved that, under certain technical conditions,[3] if the government can tax *final* commodities and/or *intermediate* inputs, and if the government seeks to raise a given amount of revenue with the least distortion to social surplus, then the efficient tax system involves no distortion in production. So, no tax on intermediate inputs; tax instead the final commodities. This is called the "efficient public production" result in the public finance literature spawned by Diamond and Mirrlees.

This is similar to the result in my *JPE* paper on affirmative action with Fryer: The distortion (in our case, preferences for a disadvantaged group) should take place "downstream," at the point of competition for final positions, rather than "upstream," at the point where people are investing in their own productivity.

So, those are two examples of similar economic contexts where similar results have been found. Now, you'd think that for affirmative action it might be different, that, well, it's always better to go early.

Region: Pre-K—as early as that, perhaps?

Loury: Sure, Pre-K is something people are advocating these days. And, indeed, there may be other reasons, not in our model, having to do with cycles of development and so forth, which would explain why early intervention of a different kind is warranted.

But if it's purely in the framework of our model, I think our finding is explicable in terms of intuitions that you find in other areas of economics.

So, I have said two things really. First, that our conclusion depends on people having the farsightedness to anticipate the consequences of the fact that they're *going* to be favored at the slot competition stage, and that this is an implicit subsidy of their investments. And, second, that writers in the industrial organization and public finance literatures have established results similar to ours. Because of that, I was not at all surprised by our finding.

TRANSITION FROM FORMAL SEGREGATION

Region: Let me ask about another piece of recent work, this with [Samuel] Bowles and [Rajiv] Sethi. You consider racial and ethnic discrimination in many societies—from the United States to South Africa to South Korea—and develop a model to analyze factors that affect the evolution of income distribution during transition from *overt* discrimination to equal opportunity.

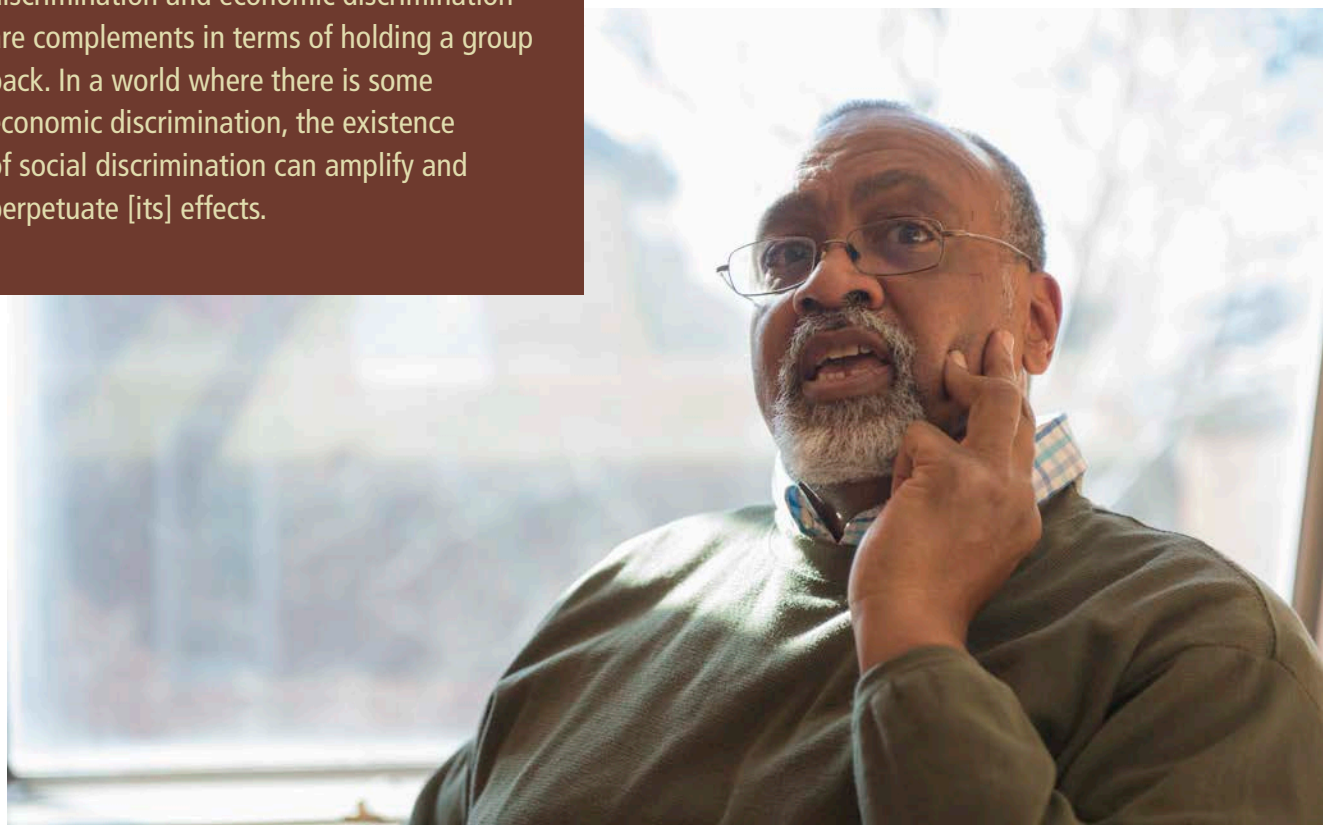
You found, I believe, that the course of evolution depends crucially upon three factors: the degree of segregation in social interaction post-transition, the society's demographic composition and, third, timing of integration relative to demographic trends.

Can you describe those findings a bit more deeply?

Loury: I love being invited to describe this problem because it goes back to my dissertation. Most dissertations don't have 35-to-40-year legs! You know what I'm saying? In fact, two papers grew out of my thesis. One was published in *Econometrica* in 1981, "Intergenerational Transfers and the Distribution of Earnings." This other was published in a conference volume in 1977 under the title "A Dynamic Theory of Racial Income Differences." Both are still being cited and, I must admit, I'm quite proud of that.

What I was unable to do in my orig-

The overriding idea here is that social discrimination and economic discrimination are complements in terms of holding a group back. In a world where there is some economic discrimination, the existence of social discrimination can amplify and perpetuate [its] effects.



inal "Dynamic Theory" paper was to provide a satisfactory formalization of the process by which racial segregation limits the economic opportunities of the members of a disadvantaged racial group.

There is an ad hoc character to my argument in that paper. I said then, in effect: OK, let's contrast two worlds: one where an individual's cost of getting human capital depends only on his family background and the other where an individual's cost of getting human capital depended on his family background *and* his community background.

Family background was proxied by the parents' earnings, and community background was proxied by the average earnings of the racial group to which the individual belonged. I just slapped that specification down on the page and gave no account of how these effects might be derived. That is, I simply posited cost functions for human capital acquisition that had these things as their arguments. I didn't explain where they came from.

Now, the internal family thing is kind of plausible, and you can tell a story about that. It could be that higher-income households have access to certain goods that make it easier for their kid to get effective education. Something like that.

I also had a story about the community background effects, which had to do with peer group influences and whatnot. But I didn't try to model that at all. I just said it was there.

And then I asked, What will evolve if it's *only* family background, and you have a group that is behind (on average) because of a history of discrimination against them, but *now* you have equal opportunity for the individual members of that group going forward? So then, yes, initially those families are going to be disproportionately poor because they were behind due to the discrimination. But now that there's equal opportunity, you've got a difference equation, a *dynamic* system. There *will be* some mobility; it may not be perfect mobility, but there will be *some*. And then, let me ask a question in the most generous way: Suppose we take time to infinity. Does the disadvantaged group ever catch up?

What I was able to show was that, if the only influence of the past on the current and future prospects of group members was that their parents had lower incomes, then *eventually* they would catch up. (There were some technical conditions involving diminishing returns across generations to the benefit of higher parental income and so forth.)

On the other hand, I exhibited a numerical example in the context of my model where, if it was not just the *parents*' income but *also* the *community*

group income which adversely affected the cost of acquiring human capital for members of the disadvantaged group, then you wouldn't necessarily catch up, even in the longest of long runs.

