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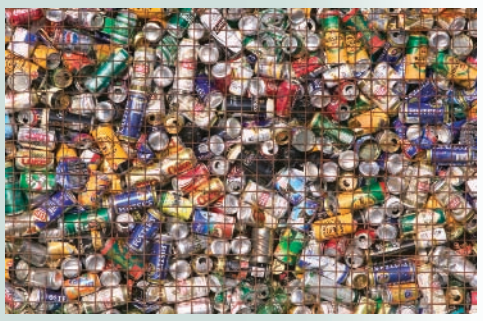

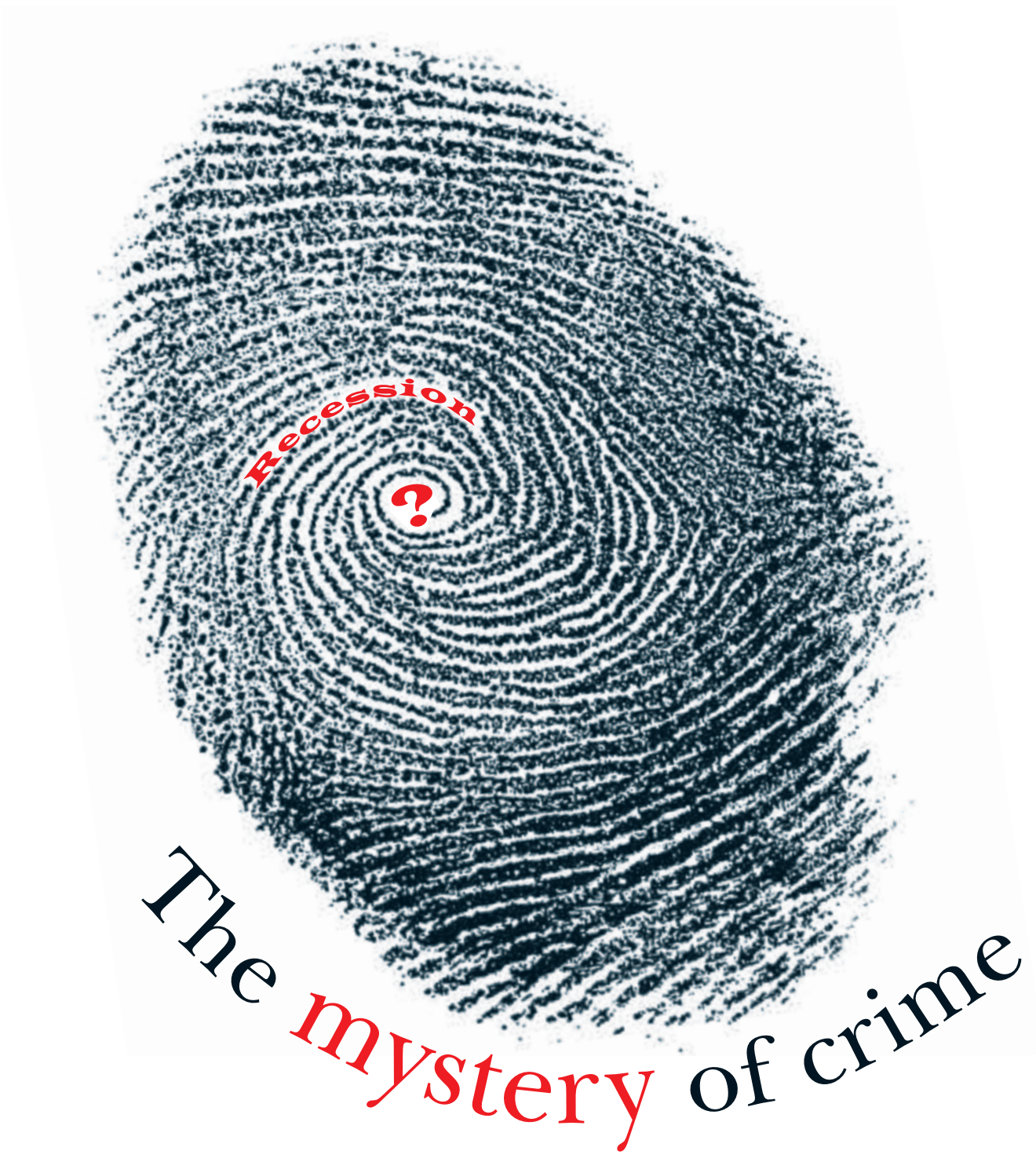

The mystery of crime

Will the recession cause a surge in crime? Economic theory suggests it might, but empirical evidence for the widely held notion is far from conclusive

By DOUGLAS CLEMENT
Senior Writer

In late December 2008, the Minneapolis Police Department held a press conference to announce a major achievement. For the second year in a row, the city had experienced a double-digit reduction in crime. Since 2007, violent crime had dropped 13 percent; compared with 2006, it was down 24 percent. Homicide—the most brutal component of the violent crime category—was down 22 percent in 2008, a 39 percent drop since 2006. Robbery and rape were also down significantly.

Minneapolis Mayor R.T. Rybak praised the police for this accomplishment. He attributed the reductions to better police work, outreach to communities and a focus on juvenile crime prevention. But in the next breath, Rybak cautioned that the trend might not continue. "When the economy is bad," he observed, "people do desperate things they wouldn't otherwise do."

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As the economy sours and increasing numbers lose their jobs, more and more voices like Rybak's are warning of the ominous prospect of a return to high crime. Since hitting historic peaks in the early 1980s (property crime) and early 1990s (violent crime), crime rates have dropped significantly in the United States. But many fear that trend will reverse because of the economic recession: Not only will a tough economy push some individuals toward criminal activity, as Rybak suggested, but government budgets will be strained by lower tax revenues, and law enforcement budgets could suffer. Both concerns were voiced by people throughout the district.

But not all see the link as so clear-cut and dire. Yes, budgets will tighten, but public safety won't necessarily be threatened, according to some. And while desperate times may encourage desperate acts, many criminologists and some police point out that crime rates are influenced by a wide range of factors. Recessions aren't pleasant for anyone, but concerns about surging crime waves are likely overblown.

The matter is complicated, at least somewhat, by findings from economic theory and empirical research. Though some research supports the conventional view of rising crime during economic downturns, a closer look at theory finds a more complex story, and empirical studies over the years haven't found as solid a relationship as one might think between economic downturns and criminal activity. Many other factors are at play, from demographic changes and shifting cultural norms to legislative initiatives and technological innovation. Thus, forecasting crime trends—like predicting the weather or the economy—is an uncertain venture.

