Published Quarterly by the Federal Reserve Bank of Minneapolis

December 2010

The Region

Volume 24 Number 4
December 2010
ISSN 1045-3369

The Region

The Region
Federal Reserve Bank of Minneapolis
P.O. Box 291
Minneapolis, MN 55480-0291

E-mail: letters@mpls.frb.org
Web: minneapolisfed.org

Cover photograph by Peter Tenzer

On the Road: A Two-Way Street

Narayana Kocherlakota

President
Federal Reserve Bank of Minneapolis

Those of you who follow business and economic news know that Federal Reserve presidents regularly give speeches. These appearances are an important responsibility because they let the public know what the presidents are thinking on issues that are important in people's lives. We are public policymakers, after all, and the public part of that job title is as important as the policymaking part.

But those speeches are more than just opportunities to tell you what is on our minds; they also offer a chance to hear from you. I have written in the past about the value of better communication when it comes to economic research and policy, but communication is a two-way street. And we policymakers have as much to learn as we have to teach.

For example, I visited Fargo, N.D., this fall to give a talk before a large business group that included everyone from business owners to bankers to retail managers and service providers, many of whom brought along a number of their employees. The speech made news, as it often does when a Fed president talks, but it's what happened after the speech that was particularly valuable, at least for me. That was when people started asking questions, and there were a lot of them. People asked about issues raised in my talk, and they had things to say about the Federal Reserve and the economy in general. It was a spirited exchange, invigorating and informative. I always learn a great deal during these post-speech sessions, as they not only tell me what currently concerns people in the Ninth District, but often help me sharpen my own thinking about economics, and monetary policy in particular. I also gain deeper insights into how the local economy is performing and what factors are affecting the area's economic prospects, for good or ill.

But my "speech" in Fargo didn't end there. Following the question-and-answer session, people came up to continue the conversation one on one. Those impromptu discussions would have lasted longer if I hadn't been scheduled to attend another event—one that was, in many ways, even more rewarding. I had the privilege of speaking with col-

lege students from around the Fargo-Moorhead area, along with their professors. Once again, the question-and-answer session was invigorating. And as a former economics professor, I must admit that it felt particularly good to stand in the front of a lecture hall once again.

In addition to these events, I also had other chances to meet with members of the business community, to connect with members of our Bank's board of directors and to get a quick tour of Fargo's impressive manufacturing district. So, when I say that I was in Fargo, N.D., this fall to give a talk, it was much more than that. Everywhere I went, I encountered interested people who wanted to know more about their central bank and to engage in thoughtful discussions about the economy.

I have repeated this experience in cities throughout the Ninth District over the past few months, including Marquette, Mich.; Missoula, Mont.; Bloomington, Minn.; and Sioux Falls, S.D.; as well as Eau Claire, Wis., last spring. In every case, I was called to give a speech, but I ended up doing—and learning—so much more. Again, that's because I have had the pleasure of meeting so many district residents who have taken time from their busy schedules to listen to what I have to say and then to give me thoughtful feedback.

As I look back over my first year as president of the Federal Reserve Bank of Minneapolis, these trips around the Ninth District are among the highlights of my service. I was familiar with some of the Ninth District from my travels over the years—and stretching from the Rocky Mountains in the west to the Great Lakes in the east, it certainly is a beautiful place—but during this past year, I have also learned of the incredible diversity of the district's economy. Mining, oil, timber, agriculture—including farming, ranching and production—financial services, technology firms involving medicine, biomedicine and digital media, as well as many service industries, are all an important part of the Upper Midwest economy.

I feel very lucky to have this opportunity to serve the public as the president of a Federal Reserve bank and especially privileged to represent the Ninth District. I look forward to giving many more talks throughout the district's six-state region in the years to come. And, of course, when I say "giving talks," I mean so much more. R

Degrees of Job Security

We tend to assume that high-wage workers are recession proof. But a good education offers better protection against job loss than a big paycheck

Wonho Chung
Research Assistant

Phil Davies
Senior Writer

Terry J. Fitzgerald
Senior Economist

Recessions are not equal-opportunity events. A well-known feature of economic downturns, including the so-called Great Recession that ended in June 2009, is that some groups of people suffer job loss and sustained unemployment much more than others. While some workers hold onto their jobs or quickly find new ones, others lose their jobs, go months without work or even drop out of the workforce.

Most economic analyses have attributed this uneven distribution of economic hardship to demographic factors like education, age or race. Researchers have consistently found that less educated, young and minority workers are much more likely to be unemployed than the workforce as a whole.

In particular, numerous studies have highlighted the importance of education in avoiding joblessness—at all times, not just during recessions. In general, people with a college degree have much lower unemployment rates than those with less education. (In September 2010, the U.S. rate for college-educated workers aged 25 and over was 4.4 percent, less than half the rate for workers who hadn't completed college.)

During economic downturns, poorly educated workers sustain bigger job losses than the better educated. For example, during the last recession, employment of workers with only a high school diploma dropped 5.6 percent, while employment of workers with a bachelor's degree fell less than 1 percent.

These facts suggest that low-wage workers bear the brunt of job loss during recessions, while higher-wage workers go relatively unscathed. This seems logical, given what is known about the demographics of job loss; low pay is associated with youth, minority status and low education level. As a rule, young adults in their 20s and 30s usually make less money than middle-aged workers; people who didn't finish high school typically earn less than college graduates.

But is this assumption true? During downturns, are high-wage workers destined to keep their jobs, while low-wage workers head to the unemployment line? For this article, we sought to answer this question by taking the unconventional approach of looking at recessionary job loss through the lens of wage structure rather than demographics. We found a more nuanced story about which workers suffer the worst job losses during recessions than the one implied by demographic factors alone. Contrary to expectations, high-wage workers are not spared job loss during recessions; their unemployment rate rises substantially, largely mirroring those of medium- and low-wage workers. This sharing of pain is seen, with some variation, in all recessions over the past 30 years.

How can this be, in light of the low unemployment rates of college graduates—all those corporate executives, software engineers and economists earning high salaries? It turns out that workers can't be neatly categorized as well-educated *and* high-wage versus less-educated *and* low-wage. In

ILLUSTRATION BY TYLER JACOBSON

labor markets, wages and education are closely correlated, but not joined at the hip.

The fact that recessions inflict significant job losses across the wage spectrum doesn't mean that education isn't important in avoiding unemployment; indeed, our analysis shows that it's vital. The key insight is that education is linked to occupational choice, and during downturns, some occupations are hit harder than others. People who didn't finish college are much more likely to work in industries that suffer larger employment declines during recessions. Some positions in those industries pay high wages, but a sheepskin offers better protection against joblessness than a big paycheck.

All in the same boat?

By definition, the unemployed don't earn wages—they're not working! But it's possible to assess their wages before they lost their jobs in order to determine which workers—low- or high-wage earners—suffer the severest job losses during recessions. We analyzed 30 years of wage and unemployment data from the U.S. Census Bureau to trace the effects of the most recent recession and three others that have rocked the economy since the early 1980s.

A special supplement to the Census Bureau's Current Population Survey (CPS) reports not only an individual's employment status as of March of each year, but also how many hours he or she worked and how much he or she earned during the previous year. We use these data to calculate an average hourly wage for each worker aged 25 and over for the previous year. Then we assign all workers to five wage "bins," or quintiles, for that year, ranging from lowest to highest. By counting how many workers in each wage quintile were unemployed as of March the next year, we can compute an unemployment rate for each wage group.

(About one-quarter of unemployed workers in March of each year didn't work during the previous year and so were not counted in this study. This fact doesn't reflect increases in long-term unemployment during recessions; the proportion holds true throughout the survey period, in good times as well as bad.)

Chart 1 shows the breakdown of unemployment by wage in March 2007, before the onset of the last recession. It confirms the notion, based on the unemployment rates of younger, less-educated and minority workers, that low-wage employees run the most risk of job loss, even in times of economic growth. The workers in the bottom fifth of the wage distribution have the highest unemployment rate; those in the top wage quintile have the lowest.

But the relationship between wages and unemployment changes when we compare the 2007 rates with those two years later, when labor markets were in the grip of the deepest and longest recession since World War II (Chart 2). As the economy headed south, the unemployment rate increased substantially across all wage quintiles. That's to be expected, given that the national unemployment rate almost doubled to 8.6 percent between March 2007 and the same month in 2009. What's unexpected is the similar magnitude of the increases across the board. Although the lower wage quintiles see bigger absolute increases than the upper quintiles (the rate for the bottom group rises about five percentage points versus less than three points for the top group), the jumps in the wage classes aren't in proportion to the 2007, or "base," rates. In fact, the proportional increases in unemployment rates for

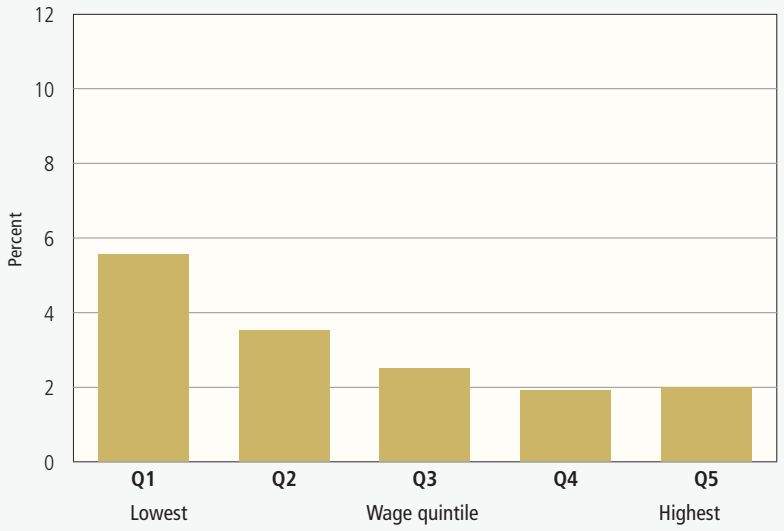
In Brief

Who suffers during recessions?

- The fact that poorly educated, young and minority workers suffer high unemployment seems to suggest that low-wage workers bear the brunt of job loss during recessions, while higher-wage workers go relatively unscathed.
- But high-wage workers are not spared the unemployment line during downturns; they see unemployment rate increases roughly similar to those experienced by low-wage workers. This seems paradoxical, given the low jobless rate of college graduates.
- The key is the link between education and occupational choice. Some occupations filled by less-educated workers pay high wages, but in a recession a college degree offers better protection against joblessness than a big paycheck

Chart 1. **Unemployment is lower for high-wage quintiles**

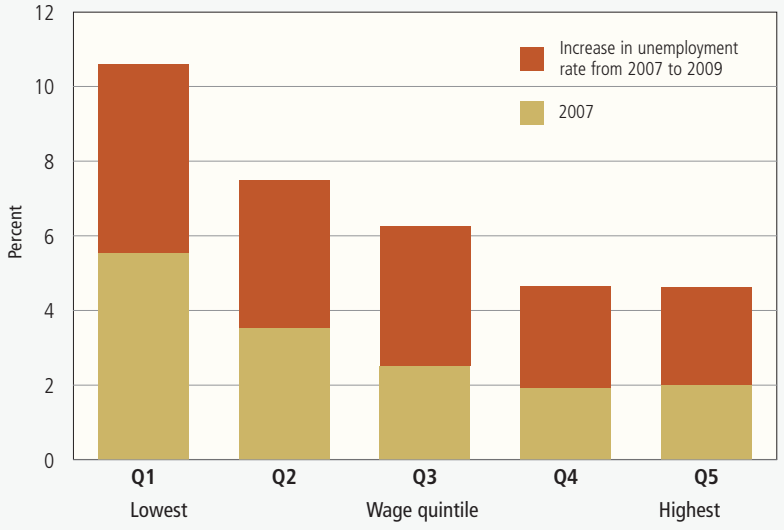
Unemployment rate by wage quintile, 2007*



*Age 25 & over, March data
Source: Integrated Public Use Microdata Series, calculations by Minneapolis Fed

Chart 2. **But recession raises unemployment for all groups**

Unemployment rate by wage quintile, 2007 & 2009*



*Age 25 & over, March data
Source: Integrated Public Use Microdata Series, calculations by Minneapolis Fed

medium- and high-wage workers are greater than those for low-wage workers.

This pattern—roughly similar increases in unemployment rates for all wage groups—is also evident in three previous downturns, starting with the 1981-82 recession. During the 2001 "dot-com" recession, high-wage workers not only experienced higher proportional increases in unemployment than workers who earned the lowest wages, but they also saw larger absolute increases in their unemployment rates. (For charts showing wages and unemployment in past recessions, see "The Recession and Recovery in Perspective" online at minneapolisfed.org.)

Our finding seems to fly in the face of what we know—or think we know—about the characteristics of high- versus low-wage workers. If high-wage workers are insulated from job loss by virtue of their education, age, race and other demographic factors, how is it that they find themselves in the same boat as everybody else during recessions? Why do they experience unemployment increases about the same as those seen by workers earning lower wages?

Resolving this paradox requires looking at the CPS wage data from another perspective, taking into account the connection between unemployment and lack of education.

Education is destiny

The approximate symmetry of unemployment increases across wage classes during recessions evokes an image of common suffering—stockbrokers rubbing shoulders with gas station attendants in the job fair line: "Brother, can I borrow your iPad?" But an entirely different picture emerges when we consider the effects of educational attainment, as well as wages, on the likelihood of becoming unemployed.

In both booms and busts, there's a strong inverse relationship between unemployment rates and education (see Chart 3). Regardless of wage level, joblessness declines as education increases (we focus on workers aged 25 and older because most of these workers have completed their education). Compared with the college-educated, workers with a high school education or less had higher unemployment rates in 2007 and saw bigger increases in unemployment during the Great Recession. This relationship between educational attainment and the risk of unemployment also holds for previous recessions (see "The Recession and Recovery in Perspective" online at minneapolisfed.org.)

(To put these statistics in perspective, college-educated workers account for a good chunk of the 25-and-over workforce: In 2006, about one-third of workers had a bachelor's degree. In contrast, about 25 percent of workers had only a high school diploma, and a mere 10 percent were high school dropouts.)

The lack of job security afforded by high wages is striking: Workers with a high school education or less in the top wage class sustained large job losses during the last recession.[1] Meanwhile, college-educated workers in the lowest wage quintile saw relatively modest unemployment increases during the recession.

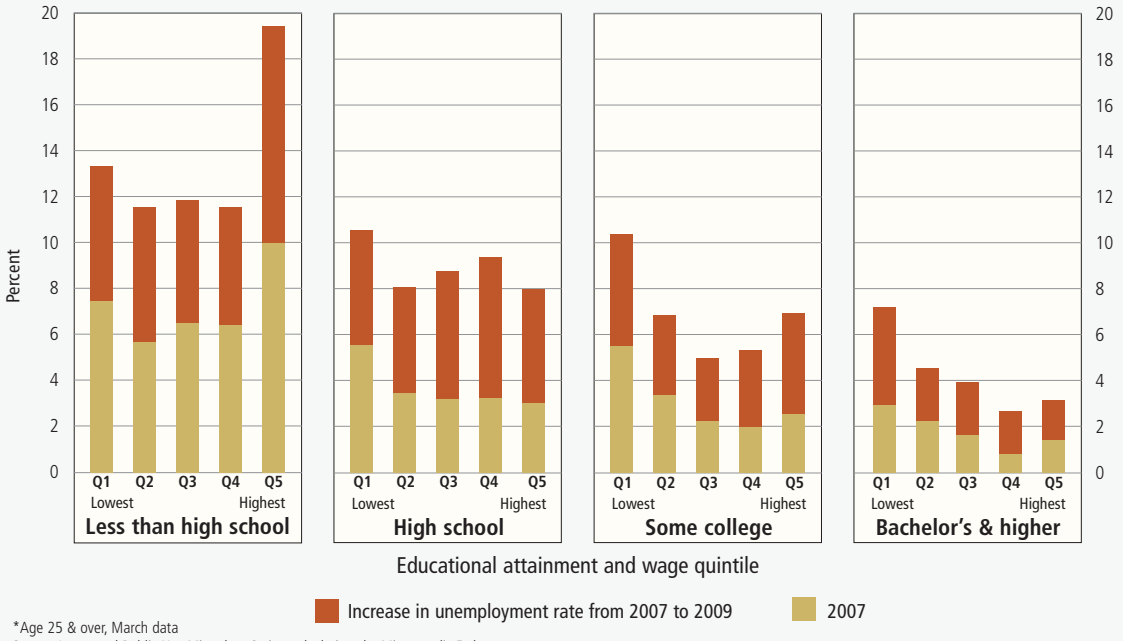
Clearly, education—not wages—is the critical factor in determining which workers are likely to lose their jobs during a downturn. So why is the rise in unemployment during recessions so even across wage classes? The answer lies in the different career paths taken by workers with varying levels of education.

Belying occupational stereotypes, wage classes aren't neatly demarcated along educational lines. In the aggregate, college-educated workers earn more than those with less education. But at the individual level, there's considerable crossover—some workers with a college degree earn a journeyman's wage, while some workers with only a high-school degree earn as much as a professional employee. Chart 4 illustrates the degree to which workers earn wages seemingly at odds with their academic achievements. In 2006, about 20 percent of workers with a college degree were in the lowest two wage quintiles, earning less than $14.50 per hour. Toward the other end of the education scale, 25 percent of workers with only a high school education fell into the top two wage groups, earning over $20 per hour.

For less educated workers, earning high wages is more difficult than it was a generation ago, because of the higher skills required for most higher-paying

Chart 3. **Increase depends on education much more than wages**

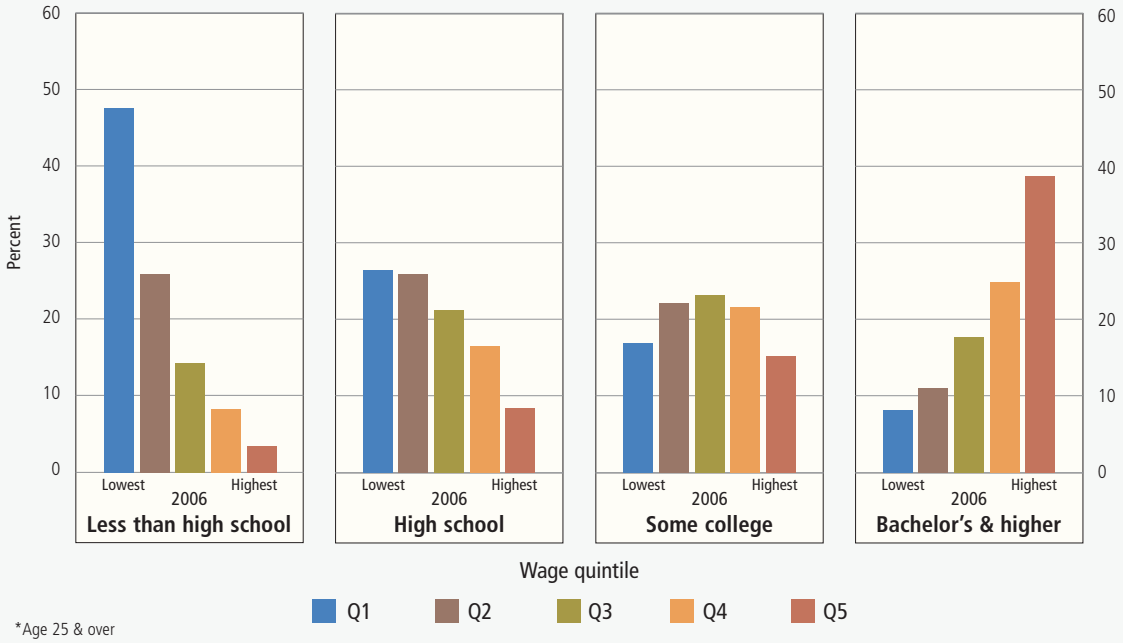
Unemployment rate by education and wage quintile, 2007 & 2009*



*Age 25 & over, March data
Source: Integrated Public Use Microdata Series, calculations by Minneapolis Fed

Chart 4. **Education influences, but does not determine, wage level**

Distribution of wage rates by education, 2006*



*Age 25 & over
Source: Integrated Public Use Microdata Series, calculations by Minneapolis Fed

jobs today (see charts showing the shifting distribution of wages by education over the years in "The Recession and Recovery in Perspective" online at minneapolisfed.org). This is the case even for blue-collar, clerical and other types of jobs that traditionally didn't require a bachelor's degree. In 1978, the proportion of high-school educated workers in the top two wage quintiles was 35 percent, compared to 25 percent in 2006. Nevertheless, the data show that it's still possible for someone without a college degree to earn high wages. Conversely, some college graduates earn relatively low wages.

But when it comes to unemployment, education is destiny; workers tend to sort into different occupations based on their education level, and some occupations are more vulnerable to job loss during recessions than others.