The result was interesting and, if I may say so, important. But the technique by which it was demonstrated was not very satisfactory by the standards of a modern economic theorist. Still, it was a creative way to pose what many people considered to be a critical question.

Region: And that work from your dissertation was the starting point for Sethi and Bowles.

Loury: Right. Rajiv Sethi and Sam Bowles went back to my "Dynamic Theory" paper and said: Well, let's try to make explicit how the community income effects that Loury talked about might actually work. They offered a formal but very simple story about that, which was to posit that all individuals have certain other individuals to whom they are connected or with whom they are affiliated. This, they argued, constitutes an individual's network, and the average earnings of a person's network affect the cost to that person of acquiring human capital.

Then they suggested the following model of network formation, through which the impact of racial segregation could be made explicit: Absent any racial segregation, with (say) blacks and whites in the society, the chance that a randomly selected person in anyone's network is a black or a white equals the proportions of blacks or whites in that society.

Thus, with no racial segregation of networks in this sense, even if a group started out behind because of past discrimination, the young people in that group would not be adversely affected by having less beneficial social networks because every individual's network would be formed as a result of the same random process.

In contrast, the relative burden of belonging to any historically disadvantaged group will be greater, the greater is the degree of in-group bias in the random process of network construction. Segregation bias is modeled by supposing that the chance of a randomly selected member of any person's network being from that person's own group is *greater* than that group's share of the society's population.

Region: Certainly seems a realistic way to model bias in one direction or another.

Loury: In the limit, a perfectly *segregated* society would have the property that everyone's network consists *only* of members of that person's own group, and vice versa. So, to capture the extent of this own-group bias in network formation, Sethi and Bowles set a "segregation" parameter to zero for perfect integration and to one for perfect segregation. The parameter captures the range between perfect integration and perfect segregation, then, in terms of a probability-weighting on how a person's network is constructed.

Region: Now, in your joint paper with Bowles and Sethi, you do this analysis *post-transition* from formal segregation to a society in which segregation is no longer legally permitted, but does persist informally.

Loury: Yes. Post whatever it was that caused the groups to be unequal in the first place.

Region: Apartheid or …

Loury: Yes, apartheid or Jim Crow or whatever. And, given this simple depiction of the social segregation process, we're just saying, all right, now you've got a level playing field going forward, but you've got initial conditions and you've got intergenerational overhang. Let's see where the thing goes.

Rajiv and Sam conjectured in their earlier paper, and we show in our joint paper, now published in the *Journal of European Economics Association*, that you can put down a very plausible model in which this social segregation parameter exhibits a kind of threshold influence on the dynamics of what happens after transition.

For segregation below the threshold, historically inherited group inequality eventually withers away in the face of current and ongoing group equality of opportunity. But for segregation *above* the threshold, the historical inheritance of group inequality might endure forever, notwithstanding the permanent abandonment of racially discriminatory practice in labor (and other) markets.

Moreover, the threshold above which social segregation implies permanent economic inequality between racial groups *depends on* the relative size of the groups. That's how demography and segregation interact with each other.

Region: That interaction would account for the potential post-transition differences in, say, Bangor, Maine, and Baltimore, Maryland—as mentioned in your paper—since their black-white ratios are so different.

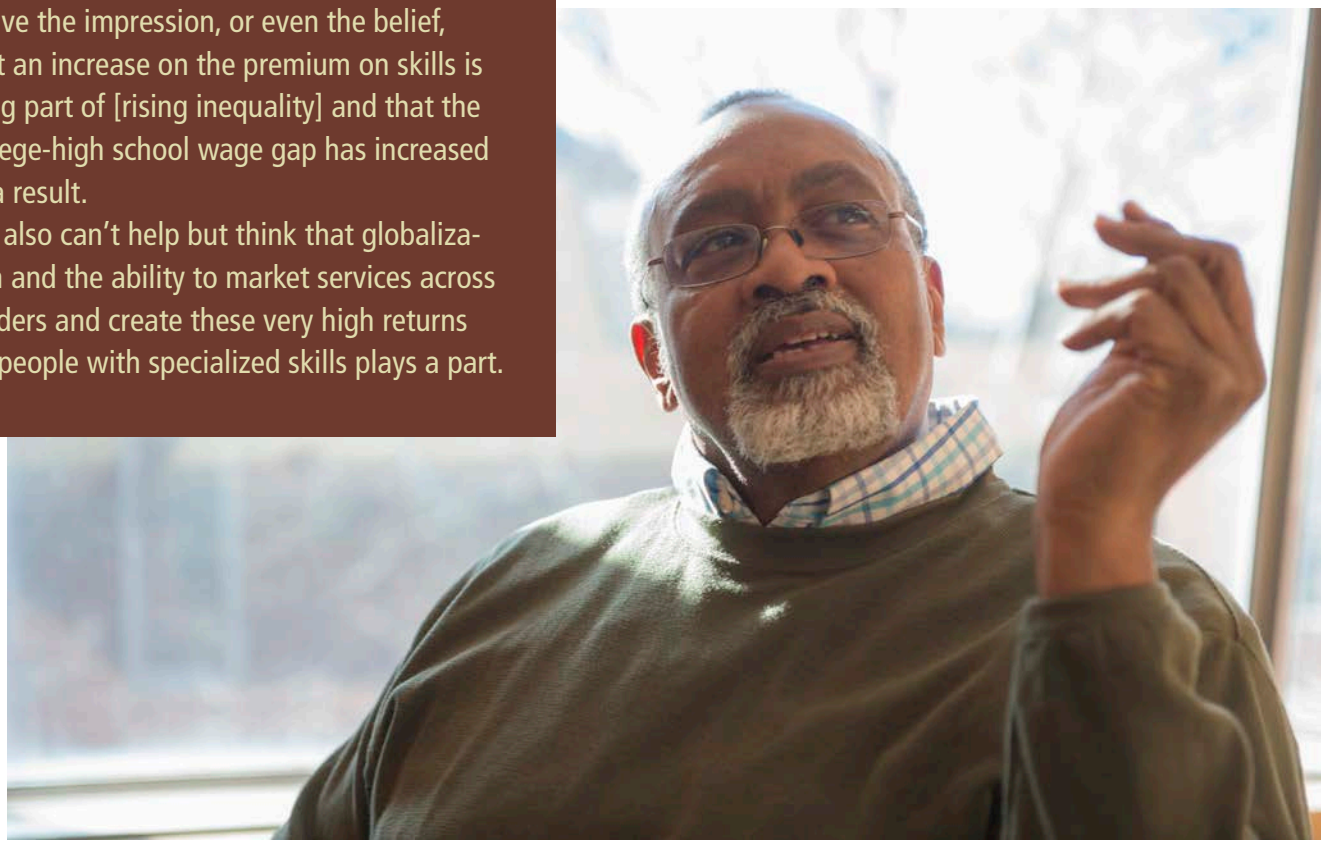
Loury: Exactly, though anything I'd say along those lines would be speculative because I have not done any careful empirical investigation of those cases.

I'm happy about this paper with Sam Bowles and Rajiv Sethi because, in a way, it completes in a rather satisfying fashion a project that I began almost 40 years ago. And it does it by formalizing this idea that too much social segregation can get in the way of a natural recovery from a history of discrimination against groups. The overriding idea here is that social discrimination and economic discrimination are complements to each other in terms of holding a group back.

In a world where there is some economic discrimination, the existence of social discrimination can amplify and perpetuate the effects of that economic discrimination. That's how all of this is relevant to this idea of "transition."

I have the impression, or even the belief, that an increase on the premium on skills is a big part of [rising inequality] and that the college-high school wage gap has increased as a result.

I also can't help but think that globalization and the ability to market services across borders and create these very high returns for people with specialized skills plays a part.



SOURCES OF RISING INEQUALITY

Region: I'd like to ask you about rising U.S. income inequality—a very prominent issue these days, for obvious reasons. Many theories are put forth as to the causes of rising inequality over recent decades—since you wrote your dissertation, actually—from broad structural changes like technological change and a transformed international economy to those perhaps more amenable to policy intervention.