Criminal tendencies?

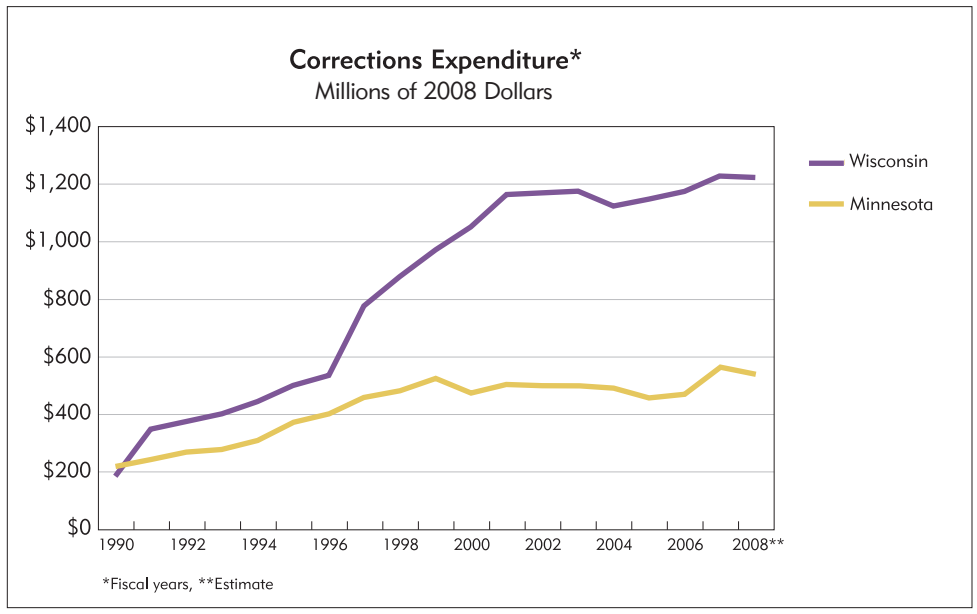
There's no question that many law enforcement officials in the district fear that a weak economy will lead to more crime. In Douglas County, home to Superior, Wis., police are concerned about the impact of a recession.

"It can't get better anytime soon, in my opinion, just because you have more and more people who aren't working; more and more who are losing their homes," said Douglas County Sheriff Tom Dalbec. "I mean, our foreclosure notices and sheriff's sales … have gone up pretty drastically." Dalbec said that property crimes like theft and burglaries are likely to increase in a recession. "It's more the necessary things that are part of the crimes—food, gas and that type of stuff."

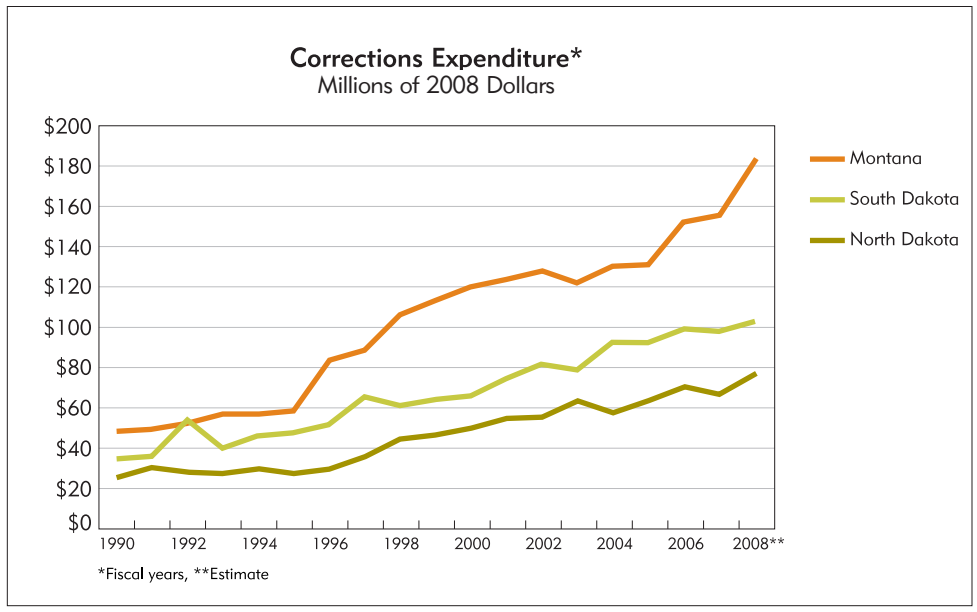
Lynn Erickson has a similar view. He worked for years in the Williston, N.D., police department; now he's chief of police in Glasgow, Mont. In both states, he said, bad times mean more crime, and though the recession hasn't hit Montana as hard as it has some states, he anticipates that it will. Already, crime is trending up as the economy heads down and some people lose their jobs and/or homes, he said. "People are looking at, you know, if they have a family and they're going to survive, they have to look at any means possible, and I think we are seeing somewhat of a rise in theft and other property crimes" because of that.

Erickson sits on the Montana Board of Crime Control, and its executive director, Roland Mena, is of the same opinion. "We're not in this recession enough to know for sure; our crime reporting would lag," Mena said. "But anecdotally, there appears to be more fraud and different kinds of scams that we're seeing. We're also seeing some increases in larceny and theft over the past quarter. Also, domestic violence becomes a major issue in [difficult financial] times, with stress on families and so forth."

Still, Mena said that the connection between economic health and crime rates is unclear. "It's complicated when you look at all the factors that come into play, so there's no cut-and-dried answer to the [question of] economics and crime trends."



Source: NASBO State Expenditure Reports



Source: NASBO State Expenditure Reports

Cutbacks?

In addition to worries about increased criminal activity, the conventional wisdom also holds that recession-strained government budgets will result in fewer police on the street.

Mike Angeli, police chief in Marquette, Mich., is concerned about the impact a recession might have on his budget. Michigan's economy has been "in the tank" for quite a while, and revenue-sharing with local agencies has been going down for years. "So we've had to cut back in our law enforcement. If it gets worse, it could have an effect [on our ability to fight crime]." State police and sheriff's department staffing has been scaled back considerably, he said, but the Marquette Police Department has been able to maintain staffing, so far, and that's kept criminal activity outside of town limits. "If our numbers go down, and they know it—the bad guys know it—certain things could develop in town. I do see a relationship there."