Separated at graduation

The segregation of occupations on the basis of education can be seen in Chart 5. Workers with a high school education or some college training gravitate toward occupations that don't require a bachelor's degree, such as construction trades, food service and transportation. Some jobs in those occupational groups pay high wages; for example, construction managers can earn over $50 per hour.

But these occupations are concentrated in industries such as construction, manufacturing and hospitality that historically have hemorrhaged jobs during recessions. In March 2009, 18.7 percent of workers in construction trades during the previous year were unemployed, according to CPS figures. The jobless rate for production workers—a broad category that includes machinists and print technicians—was over 12 percent. Chart 6 shows that workers in occupations requiring less education suffered big increases in unemployment during the 2007-09 recession. (Recession-sensitive occupations also tend to attract males—one reason job loss hit men harder than women during the recession.)

College-educated workers, on the other hand, can take their pick of a wide array of occupations. Many put their verbal and analytical skills to use in white-collar or professional occupations such as management, law and teaching. Some highly educated workers toil for meager pay (think philosophy majors working as receptionists or bus drivers). However, their jobs come with a valuable fringe benefit: They cluster in industries that, compared with those that employ less-educated workers, are not as prone to job loss during downturns. Increases in unemployment during the recession were much less for occupations such as nursing, library science and social work.

The contrasting occupational choices—and consequently, recessionary fortunes—of college-educated versus less-educated workers explain why, when viewed through the prism of wages (back to Chart 2), unemployment increases were so similar across the board during the recession. Unemployment rates rose markedly for less-educated, high-wage workers, contributing to sizable overall unemployment increases for top wage earners. College-educated, low-wage workers saw smaller increases in unemployment, reducing the overall rise in unemployment for low-wage earners.

But this view obscures the underlying truth about joblessness during recessions: Education is the great divider in the labor market, channeling workers into different occupations according to their educational level. In a downturn, jobs filled by workers with a high school education or less are much more likely to disappear than those taken by college graduates.

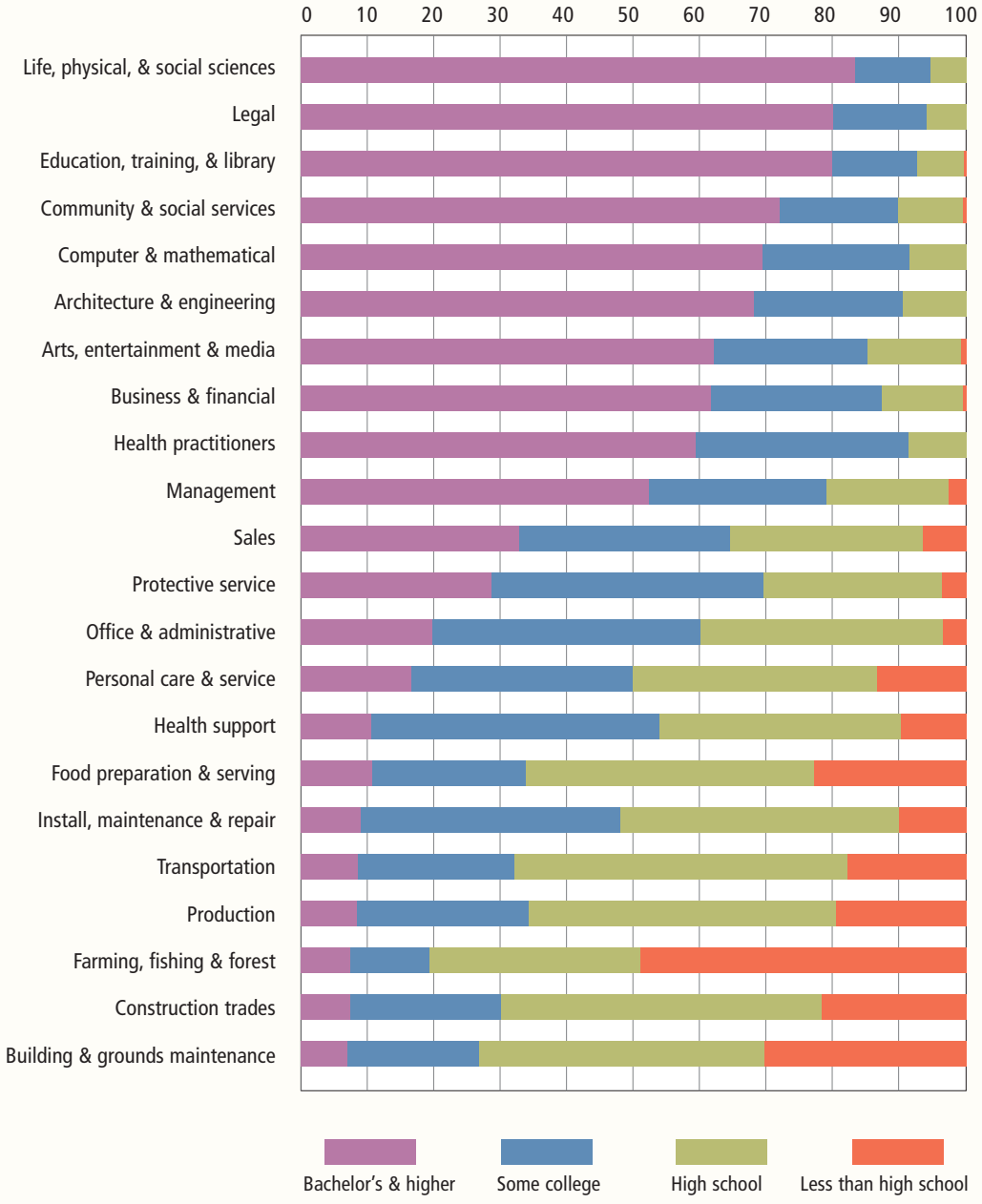
A job security premium

The take-away message for young people weighing their career options in the wake of the Great Recession? If you want to keep your job during the next one, it's better to be well educated than well paid.

At first glance, the data on unemployment and wages appear to contradict the idea that educational attainment, age and other demographic factors determine who suffers the greatest job losses during recessions. All wage classes—those associated with high socioeconomic status as well as those lower on the scale—see roughly comparable increases in unemployment during downturns. But a look at the Census data from a broader perspective reveals the crucial influence of education on the dynamics of recessionary unemployment.

Chart 5. **Education level varies greatly across occupations**

Percent of workers in each occupation by education level, 2008*



*Age 25 & over

Source: Integrated Public Use Microdata Series, calculations by Minneapolis Fed

Chart 6. **Recessionary unemployment rises more for occupations with less-educated workers**

Unemplomet rate by occupation, 2007 and 2009*

*Age 25 & over, March data

Source: Integrated Public Use Microdata Series, calculations by Minneapolis Fed

It's not richly compensated workers who are largely insulated from job loss during downturns; rather it's workers—whether high- or low-wage—who continued their education beyond high school. Educational achievement is linked to occupation, which in turn has a strong bearing on the risk of unemployment.

College-educated workers as a group already enjoy a considerable wage advantage over less-educated workers; in 2009, the hourly wage of the typical U.S. college graduate was almost twice that of the average high school graduate.[2] This wage premium has steadily risen over the past three decades. (College graduates also garner a disproportionate share of nonwage benefits such as vacation pay, employer-paid health insurance and pension contributions.)

Our analysis adds to a growing body of evidence that a college degree also confers a job security premium. Earning a bachelor's degree—or at least attending college—greatly reduces the odds of joining the ranks of the unemployed in a faltering economy. R

Endnotes

[1] High-wage workers without a high school diploma suffered particularly large increases in unemployment, elevating their already high unemployment rate. This may be partly due to measurement error—the number of these highly atypical workers is small. However, the same pattern does appear in previous recessions.

[2] See David Autor, "The Polarization of Job Opportunities in the U.S. Labor Market," p. 5. Jointly published by the Center for American Progress and the Hamilton Project, April 2010. Online at http://www.americanprogress.org/issues/2010/04/pdf/job_polarization.pdf.

Gary Gorton

I have no idea what Gary said just now, but I know it's really, really important, so I'm going to sit down and study this until I get it.

Professor Randall Wright
University of Wisconsin
Oct. 5, 2010

After listening to Yale finance economist Gary Gorton deliver a talk on "shadow banking" and the recent financial crisis, Randy Wright, a brilliant monetary theorist, was both perplexed and intrigued. *Region* readers may well have the same reaction after dipping into the following interview with Gorton.

Shadow banking—the intricate web of financial arrangements and techniques that developed symbiotically with the traditional, regulated banking system over the past 30 or so years—is territory Gorton has studied for decades, but it (and he) have been largely on the periphery of mainstream economics and policy.

That all changed in mid-2007, when panic broke out in the subprime mortgage market and financial institutions that support it. Expressions like "collateralized debt obligation" and "repo haircut" escaped the confines of Wall Street and business schools, and began to fill the airwaves. We're still struggling to come to terms—and few are in a better position to help than Gorton.

Gorton might have stayed on the margins had Fed Chair Ben Bernanke not highlighted his research. In a September 2010 speech, for instance, Bernanke cites a Gorton paper as an example of contemporary research that has "significantly enhanced our understanding of the crisis and [is] informing our regulatory response." By no coincidence, the Fed invited Gorton to major policy conferences in 2008 and 2009 to give papers on shadow banking, versions of which appear in his 2010 book *Slapped by the Invisible Hand*.

Gorton begins that book with a bit of self-disclosure that reveals his grasp of the issues as more than academic. "I was in a unique position to observe the events" of August 2007, he writes. Not only had his research career focused on banking, financial crises and banking panics, but "starting in 1996, I also consulted for AIG Financial Products, where I worked on structured credit, credit derivatives, and commodity futures."

Thus, Gorton's appreciation of modern banking and its vulnerabilities is informed by practice as well as theory. Sharing that understanding requires considerable effort; we've provided a glossary to help with the terminology and, fortunately, Gorton is a lucid narrator of a complex tale. And as Wright suggests, the rewards to studying this material are profound.

Photography by Peter Tenzer

SHADOW BANKING

Region: Why don't we begin with some background on so-called shadow banking—the factors behind its enormous growth, and then its collapse during the financial crisis? Do you prefer a different term? You use "securitized banking" in some of your papers.

Gary Gorton: The term shadow banking has acquired a pejorative connotation, and I'm not sure that's really deserved. So let me provide some context for banking in general.

Banking evolves, and it evolves because the economy changes. There's innovation and growth, and shadow banking is only the latest natural development of banking. It happened over a 30-year period. It's part of a number of other changes in the economy. And let me give even a little *more* context, historical context. I want to convince you that shadow banking is not a new phenomenon, in a sense—that we have had previous "shadow banking" systems in the past—and that there is an important structure to bank debt that makes it vulnerable to panic. So, the crisis is not a special, one-time event, but something that has been repeated throughout U.S. history.

Before the Civil War, banking involved issuing private money—that is, banks issued their own currency or bank notes. And this system worked in the way economists would expect it to work. The private bank money did not trade at par when it circulated any significant distance from the issuing bank. Instead, it was subject to a discount, so that a bank note issued by a New Haven bank as a $10 note might only be worth $9.50 at a store in New York City, for example.

Such discounts from par reflected the risk that the issuing bank might not have the $10—redeemable in gold or silver coins—by the time the holder took the note back to New Haven from New York. The discounts from par were established in local markets. But you can see the problem of trying to buy your lunch when the cook has to figure out the discount. It was simply hard to buy and sell things in such a world.

Shadow banking has acquired a pejorative connotation, and I'm not sure that's really deserved. ... Banking evolves, and it evolves because the economy changes. There's innovation and growth, and shadow banking is only the latest natural development.

A big innovation in that period was to back the money by collateral, by state bonds. It turned out that this didn't always work very well because the bonds themselves were risky. The National Banking Act then corrects this by having the government take over money and issue greenbacks, or federal government notes backed by Treasuries. That was the first time in American history that money traded at par. That was 1863.

The National Banking Acts (there were two of them) are arguably the most important legislation in the financial sector in U.S. history. But what's interesting, and the reason I bring this up, is that as that was going on, a shadow banking sector was developing. And this shadow banking sector first really makes itself felt in the Panic of 1857 when depositors run and demand currency from their checking accounts.

So, after the Civil War, there's no problem with currency [because greenbacks were backed by the federal government], but we have this other form of bank money: checking accounts—which appears to be shadow banking.

It develops into something very large and repeatedly has crises. In the late 19th century, academics were literally writing articles with titles like "Are Checks Money?" in top economics journals. And in 1910, the National Monetary Commission, which is the precursor to the Federal Reserve System, commissions 30-some books, one of which is about the extent to which checks are used as currency for transactions. So they're still studying it in 1910.

Eventually, as you know, we get deposit insurance, which then makes checks safe, so to speak.

Region: There were some efforts to provide deposit insurance prior to the Federal Deposit Insurance Corporation, of course.

Gorton: Yes, there were state deposit insurance schemes that had different experiences, and there were proposals for federal deposit insurance for quite a while before it was actually adopted. Interestingly, FDIC insurance was opposed by economists.

THE RISE OF REPO

Region: How does this historical context relate to shadow banking today?

Gorton: In the last 30 or 40 years, there have been a number of fundamental changes in our economy. One of the most fundamental of these has been the rise of institutional investing. The amount of money under management of institutional investors has just been exponentially increasing. These include pension funds, mutual funds, large money managers. And these institutions basically have a need for a checking account, if you will. So if you're a large institutional money manager, you may

need a place to put $200 million, and you want it to earn interest and to be safe and accessible. That led to the metamorphosis of a very old security: the sale and repurchase (or "repo") market. Like a check, **repo*** had been around for perhaps 100 years, but it was never very large.

Region: This is in the early 1980s?

Gorton: Well, the early '80s are the beginning point of a number of developments that are going to come together. We don't have any data on repo except for a small subset of firms, so we can't document many of the things we're interested in knowing. I'll come back to this problem later, perhaps: the measurement problem in macroeconomics generally.

But these firms basically would like to have a checking account, and a repo provides that in the following sense. Let's just start with a regular bank. If you put your money in a checking account in a bank, they pay you, say, 3 percent; they take your money and lend it out at 6 percent. They make the spread. Banking is a spread business.

Repo works similarly. You take your $200 million to the bank, to Lehman Brothers, say. You deposit it, so to speak, overnight so you can have access to it the next morning if you want to. They pay you 3 percent. And you want it to be safe, so they give you a bond as collateral. But Lehman earns the interest on the bond, say, 6 percent. And the bond is going to turn out often to be linked to bank loans.

Region: And there's also a "**haircut**," true?

Gorton: There may be a haircut. If you deposit $100 million and they give you bonds worth $100 million, there's no haircut. If you deposit $90 million and they give you bonds worth $100 million, then there's a 10 percent haircut.

Region: Just to be clear, they don't deposit those funds in a checking account because …

If you're a large institutional money manager, you may need a place to put $200 million, and you want it to earn interest and to be safe and accessible. That led to the metamorphosis of a very old security: the sale and repurchase (or "repo") market. Like a check, repo had been around for perhaps 100 years.

Gorton: Right, because the Federal Deposit Insurance Corporation limit is too low, just $250,000, and these deposits are in the tens or hundreds of millions.

There are competitors for repo that these firms consider and use, but again we don't know the relative sizes of these. I think now we have a good idea of what repo was just before the crisis.

But repo—the transaction I just described—has other similarities to the checking account story. If you put a dollar in your checking account and the bank has to keep 10 percent of it on reserve, they lend out 90 cents. Somebody deposits that 90 cents, the bank can lend out 81 cents (because of the 10 percent reserve requirement) and so on. So you end up creating $10 of checking accounts for $1 of demand deposits, assuming there's a demand for loans. Now, that money multiplier process is very important because it means that the amount of endogenously created private bank money in checking accounts is 10 times the size of the collateral, so to speak, of $1 of government money. So, in a traditional banking panic, if everybody wants their $10 back, there's only $1. And that's the problem.

Region: The **Jimmy Stewart problem**.

Gorton: Right, the Jimmy Stewart problem. And that can happen in repo as well because if you're Lehman and I'm the depositor, and you give me a bond as collateral, I can use that bond somewhere else. So there is a similar money multiplier process.

Region: That's "**rehypothecation**," right? One of my favorite new words.

Gorton: Yes, it's become very popular lately [laughs]. So, if shadow banking refers to the growth of this type of money—and it's not controversial to say it's money; it was counted in **M3**—but in order for this to grow, you have to have the collateral, and collateral, of course, like in the pre-Civil War era, can turn out to be risky bonds.

The reason for this is that there aren't enough high-quality bonds. Prior to the crisis, there were not enough Treasuries. Many Treasuries are owned by foreigners and are not available to be used in repo. And collateral is also demanded for posting in derivatives transactions, and for clearing and settlement. The most common way of dealing with counterparty risk is to ask for collateral. So the demand for collateral is pervasive. For repo to grow, you needed to have more collateral.

The other important aspect of shadow banking is related to the way the traditional banking sector evolved, the decline of the traditional banking business model. The traditional model was: I issue checking accounts—and in the old days, I didn't have to pay interest because I had a monopoly on that. And I would lend the money out.

A lot of things changed. Money market mutual funds took market share

*Terms highlighted in blue are defined in a glossary on pages 28–29.

from banks because they offered interest. Eventually, checks are going to pay interest, which makes banks' cost of capital go up. Junk bonds take away a profitable form of lending for banks. And so, starting in the 1980s, the traditional bank lending business didn't work anymore.

Region: They lost what you refer to as "charter value." Could you explain that a bit?

Gorton: Right. The way that's described in the economics literature is that the charter value, which is the title to earn some monopoly profits because of limited entry into banking, disappears because of competition and innovation. And that's not so surprising, right? That's something that happens all the time: There's innovation.

But what happened this time was interesting because the regulatory response was to allow banks to compete, and allowing banks to compete meant that the charter value went down even more. So traditional banking needed to have an innovation in order to maintain itself as an industry. And the innovation was **securitization**.

GROWTH OF SECURITIZATION

Region: I've seen your data from the early '90s showing declines in profitability of U.S. banks, or their low profits relative to Japanese banks that entered the U.S. market and competed with them. Is there more recent empirical evidence of reduced profitability in traditional banking relative to shadow banking?

And would you elaborate on why and how securitization evolved?

Gorton: The empirical question is very hard to answer because in equilibrium these firms do things to be profitable, so in traditional banking you can see a decline in profits, but the decline goes away because they're doing new, profitable activities.

Securitization basically allows the traditional banks to finance their loans by selling them rather than holding them on balance sheet, and the source of value here is avoidance of bankruptcy costs. A firm that originates loans does so by lending money to any number of borrowers—both corporate and consumer—and it then selects a large portfolio of its loans to sell, in a very specific legal sense, to a "**special purpose vehicle**," an entity it creates for that very precise reason. The main advantage of doing so—of establishing the SPV and legally selling the loans to it—is that this arrangement circumvents the costs associated with bankruptcy.

Securitization basically allows the traditional banks to finance their loans by selling them rather than holding them on balance sheet, and the source of value here is avoidance of bankruptcy costs. ... Because of this link, traditional banking and shadow banking are integrated. ... Traditional banking funds itself in large part by selling loans to firms that use those loans for collateral for this other category of loans. This is a crucial, crucial point.

I would describe shadow banking as the rise to a significant extent of a very old form of bank money called repo, which largely uses securitized product as collateral and meets the needs of institutional investors, states and municipalities, nonfinancial firms for a short-term, safe banking product.

Let me briefly elaborate on the appeal of these SPVs. They're a kind of robot firm, a set of rules governing the cash flows. No one works there, and there is no physical location. They own loans and are obligated to pay their liabilities, which are the **asset-backed securities** they issued to buy the loans. But if the SPV can't pay those liabilities—if the underlying loan portfolio doesn't generate enough cash to make the coupon payment due on the asset-backed securities bond—it doesn't trigger an event of default. Instead, the liabilities amortize early. That is, the principal payments are made ahead of schedule, but over time. So again, for the firm that originates the loans, the source of value is the avoidance of bankruptcy costs.

Institutional investors, including money market mutual funds among others, buy portions (called "tranches") of these loans at prices that reflect their credit ratings—**AAA** senior, BBB and so on—and that's how the traditional banking sector is linked to this securitized, or shadow, banking sector. This elaborate system of securitization evolved over 30 years, and it ended up producing a large part of the collateral that's used for repo.

Region: What you've just described, then—this intricate process of large investors buying asset-backed securities that are based on portfolios of loans generated by banks or loan originators—is the connection between repo in the shadow banking sector, and the consumer and business loans that are originated in traditional banking.