What are your general thoughts on the factors behind rising U.S. inequality?

Loury: Well, you know, I'm not in as good a position as are some of my colleagues to address this. Larry Katz and Claudia Goldin at Harvard have looked a lot at skill-biased technology change. David Autor at MIT as well could give you a detailed accounting of what all these various studies are showing about the decomposition of inequality trends across different explanatory factors.

I have the impression, or even the belief, that an increase on the premium on skills is a big part of it and that the college-high school wage gap has increased as a result. I do believe that skill-biased technical change is a real thing.

I also can't help but think that globalization and the ability to market services across borders and create these very high returns for people with specialized skills plays a part.

I don't know what share of increased inequality is being driven by the financial sector, but I know it's going to be a quantitatively measurable effect. I don't know how much is due to excessive executive compensation. I tend to think that that gets overstated.

On the other hand, I also tend to think that Sherwin Rosen's 1981 *AER* paper, "The Economics of Superstars,"[4] offered a profound insight. If you can manage, and manage better than this guy over here, so now you're managing over $500 billion worth of stuff instead of $500 million, you know, that's going to imply a convex function measuring the linkage between financial rewards and managerial aptitude.

Region: And Rosen's theory doesn't just apply to managers, of course—it applies to "stars" of all sorts: athletes, singers, actors ...

Loury: Right, it does! And it illustrates the beauty of the economics of the Chicago school. I was trained at MIT but I have always found there to be an elegance in Rosen's and Becker's pioneering contributions to labor economics. One reads those papers and one thinks—you know—*this* is *Economics*.

> Others are doing very good economics in [the] area [of crime]. There are interesting lines of investigation. I would not disparage this line of work at all, not at all. However, sometimes I think these economic issues and effects are of second-order magnitude, relative to the first-order issues, which are basically *value* questions.
>
> I didn't think economics by itself reached broadly enough or deeply enough to allow me to cover the terrain I wanted to cover, which is, What has happened to my country here? How did we get to be a nation of jailers?

What's the difference between economics and mathematics? I mean, it's not all about, you know, "proving hard stuff." Some of it is just about getting the right curves, seeing the right trade-offs, modeling the right margins and seeing implicit markets where no explicit markets exist—stuff like that. That I think is very characteristic of the Chicago style, and I've always admired it.

CRIME, INCARCERATION AND INEQUALITY

Region: I'm curious about your work on crime, prisons and racial inequality. You're a public intellectual. You've done a lot of scholarship that's not strictly economics, and much of this has focused on incarceration and inequality.

Loury: Recently, that's true.

Region: Perhaps I'm ignorant about this, but you don't seem to approach it as an economist. I've wondered if there's a specific reason for that. Obviously, Becker and many others have researched the economics of crime. Why not you?

Loury: The stuff I've been writing about crime—which you are quite right to say is not economics—in fact, I've been mildly chastised from time to time by some colleagues in economics when I send around this or that paper, and they'll say, "Why don't we get some data and try to look at this?"

But this work comes out of a very specific origin. I would have never been writing about crime if I hadn't been invited to give the Tanner Lectures on Human Values at Stanford, which I delivered in 2007.

It was a great honor to have been invited. I had somewhat of a reputation among some political theorists and philosophers because I had been doing this public intellectual work, and I had been writing the occasional essay about reparations for slavery, for example. Different things like that.

And when I got to Boston University in 1991 and became a university professor there a few years later, I could teach outside the economics department. I was invited to do a lot of different collaborative, interdisciplinary teaching.

I started teaching with a philosopher and a political theorist—courses on Adam Smith, Karl Marx, John Maynard Keynes, Joseph Schumpeter. You know, reading classics in political economy. So I was known to some of these people. And when the committee out of Stanford was deciding who they were going to have to be the Tanner lecturer, they asked me.

The Tanner Lectures, created by a foundation in Utah, are very distinguished lectures in political philosophy. They have them at Princeton, the University of Michigan and other major universities. So it was a real honor to have been invited. When I got the invitation, I said "Oh, well, that's cool" because there were only a few other economists I could find at that time who had done the Tanner Lectures. My dissertation adviser, Robert Solow, was one. Jeffrey Sachs, Amartya Sen and Thomas Schelling were others. I felt this was pretty good company to be in, so I took the assignment very seriously and wanted to challenge myself by choosing my topic judiciously.

My first instinct was, OK, I'll go to my corpus of work on affirmative action, and I'll find a way of saying something that philosophers could appreciate out of that. But the more I thought about it, the less I liked that idea. I mean, it was too easy for me [laughs].

And I had been disturbed in a general way about the rising numbers of Americans in jail, particularly African Americans. I'd been teaching undergraduates about race and inequality. I would teach some ethnography and urban sociology, and the crime issue and rising prison numbers would always come up.

So, I decided I was going to give lectures on "Race, Incarceration and American Values." That's the title that we came up with. I had two lectures to give and it was a wonderful experience, just a wonderful, wonderful experience. A great triumph, and well—I got fired up while preparing for it.

Preparing took nine months to do. I instituted a course at Brown to help me get ready, which I taught in the fall of 2006; I gave these lectures in the spring of 2007. So, my course on punishment had a ton of books from a variety of scholars. Like Michel Foucault, you know? "Discipline and Punish"—man, it makes your head hurt trying to read that stuff.

It was mostly sociology and criminology because, what else would it be? Not that there isn't any economics in it, but I wasn't going to limit myself to the economics literature to be able to engage in this question for what were basically lectures in ethics.

I read and thought broadly, and I composed an argument that was not an economics argument. It was basically a kind of Rawlesian justice argument, at the end of the day—applied, very applied.

So, that's why I approached crime from that particular point of view.

But I also want to say that others are doing very good economics in this area. There is a program at the NBER on the economics of crime. I know these people. These are very good economists: Phil Cook, Justin McCrary, Jens Ludwig. There are interesting lines of investigation, studies that people are doing with applied micro approaches. Steven Levitt has made his career, in part, writing articles about this area.

So, I would not disparage this line of work at all, not at all. However, sometimes I think these economic issues and effects are of second-order magnitude, relative to the first-order issues, which are basically *value* questions.

Who are we as a people? And what are we going to do with this conundrum, that we've got these undeveloped individuals in our midst, in our cities? I mean, these people who are bad actors. Some of the discussion about this issue is just very discouraging because people are not facing up to the facts. I'm talking about discussion on the left, OK? I'm talking about people who are against prisons, who think—as I do—that we are over-incarcerated.

But crime *is* a real issue, and there are empirical questions. Does the death penalty deter people from committing murder? That's a classical question of inference from whatever the data might be. It's a microeconomic and sort of analytic, quantitative sociology, criminology-type question. It's a question that experts need to answer, and it's subtle. I want to hear what Dan McFadden or Charles Manski has to say, because they're among the people who are going to know how to best judge what these robust statistical models will tell us. So, those are technical questions.

But, there are just *other things* that are going on. I mean, how long should these sentences be? Should we allow felons to vote? Does it make sense to disqualify them from housing subsidy and educational subsidy programs, Pell grants and things like that after they get out? What do you do with a juvenile? Life without the possibility of parole as a sentence to a juvenile offender, is that something that you actually want to do? What about solitary confinement? "Administrative segregation," I think that's the sanitized term.

I didn't think economics by itself reached broadly enough or deeply enough to allow me to cover the terrain that I wanted to cover, which is, What has happened to my country here? How did we get to be a nation of jailers?

PROGRESS IN ECONOMIC THEORY?

Region: My next question is about progress in economics. In your 1977 article that we discussed earlier, "Dynamic Theory of Racial Income Differences," you wrote that it might "be useful to employ a concept of 'social capital' [because it forces] the analyst to consider the extent to which individual earnings are accounted for by social forces. … However, for precisely this reason such analysis is unlikely to develop within the confines of traditional neoclassical theory."