Erickson in Glasgow, Mont., is similarly alarmed. "The recession is going to start affecting us, and when it does, it's going to be a budgetary thing. One thing in my 28 years in this business that I've known is that usually law enforcement is the first place they like to cut," he said. "Do you give up your public works or your law enforcement? Which one are people going to bitch most about? If people have potholes in their street, they're going to be really mad, but if they don't see that police car drive by every 15 minutes, it's no big deal—until it directly affects them."

Unlike Minnesota and Wisconsin, which face multibillion-dollar deficits over the next two years, Montana will enjoy a budget surplus in 2009, but its projected size has dwindled rapidly over recent months. "We're starting to get the forecasts that we're going to be hurt just like everybody else," said Mena of the Montana Crime Board. "That'll impact local budgets, and certainly law enforcement struggles locally competing with other interests in the community."

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One of the Minneapolis Fed's congressionally mandated responsibilities is to gather information on the Ninth District economy. The *fedgazette* is published bimonthly to share that information with the district, which includes Montana, North and South Dakota, Minnesota, northwestern Wisconsin and the Upper Peninsula of Michigan.

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"There's not a clear one-to-one relationship. In many times of economic expansion, crime rates have risen, and during times of contraction they've sometimes fallen."
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"It's complicated when you look at all the factors that come into play, so there's no cut-and-dried answer to the [question of] economics and crime trends."
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"It's more the necessary things that are part of the crimes—food, gas and that type of stuff."
—Tom Dalbec

"When the economy is bad, people do desperate things they wouldn't otherwise do."
—R.T. Rybak

Sheriff Dalbec in Douglas County, Wis., has a pretty good sense of how things might play out there. In setting his 2009 budget, he faced contractual wage increases for his staff of about 2.5 percent and health care costs rising about 10 percent. But the state's expenditure restraint payment program allowed him to raise his total budget by only 2 percent, "so I'm behind the eight ball going into the budget process based on wages and health care costs alone," Dalbec said. Thanks to cuts over the previous three years, "if I have to start making cuts for the 2010 budget, it's going to end up being positions, because I've got nothing else left to cut."

In Minnesota, city administrators are suggesting that police services will be on the cutting block along with everything else as the state's financial shortfall forces communities to trim budgets. St. Paul had planned to hire 14 new police officers in 2009, but in mid-January Mayor Chris Coleman announced a hold on those hires. In December, Rochester, Minn., city administrator Steve Kvenvold told the *Post-Bulletin* that he anticipates some level of cutbacks in police services in response to the state's $1.9 million reduction in local aid to the city.

Financial pressures are also hitting farther up the criminal justice ladder. District states vary widely in spending on their prisons, but generally speaking it has been rising. Minnesota expenditure growth has been the slowest in the district, up 132 percent since fiscal year 1990, adjusted for inflation; Wisconsin's spending has grown the most, up 531 percent (see charts on page 2).

Still, corrections are a relatively small fraction of total state expenditures. Wisconsin, Montana and South Dakota now spend a bit over 3 percent of their total state budgets on corrections, while North Dakota and Minnesota spend about 2 percent. Where these trends will go over the next few years is hard to predict.

Whatever happens with corrections spending, police and court budgets are strained nationally, according to Chris Uggen, professor of criminology at the University of Minnesota. In Hennepin County or Minneapolis, for instance, absorbing a significant funding cut would be difficult. "To the extent that there was any fat in the budget, it was trimmed several years ago," Uggen said. Police and prosecutors are typically protected in the budget process in the name of public safety, but "often that means that we're laying off their administrative staff so they're spending time doing paperwork." If a recession forces further cutbacks, he concluded, "you do reach a tipping point at which it becomes difficult to maintain the sort of crime control service level that we're accustomed to."

Cracks in the wisdom

Even if there are no cutbacks in public safety budgets, many believe that a deteriorating economy is certain to spur a rise in crime. But many scholars in the field—and a few cops as well—tend to be more cautious. Yes, budgets will tighten, but public safety won't necessarily be threatened, according to some. And while desperate times may encourage desperate acts, crime rates are influenced by a wide range of factors unrelated to macroeconomic trends.

Does economics play a part in explaining crime rates? "Clearly it does," said Uggen. "But it's complex." He pointed to historical data on arrests and unemployment and noted that "there's not a clear one-to-one relationship. In many times of economic expansion, crime rates have risen, and during times of contraction they've sometimes fallen."

At the individual or group level, he said, the relationship is clearer. Uggen has studied recidivism among released prisoners and found that if they have steady jobs, they're less likely to commit crimes. Also, overall economic conditions make a real difference in youth

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perceptions of whether to invest in school or consider illegal activities instead.

But such tendencies don't necessarily add up to general societal trends, according to Uggen. "The relationship between economic conditions and crime is complex and crime-specific. There are some crimes—for example, residential burglary—where having more people at home during the day actually can help reduce some of those crimes."