Gorton: Right. Let's just review how repo operates. For repo to work, firms that want to borrow cash (to finance their activities) must hold a sufficient amount of bonds on their balance sheets to be

used as collateral when depositors (effectively lenders: money market mutual funds, other institutional investors or corporations seeking a place to save large quantities of cash in the short term) arrive to put their money in the "bank"—the firm wanting to borrow cash. In the example I used earlier, the "bank" was Lehman Brothers, but most financial firms using repo didn't collapse as dramatically as Lehman did.

So those bonds, if they're securitization bonds, asset-backed securities, are linked to portfolios of bank loans. Because of this link, traditional banking and shadow banking are integrated. They're part of the same system. Traditional banking funds itself in large part by selling loans to firms that use those loans for collateral for this other category of loans.

This is a crucial, crucial point. Because if you think about the current unemployment rate and wonder, "Well, banks aren't lending. What could we do?" A very practical, constructive step would be to help the securitization market, which would at the same time help traditional banks.

The fact is that this market is broken. And shadow banking very importantly is not a separate system from traditional banking. These are all one banking system. It happened that repo was concentrated in certain firms, many of which were the old investment banks, but also in the large quasi-investment banks or commercial banks.

In summary, I would describe shadow banking as the rise to a significant extent of a very old form of bank money called repo, which largely uses securitized product as collateral and meets the needs of institutional investors, states and municipalities, nonfinancial firms for a short-term, safe banking product.

Region: So, it's a valuable innovation.

Gorton: Exactly. It's a valuable innovation.

Region: And that's why you might want a term other than "shadow banking" that doesn't have a pejorative connotation.

Gorton: Yes. Of course, the problem with repo and shadow banking is that they have the same vulnerability that other forms of bank money have. We can talk at great length about what that vulnerability is, but loosely speaking, it's prone to panic. Looking back at history, think about how long it took to devise a solution to the first banking panic related mostly to demand deposits. That was in 1857. It wasn't until 1934 that deposit insurance was enacted. That's 77 years where we're trying to understand demand deposits and figure out what to do.

The situation that we're in now, seriously, is one where we are back in about 1860: We've just had a big crisis, and we're trying to figure out what to do. We can only hope that it doesn't take 77 years to figure it out this time.

SENSITIVE/INSENSITIVE TO INFORMATION

Region: That brings us to the question of what did cause the collapse. You write a lot about information asymmetry regarding debt, and how panics are caused by the status of debt shifting from information-insensitive to information-sensitive. What role did information asymmetries play in the financial panic? And what is this distinction between debt that is sensitive or insensitive to information?

Gorton: I should say first that I think it's very important for economists to be very precise with these terms. For example, the term "crisis." I think it's used in economics very loosely; and certainly informally, people think of a crisis as just a bad event. But I would distinguish between global financial crises and bad events such as the collapse of the Internet bubble, the Asian crisis, the 1987 stock market collapse, the S&L crisis. These were not global financial crises. There's a distinction between these two.

Now, formally, what is the distinction? I think economists need to think about that as well. Global financial crises are about debt. About *debt*. But, obviously, we need to have a theory of debt to understand why people would use a security, bank debt, and how that could lead to a crisis.

In the literature so far, I think we've all had trouble with this because the models of crises assume debt and the models of the optimality of debt really have little to do with crises. This is an unfortunate situation to be in as a profession. In my work with Tri Vi Dang and Bengt Holmström, we develop this idea, that you mention, of the optimality of debt arising from its information insensitivity. Roughly speaking, the argument for the optimality of debt is simply that it's easiest to trade if you're sure that neither party knows anything about the payoff on the debt.

Go back to the Free Banking Era again. The Free Banking Era worked in the sense that the discount from par at which the notes traded was correct in an efficient market sense. But the problem was that when you went to buy your groceries in a nearby town, somebody had to figure out what the discount was, and you could never be sure that the discount was correct and you weren't being taken advantage of. Meanwhile, the cashier is looking up in this little newspaper to figure out what the discount is. And that's not an efficient way to transact. That was exactly the problem that the Free Banking Era law tried to prevent, by sufficiently backing the notes so you wouldn't have to do this.

Region: You wanted the note's value to be information-insensitive.

Gorton: Yes, information-insensitive. You wanted it to be the case that I come to your store and I offer you "Bank of New Haven" notes in Wisconsin, and you just say "fine" and you take them. And that happened once the National Banking Act created federal money.

That intuitive logic applies to repo as well. Nobody wants to be given collateral that they have to worry about. And the mechanics of how repo works is exactly consistent with this. Firms that trade repo work in the following way:

The repo traders come in in the morning, they have some coffee, they go to their desks, they start making calls, and in a large firm they've rolled $40 to $50 billion of repo in an hour and a half. Now, you can only do that if the depositors believe that the collateral has the feature that nobody has any private information about it. We can all just believe that it's all AAA.

This is a feature of an economy that is fundamental. It is fundamental that you have these kinds of bank-created trading securities. And the fact that it's fundamental and that you need these is not widely understood in economics. I mean, if you take a standard macro model, a dynamic stochastic general equilibrium model, this is a neoclassical growth model that has no technology for transactions.

Region: Money plays no role.

Gorton: Bank money plays no role. There's no chance that such a model could ever explain a crisis. Zero chance. And I should add that it's not a matter of putting in a "friction." The nomenclature that's used is very interesting. You say, "It's a friction. We need a friction."

In welfare terms, the fact that your model can explain good times doesn't get a lot of weight if it can't explain what happens in a crisis where there is a huge welfare loss.

BETTER DATA: BETTER MODELS

Region: In Chairman Bernanke's recent speech about what the financial crisis means for economics, he suggests that because standard macro models were designed to understand noncrisis periods, they don't have much to say about crisis or financial instability.[1]

I gather you would agree?

Gorton: The way standard models deal with it is, I think, incorrect. A lot of macroeconomists think in terms of an amplification mechanism. So you imagine that a shock hits the economy. The question is: What magnifies that shock and makes it have a bigger effect than it would otherwise have? That way of thinking would suggest that we live in an economy where shocks hit regularly and they're always amplified, but every once in a while, there's a big enough shock … So, in this way of thinking, it's the *size* of the shock that's important. A "crisis" is a "big shock."

The recent crisis, the Great Depression, the panics of the 19th century. Those are more than a shock being amplified. There's something else going on. I'd say it's a regime switch—a dramatic change in the way the financial system is operating. … The notion of adding things to existing models—a friction or an amplification mechanism—retains this overall paradigm in which financial intermediation generally has no role. I don't think that is going to work.

I don't think that's what we observe in the world. We don't see lots and lots of shocks being amplified. We see a few really big events in history: the recent crisis, the Great Depression, the panics of the 19th century. Those are more than a shock being amplified. There's something else going on. I'd say it's a regime switch—a dramatic change in the way the financial system is operating.

This notion of a kind of regime switch, which happens when you go from debt that is information-insensitive to information-sensitive is different conceptually than an amplification mechanism. So there's a problem. Conceptually, the notion of adding things to existing models—a friction or an amplification mechanism—retains this overall paradigm in which financial intermediation generally has no role. I don't think that is going to work.

Region: Is this a preview of what you'll be covering in your keynote tonight [at the University of Wisconsin School of Business Conference on Money, Banking and Asset Markets]?

Gorton: No. I'll try to convince people of a few things about the crisis in my talk tonight—in particular, that the panic is not a special, one-off event, but is due to this structural feature of bank money that we have been talking about. But to understand that requires doing some things that are painful for most economists.

One thing is that you have to understand a lot of institutional detail. It's important to do that so you can understand what's really going on. It's not that the institutional detail per se is so valuable to understand. We're not consultants. But to penetrate the details to the point that you can see the commonalities between, say, different forms of bank money, so you can see what's really going on, requires an understanding of the institutional detail which is not, I think, widely appreciated.

The other thing is that it's very important to document and understand what happened by getting data. We can't write theories just by reading the newspaper. You have to go find out what happened, and that's much harder. With respect to the crisis, there's no place you can go and just download data. For example, there is no source for repo data; the New York Fed only collects data on repo that the primary dealers do with the New York Fed.

Region: But not on haircuts, true?

Gorton: They never collected haircuts. Now they do. The important data are hard to find. One thing I've done is spend a lot of time trying to get data. And you get data by appealing to the civic duty of traders and your friends and former students.

Region: People you've worked with in the financial industry, or taught.

Gorton: Yes. That's how you get data. You tell them, "It's very important, and I know your company is significant." So, again, it's the endeavor of finding data. People just have to be encouraged to do it. I encourage my students to do it.

THE COLLAPSE OF REPO

Region: Let's go back to causes of the crisis, if we could. Why did the repo market collapse? What caused the transition from insensitivity to sensitivity of debt? Why did what seemed to be a house of bricks turn into a house of cards?

Gorton: It looks a lot like the 19th century banking panics in that sense. Those panics tended to happen at business cycle peaks. Information arrived, told you that a recession was coming. And if that shock was above a certain threshold, there was a panic. There was never a panic when that shock wasn't over the threshold, but every time it was over the threshold, there was.

The same thing happened this time. There was a shock. The shock by itself wasn't big enough to cause a global financial meltdown. The shock was that house prices didn't rise.

Region: And that was reflected in the ABX index. That was the new information.

Gorton: Yes, the house price decline had the biggest impact on subprime mortgages, and that's the information that was revealed by trading the ABX index, although I think it was widely known and understood, probably, beforehand. But the question is, again: How could that shock lead to such a big crisis?

Remember: At the time, subprime mortgages outstanding totaled about $1.5 trillion. If all of that had defaulted with zero recovery, that would not have been a global financial crisis. That would have been a problem, because poor and minority people received a disproportionate share of these subprime mortgages. And surely there were problems with all sorts of other things—underwriting standards, broker incentives—but they didn't constitute or cause a global financial crisis. So what happened?

What happened, I think, is that the depositors in the repo market got nervous to the extent that the only way to protect themselves against agents producing private information was to ask for a buffer. Let's go back to the repo market. In the repo market, I give you $100 million; you give me $100 million worth of bonds. Let's say those bonds are AAA, credit-card-linked bonds, an asset-backed security. The only way I can lose as a depositor is if you fail. I am then allowed to unilaterally terminate the agreement, and I go to sell my bonds and I fetch less than $100 million.

Now, if the shock causes me to worry that when I sell my bonds somebody will have produced private information (because now, unlike before, it's profitable to do that), then I can protect myself by saying, "I'm not going to give you $100 million. I'm only going to give you $80 million, and you give me $100 million of bonds as collateral."

So that gives me a 20 percent buffer against that possible loss. For you, however, that's a big problem because you were financing $100 million with me before and now you're only financing $80 million, and so now you have to finance the other $20 million somewhere else.

Region: This was the increase in haircuts that occurred in the early stages of the crisis.

Gorton: Right. This was the increase in haircuts. An increase in haircuts is a withdrawal from this banking system. There are several studies that allow us to put some numbers on this. With Andrew Metrick, I've estimated the size of the repo market; two economists at the BIS [Bank for International Settlements] have estimated the size of the repo market independently and in a separate way; and there's an IMF [International Monetary Fund] economist who has also estimated the size of the repo market, again, with a third method. And we have another important piece of information, a very good survey of the European repo market, which is widely viewed as being much smaller than the U.S. market. So, if you look at all of this information, the size of the repo market, conservatively, was $10 trillion.

Region: This is *just* repo?

Gorton: Right, just repos. Never mind about asset-backed commercial paper or the rest of it.

Region: So shadow banking is—or was—huge. Possibly even larger than standard, regulated banking.

Gorton: The total assets in the regulated banking sector in the U.S. are $10 trillion.

Let's do just a back-of-the-envelope calculation: If haircuts go from 0 percent to 30 percent, on average, that's $3 trillion the shadow banking system has to raise. The run is that depositors want $3 trillion. There's no place to get $3 trillion. And we know what happened over the course of the crisis. The Fed ends up buying $2 trillion, and commercial banks end up buying $1 trillion. But the process of transferring these assets is very painful.

Region: What's the current status of shadow banking?

Gorton: Regulated banks are sitting on over $1 trillion of reserves and really don't lend. And since they're not lending, there's not a lot to securitize, and

Regulated banks are sitting on over $1 trillion of reserves and really don't lend. And since they're not lending, there's not a lot to securitize, and the securitization market is a shadow of its former self. ... It's not that the system is healthy and it won't lend. It's not healthy—either the traditional system or the shadow banking system.

the securitization market is a shadow of its former self. The banking system is really in a shambles. You can see in all the current issues about foreclosure that the bleeding is continuing. It's not that the system is healthy and it won't lend. It's not healthy—either the traditional system or the shadow banking system.

But I would emphasize that there are some constructive, positive things that we could do in this area.

REGULATORY REFORM

Region: Good, let's talk about regulatory reform. In your paper with Andrew Metrick, you say that the Dodd-Frank Act takes some positive steps but that there continue to be three major gaps, and you offer what I'll call the Gorton-Metrick proposal of narrow-funding banks.[2] Could you elaborate on what you see as gaps in Dodd-Frank and tell us why NFBs could address that? Also, what are your thoughts about Fed Governor Tarullo's response to your proposal?[3]

Gorton: A constructive policy I think would be a reform that did two things. First, it would remove the vulnerability of the repo market to runs. And second, it would also re-create confidence in securitization so that we could get the banking system functioning again. Those would be the two things that you need to accomplish for a constructive reform.

Now, Dodd-Frank doesn't do that. Dodd-Frank addresses some things that perhaps needed to be addressed: some infrastructure issues, consumer protection. For these things, it depends on how the rules are written. We'll see what happens. But with regard to the core issue, I think it's like what happened after every panic in the 19th century. Reforms were passed, and we went on to the next crisis.

Region: And we tend to fight the last battle.

Gorton: Not really fight the last battle. I don't think it is understood how we won the last battles—that is, how deposit insurance worked or why the National Banking acts worked. Today there is no need to fight these battles again. We should have learned, and we should not just repeat the 19th century, during which we had ineffective reforms after every panic.

Region: The historical quotations that you often use to begin your papers are amazing in their similarity to current events.

Gorton: Right. People point to the failure of certain firms. They point to speculative activity in certain railroad stocks or land. And the structural commonalities they miss. That's why it's so ironic, and almost tragic, that deposit insurance was passed as a populist mandate, over the objections of bankers, economists and FDR.

So, Dodd-Frank is well meaning, it's well intentioned, it does some good things. But does it solve the problem? No. Does it understand the problem? No. Metrick and I propose, broadly speaking, that we address three things: money market mutual funds, where we have nothing new to say so we leave that one aside, but we want to bring securitization under the regulatory umbrella because it's used as collateral. If the government doesn't oversee it, then we won't have high-quality collateral that's created that people will have confidence in, in the sense that it's information-insensitive.

We want all securitized product to be sold through this new category of banks:

We want all securitized product to be sold through this new category of banks: narrow-funding banks. The NFBs can only do one thing: just buy securitized products and issue liabilities. The goal is to bring that part of the banking system under the regulatory umbrella and to have these guys be collateral creators.

narrow-funding banks. The NFBs can only do one thing: just buy securitized products and issue liabilities. The goal is to bring that part of the banking system under the regulatory umbrella and to have these guys be collateral creators.

A reasonable question would be: Why doesn't the government create collateral? Well, the Treasury has fiscal issues, and that's what determines whether they borrow or not, and we don't want to mix these things up. And the Fed in principle could create collateral, and we talk about that in the paper. But short of the Fed creating all the collateral, it seems desirable to oversee the creation of collateral by the private sector.

The second part is also straightforward. If we're going to have private money creation in the form of repo, we want it to be done in regulated entities, just like demand deposits. We don't want nonbanks to do a lot of repo.

However, repo is sort of a lifeblood of the financial system, and it has lots of other uses. So we don't want to outlaw its use by hedge funds and all sorts of other firms. But we then want to regulate that. There are many details to be worked out in this proposal. We omitted a lot of the details in order to get out some of the big ideas.

One of the responses we got was that this was a radical proposal. And I would point out that the National Banking Act was also a radical proposal. And FDIC insurance was also a radical proposal. When we have an event as extreme as the crisis, a nonradical proposal probably isn't going to work. So I don't take that as a criticism. I take that as sort of a superficial response.

Region: You don't want a bandage when you need surgery.

Gorton: Exactly. Now, Governor Tarullo's response, I thought, was fantastic. I found it very thoughtful. He brought up great points. I don't disagree with many of those points.

I *would* disagree with the notion that it might have unintended consequences so we should not adopt the NFB proposal. Anything you do might have unintended consequences. Right now, I think, if we don't act, we *will* have a lost decade. Getting the banking system functioning; well, there's some urgency to that. So I'm willing to go for that and deal with the unintended consequences rather than not do anything. I'm not sure that he would disagree with that, but he refers to unintended consequences.

Region: He also said, I believe, that we need to do a cost-benefit analysis of the proposal. How do the benefits compare with the costs of reforming securitization and major changes in regulatory law?

Gorton: Yes, but how long is that going to take? Twenty million Americans are out of work, so they'll be waiting for the study.

Region: So you're saying this is ER surgery, not elective.

Gorton: Right. There's some urgency to thinking about this. People in Washington would, I hope, be open-minded to these kinds of ideas just because the alternative seems so bleak.

DODD-FRANK, THE FSOC AND MEASUREMENT

Region: A big concern at the Minneapolis Fed is whether Dodd-Frank deals adequately with **moral hazard**. It sets up **resolution authority**; it establishes the Financial Stability Oversight Council, which had its first meeting about a month ago. The FSOC's mandate is "responding to emerging risks to the stability of the United States financial system."

Given what you know about the history of U.S. regulatory efforts and banking panics, what's your take on whether the FSOC is likely to be able to respond to emerging risks, rather than looking at the old ones, specifically in terms of moral hazard?

Gorton: Let me set moral hazard aside for a moment. The question you raise is one that I think of in terms of measurement. Measurement is at the root of science, and it ought to be at the root of economics. One of the problems that I think we've been aware of for a while is that when you have derivatives, traditional methods of measuring are not effective.

Think about how we measure things now. We have the **call reports**; we have **Flow of Funds**; we have **national income accounting**; we have **GAAP**. And these methods are fine when you live in a world where the risks of cash flows are put together in a security. But that's not the world that we live in. So having a picture of the economy now that's consistent with these innovations—derivative securities—is very important, and that means that these measurement systems need to be rethought.

When you have derivatives, traditional methods of measuring are not effective. ... So having a picture of the economy now that's consistent with these innovations—derivative securities—is very important. ... An oversight council like the FSOC has no chance of understanding anything if we don't have better measurement systems.

I have a paper with Markus Brunnermeier and Arvind Krishnamurthy where we broach these issues.[4] I think these issues ought to be at the top of economists' agendas, but they're not issues that anybody thinks about, really.

An oversight council like the FSOC has no chance of understanding anything if we don't have better measurement systems. That's why in Dodd-Frank, they set up the Office for Financial Research. And this goes to the roots of economics, right? Think of Burns and Mitchell on business cycles. Think of Kuznets on national income accounting. And there are economists who think about measuring productivity. Now it's time for us to work on measuring risk.

Go back to macroeconomics. Macroeconomics as a paradigm in large part is determined by what is measured. If I told you that I had a 30-year panel data set of firms by sector and I had the deltas of the change in value with

respect to certain systemic risks and idiosyncratic risks, people would calibrate models to measures of risk, right?

The way models are built, and the way people think, is determined in large part by what we measure. It's determined by Kuznets, basically. So it's hard to even imagine how you're going to build models if we don't measure things that are more directly associated with what we would like to know.

So we wrote this little paper about measurement—it's really half a paper at the moment; it's a draft. And my coauthors organized this NBER [National Bureau of Economic Research] conference a couple of weeks ago in New York. (I told them they should do it; they're younger than me [laughs].) And it was a really interesting conference, I must say. But the reason it was so interesting is that everybody was totally confused. People had all kinds of interesting ideas, I thought, about what to measure.

Region: That's how new the idea was.

Gorton: Exactly, that's how new it was. You go to most conferences and you're hearing finished papers, and you can kind of agree or disagree, whatever, but it's going to be sent off to a journal to be published, if it's not already sent off, and pretty much the disagreement is very predictable. We all know who disagrees with whom about what.

This was one of the few times, I think, that generated a really productive discussion. I think it's great that people are thinking about these things. This is absolutely critical. This is critical to everything. And it's unfortunate that young people aren't interested in this. You can't get tenure working on measurement. You can't get published in top journals working on measurement. It's not theory.

So I think the oversight council has this problem. Now, they're not going to be able to prevent crises, because you can't prevent a banking panic by identifying risks. You need to prevent the bank money from being vulnerable to panic. If you had had this oversight council in 1930, or even 1920, would it have prevented the banking panics of the Great Depression? No.

But it's still a good thing. I think it's a good thing to understand where risk is and to be able to think about it and to be foresightful. But it's not going to work if you don't have new measurement systems.

But I should get back to your question about moral hazard ...