You wrote that nearly 40 years ago. Time has passed. Was your pessimism warranted? Has economic theory made any progress in this direction?

Loury: Oh, sure. You have to understand, I wrote that line in 1975 or early '76. The '60s were over, but not long over—the '60s effectively extended into the '70s in many ways. The Vietnam War, for instance, was winding down, with all that entailed.

But I had grown up in Chicago. I was then a black kid at MIT in the graduate program, and the question, "How are you relevant to being a part of the solution to the struggle for our people?" was being asked. This kind of thing. "Can you be a black and an economist at the same time?" "Have you sold out?"

> Have economists done better [theory] in this area? Sure. Matt Jackson, people like that, will get Nobel Prizes for working out the implications of people's social connectivities. On the empirical side, there have been advances and much better data. And a lot of the social economics work is being done around the world.

So there was a lot of faux radicalism in the air, a lot of posing, a lot of, "Yeah, I'm going to get an education and I'm going to become a scientist, but I'm going to be a *critical* scientist. I'm going to stand a little bit at a remove from the system. I'm not going to just buy it all, not going to drink the Kool-Aid." That kind of thing.

And in economics, there was neoclassical versus radical economics. Something called the Union of Radical Political Economists really existed. I guess it probably still exists.

Region: Sam Bowles, your co-author now, was prominent in URPE back then.

Loury: Yes, Sam Bowles and Herb Gintis—their book had a big impact on me, *Schooling in Capitalist America*. I read that book cover to cover. And then there was the controversy of "Bowles and Gintis, Marxists at Harvard, were they going to get tenure?" All that good stuff. And, you know, I wasn't a radical economist. I was a mainstream economist, but …

So those lines in the article were kind of a pose to say, "I'm in the neoclassical camp, but I'm not *of* it." I didn't really have any critique of neoclassical economics, as such, and, really, that's an ad

hominem comment I'm making there.

But more substantively, you asked me, Have economists done better in this area? Sure. I mean, theory is now a major topic—Stanford's Matt Jackson, people like that. These guys will get Nobel Prizes one of these days for working out the implications of people's social connectivities.

On the empirical side, there's Northwestern's Charles Manski's "reflection problem." This is the idea that if I'm trying to measure the impact of a peer group on an individual, I can't look at variance across data on individuals' observations on their peers, because individuals are *choosing* their peers. That's a kind of intrinsic endogeneity that creates a very difficult identification problem for inferring the causal effect of association on outcome. People have worked on that. So I'm just saying, there have been advances and advances. There's much better data.

And a lot of the social economics work is being done not just in the United States, but around the world. The Poverty Action Lab, for example, does its random clinical trials in international settings and around the questions that have social-capital-like themes embedded in them.

So, I don't think that I would be at all dismissive of the profession in terms of taking seriously the kind of social effects that I was interested in, in those days. But, yes, that line was a little gratuitous.

But, then, the other thing is about markets: "Will markets solve all the problems? Is laissez-faire sufficient?"

Region: And you're not in that camp.

Loury: No, I'm certainly not saying laissez-faire is OK. Laissez-faire has its issues.

Region: Well, clearly then, that leaves much to discuss. But perhaps we should end on that note. Thank you so much—it's been a great pleasure.

—Douglas Clement
March 7, 2014

Endnotes

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An extended version of this interview is available online at minneapolisfed.org.

More About Glenn Loury

Current Position

Merton P. Stoltz Professor of the Social Sciences and Professor of Economics, Brown University, since 2005

Previous Positions

Professor of Economics, Boston University, 1991-2005; University Professor, 1994-2005; Founder and Director of the Institute on Race and Social Division, 1997-2003

Professor of Political Economy, John F. Kennedy School of Government, Harvard University, 1984-91; Professor of Economics and Afro-American Studies, 1982-84

Professor of Economics, University of Michigan, 1980-82; Associate Professor of Economics, 1979-80

Assistant Professor of Economics, Northwestern University, 1976-79

Professional Activities

Advisory Committee, Center for the Study of Slavery and Justice, Brown University

Committee on the Causes and Consequences of High Rates of Incarceration, National Research Council, National Academy of Science

Editorial Advisory Board, First Things

Editorial Board, Boston Review

Honors

Inaugural speaker, Thomas Schelling Lectures, School of Public Policy, University of Maryland, 2014

President, Eastern Economics Association, 2013

Member, American Philosophical Society, since 2011

Member, Committee on Law and Justice, National Academy of Sciences, since 2009

Recipient, Honorary Doctorate, Tuskegee University, 2008

Invited Lecturer, Tanner Lectures on Human Values, Stanford University, 2007; James A. Moffett '29 Lectures in Ethics, Princeton University, 2003; W.E.B. DuBois Lectures in African American Studies, Harvard University, 2000

Recipient, John von Neumann Award, Budapest University, Hungary, 2005

Fellow, American Academy of Arts and Sciences, since 2000

Member, Council of Foreign Relations, since 1999

Vice President, American Economic Association, 1997

Fellow, Econometric Society, since 1994

Publications

In addition to substantial research on applied microeconomic theory, game theory, industrial organization, natural resource economics and the economics of race and inequality, Loury is the author of *Race, Incarceration and American Values* (MIT Press, 2008); *The Anatomy of Racial Inequality* (Harvard University Press, 2002) and *One by One, From the Inside Out: Essays and Reviews on Race and Responsibility in America* (Free Press, 1995), winner of the American Book Award and the Christianity Today Book Award.

Education

Massachusetts Institute of Technology, Ph.D., economics, 1976

Northwestern University, B.A., mathematics, 1972

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Till College Do Us Part

Exploring the link between divorce and rising college attainment for women

Phil Davies
Senior Writer

In the 1970s, the divorce rate in the United States increased sharply, largely because of changes to divorce laws that permitted one partner to dissolve the marriage without the other's consent. At roughly the same time, the share of women with college educations also rose steeply, and since then women's college attainment has accelerated while men's has stalled. Women's rising education has coincided with an enormous increase in labor force participation by married women.

Could there be a link between divorce and women's college achievement? And could relations between husbands and wives also explain changes in the labor market over the past half century, including the mass movement of wives into the workforce?

Recent research by Minneapolis Fed visiting scholar Fatih Guvenen and Michelle Rendall, an economist at the University of Zurich in Switzerland, indicates that marital distress is indeed intimately related to the strides women have made on campus and in the workplace. In "Women's Emancipation through Education: A Macroeconomic Analysis" (Minneapolis Fed Working Paper 704), the researchers find that education can insure women against the consequences of a failed marriage. Through higher education, women who would otherwise remain trapped in matrimony achieve financial independence. This insurance is worth more to women than to men; and it has the added benefit of helping women to avoid a bad marriage in the first place.

Guvenen—who also is an associate professor of economics at the University of Minnesota—and Rendall construct a complex economic model in which divorce reform interacts with other trends in the U.S. economy and society to substantially increase college attainment for women. In the model, today's college achievement rate for women is about 40 percent higher than it would be if divorce laws had not changed. Divorce reform also is a key factor in the rapid rise of married women in the labor force and the decline in marriage rates over the past generation.

In their model, change occurs slowly at first, but gathers momentum through strong feedback mechanisms. For example, educated wives' growing financial independence leads many in troubled marriages to file for divorce; as the divorce rate rises, more women pursue education to insure themselves and their children against a breakup.

Guvenen and Rendall's work adds to a growing body of knowledge about family economics—how economic forces at work within the household affect both families and broad social and economic trends. Their research shows that domestic phenomena such as marital discord, the dating game and the evolution of love within marriage can help explain outcomes that have long puzzled economists, such as women's ascendance in higher education. Today more U.S. women than men earn college degrees—a reversal of college gender ratios in the 1960s.

PHOTOGRAPH BY JOE PACZKOWSKI


... hmmm, maybe college.

"Our model, with this force—education as insurance against a bad marriage—has first-order implications for the reversal of the college gender gap, for which there's no generally accepted explanation," Guvenen said in an interview.