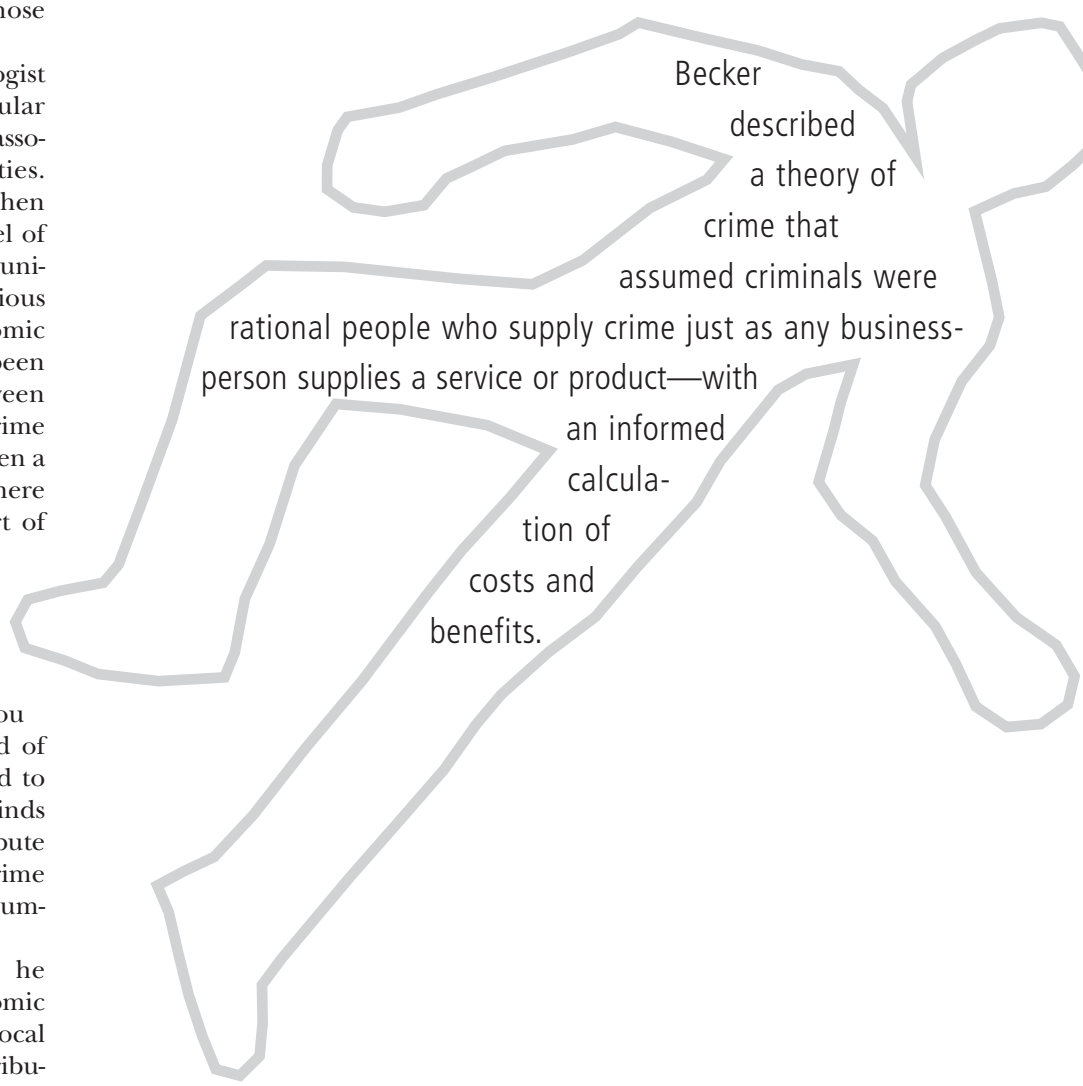
University of Montana criminologist Dan Doyle agrees that particular crimes, even violent crimes, can be associated with economic difficulties. "Domestic violence can go up when times are hard just because the level of tension within families and communities rises," he said. But Doyle is cautious about linking crime rates and economic trends. "For many years, there's been hypothesized a relationship between good times versus bad times and crime rates," he noted, "and there have been a number of longitudinal studies where they've tried to correlate some sort of measure of economic health and some measures of crime. It's proven to be difficult to draw really close correlations."

Why is the conventional wisdom so hard to confirm? "When you find changes over time in any kind of social factor," said Doyle, "they tend to be associated with so many other kinds of changes that it's hard to attribute them to [just one factor], like crime being affected by economic circumstances."

Uggen agreed. "Crime rates," he said, "are much like rates of economic performance in that you'll have a local phenomenon and you'll make attributions as to its causes, but then you look around, and there are these larger secular trends in operation that are clearly multifaceted and systemic."

And indeed, not all police are convinced that recessions cause crime. "We don't tend to see that type of relationship," noted Angeli, of Marquette, Mich. "We do see a relationship between economics and crime, but not necessarily bad economic times. In other words, less fortunate or poorer people tend to be involved in more crimes than the wealthy. But when it comes to the economic times, I can't say that I see a huge difference here."

John Sweeney, chief deputy sheriff of Oneida County, Wis., says the recession hasn't hit his area's tourism-heavy local economy too hard yet, as far as he can tell. On the other hand, the largest manufacturing employer in Rhinelander, a paper mill, is now on rolling layoffs. In any case, he isn't ready to predict that the recession will cause a spike in crime. "I'm not gonna make that connection yet."



And though many fear the effects of cutbacks in local police budgets, some officers say the public needn't fear desperate criminals roaming the streets emboldened by the absence of police. "We've gone through this before, and we've weathered the storm pretty good," said Jesse Garcia, a sergeant with the Minneapolis Police Department. "Basically, we've tightened our belts and made ourselves a little bit more efficient. We already have a framework for that. If it happens again, we'll do the same thing."

Theory and data

Economists have studied the interrelationships between crime and economics for centuries, but the first formal model was set forth by University of Chicago economist Gary Becker in 1968. Becker described a theory of crime that assumed criminals were rational people who supply crime just as any businessperson supplies a service or product—with an informed calculation of costs and benefits.

For a criminal, the benefit of crime is, of course, the "ill-gotten gain"—the television, auto, cash or identity he or she manages to steal. The cost includes not just the crowbar used to pry open the window, but the likelihood of being caught and the severity of punishment if caught. There's also the opportunity cost to be considered; perhaps an hour spent as a pickpocket would be less lucrative than an hour delivering pizza. Rational criminals, in Becker's theory, will supply crime up to the point where costs outweigh benefits.

On the other side: society trying to minimize expected losses from criminal activity. Those losses, Becker explained in a June 2002 *Region* interview (minneapolisfed.org), include "the damage done by the crime … [and also] the cost of policing, cost of taking somebody to trial, cost of punishment" and so on. Society won't pay for an officer on every street corner to prevent illegal parking—the cost would outweigh the benefit. Becker suggested that society will tolerate (or "demand") a certain level of crime, and that demand is derived indirectly from the cost of crime protection. The higher the cost of protection, the less protection society will purchase, and the more crime it will tolerate.

"I had a model of the criminal and a model of society, and I put those two together to get a solution as to how much crime there should be," Becker explained.

Becker's model quickly sparked an outpouring of debate among economists, sociologists and other scholars. (It was also responsible, in part, for Becker receiving the 1992 Nobel Prize for economics, for "having extended the domain of microeconomic analysis to a wide range of human behavior.")

Was crime truly a rational act? Were criminals so calculating? Didn't punishment serve other purposes besides mere deterrence: revenge, for example? Becker's theory addressed many of these issues, but also invited elaboration and refinement.