CREATING COLLATERAL, NOT INSURANCE

Region: Is your idea of narrow-funding banks essentially opting to create collateral rather than insuring repo markets, which might generate moral hazard?

Gorton: Yes, because collateral is the other way of thinking about it. It's easy to just insure everything [laughs].

Metrick and I have the view that it would be better to go for the model of the National Banking Act or the Free Banking Act, to try to create viable collateral, rather than to try to create charter value, in order to keep moral hazard in check.

Now, narrow-funding banks may have charter value as well, but we're not relying on that. The interesting thing about moral hazard is that it's, I think, kind of a lazy argument. No one has ever said that moral hazard was at the root of all the 19th century banking panics.

Region: But that was before deposit insurance.

Gorton: Yes, it was before deposit insurance, but there were clearinghouses and you could free-ride clearinghouses, and no one has argued that anybody did. And it's also, I think, important to explain why deposit insurance *worked* from 1934 to 2007. And the argument in the literature is that there was positive charter value. So the argument is not that you had moral hazard; it's that charter value went down. That was the problem. You had these innovations in finance that decreased charter value.

So the issue is to somehow accept the fact that the world was different—and in fact, better—because of shadow banking, but to aim at the vulnerability of shadow banking. The way we saw that before was with either insurance or collateral.

After the fact, things always look clearer, don't they? Monday morning. People make statements like, "Obviously, there was too much leverage." That's like saying the patient died because his heart stopped beating or inflation is caused by prices going up. Obviously, there was leverage. That's why I said before that you need a theory of debt; you need to explain why there's this debt and what is the purpose of having this debt.

It's a similar thing with terms like "too big to fail." The banking system was too big to fail. That's why we allowed suspension of convertibility [in the 19th and early 20th centuries]. Suspension of convertibility by banks, prior to the Fed, was always illegal, but it was never enforced because nobody wanted to liquidate the banking system.

Now you could say, "Well, it's just a matter of commitment." If we could commit to liquidate the banking system, just one time, then they would never create private money. We would just

have currency. Well, that was the whole problem in the 19th century: the inelasticity of currency. So if you don't want private money, why don't you just come out and say it? We don't want private money.

We could eliminate private money, at least for a year or two until it popped up in some other form. So the too-big-to-fail argument, again, it's not clear to me that it's really a moral hazard issue so much as it is that when you have a banking panic, the system is insolvent.

After the fact, things always look clearer, don't they? Monday morning. People make statements like, "Obviously, there was too much leverage." That's like saying the patient died because his heart stopped beating or inflation is caused by prices going up. Obviously, there was leverage. That's why I said before that you need a theory of debt; you need to explain why there's this debt and what is the purpose of having this debt. Does that security, which is optimal, have consequences that are socially suboptimal or not? What's the problem? To make progress, we need to say more rather than just repeating these things.

FINANCIAL INNOVATION

Region: In your writing, you draw an analogy between banking and electricity. When these systems work well, we don't care how they work. But when they fall apart, then we suddenly realize that we don't understand them. That's certainly become clear in the recent crisis as researchers like you have explained the complexity of financial innovations.

Is the pace of financial innovation so overwhelming that it inevitably leads to

More About Gary B. Gorton

Current Positions

Professor of Finance, School of Management, Yale University, since 2008

Professor of Economics (secondary appointment), College of Arts and Sciences, University of Pennsylvania, since 1996

Sloan Fellow, Wharton Financial Institutions Center, since 2000

Research Associate, National Bureau of Economic Research, since 1990

Previous Positions

Robert Morris Professor of Banking and Finance, Wharton School, University of Pennsylvania, 2003–08; Liem Sioe Liong/First Pacific Company Professor of Finance, 1998–2003; Professor of Finance, 1995–98; Associate Professor of Finance, 1990–95; Assistant Professor of Finance, 1984–1990

Director, Banks and the Economy Program, Federal Deposit Insurance Corp., 2003–04

Adviser, Federal Reserve Bank of Philadelphia, 1994–95; Senior Economist, 1984; Economist, 1981–84

Houblon-Norman Fellow (first non-English winner), Bank of England, 1994

Visiting Associate Professor of Finance, Graduate School of Business, University of Chicago, 1992–93

Professional Activities

Member, American Finance Association, American Economic Association, Economic Society

Consultant, Board of Governors of the Federal Reserve System, Bank of England, Bank of Japan, Central Bank of Turkey, various private firms

Member, Moody's Investors Service Academic Advisory Panel, 2003–07

Foreign Editor, *Review of Economic Studies,* 2002–07

Editor, *Review of Financial Studies,* 1997–2000

Director, Western Finance Association, 1997–2000

Editorial Board Member and Referee, numerous professional journals, since 1993

Publications

Author of scores of theoretical and empirical articles on banking and bank regulation, securitization, stock markets, commodity futures, asset pricing and corporate control issues, including the following:

Slapped by the Invisible Hand: The Panic of 2007, Oxford University Press, 2010

"Security Price Informativeness with Delegated Traders" (with Ping He and Lixin Huang) in *American Economic Journal: Microeconomics,* November 2010

"SEC Regulation Fair Disclosure, Information, and the Cost of Capital" (with Armando Gomes and Leonardo Madureira) in *Journal of Corporate Finance,* June 2007—winner of the Geewax, Terker & Co. Prize in Investment Research and the Distinguished Paper Prize, special issue of the *Journal*

"Equilibrium Asset Prices under Imperfect Corporate Control" (with James Dow and Arvind Krishnamurthy) in *American Economic Review,* June 2005—winner of the Western Finance Association Best Corporate Finance Paper Prize

"Capital, Labor, and the Firm: A Study of German Codetermination" (with Frank Schmid) in *Journal of the European Economic Association,* September 2004—winner of the Hicks Tinbergen Medal from the European Economic Association for the best paper published in its *Journal* during 2003 and 2004

Liquidity, Efficiency, and Bank Bailouts" (with Lixin Huang) in *American Economic Review,* June 2004

Education

University of Rochester, Ph.D. in economics, 1983

University of Rochester, M.A. in economics, 1980

Cleveland State University, M.A. in economics, 1977

University of Michigan, M.A. in Chinese studies, 1974

Oberlin College, B.A. in Chinese language and literature, 1973; Tunghai University (Republic of China), 1971–72

information asymmetries that can cause panics?

A more positive way to put it might be: How can we get the benefits of financial innovation with less risk?

Gorton: The electricity example had another step to it, which is that once the electricity grid fails—a crisis—and you have a blackout, the answer is not that we want everybody to become an electrician. We don't want to post complicated diagrams of electrical circuitry on the Web for everyone to study. The answer is to create—to *re*-create—a world where nobody needs to know about electricity. And that's saying, in terms of finance, that you want to want to re-create this world of information insensitivity for many securities.

In the crisis, when investors really started to think about how subprime securitization works, it turns out to be extremely complicated, even compared to a standard securitization. You don't want to have to study that. Not everybody needs to know that.

So this kind of reaction that we need more transparency is not, I think, the right approach, and I would point out that deposit insurance did not take that approach. Deposit insurance said to depositors …

Region: "Don't worry about it."

Gorton: Exactly. A traditional finance approach might be: If we give depositors lots of information, every day they'll move their deposits to the strongest bank and then banks will have the incentive to be strong, and then everyone will have to spend lots of time doing due diligence on banks.

That's insane, basically, and that's not the approach we adopted, and that's not the approach we should adopt now.

That's why our proposal about narrow-funding banks in large part is to say, "Let's create a system of oversight that doesn't put investors in a position where they have to worry about this." They're going to rely, hopefully, on oversight to do it.

So all this infrastructure: measurement, narrow-funding banks, who does repo. This kind of infrastructure has to be built. It'll take a long time, but it is important that it be done. The power of recent financial innovation—structured products, credit derivatives—is awesome. I don't think that it's really appreciated. This is a global financial system.

In terms of financial innovation, remember that the trend is toward institutional money management, delegated portfolio management.

Region: Which raises **principal-agent problems**.

Gorton: True, it does. But it also means you and I don't have to worry about whether we want to do a "**vol swap**," right? Somebody else will worry about that. There are, of course, problems with innovation, and these problems, I think, are exactly the things that we need to detect by the measurement system I was talking about earlier. And I think if you have the measurement system, and you have confidence that you've removed the vulnerability of repo, you're in a world where you can manage this innovation.

So all this infrastructure: measurement, narrow-funding banks, who does repo. This kind of infrastructure has to be built. It'll take a long time, but it is important that it be done. The power of recent financial innovation—structured products, credit derivatives—is awesome. I don't think that it's really appreciated. This is a global financial system.

VULNERABILITY TO PANIC

Region: But if somebody invents a financial instrument and the economists or data geeks don't know about it because it's brand new, they're not going to know they should measure it, true?

Gorton: In our proposal for measurement, we propose a big supplement to, essentially, the call report, but it's for all financial firms, where we say, "We want to know the change in the value of your firm and your liquidity positions," which we define in a certain way. If the following happens—housing prices go down by 2 percent, 5 percent, 10 percent, 15 percent, 20 percent and so on—how does your value change? And we ask you 200 questions. We also drafted a questionnaire. I won't bore you with all the details, but it's the sensitivity to different risks. So we don't ask you about the actual financial instrument; but if that financial instrument causes your sensitivity to this risk to go up, and we see that that happens to every bank, then we know something.

It's not perfect, but getting the measurement system into the 21st century is the logic of it. But, again, I would point out that the overriding issue here, I think we should understand, is the vulnerability of bank money to panic. That's the issue. It's not that other things are unimportant. But we haven't had trouble with the other things in the sense of a global financial crisis.

If you had brokers cheating people, predatory lending, declines in underwriting standards, or you don't like credit derivatives or something, whatev-

The overriding issue here, I think we should understand, is the vulnerability of bank money to panic. That's the issue. It's not that other things are unimportant. But we haven't had trouble with the other things in the sense of a global financial crisis.

er it is, those things per se are not a global financial crisis. And it's the global financial crisis that is the first-order effect to be dealt with. And I think we know, we *should* know by now, what the problem is and what to do. My concern is that we'll go another 77 years before we figure it out.

Region: That's a good place to stop. Let's hope your concern is not well founded.

Gorton: Yes, let's hope.

Region: Thank you so much.

—Douglas Clement
Nov. 5, 2010

Endnotes

[1] Bernanke, Ben S. 2010. "Implications of the Financial Crisis for Economics." Speech at the Conference Co-sponsored by the Center for Economic Policy Studies and the Bendheim Center for Finance, Princeton University, Princeton, N.J., Sept. 24. Online at http://www.federalreserve.gov/ news events/speech/bernanke20100924a.htm.

[2] Gorton, Gary, and Andrew Metrick. 2010. "Regulating the Shadow Banking System." Social Science Research Network. Online at http://papers.ssrn.com/so13/papers.cfm?abstract_id=1676947.

[3] Tarullo, Daniel K. 2010. "Comments on 'Regulating the Shadow Banking System.'" Speech at the Brookings Panel on Economic Activity, Washington, D.C., Sept. 24. Online at http://www.federalreserve.gov/newsevents/speech/tarullo20100917a.htm.

[4] Brunnermeier, Markus K., Gary Gorton and Arvind Krishnamurthy. 2010. "Risk Topography." Online at http://www.kellogg.northwestern.edu/faculty/krisharvind/papers/risk-topography.pdf.

For the complete interview, including Gorton's thoughts on asset price bubbles and the future of economics, go to minneapolisfed.org.

For further reading, see

Gorton, Gary. 2010. "Questions and Answers about the Financial Crisis." Social Science Research Network. Online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1557279.

Gorton, Gary. 2008. "The Panic of 2007." Prepared for the Federal Reserve Bank of Kansas City, Jackson Hole Conference. Online at http://www.kc.frb.org/publicat/sympos/2008/gorton.08.04.08.pdf.

Haltom, Renee Courtois. 2010. "Out from the Shadows." *Region Focus,* Third Quarter, at www.richmondfed.org and at http://www.richmondfed.org/publications/research/region_focus/2010/q3/pdf/feature3.pdf.

Glossary

AAA
The highest credit rating given by debt agencies such as Standard & Poors and Moody's. An AAA rating allows a corporation or government to borrow at low interest rates.

ABX index
An index that tracks the performance of a basket of credit default swaps based on 20 bonds that consist of U.S. subprime home mortgages. Credit default swaps are like insurance contracts that allow buyers and sellers to trade risk. ABX contracts allow traders and investors to take positions on subprime securities without actually holding them. A decline in the ABX suggests a decline in confidence that the underlying subprime mortgages will be repaid as expected.

Asset-backed securities
Bonds backed by cash flows from a pool of specified assets in a special purpose vehicle rather than by the general credit of a corporation. The asset pools may be residential and commercial mortgages, automobile loans, credit card receivables, student loans and other asset classes.

Call report
A quarterly report of income and financial conditions that commercial banks are required to file with their designated federal and state regulatory agencies.

Flow of Funds
A set of accounts used to follow the flow of money within the economy. The Flow of Funds analyzes data on borrowing, lending and investment among households, businesses and government bodies. In the United States, the Federal Reserve tracks and analyzes the flow of funds and provides reports about 10 weeks after the end of a quarter.

GAAP
Generally accepted accounting principles. GAAP is a code of accounting rules and procedures established by the American Institute of Certified Public Accountants.

Haircut
A percentage reduction from an asset's stated value (e.g., book value or market value) to account for possible declines in value that may occur before the asset can be liquidated. Haircuts are often applied to collateral pledged in repo contracts; the collateral is valued at less than market value in reflection of its perceived underlying risk.

Jimmy Stewart problem
Referring to the predicament faced by George Bailey, a character played by Jimmy Stewart in the 1946 Frank Capra film, "It's a Wonderful Life." Bailey is a small-town banker whose depositors have run on his bank, demanding their deposits back because they're worried that the bank is insolvent. Bailey explains to them that he has only a fraction of their actual cash on hand because most of it has been loaned out in the form of home mortgages and personal loans.

M3
M1, M2 and M3 are (or were) measures of the nation's money supply reported by the Federal Reserve System. M1 includes currency and demand deposits at commercial banks. M2 is a broader measure that incorporates M1 but also includes assets such as commercial bank savings deposits, deposits at credit unions and noninstitutional money market funds, among other components. M3 was broader still, but publication of M3 figures ceased in March 2006 when the Fed determined that M3 no longer conveyed "any additional information about economic activity … not already embodied in M2." The Fed also ceased publishing one of M3's components, repurchase agreements.

Moral hazard
When persons or institutions protected from risk are thereby encouraged to take greater risks than they would if not protected.

National income accounts
An accounting framework used to measure a nation's aggregate economic activity. National accounts broadly present the production, income and expenditure activities of all economic actors (firms, households and government bodies). They present both flows during a period and stocks at the end of that period. In the United States, the national income and product accounts (NIPA) provide estimates for the money value of income and output respectively, including GDP.

Principal-agent problems
The difficulty of motivating one person, an agent, to act in the best interests of another, the principal. Problems arise because the agent's incentives differ from the principal's, and the principal is unable to fully monitor and direct the agent's actions.

Rehypothecation
From "hypothecate"—to pledge collateral. Rehypothecation is the reuse (or repledging) of collateral received in one transaction in an entirely unrelated transaction.

Repo
An abbreviation for (sale and) repurchase agreement. A repo is a contract that combines the sale of a security with an agreement to repurchase the same security at a specified price at the end of the contract period. Effectively, a repo is a secured or collateralized loan—that is, a loan of cash against a security as collateral. The party that buys the security is operating as a lender; the party that sells it is borrowing. The repurchase price will usually be somewhat higher than the initial sale price; the difference is the interest earned on the loan, and is referred to as the repo rate.

Resolution authority
Power to liquidate, in an orderly manner, the assets and liabilities of a failed financial institution. The Dodd-Frank Act designates the FDIC as the resolution authority for most financial institutions.

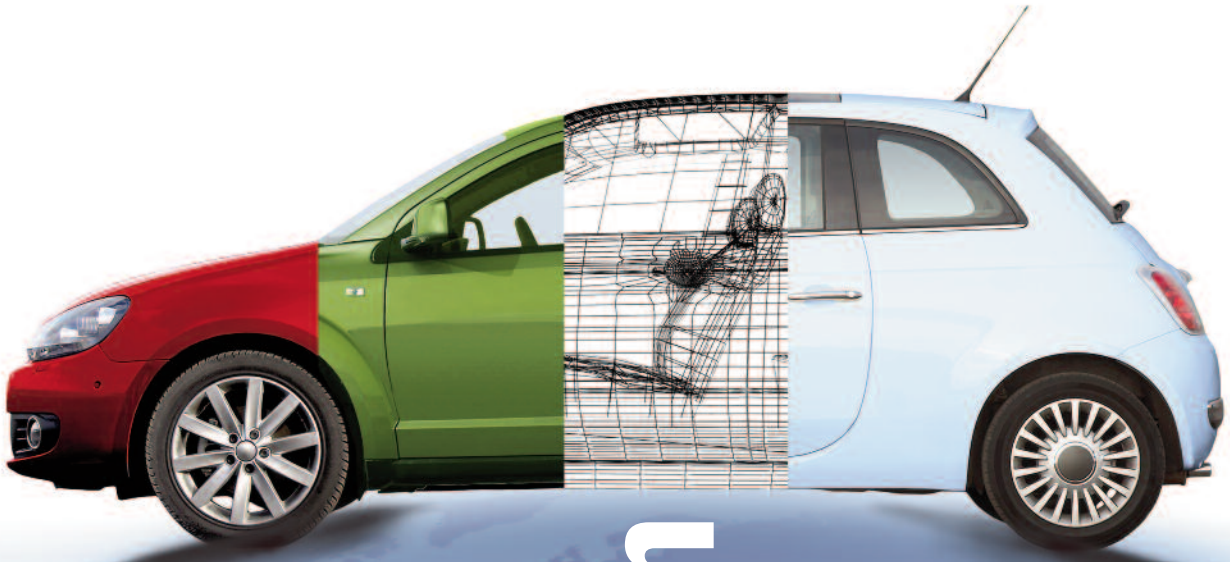
Securitization
The process of financing whereby interests in loans and other receivables are packaged, underwritten and sold in the form of "asset-backed securities" (defined above). This is done through the creation of a "special purpose vehicle" (defined below) by segregating specified cash flows from loans originated by a firm and selling claims to these cash flows through the SPV to investors. Asset securitization began in the 1970s with the structured financing of mortgage pools. Since the mid-1980s, similar techniques have been used to finance a variety of nonmortgage assets, including car loans and credit card receivables.

Special purpose vehicles
Legal entities established for narrow and often temporary objectives related to regulation, taxation or risk. SPVs are set up by a sponsoring firm specifically to achieve those objectives. An SPV is not an operating company in the usual sense, but rather a "robot" company—a set of rules without employees or a physical location.

An SPV can only carry out a specified purpose, a circumscribed activity or a series of such transactions. Sponsoring firms create SPVs with the specific purpose of selling specified cash flows to it. The SPV purchases rights to those cash flows by issuing securities. The sponsor ensures that the cash flows arrive.

But if cash flows are inadequate to meet obligations on the securities, the SPV cannot become legally bankrupt. Instead, it makes principal payments ahead of schedule, but extended over time. An essential feature for an SPV, then—and a source of value to the sponsoring firm—is that it is "bankruptcy remote."

Vol swap
An abbreviation for "volatility swap," a futures contract based on the realized volatility of an underlying asset. In this instance, Gorton is simply providing an example of a financial instrument that most investors don't use or understand.



Process Innovation Product

The Self-Limiting Nature of Innovation

Trade stimulates innovation by exporting firms. Does this result in improved economic welfare? Surprisingly, the answer is largely no

Douglas Clement
Editor

This article concerns international trade, innovation and the behavior of companies. But at heart, it is about economic well-being, and the complex and somewhat controversial exploration of how society's welfare is affected when the costs of trade alter incentives to innovate.

This general topic is certainly not new to economics. In some sense, David Ricardo sought to understand these matters nearly two centuries ago. But recently, economists have been forced to question what for many years has been a bedrock belief: Trade aids economic growth and promotes well-being by fueling innovation and thereby productivity.

"For the last decade or so, the idea that international trade might have extra benefits because it stimulates innovation by firms that export has been a strongly held view among economists," observed Minneapolis Fed consultant Andy Atkeson in a recent interview. "But what we're finding, in fact, is that these 'extra benefits' don't really exist."

Like their peers, Atkeson and Ariel Burstein, his colleague at the University of California, Los Angeles, believed that increased market exposure through international trade could spark innovation. If you reduce the costs of trade, the thinking went, large companies that export would suddenly be looking at a much bigger global market; that should increase their incentive to innovate so they can reduce costs while maintaining profit margins and selling to more nations. "When we started our research," recalled Atkeson, "that's what we thought was going to happen. That was the intuition."