All in the family

In the early 1980s, Gary Becker, an economics and sociology professor at the University of Chicago, proposed a theory of household production in which wives and husbands specialize in either home or market work. A woman who has a comparative advantage in market work will supply more time to the market, and less to the household, than her husband. Alternatively, if a man's comparative advantage lies in the office or the factory, he will devote more time to market work than his wife. Yet spouses aren't pure specialists; they share household tasks and spend leisure time together.

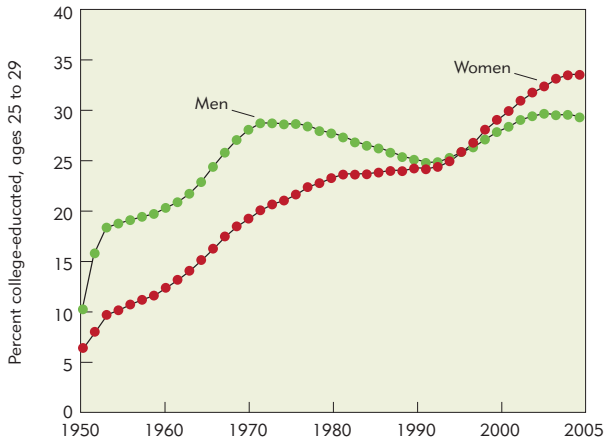
Becker's (1981) book *A Treatise on the Family* is a foundational text for economic research that explores the nexus between household decisions and what goes on in labor markets and the broader economy. Understanding economic forces at work in the household is important because women in the United States and many other countries have experienced immense social and economic change since the 1950s. (Becker is interviewed in the June 2002 *Region*, online at minneapolisfed.org.)

When John Kennedy was president, less than 8 percent of women in their 20s had four-year college degrees, less than half the college attainment rate of men (see Chart 1); by 2005, a higher proportion of women than men were college educated. Women have made comparable advances in the workplace. Labor force participation by married women has soared: In 1960, just one-third of married women worked outside the home; by 1990, almost 70 percent worked for pay. Although women on average still earn about 23 percent less than men, the wage gap has shrunk markedly since the days of bouffant hairdos and 30-cents-per-gallon gasoline.

Economists have struggled to explain these momentous changes in women's lives. Many have sought answers in family dynamics, blending observations of societal trends with insights into family formation, intrahousehold bargaining and the sexual division of labor. In the process, researchers have adapted some of Becker's premises to the world as it is today.

Chart 1

College attainment by gender



Source: Economists' calculations from Current Population Survey's IPUMS data

Claudia Goldin of Harvard University has attributed the reversal of the college gender gap to several factors, among them improved job prospects for women and delayed marriage, facilitated by the wider availability of birth control. Explanations proposed by other scholars for women's education and workforce gains include a narrowing of the gender wage gap, a shift in labor demand from brawn to brain, the introduction of labor-saving home appliances and intergenerational changes in women's beliefs about the payoffs of market work. (Goldin is interviewed in the September 2004 *Region*, online at minneapolisfed.org.)

To test their theories, economists develop computer models—virtual worlds in which individuals interact and make decisions in response to different social and economic scenarios. For example, a study by Greenwood et al. (2012) analyzes the impact of advances in home technology—microwaves, dishwashers, frozen foods—on college attainment, hours worked and other household characteristics. In the model, improved technology reduces time spent on household chores, freeing more married women to work in the market—and to attend college to increase their earnings.

In this framework and models developed by other researchers in recent years, higher incomes due

to increased education also make women more discriminating in their choice of mates, lowering marriage rates and increasing the incidence of divorce.

Divorce American style

Long before he became an economist, Guvenen was aware of the implications of divorce for education and labor decisions. Growing up in a household with three sisters, he heard much talk about the consequences of a bad marriage—the choices women faced between staying in the marriage and leaving. Striking out on their own was a fearful prospect for women without the means to support themselves and their children. Later in life, Guvenen met women whose unhappily married mothers urged them to earn multiple college degrees so they wouldn't suffer the same fate.

"I kept hearing the same story, of women who are trapped in marriages because of financial reasons," Guvenen said. The moral of the story: Go to college, just in case.

Economists have long noted the correlation between education and the risk of divorce; since the early 1980s, college graduates have divorced at a lower rate than those without college degrees. But little, if any, research has considered divorce—or the anticipation of it—as a major driver of large increases in women's education and labor force participation over the past 50 years.

Guvenen and Rendall (who studied under Guvenen as a university student) began their investigation in 2008. Their main objective was to test their intuition about the role of education as insurance against marriages gone wrong. Has that role grown over time, and can its effect on women's welfare be measured? To what extent did divorce reform increase the value of education for women, leading them to attend college and earn higher wages upon graduation? But the researchers soon realized that the answers to those questions could also shed light on the reversal of the college gender gap and the storming of the workplace by married women.

The simulation Guvenen and Rendall construct is a "search" model, a type developed to analyze frictions in labor markets. Computing advances over the past decade allow researchers to build models capable of teasing out the subtle, dynamic interplay among myriad variables—a level of analysis not possible before. "The mechanics of these models are very rich and so interdependent," Guvenen said. "When you change one thing, it creates all these ripple effects."

A model life

In the model, over half a century of economic and social evolution plays out, viewed from the perspective of men and women making important life choices—whether to go to college, how many hours to work, whom to marry, if and when to divorce. Numerous forces represented by mathematical equations affect these decisions. Chief among them are divorce reform and the narrowing of the gender wage gap.

Until the late 1960s, most U.S. states required both husband and wife to consent to divorce. Then, over the next decade, state legislatures across the country passed laws permitting one spouse to file for divorce without the other's consent. By 1980, almost all states had some form of "no-fault," or unilateral, divorce statute. Divorce reform allowed women to escape unhappy marriages; but it also exposed them to the risk of a divorce filing by their husbands. In either case, women had to be prepared to support themselves after divorce. Women bear a disproportionate share of the costs of a breakup, in large part because mothers usually have custody of children after divorce. This fact is also captured in the Guvenen-Rendall model.

In the 1960s, women in the U.S. workforce earned an average of 60 cents for every dollar earned by men. In the 1970s, that disparity started shrinking, and by 2005 women earned about 77 percent of men's pay. The closing gender wage gap is also in the model, but Guvenen and Rendall don't address the question (a burning one in labor economics) of why the gap narrowed. But an addendum to their paper, based upon earlier work by both authors, proposes that technological progress in the workplace favoring cognitive skills over strength lifted women's wages relative to men's.

Other key elements of the model include the college wage premium—the higher pay college graduates receive compared to those who only

completed high school—and the advantages of education in attracting desirable spouses. The college wage premium has risen over the decades, especially for women. And the college-educated tend to marry individuals who are similarly well schooled—a process called positive assortative matching.

The economists set the parameters of the model from selected U.S. Census data, such as wages by gender and education, the average number of children living in postdivorce households and college attainment rates in 1950. Then they set their simulation in motion to see how it performs in generating transformative trends for women, such as the reversal of the college gender gap and the leap in workforce participation by married women.

Harriet goes to college

The results of Guvenen and Rendall's experiment capture with remarkable fidelity the socioeconomic changes that have swept the nation since World War II. The basic model replicates marriage and divorce trends seen in the Census data—the 1970s divorce outbreak, a falling marriage rate, marriages later in life. The model also predicts the increase in the labor supply of married women, producing about 90 percent of the rise in market hours worked by wives since 1950 (in the model and in the actual labor force, hours put in by single men and women change little).

Most important for the economists' thesis, the college gender gap closes and then reverses in the model. In line with the data, women's college attainment increases at about twice the pace of men's, allowing women to surpass men by the mid-1990s.

In the model, divorce reform coupled with a rising female-to-male wage ratio brings about these changes. Revamped state divorce laws combined with greater returns for women from paid labor starts a chain reaction that ultimately transforms the gender makeup of colleges and workplaces, the division of labor within households, even the reasons people marry.