For example, Becker's model was essentially static. The calculation of how much crime to supply (or prevent) was described as a one-time decision based on present values. Later, economists would build dynamic crime models in which decisions made in the current period would depend not only on present cost/benefit calculations but also on earlier actions taken by the potential criminal or on the expected impact of current actions on future outcomes. Economists have also explored the intricate interaction between labor and crime policies, including recent models that show how labor market policies such as wage subsidies might affect crime rates and how crime policies such as jail sentences could influence labor markets.

An empirical explosion

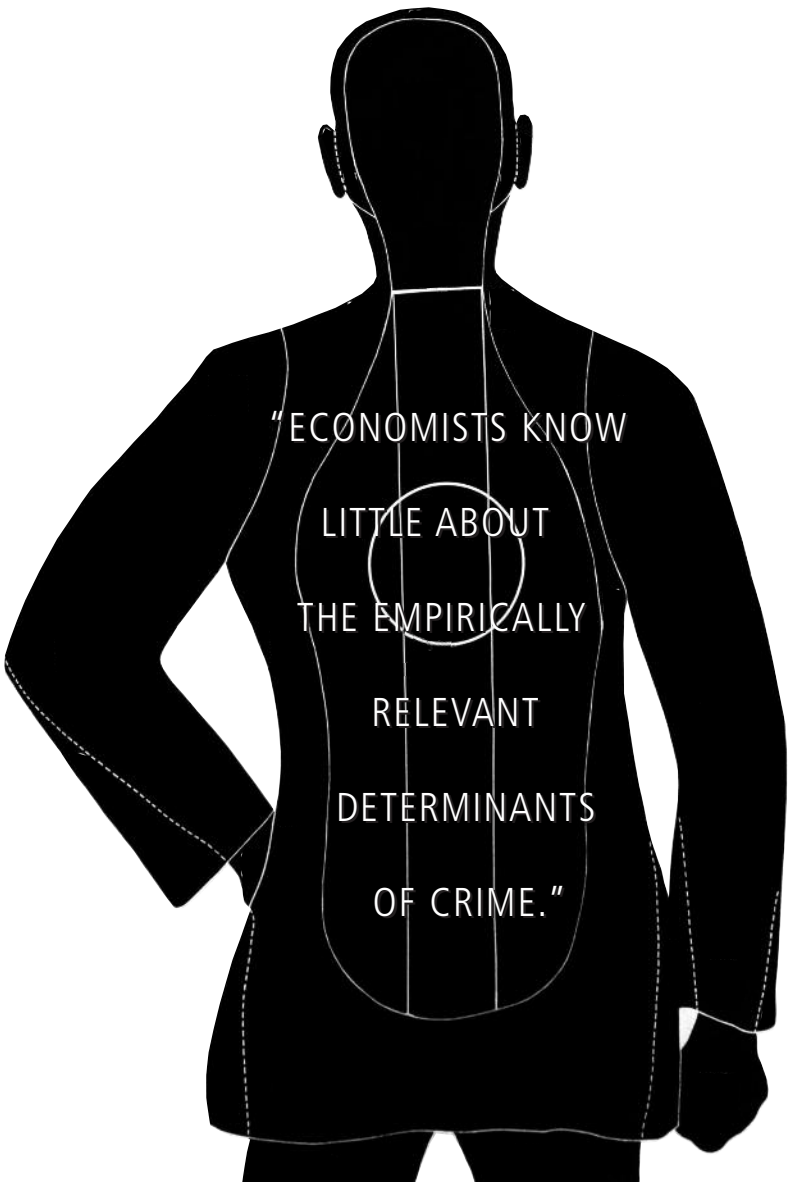
But the main explosion generated by Becker's theory was empirical research into its validity and implications. How well does deterrence work? For instance, does the threat of capital punishment result in fewer murders? Is the severity of punishment more or less important than its probability? Do improved labor markets result in less crime because they raise the opportunity cost of criminal activity? Do economic variables such as unemployment rates have greater explanatory power than

deterrence variables like expenditures on corrections or policing?

Research on these questions should, ideally, examine data at the level of the individual, since Becker's theory speaks to motivations of individuals. But for practical reasons (including the fact that few criminals are amenable to scientific inquiry and that random sampling requires large study populations) most research has looked at data aggregated at the state, regional or national level. Looking at data at this level, though, may obscure some of the effects Becker's model predicts.

For example, while most studies have found that, as theory (and intuition) predicts, unemployment rates are positively associated with crime rates, the effect is surprisingly small, smaller than one would think when hypothesizing motives about "desperate" out-of-work individuals committing crimes to feed their families. As Harvard economist Richard Freeman wrote, "Even the largest estimated effects of unemployment rates on crime are much too small to explain the variation in crime. … Joblessness is not the overwhelming determinant of crime that many analysts and the public … expected it to be."

Freeman and other economists suggest that, to some extent, this is because crime and employment aren't mutually exclusive—indeed, some crimes (embezzlement, for example) are dependent on being employed—and the boundary between the two is porous. And while unemployment rates may not have a strong impact, recent empirical research indicates that higher wages for unskilled workers may result in less criminal activity, suggesting that opportunity cost is part of the equation for those contemplating crime.



From "What Do Economists Know About Crime?" a 2008 paper by Harvard economists

Does deterrence work?

Economists have also devoted much attention to measuring the effect of deterrence—police, prisons and other direct costs—on crime. This research has looked at imprisonment rates, length of prison sentences and numbers of police, but the results have sometimes been hard to interpret. For instance, studies have often found that crime rates actually tend to be positively correlated with numbers of police—an inversion of the deterrence hypothesis.

Upon reflection, the reason seems clear: As crime rises in a given city, state or nation, politicians respond to public concern by hiring more police to stop the rise in crime. For similar reasons, imprisonment rates are often positively correlated with crime (not negatively, as deterrence theory predicts) because higher levels of crime increase political pressure to throw criminals in jail. So while Becker's theory may well be valid—most individuals are no doubt dissuaded from crime by fear of arrest and punishment—other effects may obscure the true impact unless analysts employ careful statistical techniques to isolate the specific effect of a particular variable.

For example, one study—by *Freakonomics* co-author Steven Levitt—used the timing of mayoral and gubernatorial elections as a variable in estimating the impact of police numbers on crime rates. Increases in police force numbers, Levitt showed, were disproportionately concentrated in election years for these city and state officials, rising an average of 2 percent for a sample of 59 large U.S. cities versus 0 percent in nonelection years.