"But what surprised us was that in a general equilibrium model, that doesn't work out," he continued. "Or rather, it does work out at the *micro* level. Lower trade costs do stimulate big changes for some companies. But you end up having an *offsetting* effect of cutting into the production of new products by smaller companies, particularly those that are serving the domestic market."

What Atkeson and Burstein discovered, as they explain in "Innovation, Firm Dynamics, and International Trade," a Minneapolis Fed staff report (SR444, online at minneapolisfed.org) published in the *Journal of Political Economy* in June 2010, was that although lower trade costs do increase incentives of exporting firms to improve production methods—"*process* innovation"—the effect is counterbalanced by a reduction in "*product* innovation"—the market entry of new firms with new products. The net result: little or no extra benefit in terms of improvements in overall productivity due to increases in exporters' innovative activity, and so no extra increase in economic well-being.

"Now, you ask, why does that happen?" Atkeson said. "And this is what the equations say…"

Trade theory

But before we go there, it might be useful to take a short detour through international trade theory. As Atkeson noted, "For hundreds of years, economists have had as a matter of faith that free international trade is a wonderful thing. The challenge has been to discover models and mechanisms that actually say that."

The pioneer in exploration of the benefits of international trade was British economist David Ricardo. In 1817, while Great Britain was embroiled in heated debate over import tariffs, he explained that two nations would reap gains from free trade even if one of them was better (that is to say, more efficient) than the other in production of various goods. By exporting those products for which its opportunity costs were lowest and importing those with higher opportunity costs, nations could gain

"For hundreds of years, economists have had as a matter of faith that free international trade is a wonderful thing. The challenge has been to discover models and mechanisms that actually say that."

from trade. It was a concept he termed "comparative advantage."(Another British economist, Robert Torrens, actually described the idea two years before Ricardo, in "An Essay on the External Corn Trade.")

The notion was based largely on technological differences. Even if Portugal had technology that gave it an absolute advantage over, say, England, in production of textiles and wine, both nations would benefit from exporting those goods at which it was relatively more efficient. So, in this example, England would be better off exporting cloth to Portugal and importing wine if its opportunity cost for textile production were lower than for wine. (For a more complete explanation, see "Comparative advantage: Powerful, but not obvious" in the December 2002 *Region* at minneapolisfed.org.)

The next generation of trade models, developed in the early 1900s initially by Eli Heckscher and subsequently by Bertil Ohlin, his student, was similar to Ricardo's, but relied more on factor endowments than technological differences. The Swedish economists showed that, given its endowments of capital and labor, a country like the United States, for instance, would be a relatively low-cost location for producing and exporting goods that needed physical capital and skilled labor. China, on the other hand, would be better suited for the production and export of goods requiring lots of unskilled labor. Trade flows of dissimilar products between nations with disparate factor endowments would therefore be the optimal pattern.

Powerful as it was, the Heckscher-Ohlin model "soon ran into a problem with the data," noted Atkeson. "Most trade is actually between countries that are similar in their levels of development." And much of that trade consists of similar products. For instance, the United States and Germany trade significant quantities of cars, shipping Fords or Chevrolets eastward across the Atlantic and sending Volkswagens and BMWs in the opposite direction. Existing trade theory couldn't account for this.

Increasing returns

"Neither the extensive trade among the industrial countries, nor the prevalence in this trade of two-way exchanges of differentiated products, make much sense in terms of standard theory," observed Paul Krugman, in a celebrated 1980 article. "A new framework for analyzing trade is needed."

Krugman's theory, for which he received the Nobel prize in 2008, addressed this need by recognizing that economies of scale are crucial in production (and trade) decisions. "When … economies of this kind are allowed to trade," he wrote, "increasing returns produce trade and gains from trade even if the economies have identical tastes, technology, and factor endowments."

The crucial elements of Krugman's model were product differentiation and competition among firms with some level of monopoly power (so-called monopolistic competition). So, for example, Jettas and Chevys are the same type of product (both automobiles), but they're different. Volkswagen has a monopoly in producing Jettas, while General Motors has a monopoly on Chevys.

And this is where economies of scale (or increasing returns) come in. Once GM has invested millions in producing the Chevrolet, and Volkswagen has done the same for building Jettas, it's more efficient for them to specialize in those activities. It would be far too costly for GM (or Volkswagen) to build both Chevys and Jettas; far more efficient for a company to specialize in one variety of car and then trade according to tastes.

"The Krugman model is essentially that," observed Atkeson. "Each manufacturer pays this fixed cost to start producing a variety, and it doesn't

In Brief

A trade mirage

- Economists have long thought that international trade—beneficial in many respects—might have the "extra benefit" of stimulating innovation by exporting firms, and thereby fueling productivity and overall economic growth.
- Recent research suggests, however, that such benefits are negligible or nonexistent at the macroeconomic level. While trade does appear to stimulate improvements in production methods (*process* innovation) by exporting firms, it also diminishes *product* innovation by smaller companies primarily serving domestic markets.
- The net result: little or no gain in overall productivity due to increases in exporters' innovative activity, and therefore no "extra" increase in economic well-being from international trade.

make sense to pay the fixed cost twice. If we open up to trade, we can have countries specialize. The U.S. produces all the Chevys for the world, and Germans will produce all the Volkswagens. Everybody gets more varieties and that makes us all better off."

Firm-level data

But again, there was a data problem, which has come to light only in the past couple of decades. The Krugman model argues that once a firm has paid the fixed cost of producing a given product variety, it should be provided to the entire world. That suggests that virtually every company, both small and large, should trade internationally, and a high proportion of every company's production would be exported rather than consumed in its home country.

"But when we finally got access to firm-level data, in the 1990s, we saw a picture that looked very different," said Atkeson. In reality, very few firms actually engage in international trade, and those firms tend to be very productive and very large. Put otherwise, most companies, especially small- and medium-sized firms, produce exclusively for the home market.

Summarizing the situation in a 2007 article, Andrew Bernard and colleagues pointed out that just 4 percent of the 5.5 million companies operating in the United States were engaged in international trade in 2000, and of those, the top 10 percent accounted for 96 percent of all U.S. exports. Moreover, they wrote, exporters tended to be "larger, more productive, more skill- and capital-intensive, and to pay higher wages than nonexporting firms."

Understanding this reality has been the next big challenge in trade theory, a challenge that persists.

It was Harvard economist Marc Melitz who, in 2003, developed a model that seemed to successfully account for these newly revealed facts. And the Melitz model promised even more: It indicated that increased trade would lead to higher total productivity and improvement in a nation's economic well-being.

"One of the most robust results of this paper is that increases in a country's exposure to trade lead to welfare gains," wrote Melitz in *Econometrica*. This gain, due to higher productivity generated by reallocations toward more efficient firms within industries, was, he suggested, "a benefit from trade that has not been examined theoretically before."

A closer look

It was this promise that Atkeson and Burstein set out to explore. How, precisely, does exposure to trade unleash higher productivity and raise welfare? To understand this, they developed a model that could examine how a reduction in international trade costs would affect firm-level decisions to leave an industry, to export and to innovate.

Their model allows for heterogeneous companies—firms that vary in size, productivity and decisions about how to invest, how much to export and whether or not to stay in business. Moreover, it looks not only at firm-level activity (the *micro*economy), but at general equilibrium (the entire *macro*economy). And again, their model incorporates a crucial distinction between two types of innovation: improvements in the methods firms use to produce their products (*process* innovation) and creation of new products altogether (*product* innovation).

The model includes final (consumption) goods and intermediate (production) goods, labor and such key variables as trade costs, investment in product and process innovation, aggregate productivity levels, export shares, economic output, consumption and welfare. And because this is, after all, a model of international trade, there are two countries exchanging goods, each nation with equal abilities, tastes and resources.

The economists first analyze their model from a purely mathematical perspective—that is, if you build an economic model with this particular set of characteristics, what do its equations tell you about innovation, productivity and welfare when the cost of trade is reduced? (The second step, discussed further below, is to broaden the analysis with several numerical experiments.)

Though the math is inevitably complex, the results are clear-cut—and strikingly at odds with interpretations of Melitz's finding of extra benefits from reduced trade costs. "Our central finding is that, even though such a trade cost change can have a substantial impact on individual firms' decisions, that impact is not reflected in aggregate welfare,"

By producing the same product at lower cost through improved production methods, [firms] can sell globally at a lower price, earning higher total revenues. But that increased productivity makes the market more competitive. And, for someone not yet in the industry, it becomes far less attractive to enter.

write Atkeson and Burstein. The "*response of product innovation largely offsets the impact* of changes in firms' exit, export, and process innovation decisions on … aggregate productivity" (emphasis added).

To be clear, cutting trade costs does, in the Atkeson-Burstein model, alter the flow of resources among firms, and it does increase international trade volumes. But it "does not have a first-order effect for the model's implications for aggregate productivity," they write.

In other words, Atkeson and Burstein do produce several results that closely align with Melitz and economists with similar models. They find that changes in trade costs do shift production, export share and investment in process innovation from smaller, less-productive, nonexporting firms to larger, more-productive, exporting firms, as does Melitz. And this reallocation leads to higher *average* productivity and greater productivity differences among firms.

But contrary to Melitz's conclusions, the reallocation doesn't result in a substantial increase in *total* productivity. And the bottom line: Nor does it raise, in any significant measure, levels of economic welfare.

Why not?

The results are striking, disturbing and also rather difficult to grasp. How can it be that general welfare wouldn't increase in an economy that's cutting costs, improving process innovation, increasing exports and raising average productivity? The clue rests in the nature of a competitive economy, which assumes free entry—as long as there are profits to be made, new firms will enter an industry. Or as Atkeson and Burstein put it: "The logic of our result follows from firms' free-entry condition: the profits associated with creating a new product must be zero in equilibrium."

In a competitive economy, with no substantial barriers (political or economic) to entry, firms will enter any industry that promises a profit opportunity and start producing. Given this, and other things equal, write the economists, "a reduction in international trade costs raises the profits associated with creating a new product. In equilibrium, to satisfy the free-entry condition, this increase in expected profits must be offset by an increase in the real wage and a change in aggregate output, both of which are determined by aggregate productivity."

Cutting trade costs does stimulate process innovation for exporting firms, Atkeson and Burstein agree, as firms seek to grow their profits by selling to a larger market. By producing the same product at lower cost through improved production methods, they can sell globally at a lower price, earning higher total revenues. But that increased productivity makes the market more competitive. And, for someone not yet in the industry, it becomes far less attractive to enter.

"If you make all the other firms in the economy more productive, what happens to the potential profitability of a new firm?" said Atkeson. "It drives it down, reduces entry, and so growth gets choked off. *That* is the self-limiting nature of innovation." In other words, the stimulating effect of reduced international trade costs on exports, exit and process innovation is offset by a reduction in product innovation, or market entry. The "extra gains" vaporize.

Positive with the negative

Burstein elaborates by first emphasizing the positive impact of reduced trade cost. "The process innovation decision would have an effect on some elements in the model, like the change in the share of trade when you lower trade costs or the growth in average productivity if you look just at productivity of continuing firms," he said. "So, some firms will become more productive; exporters will become larger over time. The productivity difference between exporters and nonexporters will become larger because exporters innovate more."

But then the other shoe drops. "It's just that for welfare, the welfare of the representative consumer, the increase in productivity that comes from higher innovation by firms is going to be offset by lower entry."

Burstein cautions that market entry by new firms won't necessarily cease. "We're not saying that lowering international trade costs will lead to lower entry," he clarified. "We're saying that if you have an expansion of international trade and some firms become more productive due to innovation invest-

ment, that's going to lead to an offset in entry. But it could still be the case that net entry goes up, even if there is a partial offset."

By the numbers

In discussing their model and findings from their mathematical analysis, the economists further caution that these very stark results hold only under a certain set of rather severe assumptions. To broaden the research, they relax the assumptions and generalize the results by conducting several numerical experiments. As it happens, these quantitative experiments qualify but largely confirm their mathematical analysis.

They give the model numerical parameters for features like exporters' share of output and employment, and firm size distribution, so that the experiments resemble the U.S. economy. Then they run the numbers under several sets of assumptions about interest rates, responsiveness of process innovation to reduced trade costs, and both large and small reductions in trade costs.

Numbers from one experiment are enough to illustrate the basic story. In a model with a large reduction in trade costs and a positive interest rate, when process innovation by exporting firms is highly responsive to changes in trade costs, the cost reduction greatly stimulates innovative activity by exporters and causes a surge in average productivity. In this Atkeson-Burstein experiment, productivity of the average firm rises by a factor of 7.5 times the percentage change in trade costs. But this increase in average productivity is *almost entirely offset* by a reduction in product innovation: Product innovation *falls* by a factor of 7.4 times the percentage change in trade costs.

"The net effect of these changes in process and product innovation on total productivity turns out not to make a big difference for welfare," observed Atkeson. "And that's basically due to a combination of two things. The first is the offset, the choking off of product innovation, or entry. And the second thing is that there is a substantial delay or lag in these changes. Process innovation takes quite a long time to impact aggregate productivity."

"So, again, there are two elements to there being little improvement in welfare," explained Burstein. "These companies can start investing in process innovation [in response to lower trade costs], but it's going to take a while before they really improve their products. That's why it takes so long. And the second part is that you're going to have Intel and Boeing, really big international companies, doing more innovation to take advantage of reduced trade costs. But the small, nonexporters—there will be less entry of those, because they're competing with globalized firms."

Again, accentuate the positive

So, once again, the message from the research comes across as rather negative. The optimistic promise of additional gains from trade appears to have been an empty one. Increased innovation of one sort is offset by reduced innovation of another.

But Atkeson and Burstein are quick to point out two positive aspects. The first, already mentioned, is simply that reduction in trade costs is likely to be transformative, shifting resources in a major way to exporters and to large companies, and leading to greater average productivity in those firms, which in turn suggests higher wages for workers at those companies.

The second positive element is that this framework holds great promise for better addressing the questions that Ricardo tried to answer two centuries ago. The Atkeson-Burstein model is likely to be very useful for "generating new answers to longstanding questions in trade," they write, such as the impact of globalization on trade volumes and comparative advantage patterns.

"The model is a framework for making a connection between the economy as a whole and these rich patterns in micro data that we're seeing in trade," noted Atkeson. "It's very helpful in connecting that back to the macroeconomy. Being able to handle the rich dynamics is a very positive message."

Indeed, as the long evolution of international trade research suggests, definitive conclusions about the impact of changing trade costs are likely to be elusive for years to come. Solid models that can explore the intricate links between the macroeconomy and micro-level firms as different as Boeing and a nearby corn farm will be essential to understanding both the global and local impact of international trade. R

Damage Control?

Analyzing Policies to Repair Credit Markets[1]

V. V. Chari
Professor
University of Minnesota
Research Consultant
Federal Reserve Bank of Minneapolis

Ali Shourideh
Research Analyst
Federal Reserve Bank of Minneapolis

Ariel Zetlin-Jones
Research Analyst
Federal Reserve Bank of Minneapolis

The "secondary loan" market was the focus of much attention during the recent financial crisis. This market—where companies that originate loans sell them to other firms, often packaged as asset-backed securities—appeared to freeze up at the start of the crisis. Potential buyers seemed to lose confidence in the quality of the underlying assets being offered by loan originators. In short, the market was broken.

Policymakers launched several initiatives aimed at unfreezing the market, most prominently the Term Asset-Backed Securities Loan Facility (TALF); several other policies were proposed but not implemented. In retrospect, the advocates of these policies have suggested that they were largely successful in restoring health to damaged secondary loan markets.

In this paper, we analyze the ability of such policies to solve the secondary loan market problems and find that, on the contrary, they *do not* appear to have been responsible for resolving the underlying dysfunction. While these credit markets are unquestionably operating better now than previously, the reasons for their improved function remain unproven. We hint at policies with greater potential for addressing future episodes of such dysfunction, should they occur, but stress that these policies remain untested in both theory and practice.

The paper begins with a brief description of the market situation and policy response. We then lay out some of the economic theory that illuminates dysfunction in credit markets, highlighting two concepts in particular: adverse selection and reputational incentives.

We then proceed with a short description of our economic model based on these concepts, followed by policy exercises that use this model to analyze

Economic Policy Papers *are based on policy-oriented research by Minneapolis Fed staff. The papers are an occasional series written for a general audience. The views expressed are those of the authors, and not necessarily of others in the Federal Reserve System.*

ABSTRACT

During the recent financial crisis, the volume of new loan issuances dropped sharply in the secondary loan market. U.S. policymakers responded with a variety of proposals aimed at restoring normal market function, including purchase of assets at above-market prices and reducing the costs of holding loans to maturity.

We develop a model of the secondary loan market to analyze the effectiveness of these proposals. In this model, the market's primary function is to allocate loans to originators or secondary owners that have a comparative advantage in managing them. Because loan originators are better informed than potential purchasers about their loan quality, the markets suffer from adverse selection.

The model finds that interaction of adverse selection and reputational incentives creates fragile economic outcomes. In particular, it generates sudden collapses in new issuance volume due to small changes in collateral value similar to the fluctuations and credit inefficiencies seen empirically during the financial crisis.

We use the model to analyze programs that were proposed and in some cases implemented by policymakers to address loan market dysfunction and find that they do little to resolve the market's inherent adverse selection problem. We conclude that, unfortunately, these policies were (or would have been) most likely ineffective, and possibly even counterproductive.

Ali Shourideh, V. V. Chari, Ariel Zetlin-Jones

$$\alpha \int_{-\infty}^{v_{T-1}^*(\mu_{T-1})} \{\bar{\pi}\bar{v} + (1-\bar{\pi})\underline{v}_t - q(1+r) - \underline{c} + \beta V_T(\hat{\mu}_{sg}(0))$$

$$+\alpha \int_{v_{T-1}^*(\mu_{T-1})}^{\infty} \{\bar{\pi}\bar{v} + (1-\bar{\pi})\underline{v}_t - q(1+r) - \underline{c} + \beta V_T(\hat{\mu}_{sg}(1))$$

$$+(1-\alpha)\int_{-\infty}^{v_{T-1}^*(\mu_{T-1})} \{\bar{\pi}\bar{v} + (1-\bar{\pi})\underline{v}_t - q(1+r) - \underline{c} + \beta V_T(\hat{\mu}_{sg}(0))$$

$$+(1-\alpha)\int_{v_{T-1}^*(\mu_{T-1})}^{\infty} \{\bar{\pi}\bar{v} + (1-\bar{\pi})\underline{v}_t - q(1+r) - \underline{c} + \beta V_T(\hat{\mu}_{sg}(1))$$

whether the programs proposed, and in some cases initiated, could actually improve function in secondary loan markets.

We conclude that, unfortunately, these policies were (or would have been) most likely ineffective, and possibly even counterproductive, and we suggest options that may be more successful in addressing future market crises of this sort. Such considerations are not mere academic concerns. This analysis has direct bearing on proposals that the newly enacted Financial Stability Oversight Council may consider in designing regulations for the so-called shadow banking system. It also should help policymakers in addressing future financial crises of a similar sort, if and when they occur.

Failing markets

In the fall of 2007, the total volume of new issuances of asset-backed securities fell abruptly after an almost uninterrupted climb since early 2000; by the fourth quarter of 2008, new issuances of ABS had virtually halted.

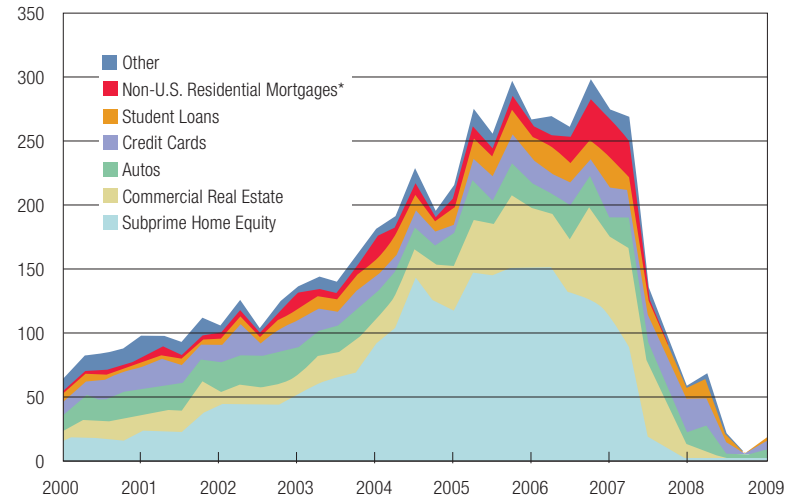
Figure 1 depicts this trend displaying the volume of new issuances of securities backed by assets for various categories, from student loans to subprime home equity, between 2000 and 2009. The consistent rise for almost all ABS categories continued from first quarter 2000 to fourth quarter 2006, climbing from about $50 billion to roughly $300 billion over that span. By third quarter 2007, the total fell to $100 billion, and then to near zero by the end of 2008. (Similar patterns, not illustrated here, have been documented for syndicated loans—that is, very large loans arranged jointly by several lenders for a single borrower.)