As in Becker's Treatise, married couples in the model split their time between market work and home activities. If the gap between male and female compensation is large, only the spouse with the higher wage (typically, the husband in the "Ozzie and Harriet" economy of the 1950s) works outside the home. But when the gender wage gap begins to shrink—as it did in the 1970s—some wives hang up their aprons and go to work in offices, shops and factories.

Work experience leads women to improve their education, so they can earn higher wages. Divorce reform bolsters this trend by making it more likely that married women and women contemplating marriage will have to start over; single women as well as wives respond by seeking a college degree as an insurance policy. In a positive feedback loop, the higher wages of educated wives trigger more divorces, because women in strained marriages now have other options. For mothers especially, higher earnings due to education provide the means to form a new household after divorce. "If the husband or ex-husband turns out to be a bad provider, education gives women the power to raise their children on their own," Guvenen said.

As divorce rates rise—increasing an individual's perceived chances of a breakup—women invest even more heavily in education. This self-reinforcing process also increases labor force participation by married women, because only women who work outside the home can realize their higher earning potential.

Thus, in the model, divorce reform amplifies trends already affecting education and labor decisions—not only the closing gender wage gap, but also a rising college wage premium and swelling personal income that made postsecondary education more affordable.

Other economists, including University of Minnesota economists Larry Jones and Ellen McGrattan, also a Minneapolis Fed consultant, have found that a narrowing of the gender wage gap alone can account for rising female educational attainment and distaff advances in the workplace. (See Minneapolis Fed Staff Report 317 and "Wives at Work" in the December 2003 issue of *The Region*.) But Guvenen and Rendall view divorce reform as an additional, powerful driver of those developments. "If you don't have this force—the divorce law change—we argue that [the model] cannot generate much action," Guvenen said.

In the model, divorce reform accounts for almost half of the increase in college attainment by women from 1950 to 2005. It has an even bigger impact on market hours worked by married women over the same period.

For love or money

If a college education is the path to emancipation for women, how much do women benefit by taking that path? Guvenen and Rendall run a series of experiments to estimate the value of education as (1) insurance against a star-crossed marriage and (2) a means of attracting more desirable spouses.

To do this, they tweak variables in their model that represent beliefs about the value of education and ask a hypothetical question: How much would an educated husband or wife have to be compensated so as to be willing to be uneducated and face the same risk of divorce?

The results of this thought experiment show that the insurance value of education is greater for women than it is for men, because of the higher costs borne by women after divorce. Low-wage women gain the most compared with men because college substantially increases their incomes. Insurance benefits increase after divorce reform, although the gender insurance gap narrows for people earning higher wages. But in dollar terms, the welfare gains over time from education are large for top-earning women. The insurance benefit is almost $15,000 annually for women in the top 10 percent of the wage distribution who marry after the mid-1970s.

Research by a number of economists, including Pierre-André Chiappori of Columbia University, has shown that increased education pays off in improving one's marriage prospects, both upon first marriage and after divorce. (See Chiappori, Iyigun and Weiss 2009.) In this arena, women also receive higher returns than men from education, according to the model.

Marrying an educated, higher-wage man increases total household income, which is shared in marriage. For the same reason—and also because of shared leisure interests—educated men often prefer educated women. Not only are educated women more likely to marry educated men, but they also have a better chance of meeting them. "If you're a highly educated person, you hang out in the same places as other highly educated people," observed Guvenen, who met his wife as a college student.

Guvenen and Rendall adjust their model to isolate the benefits of education in the marriage market and find that they're significant—at least one-third the insurance value of advanced schooling. But women gain more than men because as the share of women who are educated increases, a sheepskin becomes an even more important attractant for educated men, whose numbers are not rising at the same rate.

The insurance value of education combined with the edge it gives women in the mating game provides an explanation for why women not only caught up with men in college attainment, but passed them by. In the model, the narrowing gender wage gap provides the impetus for women to improve their education. But other incentives rooted in the marriage market drive women to invest more in education than men over time.

In recent years, economists have delved into the nature of connubial love—the x factor in family economics. Researchers such as Betsey Stevenson and Justin Wolfers of the University of Pennsylvania popularized the idea of "hedonic marriage"—a shift from shared production in households to shared consumption of leisure and social activities. The more shared consumption (love) there is in marriage, the more couples value joint free time, affecting market hours worked by spouses.

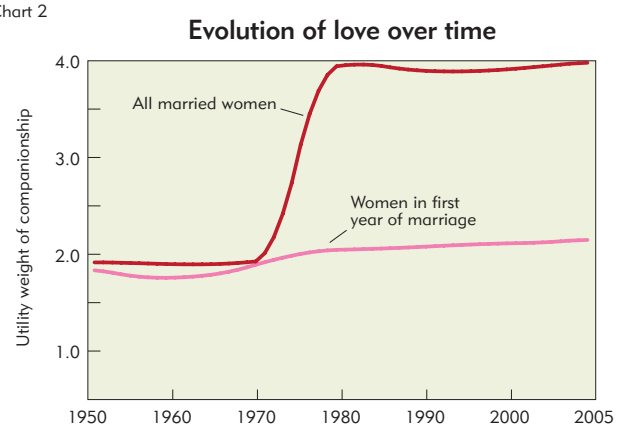
Breaking new ground in this area, Guvenen and Rendall quantify love in marriage and track its evolution over the decades. Looking at measures such as marriage and divorce rates in their model yields an estimate of changes in the magnitude of marital love.

It turns out that love so measured blossomed for U.S. married couples in the 1970s, concurrently with divorce reform (see Chart 2). This happened partly through selection—freedom to divorce means that unions light on love don't endure. But love also has become more important because increased education and wages let women marry for companionship instead of financial support. Consistent with the notion of hedonic marriage, the rise of love has coincided with an increase in leisure for Americans; studies have shown that since the 1950s, leisure time has risen by the equivalent of five to 10 weeks of vacation annually. (See Aguiar and Hurst 2007.)

Alternative histories

Guvenen and Rendall's work doesn't settle ongoing debates over why the college gender gap reversed and large numbers of married women entered the

Chart 2



Source: Economists' estimate from baseline model

labor market. But their model does propose an impulse that until now has received scant attention: the adoption of no-fault divorce. Divorce reform magnified social, economic and technological trends that took hold in the second half of the 20th century and continue to influence education and labor decisions today.

"Very few economic and social phenomena are driven by one force alone," Guvenen said. "Usually it's the interaction of forces that generates the trend. Divorce reform is one of those forces." In the model, increased education opens the door to financial independence for women who would otherwise be trapped in a failed marriage. And a college degree gives women an advantage in the marriage (and remarriage) market.

The economists' model isn't a perfect microcosm of U.S. socioeconomic history. One shortcoming is that it predicts a 60 percent drop in market hours worked by married men over the past half century—a trend not borne out by Census data. This illustrates the intricacy and sensitivity of search models—a slight change in the assumptions built into the model can change the results in complex ways.

In this case, Guvenen and Rendall model husband and wife as perfect substitutes in home production—one can readily replace the other in child rearing, cooking and other household tasks. As more women improve their education and enter the workforce, this results in an underestimate of the market hours worked by men. Assuming instead that even educated, working women are more inclined to home production than their spouses would likely correct this flaw in the model, Guvenen said.

In ongoing research, the economists experiment with a version of their model that treats divorce reform not as the initial change agent in marriage and labor markets, but as a response to changes that were already under way. As the gender wage gap starts to close in the 1960s, leading more women to work outside the home and try to escape rocky marriages, the loss of welfare due to legal restrictions on divorce prompts state governments to undertake divorce reform. This in turn triggers more divorce and progressively larger investments by women in education.

"Although preliminary," Guvenen and Rendall write, "we believe this work provides a sensible first step to acknowledging that laws also change for a reason—typically, in response to societal demands." R

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Research Digest

Sovereign debt—funds borrowed by national governments, often by selling bonds—is the focus of much attention these days, from policymakers and economists alike. Their concern is that governments in difficult economic straits will default on their sovereign debt, not only harming the lender holding that debt, but potentially leading to systemic financial stress as international bond markets tighten in response.