By taking this influence into account, Levitt was able to measure the independent impact of police numbers on crime rates. He found it to be large for violent crime, smaller for property crime. "Given the imprecision of the estimates," however, he couldn't conclude that the benefits of less crime outweighed the costs of hiring more police. A similar recent effort by economists at the University of California, Berkeley, used statistical methods to isolate the impact of imprisonment on U.S. crime rates and concluded that while the impact was significant in the 1980s, "recent increases in incarceration have generated much less bang-per-buck in terms of crime reduction."

"Economists know little"?

Despite the plethora of carefully done empirical studies on crime and economics, it's hard to reach definitive conclusions. And surprisingly, despite the massive amount of work done over the past four decades to verify and measure the economic theory of crime, many in the field are rather pessimistic about the current state of knowledge.

A 2008 paper by Harvard economists titled "What Do Economists Know About Crime?" surveyed the academic literature, studied correlations between crime rates and a variety of hypothesized determinants of crime over a long time period and across several countries, and presented a regression analysis to measure the individual influence of variables like per capita income, education levels, police per capita, arrest rates and incarceration. They found little evidence of solid causal relationships between these variables and crime and argued, therefore, "that economists know little about the empirically relevant determinants of crime."

Similarly, economist Philip Cook at Duke University recently examined the course of crime rates in urban areas of the United States in recent decades and concluded that "the statistical evidence presented here indicates that [the 1990s crime rate] decline, like the crime surge that preceded it, has been largely uncorrelated with changes in socioeconomic conditions."

Others, like University of Missouri-St. Louis sociologist Richard Rosenfeld, future president of the American Society of Criminology, continue to hold that macroeconomic conditions do indeed have a strong influence on crime rates. "Crime rates are likely to increase as the economy sours," Rosenfeld wrote in a *Los Angeles Times* opinion piece in March 2008, which warned Angelenos "to brace themselves for more crime to come."

But other scholars, including political scientist James Q. Wilson, former chair of the White House Task Force on Crime, are less certain. Almost a year after Rosenfeld predicted a rise in L.A. crime, Wilson wrote an editorial for the *Los Angeles Times,* noting that during 2008, crime had fallen in the city "at a time when the economy was reeling and unemployment was rising."

Sometimes, Wilson noted, rising crime seems tied to a declining economy, as during the 1990s, but during the 1960s, when the economy was prospering, crime rates soared. "I wish we fully understood why," he wrote. As chair of the National Academy of Sciences Committee on Law and Justice, Wilson hopes to sort out the complex relationships among crime, the economy and other factors. It is, he observed, "an effort to explain something that no one has yet explained: Why do crime rates change?" f

Just the facts, ma'am

Crime patterns in the district vary widely, but explaining differences and trends is difficult

By DOUGLAS CLEMENT
Senior Writer

Like criminals themselves, crime data are both plentiful and elusive, and it doesn't take long to get buried under the available numbers. The Bureau of Justice Statistics, the Federal Bureau of Investigation, and various state and local agencies churn out reams of information about criminal activity and the criminal justice system on an annual basis, some of it available online, much of it incompatible or incomplete across agencies or jurisdictions.

The most widely recognized source of crime data is the annual Uniform Crime Report generated by the FBI. To compile the UCR, the FBI collects reports from local law enforcement agencies across the country on a variety of crimes and calculates crime rates as a ratio of reported crimes to 100,000 population. There are many reasons to be skeptical about these data (see sidebar on page 8), but they represent the most comprehensive set of crime statistics available. And because they've been compiled since 1930, they're particularly useful for measuring trends over time. The FBI cautions against using them to compare locations with one another, citing the impossibility of assessing area crime rates without thorough study of the "unique conditions affecting each … jurisdiction." With that in mind, this *fedgazette* study has tried to provide information or context about some of those unique conditions in Ninth District states.

Graphs of crime rates in the United States look like mountains; the good news is that, generally speaking, the country is headed down from the summit. Violent crimes peaked in 1991 and have dropped ever since, though recent declines have been modest compared with those seen during the 1990s. The nation now experiences about 465 violent crimes per 100,000 population, a level last seen in the mid-1970s. Property crimes climbed steadily from 1960 to 1980, topping out at about 5,300 per 100,000 population. Rates declined until mid-decade and climbed again until 1991; property crimes have dropped ever since, reaching about 3,200 in 2007, a level last seen in 1969.

Among district states, property crime rates have followed a very similar trend, but two states, North Dakota and South Dakota, have enjoyed much lower levels of crime, with the Dakotas' property crime peaks (around 3,000 in 1980) barely exceeding the current troughs of other district states and the nation as a whole. Currently, South Dakota's property crime level is about half the national level and North Dakota's is a bit higher; these rates are the lowest in the nation (see map on page 16). Minnesota, Montana and Wisconsin property crime rates are all at about 90 percent of U.S levels.

Violent crime in the district is a different animal. Montana had an initial violent crime crest in the early 1980s, then a decline until the late 1990s, when reported violent crime rates soared for six years, reaching a peak in 2003. The violent crime rate has declined since then, down from 365 per 100,000 to 288 in 2007. South Dakota's rate experienced a similar early crest in the mid 1970s, then dropped until the late 1980s and climbed to a second peak in 1994, whereupon rates dropped and leveled off at about 170. Minnesota and Wisconsin have had parallel paths in violent crime, by and large, with peaks in the early 1990s, a bit after the national peak, and then trending downward, though both have had increases in recent years. North Dakota has the lowest level of violent crime in the district, and the nation, remaining well below 100 per 100,000 until 2005, when it jumped to 111. In 2007, the rate was 142, well above the North Dakota average, but still less than half the rates experienced in Minnesota, Montana and Wisconsin, and less than a third the national rate.

Some explaining to do

So, what accounts for these different rates of crime, across states and over time? Does economics play a role? And specifically, are economic recessions associated with increases in crime? First, a look at recessions.

In the charts of violent and property crime rates, shaded blue columns represent years in which the National Bureau of Economic Research, the nation's arbiter of recessions, declared that a recession took place. The most acute eye would have a difficult time discerning any consistent relationship between those recessionary years and specific trends in crime. During the difficult 1974 recession, property crime rates were climbing, but during the hard recession of 1981–82, they dropped substantially.