This collapse in new issuance volume coincided with a reduction in collateral values. The S&P/Case-Shiller U.S. home price index provides one clear example of this, with steady growth until late 2006 and abrupt decline throughout 2007. (See Figure 2.)

Other economists have suggested that a similar boom-bust cycle existed in the United States in the 1920s, and this is seen in Figure 3, derived from data on annual changes in publicly traded real estate bonds issued against single large commercial mortgages or pools of commercial and real estate mortgages.[2] Again, the trend is a steady climb from zero in 1919 to about $145 billion each year of the mid-1920s, followed by a collapse to roughly $50 billion issued in 1929. These large changes in stock of real estate bonds were likely associated with similar changes in the volume of new issuances.

Figure 1

New issuance of asset-backed securities



*No reliable data after Q3 '08

Source: Morganmarkets, JPMorgan Chase

The 2007-08 collapse in the market for such asset-backed securities was a cause for great concern among policymakers, who perceived it as an indication that the secondary loan market had become extremely inefficient. "Secondary markets have become highly illiquid, and are trading at prices below where they would be in normally functioning markets," declared a U.S. Treasury Department fact sheet on March 23, 2009. Also in March 2009, the Federal Reserve Bank of New York asserted that "[n]ontraditional investors such as hedge funds, which may otherwise be willing to invest in [asset-backed] securities, have been unable to obtain funding from banks and dealers because of a general reluctance to lend."

Policy response

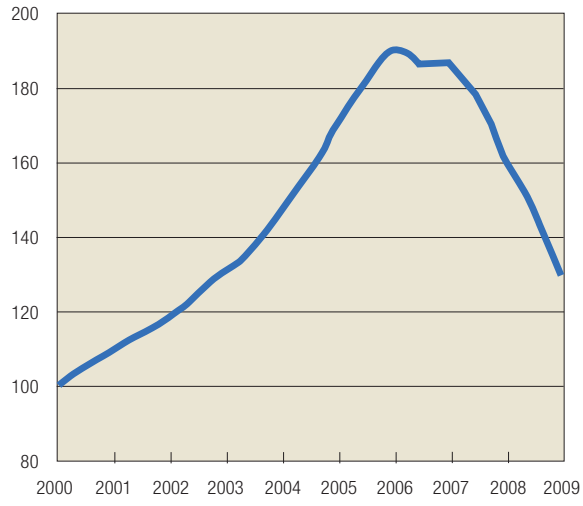
These Treasury and Federal Reserve statements were drawn from documents concerning the proposed and/or adopted policy responses to the perceived market inefficiency. The Treasury Department proposed a Public-Private Partnership for purchasing assets held by distressed financial institutions, but this partnership was never implemented. The New York Fed proposed the TALF, which was quickly enacted.

Under TALF, the New York Fed was authorized to lend up to $200 billion on a nonrecourse basis (meaning that the lender can recover no more than the collateral pledged) to holders of AAA-rated ABS backed by new or recently originated consumer and small business loans. The intention was to increase credit availability and support economic activity by facilitating renewed issuances of consumer and business ABS at normal interest rate spreads. The New York Fed noted that as the ABS market came to a near-complete halt in October 2008, "interest rate spreads on AAA-rated tranches of ABS rose to levels well outside the range of historical experience, reflecting unusually high risk premiums."[3]

To the extent that the interest rate charged by the Federal Reserve under TALF was below market interest rates, this program, which terminated in June 2010, was effectively a subsidy for the private purchase of assets in the secondary loan market. To the extent that the Fed charged market interest rates, it is not clear why it could have been effective. These observations will be evaluated later in this paper.

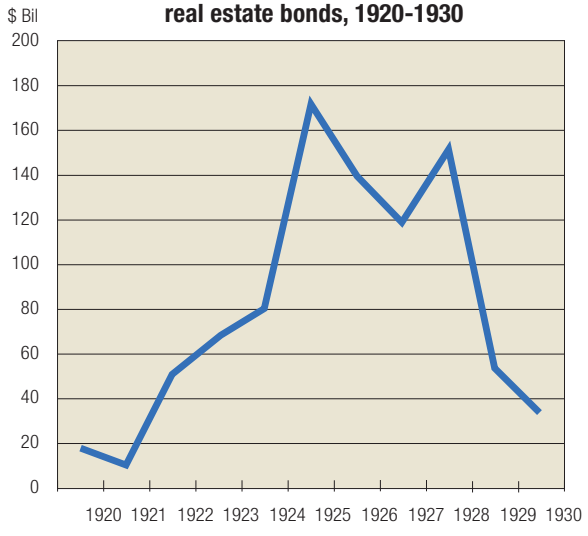
Also, of course, the Federal Reserve System rapidly lowered its target for the federal funds rate

Figure 2 **U.S. home price index**



Source: Standard & Poor's/Case-Shiller

Figure 3 **Change in stock of real estate bonds, 1920-1930**



Note: Data are annual change in real estate bonds divided by Norminal GDP at relevant year multiplied by nominal GDP 2009.

Source: Carter et al., Historical Statistics (2006) Series Dc904

from 5.25 percent in the summer of 2007 to 2 percent by April 2008, and it now stands between 0 and 0.25 percent. The Fed also engaged in massive purchases of assets, a policy referred to as "quantitative easing," which eventually lowered market interest rates in many related credit markets.

The Fed's assessment

Credit markets, including the secondary loan market, have indeed improved since their nadir in the fall of 2008, but the question of whether this improved function was (or could have been) due to implemented (or proposed) policies has not been closely scrutinized. The Federal Reserve, for its part, *does* believe that TALF was effective in restoring efficiency and normal levels of liquidity to dysfunctional markets.

"Overall, the TALF performed impressively," said Brian Sack of the New York Fed in a June 2010 speech.[4] "The program contributed to a substantial improvement in conditions in the securitized credit market, facilitating an increase in the availability of credit to households and businesses."

Sack acknowledged that other factors played a role in the increased efficiency of secondary loan markets: "To be sure, improvements in funding markets broadly and in the macroeconomic outlook during the course of the program clearly influenced the recovery of securitized credit markets." Nonetheless, he asserts that TALF "has been widely credited with helping to jumpstart those markets."

Theory on credit markets

Relying on anecdotal evidence is insufficient for rigorous policy evaluation. To better assess policy effectiveness, we must know what underlies function and dysfunction in credit markets; to do so, we developed a mathematical model based on economic theory. Economic research on credit markets generally, and asset-backed markets in particular, has developed rapidly in the wake of the recent financial crisis. But this leading-edge research is based on long-understood principles, including those of adverse selection and reputational incentives. Our model builds directly on these concepts, so a brief review of each is in order.

Adverse selection is the idea that in markets where buyers and sellers have different levels of (or asymmetric) information, some sellers—often those with goods of the highest quality—may exit the market.[5] Much economic theory on this concept was sparked by economist George Akerlof's celebrated 1970 paper, "The Market for Lemons," which illustrated the idea with a used-car market. Potential sellers of high-quality used cars are likely to leave the used-car market, he showed, because if buyers are unable to judge quality, they will pay no more than an average market price. In the absence of a mechanism to better inform buyers about quality or guarantee their purchases (through "lemon laws"), bad cars will push out better cars, and markets will collapse.

Credit markets, including the secondary loan market, have indeed improved since their nadir in the fall of 2008, but the question of whether this improved function was (or could have been) due to implemented (or proposed) policies has not been closely scrutinized.

Adverse selection is highly germane to secondary loan markets because loan originators (those who initiate the mortgage or other loan contract with the borrower) know the quality of the assets underlying the loan (the home's market value, the borrower's creditworthiness) better than the potential secondary buyer. Indeed, Akerlof's article used credit markets as an additional example to illustrate the theory. There is therefore considerable potential for high-quality loans to exit the market, leaving behind only poor credit risks and bad underlying assets.

Since the mid-1980s, economists have studied adverse selection in asset markets and more recently in markets where assets are securitized. In our analysis, we assume that buyers of secondary loans have less information about loan quality, and there is substantial scholarship supporting this assumption. For example, a recent study by Downing et al. (2009) found that loans which banks held on their own balance sheets yielded more on average than

those which they securitized and sold, indicating that they kept the high-quality loans and sold the "lemons."[6]

Reputational incentive is the second central concept behind our analysis of secondary loan markets. Akerlof pointed out that certain practices and institutions have developed to counteract the effects of quality uncertainty: Guarantees, brand names, store chains and licenses certifying proficiency are examples. Each is a means of creating trust or confidence in quality of the good or service being sold, and might therefore defuse concerns about true value and adverse selection. Each, in short, seeks to build reputation.

In loan markets, trust is paramount, so those who seek to borrow or, by extension, to resell loans they've originated, have a strong incentive to establish a reputation of trustworthiness. These reputational incentives have been studied in a number of economic settings, from central banks to chain stores to predatory monopolists. In a 1989 analysis of debt markets, Diamond analyzed the reputational incentives that borrowers face in the markets where adverse selection is a problem.[7] "The value of a good reputation rises over time, as does the cost of a default," he argued. "If there is sufficient adverse selection, then a typical equilibrium path for a borrower … is to choose risky projects when 'young' and, if able to survive long enough without a default, to switch to safe projects from that point forward."

Generally speaking, the economic literature suggests that the existence of incentives to build a good reputation improves economic welfare—that is, equilibrium outcomes are better in models *with* reputational incentives than in models *without* them. But more recent work has suggested that in some settings, reputational incentives can result in worse outcomes. If participation in a market is optional for short-run players and if actions by long-run players that encourage participation by short-run players can be interpreted as a signal that the long-run player is "bad," then reputational incentives have bad economic consequences.

Like much game theory, that sounds quite abstract. To make it more concrete, the economists who have done this research use an example, as did Akerlof, from the automotive world.[8] Consider car mechanics who have a choice of whether to replace a car's engine (and charge the customer accordingly) *only* if it's necessary, or to replace it *regardless* of whether the engine is faulty. If customers can only gauge mechanic quality by whether their car runs well after the visit to the mechanic's shop, and bad mechanics increase profits by charging for repairs they don't perform, then even good mechanics have a pecuniary incentive to become bad—that is, to charge for unneeded repairs. So, reputational incentives, interacting with adverse selection, can lead to bad outcomes.

A model of secondary loan markets

The same, we found, is quite true in secondary loan markets: Our analysis demonstrates that reputational incentives can lead to poor outcomes in these markets when adverse selection is present. In particular, *our model of the secondary loan market demonstrates how adverse selection and reputation interact to yield abrupt collapses in loan volume, with increased inefficiency*. This "freeze" in the secondary loan market is precisely what policymakers perceived during the U.S. financial crisis of 2007-09 and sought to address with a variety of initiatives.

We begin with a very basic model—we call it our benchmark—which is *static*: There is just one round of transactions in the secondary loan market, rather than a series carried out over time. There are three types of actors or agents in this model: a loan originator (referred to as a "bank" in the following discussion), a set of buyers and a set of lenders. Banks have one loan apiece (a home mortgage, for example, or an asset-backed security). A bank with a high-risk loan is considered a low-quality bank; those with low-risk loans are high-quality banks. Banks are also sorted by their expense levels as either high-cost or low-cost.

Buyers offer to buy the banks' loans on the secondary market, and the primary decision of each bank is whether to hold onto its loan or to sell it to the buyer who offers the highest price. Lenders provide financing to banks that decide to hold onto their loans, receiving principal and interest at the going rate. In deciding which loan to purchase, buyers consider a bank's reputation, which is the lender's belief about the probability that the bank is high-quality.

Exploring the mathematical properties of this static benchmark model, we find that it produces an

efficient allocation of loans. That is to say, with a single round of transactions between banks and buyers, loans will be allocated with complete economic efficiency to those parties with the highest comparative advantage. If a bank is a low-cost bank, it will hold its loan; if it is a high-cost bank, it will sell its loan to the highest bidder.

A dynamic model

But the situation becomes more complex—and interesting—when we move to a more realistic *dynamic* scenario in which banks, buyers and lenders are able to evaluate one another's behavior in previous transactions before deciding what to do in the next round of transactions. This opens the door to concerns about reputation; because of asymmetric information—banks know more about the risk level of their loan than do potential buyers—there is potential for adverse selection. Banks with high-quality loans are more likely to hold rather than sell them, leaving a market full of low-quality (lemon) loans. But knowing that high-quality banks tend to stay out of the market, a bank with a low-quality loan might act strategically by holding onto its loan in one round to create a (false) reputation that it is a high-quality bank.

We find that unlike the static model, which resulted in a clear and unequivocally efficient outcome, this dynamic model with adverse selection and reputational incentives generates "fragile" outcomes, in two senses. The first type of fragility is that it isn't immediately clear whether reputation concerns will lead to good or bad results—in the jargon of economists, the model has "multiple equilibria"—so both outcomes are possible. The model's second fragility is that small drops in collateral values can generate large and abrupt collapses in new issuances on the secondary loan market, collapses associated with increased inefficiency.

Thus, our dynamic model—with reputation concerns and also the adverse selection that occurs with asymmetric information—ends up providing a very good testing ground for real world policies that seek to mitigate dysfunction in secondary loan markets.

A deeper look at fragility

Concerns about reputation arise with repeated transactions because actors in the model economy can look to the past and make judgments about other actors before deciding whether to engage in another transaction, just as a customer would return to a store if previous purchases at that store seemed reasonably priced and of high quality. Knowing this, the store will try to offer products of good quality at reasonable prices, or at least try to convey that impression. In other words, it will attempt to build its reputation.

Similarly, a bank in our model will—in deciding whether to sell or hold its loan—bear in mind the effect of its action on its reputation. But our model demonstrates that it isn't clear cut whether that reputational concern will result in good outcomes or bad. The dynamic model produces two mathematically correct solutions—equilibria—one good and one bad.

In the good outcome that we call the "positive reputational equilibrium," high-quality loan originators have incentives to *sell* their loans at a current loss because they want to improve their reputation so that they can obtain higher prices in the future. In the bad outcome, the "negative reputational equilibrium," loan originators who sell are perceived to have low-quality loans. That perception convinces banks with high-quality loans to *hold* onto them even if it isn't profitable to do so. In this second outcome, then, the volume of loan issuances is smaller than in the good outcome, and (under specified conditions) market efficiency suffers.

The second type of fragility in this model economy is superficially similar to the first: A small change in a fundamental economic value—in this case, loan collateral—can generate a dramatic change in an aggregate market value: an abrupt collapse in loan issuances on the secondary market. This result is, of course, remarkably akin to the real world outcome during the recent financial crisis, and that helps form the base for our policy analysis.

The model's ability to generate the latter type of fragility can be seen in the two adjacent graphs. The first graph (Figure 4) depicts the sell/hold decision threshold for high-quality banks (those with low-risk loans). According to the model's mathematics, the curve represents the cut-off line for a bank in judging whether to sell a loan, depending on the market value of its collateral. At a collateral value of 4, banks with reputation levels below roughly 0.65 hold their loans and those with higher reputations sell. This means that if collateral values fall from 5 to 4, a large segment of banks—those with reputa-

tion levels roughly between 0.4 and 0.65, will decide to withdraw from the secondary loan market. Put otherwise, the graph illustrates that as collateral value falls, the adverse selection problem worsens, and only the lowest-quality banks (with highest-risk loans) remain in the market.

The second graph (Figure 5) displays the volume of lending trade, the fraction of all banks that sell their loans as a function of collateral value. This shows that as the market value of a loan's collateral (its default value) decreases from 1.3 to 1.1, the volume of trade collapses by half, from 60 percent of banks selling their loans on the secondary market to just 30 percent. (We also found that this second type of fragility doesn't depend on whether the market is in the positive or negative reputational equilibrium. The secondary loan market can collapse regardless.)

Was policy effective?

While building this complex model of the secondary loan market is rewarding from a research perspective, contributing to the academic literature on both reputation concerns and financial market behavior, we believe it also has substantial value in allowing for evaluation of proposed and implemented policies that sought to address dysfunction in secondary loan markets. Rather than examining the details of these specific programs, we analyze two general policy types:

- Policies by which the government would purchase asset-backed securities at above-market value (similar to the TALF and to the Public-Private Partnership plan that was not enacted).

- Policies that decrease the costs of loans held to maturity (which include changes in the fed funds target rate and increased deposit insurance levels from the Federal Deposit Insurance Corp.).

Buying toxic ABS

When analyzed with our dynamic adverse selection model, policies under which the government would offer to purchase so-called toxic assets at prices above current market value would in all cases involve transfers to banks and imply that the government will make negative profits.

If prices offered to banks are below the level that prevails in our positive reputational equilibrium, market outcomes will not significantly change. Our model shows that banks with high-quality loans would enjoy no reputational gains by selling to government and would continue to stay out of the secondary market. Only banks with low-quality loans would sell to government, with no net benefit to the economy.

If, on the other hand, prices offered by government were sufficiently high, the purchase policy would leverage reputational incentives and could overcome adverse selection problems. Still, the gov-

Figure 4 **Cutoff thresholds for high-quality banks**

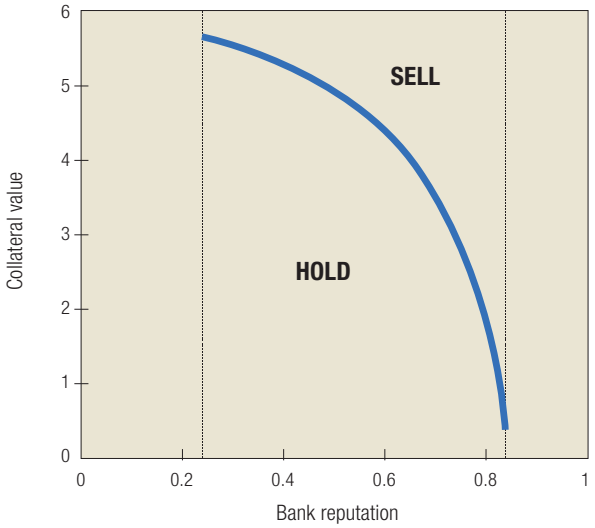
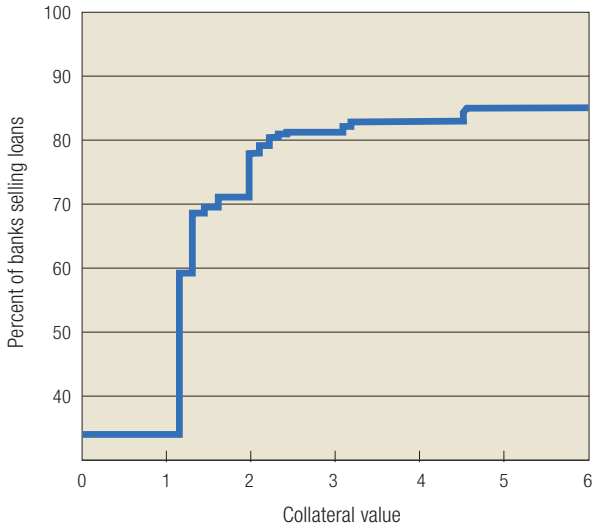


Figure 5 **Volume of trade as a function of shock to collateral value**



ernment would, through its transfers to banks, lose money in this effort to unfreeze the market.

Lowering rates

We then look at policies of lowering interest rates so as to decrease costs of holding loans to maturity. If the government reduces current interest rates and leaves future rates unchanged, our model shows, the policy will aggravate the lemons problem in secondary loan markets by encouraging banks with high-quality loans to retain rather than sell their loans. If, on the other hand, the government leaves current rates unchanged but commits to reducing future rates, it can improve current allocations but will make later allocations less efficient by increasing banks' incentives for holding onto their loans. And, of course, in the future the government would face strong incentives not to hold to its earlier commitment to reduce rates and thereby increase allocation inefficiency.

Other policy options

An alternative policy that we analyze with the model is *forced asset sales*. Under this policy (not proposed), government would randomly select banks and require them to sell their loans. The policy would by force generate a pool of loans in secondary markets, just as requiring home mortgage owners to purchase home insurance ensures a wide risk pool. However, this standard solution to adverse selection problems would come at a cost of loan misallocation: In some instances, low-cost banks would be forced to sell their loans, reducing the market's overall efficiency in terms of comparative advantage.

Another alternative would be for the government to commit to purchasing assets in the future at prices contingent on signals about loan value. Our model shows that such a policy would support the positive reputational equilibrium, meaning that reputation concerns would overcome adverse selection problems and result in efficient market allocations. The feasibility of such a policy deserves further research, but would necessitate a model in which governments can commit but private parties cannot.

Conclusion

The volume of new loan issuances dropped sharply in the secondary loan market during the recent financial crisis, and U.S. policymakers responded with a variety of proposals aimed at restoring normal market function, including purchase of assets at above-market prices and reducing the costs of holding loans to maturity.