Several recent papers by Minneapolis Fed economists examine different aspects of sovereign debt. This *Digest* discusses two of those studies.

The first paper, by Cristina Arellano, a senior research economist at the Minneapolis Fed, and Yan Bai of the University of Rochester, suggests a possible mechanism behind "debt contagion"—a historically recurrent phenomenon in which several nations default on their sovereign bonds at about the same time. Arellano and Bai's explanation hinges on the idea that nations interact strategically in international debt markets because they borrow from the same set of lenders. Default spreads from one country to another, the economists argue, because the first country's default tightens current bond prices faced by other nations and also lowers the debt repayment rates that lenders will then accept.

How should national governments best manage their sovereign debt when faced with financial stress (so that default might be avoided)? In the second paper discussed here, Minneapolis Fed economist Manuel Amador and Princeton University's Mark Aguiar propose that nations should "go short"—shift the composition of their bond portfolios toward short-term debt by actively engaging in short-term debt markets (despite the potential risk of facing higher interest rates for new short-term debt as they pay off the old), but managing long-term bonds passively: Pay them off only as they come due, not before.

The key idea is that long-term bond prices depend on future fiscal trajectories that governments cannot credibly commit to when issuing them. Therefore, pricing in debt markets will consistently move against long-term bonds, they contend, and governments would always have to sell them at low prices and buy high. Not optimal. Shortening the "maturity composition" of the sovereign debt portfolio is therefore the best strategy.

Research Digest

Debtors' prism

Sovereign default contagion may result from borrowers interacting strategically in debt markets

Cristina Arellano and Yan Bai

When countries default on their sovereign debt, history shows, they tend to do so at roughly the same time. This was true during the Latin American default crisis in the 1980s, when nearly all Latin American countries defaulted. Simultaneous or serial default has threatened Europe as well in recent years, with Greece defaulting in 2012 and other nations—especially Italy, Portugal and Spain—also in fragile condition. This clustering of sovereign default has happened frequently over the past two centuries. Despite this pattern, however, economic theorists have usually focused on default by countries in isolation from one another and largely ignored the empirical reality of recurrent international contagion.

A nation that defaults on its loan pays a price: It receives a bad credit rating, it is excluded from borrowing internationally for a time and, without that access to foreign funds, its national economic output suffers.

In "Linkages across Sovereign Debt Markets" (SR 491 at minneapolisfed.org), Minneapolis Fed economist Cristina Arellano, working with Yan Bai of the University of Rochester, offers a solid, somewhat complex explanation for the phenomenon. It hinges on borrowers themselves and

Research Digest

their strategic interplay in international debt markets. And as Arellano and Bai demonstrate, their intricate model matches recent events well and may therefore be quite useful for understanding Europe's current default dilemma.

International debt relations

The key mechanism in their model, Arellano and Bai write, is that "countries are linked to one another by borrowing from and renegotiating with common lenders." It rests on the idea that because these nations obtain loans from the same set of lending institutions, such as the foreign banks, they find themselves interconnected, and they use that association to their mutual and individual benefit. "Having a common lender generates linkages across countries," they write. But instead of focusing on coordination among lenders, as some researchers have, Arellano and Bai seek an explanation that relies on how borrowers interact with one another in international debt markets. It turns out to be a fruitful approach.

Their model starts with two nations, labeled Home and Foreign, that borrow from a shared set of lenders. Each nation is powerful enough economically to affect international lending markets or, as economists put it, each borrowing country is "strategically large." The central economic actions examined by the model are borrowing, defaulting on those loans and subsequently renegotiating with lenders to borrow again.

The key interaction in the model consists of each nation understanding that the other nation's debt activity will impact its own ability to borrow and that they have a mutual interest in minimizing borrowing costs and recovery rates.

A nation that defaults on its loan pays a price: It receives a bad credit rating, it is excluded from borrowing internationally for a time and, without that access to foreign funds, its national economic output suffers. A nation in default responds by renegotiating its debt with an international committee of lenders and bargaining with that committee over debt "recovery," meaning that the nation in default negotiates the percentage of outstanding debt it will be required to repay to regain good credit standing and renewed access to international lending markets.

The other side of debt

Lenders trade bonds with the two borrowers, Home and Foreign. They receive loan payoffs, and make decisions about new loans, in order to maximize their revenue. Because there are many of them, bond prices simply compensate them for delaying dividend payments and for potential future defaults by borrowing nations. Recovery rates are determined in the renegotiation process after a default has occurred.

The key interaction in the model consists of each nation understanding that the other nation's debt activity will impact its own ability to borrow and that they have a mutual interest in minimizing borrowing costs and recovery rates. They find that each "Home" nation's default incentives are affected by the borrowing activity of the other—in their eyes, the "Foreign"—nation.

As the economists write, "default is more likely for [a] country when [its] debt is high, the price [of borrowing] is low, and the recovery [rate] is low. The default decisions of the two countries are linked because bond prices today and recoveries tomorrow depend on the decisions of both countries through the lenders' problem."

By "lenders' problem," they're referring to the fact that lending institutions have to figure out how to maximize their revenue from debt recovery and bond payments. If, as a lender, one nation fully repays its debt to me, I'll be less likely to offer lenient terms to other nations when renegotiating loans because I know I can get dependable revenue from

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"The main idea," write Arellano and Bai in summing up their model's mechanism: "[F]oreign defaults lead to home defaults because foreign defaults lead to lower future recoveries and tighter current bond prices for the home country."

the first (demonstrably solvent) country. But if one nation defaults, I may make concessions when renegotiating loans to another borrowing nation simply because my revenue options are more limited. Observing this, the second nation will be more likely to default, since the lender will probably negotiate a lower recovery rate.

Also, bond prices are set to reflect lenders' financing costs, and recovery rate and default probabilities, both adjusted for risk. So if one nation defaults, the other nation will face a higher cost of new borrowing—because lenders will adjust prices to reflect their loss of capital inflow from the first loan. That in itself will make that second nation more prone to default.

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Numbers to the theory

Borrowers' coordination in their approach to lenders can thereby generate the historically observed pattern of sovereign default by many nations at more or less the same time, and Arellano and Bai use their model to measure the strength and nature of the coordination linkage.

Calibrating model parameters to figures observed in Europe for risk-free rate volatility, average recovery rates and lower recoveries observed in multiple-country renegotiations, they find that about one-quarter of home defaults are due solely to foreign country defaults. Of these, 11 percent happen because of "fundamental" foreign defaults (the result of that nation's high debt and low income), and the remaining 14 percent are due to "self-fulfilling" defaults, where both countries default only because the other is. Debt repayment is also contagious, with 27 percent of foreign country repayments occurring because the home nation repays.

The model also predicts that interest rate spreads among countries will be correlated, as seen in the data. Cross-country spread correlation in the model is 0.43, implying that half of the Italy-Greece spread correlation of 0.97 is due to debt linkages. This correlation in spreads "arises largely because countries default together," observe the economists. "The probability of default at home rises from an average of 4.5% to over 37% … when the foreign country defaults."

In addition, the model predicts that foreign defaults hinder home negotiations because recovery rates spike. "Recoveries for the home country during foreign defaults increase from an average of 66% to 90%" and reduce the home countries' probability of renegotiation from nearly certain to almost nil.

In addition, the model predicts that foreign defaults hinder home negotiations because recovery rates spike. "Recoveries for the home country during foreign defaults increase from an average of 66% to 90%" and reduce the home countries' probability of renegotiation from nearly certain to almost nil.

The model, in short, delivers realistic results and, as Arellano and Bai conclude, "provides a framework in which to study some of the recent economic events in Europe."

—Douglas Clement

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Maturity management

For nations facing sovereign default, research suggests, reducing debt through short-term bonds is better than going long

Manuel Amador

Mark Aguiar

When a country is close to default on its sovereign debt, should it start buying back its existing long-term bonds? Are there better—or at least more pragmatic—ways to reduce debt levels?

A related set of questions pertains to the common tendency of financially stressed nations, facing high yield spreads (interest rate payments above relatively risk-free bonds), to issue less debt and rely increasingly on short-term debt—actively refinancing short-term debt, but simply retiring long-term debt as it comes due.