A numerical comparison of crime rates might better gauge the relationship. And indeed, from 1960 to 2007, the average property crime rate in the United States was 19 percent higher during recession years than during nonrecession years. In district states, as well, this relationship held. Wisconsin's average recession year had a property crime rate of 3,826, about 24 percent higher than its average nonrecession year.

In recent years, though, this trend has been weaker. In the period 1980–2007, recession years had an average property crime rate 14 percent higher than nonrecession years in the United States, and just 10 percent higher in Montana and North Dakota.

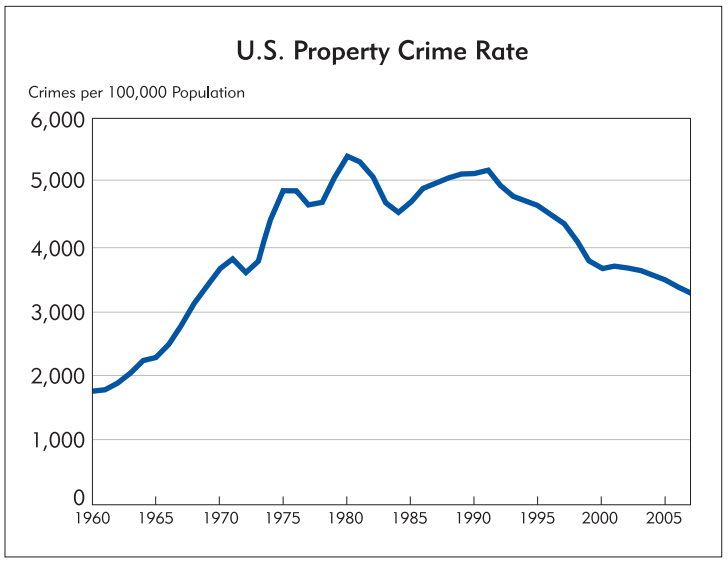
Curiously, the association is reversed or largely absent for violent crime. With the exception of Montana and the United States, district states had lower or about the same level of violent crime in recessionary years. This was especially true for the 1980–2007 period.

This apparent association between higher property crime and recession is suggestive, certainly. But it's far from a compelling correlation, let alone causal proof, because it relies on relatively few observations of recession years, just seven in a 48-year span, most of which occurred during the peak crime eras of the early 1980s and 1990s. The trends that led to those peaks were in place well before recession hit.

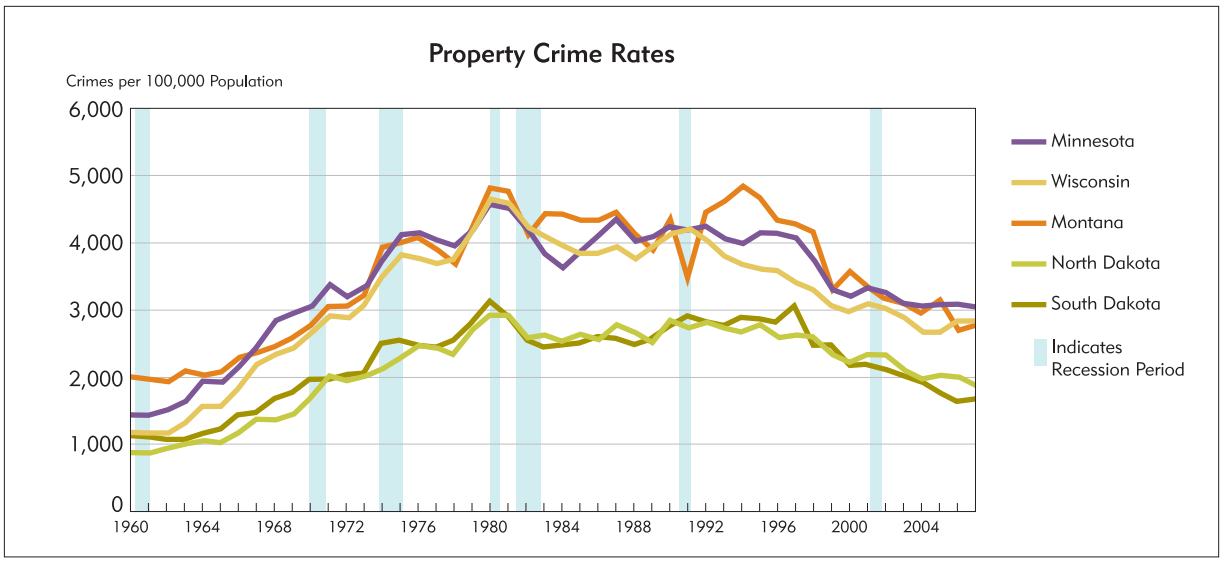
Correlations

Perhaps an analysis of year-to-year correlations between crime rates and possible causal factors could provide richer context based on more observations. The FBI cites 13 categories of factors "known to affect the volume and type of crime occurring from place to place," ranging from population density and climate to modes of transportation, and each of the categories includes a multitude of variables. "Economic conditions, including median income, poverty and job availability," is just one of the 13.

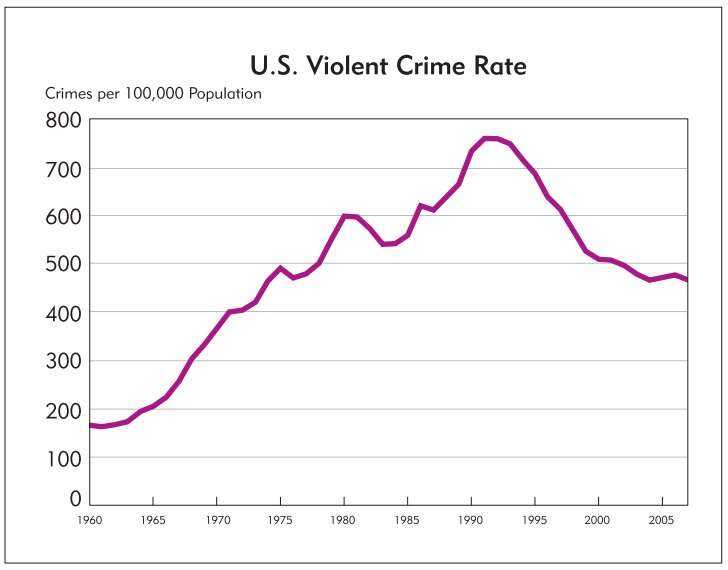
Of course, economists, in their crime models, generally put economic variables at center stage; these may include unemployment rates, personal income levels, poverty rates, measures of inequality and wage levels. Often they'll also include variables reflecting legal disincentives to engage in crime. So, for example, the imprisonment rate—number of people held in prison per 100,000 residents—may be part of the model, since it can measure both a potential criminal's sense of probability