We have built a model of the secondary loan market in which its primary economic function is to allocate loans to those institutions—originators or secondary owners—that have a comparative advantage in holding and managing them. Because loan originators are better informed than potential purchasers about their loan quality, the markets suffer from adverse selection. We use a dynamic adverse selection model of the secondary loan market to determine whether reputational incentives improve or aggravate market outcomes.

Our model has fragile outcomes in the sense that it generates sudden collapses in new issuance volume due to small changes in collateral value. Such collateral drops and market collapses, associated with increased market inefficiency, resemble those seen empirically in late 2007 during the U.S. financial crisis.

We therefore use the model to analyze programs that were proposed and in some cases implemented by policymakers to address loan market dysfunction and find that they do little to resolve the market's inherent adverse selection problem. We conclude that, unfortunately, these policies were (or would have been) most likely ineffective, and possibly even counterproductive, and we suggest options that may be more successful in addressing future market crises of this sort. Such findings have direct bearing on proposals now under consideration vis-à-vis regulatory design for segments of the financial industry that are currently subject to little oversight and regulation. R

Endnotes

[1] This policy paper is based on: Chari, V. V., Ali Shourideh and Ariel Zetlin-Jones. 2010. Adverse Selection, Reputation and Sudden Collapses in Secondary Loan Markets. NBER Working Paper 16080.

[2] The data displayed in Figure 3 are scaled for comparability to recent ABS-issuance trends: Annual change in real estate bonds from the 1920s is divided by nominal GDP in each year, multiplied by nominal 2009 GDP.

[3] Federal Reserve Bank of New York. 2010. Term Asset-Backed Securities Loan Facility: Frequently Asked Questions. July 21. (http://www.newyorkfed.org/markets/talf_faq.html)

[4] Sack, Brian P. 2010. Reflections on the TALF and the Federal Reserve's Role as Liquidity Provider. Remarks to the New York Association for Business Economics. New York City, June 9. (http://www.newyorkfed.org/newsevents/speeches/2010/sac100609.html) Sack elaborated: "By providing liquidity and a backstop to limit losses to investors, the TALF contributed importantly to the revival of securitized credit markets. Secondary spreads narrowed significantly, and volatility moderated. Moreover, the improvements in the secondary market helped restart the new-issue market. Issuance of non-mortgage asset-backed securities jumped to$35 billion in the first three months of TALF lending in 2009, after having slowed to less than $1 billion per month in late 2008."

See also: Robinson, Kenneth. 2009. TALF: Jump-Starting the Securitization Markets. *Economic Letter—Insights from the Federal Reserve Bank of Dallas* 4 (August), and Dudley, William C. 2009. A Preliminary Assessment of the TALF. Remarks at the Securities Industry and Financial Markets Association and Pension Real Estate Association's Public-Private Investment Program Summit. New York City, June 4. (http://www.newyorkfed.org/newsevents/speeches/2009/dud090604.html)

[5] Akerlof, George A. 1970. The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics* 84 (August), pp. 488-500.

[6] Downing, Chris, Dwight Jaffee and Nancy Wallace. 2009. Is the Market for Mortgage-Backed Securities a Market for Lemons? *Review of Financial Studies* 22 (7), p. 2257.

[7] Diamond, Douglas W. 1989. Reputation Acquisition in Debt Markets. *Journal of Political Economy* 97 (August), pp. 828-62.

[8] Ely, Jeffrey, and Juuso Välimäki. 2003. Bad Reputation. *Quarterly Journal of Economics* 118 (3), 785-814, and Ely, Jeffrey, Drew Fudenberg and David Levine 2008. When Is Reputation Bad? *Games and Economic Behavior* 63 (2), pp. 498-526.

Child Health and Future Success

A Minneapolis Fed-University of Minnesota conference

Rob Grunewald
Associate Economist

The importance of early childhood development for school success and adult well-being is supported by a growing body of research from neuroscience, psychology, medicine, education and economics. Research also demonstrates that the future benefits of investing in the early years accrue not only to the children themselves, but to all of society through reduced social costs, higher tax revenue and a more productive and competitive workforce.

These findings led the Federal Reserve Bank of Minneapolis to bring researchers from several disciplines under one roof to discuss the science and policy of the early years, beginning with the first of three national conferences in 2003 with a focus on economic policy. The second conference in 2007 scoured cost-effectiveness studies on investments during children's first decade. On Oct. 14 and 15, 2010, researchers descended on the Minneapolis Fed for a third conference, "Health and Early Childhood Development: The Impact of Health on School Readiness and Other Education Outcomes."

All three conferences were co-sponsored with the University of Minnesota. The past two conferences were developed by the Human Capital Research Collaborative (recently renamed from Early Childhood Research Collaborative), a cooperative effort by the Minneapolis Fed and the University of Minnesota to advance multidisciplinary research on child development and social policy.

In describing why the Minneapolis Fed is interested in early childhood development issues, President Narayana Kocherlakota said in opening remarks, "We need turn no further than the first two words in the HCRC acronym, 'human capital.' One of the key ingredients to sustained economic growth is the development of human capital."

Robert Bruininks, president of the University of Minnesota, echoed this theme: "I think the key words for the 21st century are going to be human capital and the development of human capital." Bruininks described the current challenge as a perfect storm composed of two winds—just when the economy will need more highly skilled workers than ever before, the percentage of students from backgrounds that have historically underperformed educationally is at an all-time high. "If we are going to weather this perfect storm …. we will need to improve opportunity and performance for all students from early childhood through higher education."

What determines health and well-being?

A primary task of the conference presenters was to better explain the determinants of early health outcomes themselves.

Health outcomes are often considered from a medical perspective, that is, as a function of the health care system alone. But Paula Braveman, professor of family and community medicine at the University of California, San Francisco, pointed out that health improvements enjoyed during the past 150 years are probably due more to better living and working conditions than to advances in medical practices. As an example, infant mortality in England steadily decreased from the early 1900s through the 1960s, but neonatal intensive care units weren't widespread until the 1970s. While advances in medicine have improved overall well-being, current health disparities seem to be largely influenced by income, education, and racial and ethnic group. Furthermore, the situa-

tions young children are exposed to, for better or worse, leave their mark for the rest of their lives.

Greg Duncan, professor of education at the University of California, Irvine, looked specifically at the relationship between family poverty during early childhood and later adult earnings. Using data from the Panel Study of Income Dynamics and accounting for family characteristics, Duncan and colleagues found that for children growing up in families with average incomes below $25,000, a $3,000 annual boost to family income between the prenatal year and age 5 is associated with a 17 percent increase in adult earnings. The same relationship doesn't exist for family income while children are older than age 5, suggesting that family income during the early years has a stronger influence on adult earnings than family income during middle and later childhood.

Duncan and colleagues also concluded that neither educational attainment nor behavioral outcomes (lack of arrests or nonmarital births) account for links between early income and adult earnings. However, they found that $3,000 increments to low income early in life are associated with reductions in the odds of obesity, hypertension and arthritis later in life. "Although more research is obviously needed," the authors noted, "these health pathways involving stress and inflammation appear to be very promising linkages between poverty early in life and adult labor market productivity."

Michael Georgieff
University of Minnesota

Michael Georgieff, professor of pediatrics and child psychology, University of Minnesota, turned to the impact of nutrition on brain development. Cells require certain doses of nutrients, such as proteins, vitamins and minerals, during specific time periods in order to grow and mature. "You can pretty well predict … what types of outcomes you are going to get for a given nutrient deficit," he said. Nutrition deficits can affect motor development, learning and memory, mental health and the immune system.

Georgieff noted that maternal nutrition is not the only influence on the transmission of nutrition during pregnancy; maternal stress can affect fetal nutrition. In this case, "the solution isn't a nutrient solution, but a nonnutrient solution."

How health interventions make a difference

Several researchers discussed programs that address adverse conditions in early life. Bernard Guyer, professor of children's health at the Johns Hopkins Bloomberg School of Public Health, presented a meta-analysis of studies on interventions to curb childhood tobacco exposure, unintentional injury, obesity and mental health issues, noting that "child health is more than the absence of disease."

Guyer and his colleagues calculated the total costs of these conditions, ranging from $65 billion to $100 billion per birth cohort. Research on reducing tobacco exposure was the most prevalent. One study estimated that a 15 percent reduction in parent smoking could save $1 billion per year in direct medical costs. "It's important to put children's health in a life span perspective because it's easy to ignore children in a policy world that focuses primarily on cost and cost containment, because the costs are incurred later in life, but the antecedents occur early in life," he said. Guyer concluded that the evidence points to the power of broad public health approaches rather than relying on individual medical or behavioral change interventions.

Bernard Guyer
Johns Hopkins Bloomberg School of Public Health

Researchers have uncovered evidence that depression among parents impacts their children. Mary Jane England, president of Regis College, noted that 7.5 million parents are affected by depression each year. Depression among parents is associated with more sick-child emergency room visits, fewer well-child visits to a clinic and

Mary Jane England
Regis College

increased risk of low birth weight and child obesity. England emphasized the importance of screening adults for depression, particularly "if we want to give individuals the right to control their own health and services they receive." A number of effective tools are available to treat depression. England noted that community-based approaches (screening and treatment) among vulnerable populations are critical for overcoming depression-related stigma and reducing health disparities.

The agenda then shifted to two efforts that augment existing programs. First, Karen Bierman, professor of psychology at Pennsylvania State University, discussed the impact of the Head Start REDI Project, which enriches Head Start programs with curriculum and teacher training to improve language, literacy and mental health for 3- and 4-year-old children living in poverty. Bierman showed that measures of teaching practices and child cognitive and social-emotional outcomes improved in one year.

Karen Bierman
Pennsylvania State University

Second, Diane Stanton Ward, professor at the Gillings School of Global Public Health, University of North Carolina at Chapel Hill, described the implementation of a self-assessment tool for child care centers to evaluate nutrition and physical activity as a way to help address childhood obesity. Ward noted that the incidence of child obesity has grown threefold since the early 1970s. Today about one of seven low-income preschool children is considered obese, and obesity is associated with poor school performance and behavior problems.

National health policy

Researchers then discussed the impact on children of sweeping changes in federal health care policy. Jean Abraham, assistant professor at the University of Minnesota School of Public Health, found that prior to passage of the Patient Protection and Affordable Care Act (PPACA), about 10 percent of children (below age 18) were uninsured and about 20 percent of families with health insurance were underinsured. Abraham noted that eligibility for Medicaid will expand in 2014 and that state exchanges for individual coverage will provide subsidies for families who earn low to moderate levels of income but don't qualify for Medicaid.

"There is a positive association between having health insurance and preventive care, which is valuable for well-child visits for assessing development, as well as insuring children receive clinically recommended immunizations," Abraham said. In addition to expanding health insurance access, PPACA provides funding for maternal and child home-visiting programs.

Laurie Martin, policy researcher at the RAND Corporation, broadened the discussion beyond PPACA to the impact of parents' health literacy on their children, that is, "their ability to find [and] … understand information, and ability to use information and act on it." Martin described a number of areas where disseminating accessible health information to parents could be improved, including through early childhood programs.

Martin Gaynor, professor of economics and public policy at Carnegie Mellon University, presented research on the effect of competition on health care quality. Gaynor and his colleagues investigated the impact of a policy to promote competition between hospitals in England. After implementing the policy, the researchers found that mortality rates for heart attacks were lower in markets with higher levels of competition. "We find that the effect of competition is to save lives without raising costs."

Jack Shonkoff
Harvard University

Art Rolnick
University of Minnesota

Bringing it all together

Many policy areas affect child development, such as education, health, human services and economic development, noted Jack Shonkoff, professor of child health and development and director of the Center on the Developing Child at Harvard University. "An integrated science of early childhood development could drive more productive investments across these sectors."

Shonkoff noted that the science base on early childhood development is rich and growing rapidly, yet there are "persistently ineffective or inadequate interventions to reduce disparities in health, learning and behavior." Expanding health insurance and reducing inequalities within the medical care system do not address the fundamental causes of disparities in health related to social class, race and ethnicity. Shonkoff argued that science can "enhance our capacity to promote health and prevent disease, not just treat illness."

The conference concluded with three observations by HCRC co-directors Arthur Reynolds, professor at the University of Minnesota's Institute of Child Development, and Art Rolnick, senior fellow at the University of Minnesota's Humphrey Institute for Public Affairs and retired director of Research at the Minneapolis Fed.

1. Strategies have expanded greatly in a number of disciplines to promote health and well-being.
2. There is a reciprocal and dynamic influence between health and education across the life span that requires not only a service delivery strategy, but also a research and development strategy.
3. The determinants of health and well-being are important to understand at the individual level, but also at the parent, family, community and state/federal policy levels.

Reynolds noted that "we have to integrate knowledge and information across fields, which requires collaborative groups like the HCRC." R

For video, papers and presentation slides from the conference, visit the HCRC Web site at www.humancapitalrc.org. The site also has information about *Childhood Programs and Practices in the First Decade of Life,* based on the 2007 conference, published by Cambridge Press.

Research Digest

The Region often includes one or two articles about economists at the Minneapolis Fed and their current work. Research Digest is a new *Region* feature that provides shorter summaries of recent economic research papers.

In this issue, the Digest discusses research by Greg Kaplan on economic motivations behind decisions by young adults to live with their parents or apart.

Crashing for Insurance

Greg Kaplan's research explores the economics of "Boomerang Kids."

In some countries, it's common for young adults to live with their parents, even after they get married, but if one believes media accounts, this is a fairly new phenomenon in the United States. Numerous news reports and books have focused on "Boomerang Kids"—Gen Xers and Millennials who, perhaps due to changing social norms, live in their childhood bedrooms or Mom and Dad's basement into their late 20s or 30s.

A new paper by Greg Kaplan, assistant professor at the University of Pennsylvania and a former Minneapolis Fed staff economist, suggests an economic explanation for the phenomenon. "[T]he option to move in and out of home is a valuable form of insurance against shocks in the labor market, particularly for youths from low-income households," Kaplan writes in "Moving Back Home: Insurance against Labor Market Risk" (Minneapolis Fed Staff Report 449, online at minneapolisfed.org).

Kaplan uses data from the 1997 National Longitudinal Study of Youth, a survey that follows a large number of young adults of varied backgrounds born between 1980 and 1984, catching up with them annually afterward. Among many other variables, the survey tracks work history

Research Digest

One lesson of this model for parents is a version of the Samaritan's dilemma—by helping someone currently in need, the good Samaritan also encourages behavior that is ultimately counterproductive. In this case, children who can get money or shelter from their parents end up saving less of their wages than they would otherwise.

and place of residence, so it provides ideal data for research on how labor markets affect the decision to move back home.

This research doesn't illuminate how new the boomerang phenomenon might or might not be, which would require tracking the total fraction living at home over many years. Rather, it looks at a large group of people of roughly the same age and teases out what motivates them to leave or return home.

Kaplan starts by restricting attention to those survey takers whose parents are still alive and who haven't served in the military or gone to college. Because the survey stopped asking about living at home in 2002, when many of its subjects would have been just finishing or still in college, it isn't very informative about the residential decisions of the college educated. Further, the analysis only considers men because women, particularly those with children, are much more likely to receive government benefits, which interferes with the decision to move home or live apart. What's left is a large set of monthly observations of young men who started working after leaving high school.

The next step is setting up a model of the interactions between parents and their children regarding decisions about work, savings and residence. Parenthood, as every mother knows, is a thankless job, so Kaplan assumes that children are concerned only about their own well-being. Parents, by contrast, care about their children's welfare as well as their own (though this altruism is limited) and can support their children through direct financial payments or through offering them shelter.

In addition to living rent-free, children moving home receive other perks; think cable TV or a fridge full of snacks. While leaving home eliminates those benefits, it satisfies a preference for independence, which increases over time but is subject to occasional shocks—bouts of homesickness—that make moving back home more desirable.

The labor market is the model's final ingredient. Workers are assumed to have some chance of getting fired in every period. When unemployed, their chances of finding a job paying a given wage diminish as that wage increases. The decision to accept a job offer depends on the wage, the chance of finding a higher-paying job by waiting and the consequences of remaining unemployed.

It has long been known that income fluctuates more than consumption. When people are out of work, they use savings, credit or unemployment insurance to maintain the lifestyle to which they've become accustomed. When working, they pay debts incurred in bad times and save money for rainy days in the future.

Kaplan's argument is that for young workers, moving back home is another *consumption-smoothing* device. "By reducing the consumption response to labor market shocks, the option to live at home can help explain why young households appear to have access to insurance possibilities over and above that implied by self-insurance through savings," he writes.

To determine just how important this insurance is, Kaplan runs the data from the survey through his

Research Digest

model. Then, as an experiment, he examines the model's results after removing financial transfers from parents and after removing the option to move back home. The comparison gives a measure of the importance of these sources of insurance.

Not surprisingly, Kaplan's results show that financial transfers are a more important form of insurance for young men with wealthier parents, about three times as important for the richest 25 percent of children as for the poorest. Correspondingly, the option to move home is more valuable to poorer children (about five times more valuable for the poorest 25 percent compared with the richest). This is so even after accounting for the fact that lower-income homes offer less of the "public" consumption good (cable and snacks) than higher-income homes.

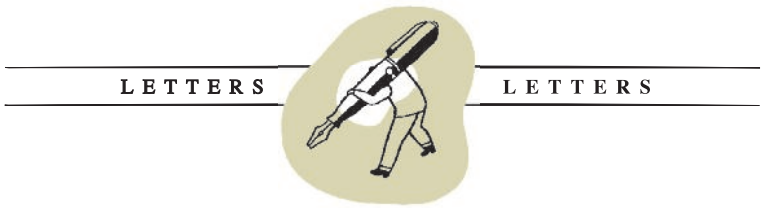
One lesson of this model for parents is a version of the Samaritan's dilemma—by helping someone currently in need, the good Samaritan also encourages behavior that is ultimately counterproductive. In this case, children who can get money or shelter from their parents end up saving less of their wages than they would otherwise. This is a new explanation for why savings rates among young people are often observed to be lower than economic theory predicts.

More broadly, Kaplan notes that macroeconomic theories usually divide the life cycle neatly between childhood and adulthood. "This paper," he writes, "suggests there is an important transitional phase, where interactions between housing, career and marital decisions may have long-term implications."

Kaplan also draws attention to a related policy issue. If workers can smooth their incomes with money and shelter from their parents, then the consumption-smoothing benefits from unemployment insurance may be smaller than previously thought. Unemployment insurance could also "crowd out" this private insurance, rendering it less important than it would be otherwise.

More broadly, Kaplan notes that macroeconomic theories usually divide the life cycle neatly between childhood and adulthood. "This paper," he writes, "suggests there is an important transitional phase, where interactions between housing, career and marital decisions may have long-term implications."

—Joe Mahon



Dear Editor,

The analysis and conclusions of the articles on scale economies by Loretta Mester and Robert DeYoung would have been persuasive if published in 2007. But the articles are appearing in the fall of 2010. [See "Scale Economies in Banking: A Symposium" in the September 2010 issue of *The Region,* online at minneapolisfed.org.] Mester notes that research has become more sophisticated regarding scale economies by including risk management in the analysis. The new and improved research concludes that scale economies extend to the very largest banking institutions. Surely the fact that the top 10 banking firms in the United States went bankrupt in 2008 should lead to a far different conclusion. The fact that these firms were bailed out by the federal government does not invalidate that conclusion. The marketplace concluded that these banks should go out of business. The fact that this conclusion applied to virtually every single very large bank but only to a small fraction of the other banks should certainly give pause to those who argue that scale economies go on forever.

David Morris
Vice President
Institute for Local Self-Reliance
Minneapolis, Minn.

Editor's note:

The writer argues that the support offered to creditors of financial institutions during the recent financial crisis proves that economies of scale don't exist in banking. We disagree.

Why? A bank could well be fully solvent, with a solid balance sheet, yet face a liquidity crisis if it's unable to pay immediate bills because assets cannot be sold quickly enough to cover them.

In this season, we need look no further than television to find a clear illustration of the insolvent/illiquid distinction. George Bailey's predicament in "It's a Wonderful Life" was one of illiquidity: He ran a solvent bank with a solid balance sheet that—due to a bank run—faced a severe cash flow crisis. Fortunately, Bailey's friends, family and larger community rescued the bank with a cash infusion.

To the degree that the 2007-09 financial crisis had features of a bank run, the presence of scale (or not) has little to do with the bailouts provided. Yale's Gary Gorton argues in our December issue that the recent crisis was a classic banking panic, a run on financial institutions sparked by an unexpected collapse in housing prices. Prevention of bank runs is the rationale behind government insurance for deposits in solvent banks.

The writer raises an important issue, nonetheless, about letting market discipline close down financial institutions that are truly *insolvent*—that is, allow markets to determine an insolvent bank's fate without providing government assistance for its creditors. We agree.