A 2013 analysis of 34 emerging markets over roughly two decades, for example, found a negative correlation between yield spreads, on the one hand, and both bond maturity profiles and issuance levels, on the other.[1]

For economists, the question is why nations go short. Such policies expose national governments to "rollover risk" as their short-term debt matures. When debt is refinanced ("rolled over"), prevailing interest rates may well be higher than the rate on the just-retired debt, and so governments will incur greater debt-financing costs—compounding debt problems and escalating chances of default. Wouldn't it be better to actively lengthen the maturity toward long-term debt rather than rolling over short-term bonds?

"In a world of limited commitment, fiscal trajectories must be time consistent," write Aguiar and Amador in their NBER working paper (19717), "and it is an open question whether the vulnerability to default provides sufficient incentive to deleverage and what role—if any—maturity plays."

These issues have been highlighted during Europe's sovereign debt crisis, with fragile economies in Greece and Italy, for example, being urged by eurozone authorities to dramatically "deleverage" (reduce debt-to-GDP ratios) through fiscal austerity. Understanding the incentives at work in such situations could help predict whether governments will truly enforce austerity measures in order to retire high debt burdens. More important, perhaps, it clarifies optimal debt reduction strategies for nations facing default.

A world of limited commitment

In "Take the Short Route," Manuel Amador of the Minneapolis Fed and Mark Aguiar at Princeton University observe that "many peripheral European countries are currently paying a significant premium over German debt on large

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quantities of sovereign bonds." And while these nations are considering fiscal policies to lower their debt/GDP ratios and thereby reduce their yield spreads, such austerity policies can be reversed quickly if political and economic realities overwhelm policymakers.

"In a world of limited commitment, fiscal trajectories must be time consistent," write Aguiar and Amador in their NBER working paper (19717), "and it is an open question whether the vulnerability to default provides sufficient incentive to deleverage and what role—if any—maturity plays." By "time consistent" trajectory, the economists mean that since no external authority can compel national policymakers to stick to their announced plan ("limited commitment"), a fiscal path must be acceptable to future policymakers, regardless of what the future holds.

The issue here is maturity management. Or as Aguiar and Amador subtitle their paper: "How to repay and restructure sovereign debt with multiple maturities." What factors determine policymaker decisions about short- and long-term debt? When default threatens, should a nation actively buy back—or even issue new—long-term sovereign debt? Why have nations faced with high spreads and imminent default relied habitually on short-term debt, despite inherent rollover risk?

The government's inability to commit long term to a fiscal policy is a key assumption, and it seems well-founded. Few policymakers, in stable let alone fragile economies, maintain straight-line government spending and taxation paths.

Debt dynamics

To answer these questions, and to resolve the empirical conundrum of nations going short, Aguiar and Amador build and analyze a mathematical model of sovereign debt markets. Their model has several fundamental features: default risk, the deleveraging incentive that risk generates, limited policy commitment, ongoing bond maturity decisions and bond prices that both "reflect and constrain" debt strategy.

The government's inability to commit long term to a fiscal policy is a key assumption, and it seems well-founded. Few policymakers, in stable let alone fragile economies, maintain straight-line government spending and taxation paths. Political changes and economic shocks are too frequent and dramatic to expect that budgets, once set, will remain rigidly intact. Also central is their assumption that governments are unable to commit to bond repayment. This, too, is a solid premise: Sovereign default is a recurrent historical problem, particularly in emerging markets.

Within this mathematical world of limited commitment, the economists derive two main results.

First, they find that active engagement in the short-term bond market is an optimal strategy or, as their title advises: "Take the short route." At the heart of this finding is limited commitment over the long term. In the short term, bond buyers need not worry about limited commitment and time inconsistency: Levels of outstanding debt are well-known when short-term bonds are offered, so default probabilities are known with relative certainty.

Not so for long-term bonds. That is, long-term bond prices depend on future fiscal trajectories that the government cannot commit to at the moment of issuing bonds. The authors show that this difference with regard to the effects of future policies makes a strategy that relies on short-term debt at least as good as any other that relies on long-term bonds. Going short, therefore, is an optimal route for debt management.

Two optimums?

But the fact that a short-term route is optimal doesn't rule out long-term strategies. They too might be optimal. That is, when attempting to reduce its debt, a government can simultaneously alter its maturity structure. For example, a government could sell (or alternatively, buy back) long-term bonds while

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reducing (or alternatively, increasing) its holdings of short-term ones. One can think of these strategies as an exchange of short-term bonds for long-term ones (or vice versa) at market prices.

The argument the economists make is that such exchanges generate relative price movements that are unfavorable to the government. The dynamics of long-term bond pricing, they discover, are such that actively selling or repurchasing long-term sovereign bonds will always be suboptimal. Even though there are risks associated with rolling over short-term bonds, following the long-term bond path guarantees a loss. In short, that's because market prices will consistently work against long-term bonds.

The key factor here is the effect of maturity composition on bond prices. In particular, bondholders care not only about the total amount of debt outstanding, but also about its maturity composition—the relative proportions of short- and long-term debt—because it determines how quickly debt can be reduced in a time-consistent manner.

Why? Short-term bonds force the government to return to the market frequently. Any delay in reducing debt will turn out to be costly the next time the debt is rolled over. This implies that short maturities provide strong incentives to deleverage.

Conversely, once long-term bonds are issued, a delay in debt reduction is not as costly since the bonds are not rolled over for some time. Because long-term bonds do not need to be rolled over as often, the default premium embedded in them is akin to a sunk cost and hence provides weaker incentives for the government to reduce its debt in the future. The net result is that a shorter maturity profile implies faster debt reduction.

Bondholders care not only about the total amount of debt outstanding, but also about its maturity composition—the relative proportions of short- and long-term debt—because it determines how quickly debt can be reduced in a time-consistent manner.

The next step in the argument is to link the incentives of maturity structure to prices. Short-term bonds face only short-run risk and are thus less sensitive to the long-run outlook for fiscal policy. This makes long-term bond prices particularly sensitive to the incentives to reduce debt and hence sensitive to maturity. A shortening of maturity will speed debt reduction and therefore raise long-term bond prices relative to short-term bond prices.

But note that a shortening of maturity involves buying back long-term bonds; thus, the increase in relative price poses a cost to the government. However, a lengthening of maturity reduces the incentives to pay down debt over time, lowering the price of long-term bonds. But a lengthening of maturity involves the sale of long-term bonds.

Therefore, changing maturity in either direction involves a countervailing price movement. When a government actively engages in the long-term bond market, it buys high and sells low. Definitely not optimal. As the economists put it, long-term bond transactions "will tend to shrink the budget set of the borrower, generating an incentive to use only short-term bonds during a period of deleveraging."

The optimal strategy, then, is to remain passive in long-term sovereign bond markets. Yes, retire long-term bonds as they mature, but don't actively buy or sell them. Despite the rollover risk inherent in such a strategy, Aguiar and Amador conclude, "The only active margin is the short-term bond market."

—Douglas Clement

Endnote

[1] Perez, Diego. 2013. "Sovereign Debt Maturity Structure Under Asymmetric Information." SIEPR Discussion Paper 12-020.

VIRTUAL FED

100 years and counting

December 2013 marked the 100th anniversary of the Federal Reserve Act, but since the architecture of America's new central bank wasn't put in place until the year following the act's passage, the Fed is observing its centennial during 2014. An assortment of conferences and other special events are planned throughout the year to mark the milestone and, as part of the commemoration, the Fed launched a website chronicling its first century.

The gateway website contains an interactive timeline of events throughout the Fed's creation and evolution. Along with each key event—the "Black Monday" stock market crash of 1987, for example—there is an essay giving greater background for visitors who want to know more. The site also includes biographical material on the Fed's leaders through the years and details on how its mission has evolved over time. All of it is illustrated with historical photos and other graphics, as well as archival materials.

Stop by federalreservehistory.org to learn more.

—Joe Mahon