We have offered many recommendations to minimize bailouts by reducing the spillover effects of bank collapse. Interested readers can visit http://www.minneapolisfed.org/publications_papers/studies/tbtf/index.cfm for an extensive discussion.

Letters are welcome at letters@mpls.frb.org.

BOOK REVIEW  BOOK REVIEW

Hollowing Out the Middle:
The Rural Brain Drain and What It Means for America
By **Patrick J. Carr** and **Maria J. Kefalas**
Beacon Press
239 pages

The Wealth and Poverty of Regions:
Why Cities Matter
By **Mario Polèse**
University of Chicago Press
254 pages

Reviewed by **David Fettig**
Senior Editor

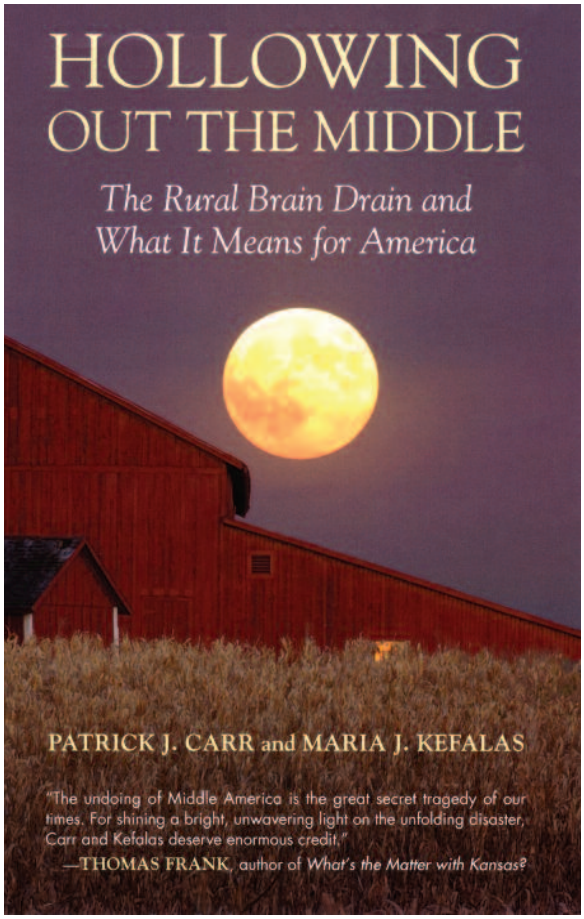
> *What can people be paying Manhattan or downtown Chicago rents for, if not for being near other people?*
> —Robert E. Lucas

My mother and father grew up on North Dakota farms in first-generation and second-generation immigrant families, respectively. Between their families, there were 18 children, 14 of whom stayed in the state to seek their fortunes and raise their own families. I grew up in one of those families in Bismarck, N.D., along with my eight brothers and sisters, only one of whom now lives in the state. The rest of us are scattered from coast to coast, with one overseas. So, from one generation to the next, the stay-at-home rate went from 78 percent in my parents' families to 11 percent in the family they created.

Multiply that one little anecdote by many thousands, and you have the demographic story of the Great Plains, as well as other rural areas in the United States, as people have moved from the farm to nearby cities and to points across the country and around the world, all within a couple of generations. If you were one of the authors of *Hollowing Out the Middle,* you would view this as a big problem for those rural areas and a call for action. But if you were the author of *The Wealth and Poverty of Regions,* you would view this as so much economic destiny, an unsurprising trend that has occurred throughout the world as technological efficiencies have shifted labor from the land to the city.

That these two books would have such distinct reactions to this demographic phenomenon is suggested by the backgrounds of the authors. *Hollowing Out the Middle* is written by two sociologists who traveled to a small (unnamed) town in Iowa to survey its citizens and to come to a better understanding of why so many young people choose to leave. During their stay, the authors turned their focus from "is" statements (what is happening) to "ought" statements (what ought to be done). In other words, they saw some facts and wanted to change them. *The Wealth and Poverty of Regions* is written by an economic geographer interested in why differences in wealth exist among different communities and regions within nations. In his case, he saw some facts and wanted to explain them.

These issues are important, not only for rural areas that are struggling with what to do, if anything, about dwindling populations, but also for successful small cities and large metro areas that want to keep their competitive edge. A lot of money is spent every year by government offices at all levels to revive this region or that town or another city. Some succeed, many fail and most keep trying.



Many achieve, few return

The value of *Hollowing Out the Middle* is in its original premise, which was to survey "the experiences of young adults from nonmetropolitan America" on choices those young people make about their future. Carr and Kefalas group these young adults into the following categories: Achievers, Stayers, Seekers and Returners (broken down as High-Flyers and Boomerangs). For anyone interested in the stories behind the demographic ebb and flow of the rural Midwest, these chapters add insight to the data. For example, the following stories are told:

- Achievers: A young girl likes her small-town Iowa life and would prefer to stay, but she knows she has to leave to achieve any sort of professional potential. Indeed, her parents encourage her to leave. She attends Stanford and completes a graduate degree in statistics.
- Stayers: Young women decide to stay and marry and begin families. One testifies: "I thought that's just what I had to do. Not that I had to do it, I just—that's what I wanted to do. I was at a point in my life where I was like, 'Let's get this going.'"
- Seekers: These young people are trying to get out, and many do not have the educational aspirations of their classmates. The military is a primary option. "The fact that he 'didn't have the best grades in the world' and that heading straight to college would not be in the cards led him to view the Navy as 'the best thing,' if only because it 'saved' him 'from getting trapped.'"
- Returners: One young couple, high school sweethearts, return after earning professional degrees and finding opportunities to put those degrees to work. These are Returners of the High-Flyer variety. "'Probably the biggest motivating factor' in returning to the Iowa countryside, Liz said, 'was my family. I want to be close to my extended family. … I chose to stay here because I wanted to raise my children [here]. I enjoy Iowa.'"

If only the authors had stopped there, they would have produced a useful text—although perhaps a lengthy paper instead of a book—that contributes to our understanding of the changing nature of the rural Midwest. Instead, they take the perilous plunge from "is" to "ought." So why should we care about the depopulation of the Midwest? "We should care because the Heartland is the place where our food comes from, it is the place that helps elect our presidents … and it is the place that sends more than its fair share of young men and women to fight for this country."

On the first point, of course we need to care about where our food comes from, whether from land, water or air, inasmuch as we want to preserve and protect the natural endowments that will allow the necessary production of that food. But whether that food is produced on land dotted with towns of 1,000 people or 500 people is of little concern, as we know that there will always be enough labor there to produce what consumers want. Indeed, as Polèse notes in his book, this reduction in agricultural employment reflects increased productivity that has improved the standard of living of rural residents and their city cousins. One way we all benefit from

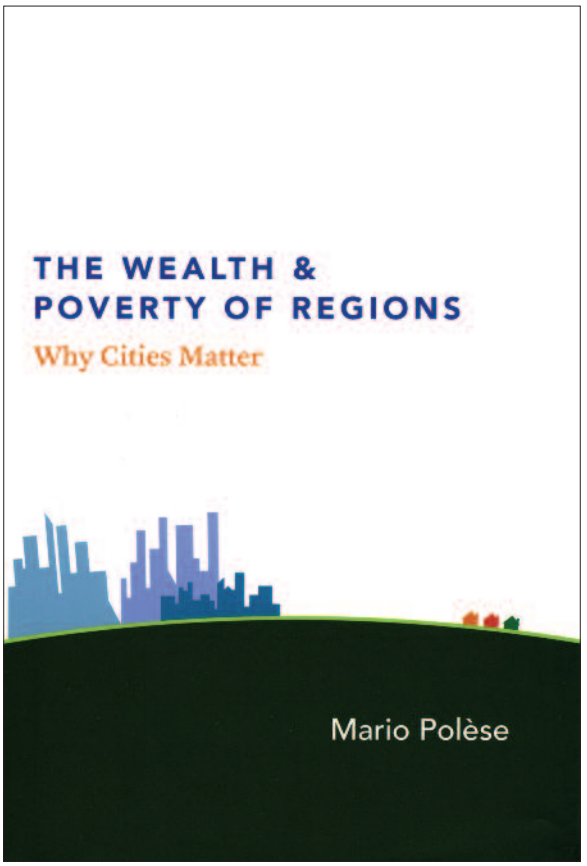
this economic phenomenon is less expensive food, and that's a pretty good outcome.

As to the second point, I am sure that political scientists, political activists and politicians themselves will adequately negotiate presidential primary schedules to better balance the influence of certain states over others. Recent election cycles have seen many states move up their primary dates so as to increase their influence and, thus, the influence of a greater number of American voters. The U.S. political system is changeable; there hardly seems a need to keep rural Iowa populated just because the state has a key primary every four years.

Finally, that a "fair share" of rural youth end up in the military is perhaps owing to the story told above: It's a way out of a small town when there are limited options; or perhaps small-town youth are more driven to serve their country through military service because of tradition, patriotism or some other cultural factor; or perhaps it's a combination of economic and cultural factors, as well as others. Regardless, these recruits will come from somewhere—quotas will be met—and it doesn't seem like a good use of limited resources to keep rural areas thriving to provide a farm system (no pun intended) for the military.

Besides the anecdotal stories in *Hollowing,* the best reason to read this book is one that the authors probably did not intend: It chronicles many of the mostly failed attempts over the years of rural states and towns to reverse the flow of young people and create opportunities for job growth. Many of these schemes involve subsidies of money, taxes and land, and are packaged as slick marketing campaigns to woo both businesses and residents. The authors are encouraged by these efforts, even those that failed, because there are lessons to be learned in the attempt. And they think even more creativity is needed.

Anybody from a rural state involved in programs to retain young people in rural areas, or who otherwise cares about them, would benefit from these stories, if only to forearm their labors. The authors have a zealous belief in these attempts, a faith quite possibly more fervent than that held by many of the state and local officials who work toward these goals and who have been chastened by economic and demographic reality over the years. As the authors note about themselves: "[A]s converts are often identifiable by the strength of their zeal, our immersion in this issue fueled a great desire to place the hollowing-out phenomenon on the crowded national to-do list." But with limited resources and a host of public policy problems to consider, should officials really put this issue at the top of their list, or include it on the list at all? Carr and Kefalas do not make a convincing case, but they do tell some useful cautionary tales.



Size, location and cost rule the day

Carr and Kefalas have one map in their book—it shows net out-migration in U.S. counties from 1980 to 2000, and it shows the movement out of America's interior counties. Rather than a straight descriptive label, Carr and Kefalas headline this map "Decimation of America's Heartland." The word decimation suggests that something awful *has been done* to this region, and the use of the word *Heart*land suggests that this is a special place, worthy of sympathy and concern.

Polèse begins his book with a series of maps from around the world depicting income and GDP per person and population change, among other data points. These maps tell stories, and a close reading reveals much of what Polèse will later describe in his analysis: People have been moving to cities for decades, and that's where employment and wealth have been growing. Included in this series is a map showing population growth in the United States and Canada. Around the middle of this map, from central Canada to much of western Texas, Polèse draws a line and labels it the "Empty Quarter." His caption matter-of-factly states, "Large swaths of North America are losing population," and his other maps, including the one showing employment density, help explain this picture of population decline.

One of the values of Polèse's book, even if one is only interested in the growth experience of U.S. regions, is that his description of other areas around the world reminds readers that the historical demographic phenomenon of population gravitation toward cities is not special to this or that region. It simply is. Additionally, Polèse's focus on economic geography encourages readers to think beyond often arbitrary state lines and consider economies as reflective of geographic space.

Polèse packs a lot into this slim book, and much can be gained from his chapter describing the merits of size and location, in which he introduces his four golden rules of economic growth for regions within nations:

- Size matters: Dynamic industries are drawn to large cities and places within easy reach. The corollary is that proximity to size also matters.
- Location matters: And it's largely a story about trade corridors and proximity to trading partners.
- Costs matter: If a city isn't large enough and/or blessed with location advantages, it had better have a labor cost advantage or resource endowment. However, a resource endowment is not necessarily better for everyone, as suggested by certain oil-rich countries where just a few benefit.
- Exceptions abound: For a variety of reasons, politics or technological shocks among them, certain places are freed from the previous three rules and can thrive. But it's not easy.

These rules are golden for a reason—they're well tested by time and mostly intuitive. Still, full consideration of their deeper implications will yield insight even for those well versed in regional economic development thinking. Polèse takes the time to describe and explain why cities grow, why proximity matters and how some small cities can retain advantages. The seven key principles (or pillars of agglomeration, as Polèse terms them) are scale economies in production and transportation, falling transportation costs, the need for proximity, the advantages of diversity, the desire to be close to the center of markets and—on a more micro note—the need for people to be near the "buzz and bright lights."

This last principle recalls the insight of the economist Robert Lucas quoted at the beginning of this review. People move to Manhattan and Chicago and London and, well, Minneapolis, to be near other people. Carr and Kefalas may disagree, arguing that people move to those places because they have no other choice—that they would rather stay down on the farm or in little villages, but they can't because those places offer no opportunity. Polèse thinks there is more to it:

> *Ambition, dreams, and the need for recognition are powerful forces driving human behavior. … The main impetus behind agglomeration undoubtedly remains economic, but agglomeration also fulfills a social need. Human beings are nothing if not social animals. The life of a hermit may appeal to some, but the vast majority of humanity seeks company. We seek the approval of others, to see others and to be seen.*

And where are the best places to "seek the approval of others, to see others and to be seen"? Likely, it's the places with the brightest lights and most exciting buzz. This especially applies to young people, Polèse notes, who have the most ambition and so will have a corresponding positive effect on the cities where they land. Eventually, also, many of those young people settle down in those cities and start families, and the cycle continues.

But is this a virtuous cycle? Is America losing something because people are choosing to move from rural areas to metropolitan areas? For an economic geographer like Polèse, this is practically a meaningless question. People are making choices to

better their lives, and what could possibly be wrong with that?

> *As long as people need to meet, the places where they can most profitably do so will continue to command a premium. As the opportunity of time increases with higher incomes, so will the true cost of travel.*
>
> *A world in which place no longer matters is a fantasy. Were that unlikely event ever to occur, we would recognize the signs immediately. Place will have ceased to matter the day a square foot of land in, say, downtown Bismarck, North Dakota, costs the same as a square foot of land in Midtown Manhattan. I leave it to the reader to evaluate the likelihood of that ever happening.*

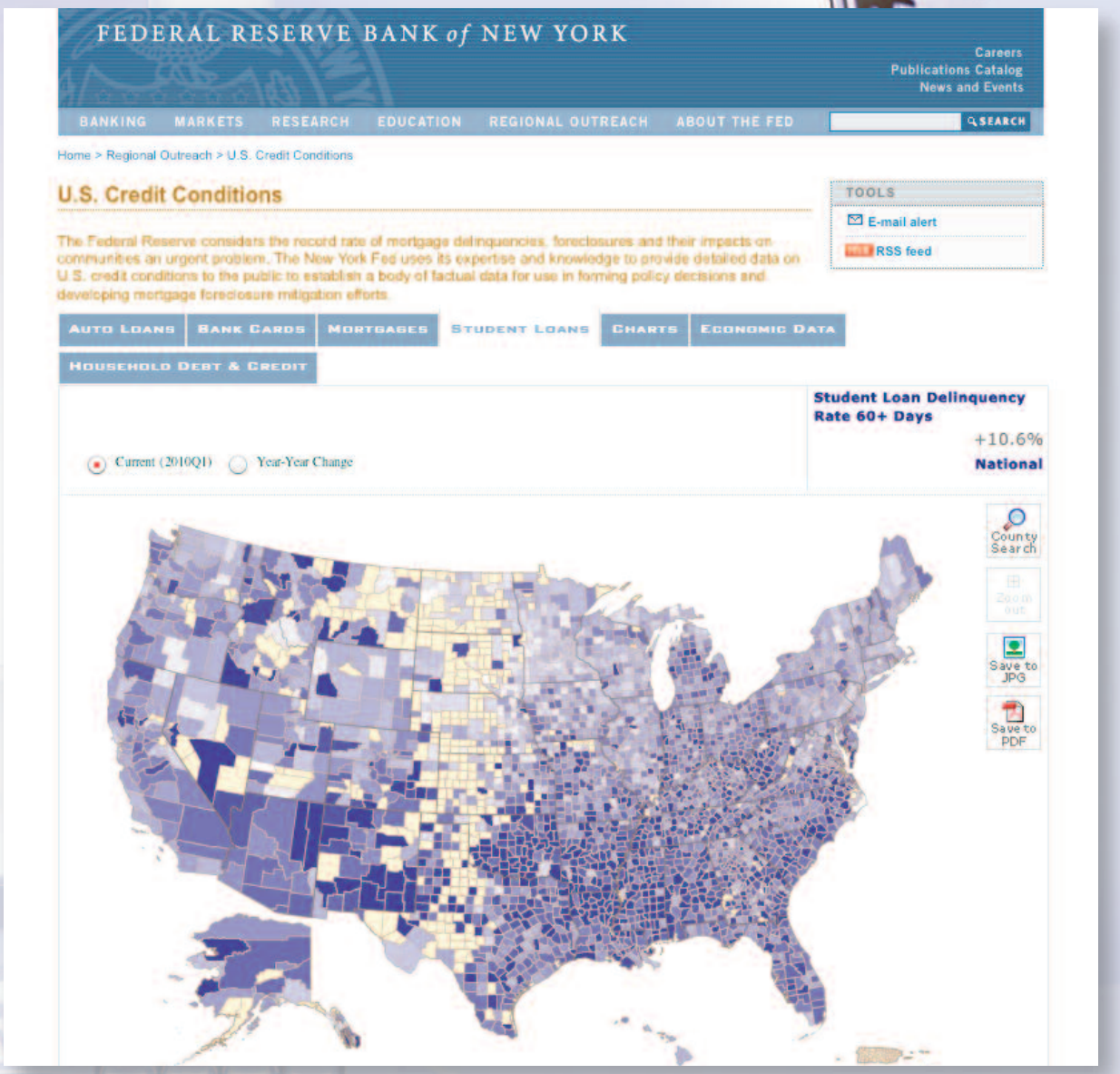
Ouch. Of all the downtowns in all the world, he had to pick on my hometown. But Polèse's point is well made. Those land prices are market signals, and they also signal the likelihood that Bismarck incomes will be correspondingly lower. Polèse is careful in making this point: Special cases abound, but on average, *smaller places like* Bismarck are explained by the rules of size and location. And, ahem, Bismarck—with an unemployment rate of under 3 percent this fall—is something of a special case, as it lies in the heart of a state benefiting from a boom in oil and agricultural products. Still, no matter how high the price of oil or wheat, Bismarck residents will likely never experience downtown rents or income levels like their cousins in Manhattan.

So, are the rules of size and location destiny? Is there nothing that smaller towns and cities (and many of them are much smaller than Bismarck) can do? While size and location "are not easily amenable to public policy," and while "public policy cannot undo the past," and while natural endowments cannot be unendowed, there might still be opportunities for certain cities or regions, according to Polèse. "There are good economic reasons why different-sized cities emerge at different locations and why they will continue to exist," he writes.

However, place will always matter, Polèse writes, even at a time when information is flattening the world; indeed, place will matter even more. "The cost of moving information is already close to zero. But, at the same time, the need to interact with others will grow. This is one of the ironies of recent times, which makes the study of regional economies so fascinating and ensures that geography will not wither away." It's also a reason why this book—which covers much more than this review can address—makes for an informative read.

Closing note: For those readers either involved in the business of economic development at the city level or otherwise interested in the subject, the Federal Reserve Bank of Boston published "Lessons from Resurgent Cities" in its *2009 Annual Report*. Boston Fed researchers identified 10 such cities that rebounded from a heavy dependence on a particular manufacturing industry and determined common attributes of those cities. While they may offer lessons, the researchers don't offer false hope: "No research study is capable of laying out the agenda for a struggling city." Instead the report hopes to describe "reasonable aspirations" and to "add to the available information concerning the economic development approaches tried by their peers." Check it out at bos.frb.org. R

Virtual Fed



Giving Credit Its Due

We admit it; at the Minneapolis Fed, we're suckers for data maps. They're often a great way to put a complex economic story into one picture and portray how it differs across regions. And few economic stories have been bigger in recent years than credit. The rise in home foreclosures and the surprising post-crisis trend of Americans paying down their consumer debt are just two stories that have featured prominently in the financial press.

Now the New York Fed has a new Web site that puts these and other credit conditions on the map, literally. Visitors can look at various indicators of credit conditions, including auto and student loans as well as mortgages and credit cards, and compare at national and regional levels. For those who really want to dig deeper, the site provides the data underlying the maps as well.

—Joe Mahon

Explore further at http://data.newyorkfed.org/creditconditions/.

(For actual U.S. maps, county by county, click tabs for Auto Loans, Bank Cards, Mortgages and Student Loans.)