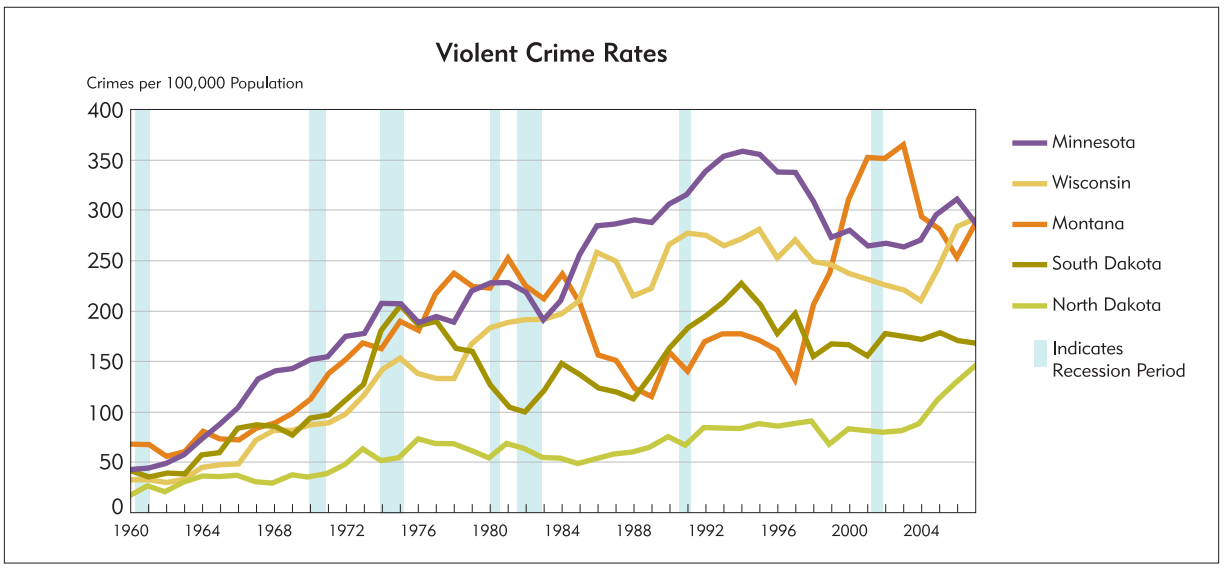
Source: Bureau of Justice Statistics



Source: Bureau of Justice Statistics



Source: Bureau of Justice Statistics



Source: Bureau of Justice Statistics

that he or she will be caught and punished and the level of a government's incapacitation of likely criminals: If they're in jail, they can't rob banks.

Economists have also looked at factors as varied as indexes of consumer sentiment and legislation to permit abortion, to allow the carrying of concealed weapons or to prohibit lead in paint. Demographic information, such as the percentage of total population in a prime crime category of, say, males 15-24 years old, is also frequently included.

As discussed in the cover article (see "The mystery of crime"), empirical studies conducted in the four decades since Gary Becker first elaborated his economic model of crime have proven surprisingly inconclusive. Still, it may be interesting to explore some of the relationships at work in the Ninth District.

To understand crime correlations in the Ninth District, data for the United States and five district states (including all of Wisconsin, but not Michigan) were collected for each year from 1980 to 2007 on eight variables: the index of consumer sentiment, poverty rates, income inequality (Gini coefficient estimates), per capita personal income, unemployment rates, imprisonment rates and percentage of population composed of males between 15 and 24 years old, plus property crime rates.

Of these, the correlations between crime and consumer sentiment, poverty, unemployment and young male population were weak or inconsistent across states—a surprising finding given that a number of empirical studies have suggested connections. Perhaps different relationships explain crime in the Upper Midwest.

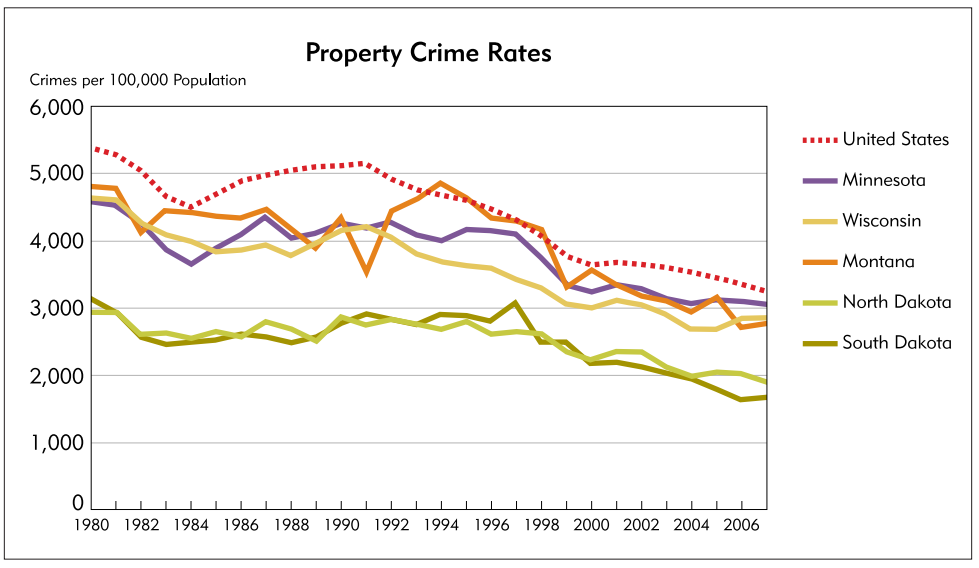
On the other hand, consistently strong negative correlations were found between crime and inequality, per capita income and the imprisonment rate. That the crime correlation for inequality was negative is surprising, given some research indicating a positive relationship between inequality and crime, but an even stronger correlation between per capita income and inequality rates may provide a partial explanation.

The negative imprisonment/property crime correlation was one of the strongest relationships, but the direction of causality is open to question (see charts at right). Perhaps putting people in jail prevents crime, but it could also be that higher levels of crime lead to higher levels of arrest and sentencing.

Regression to the mean streets

One weakness of correlation analysis is precisely that direction of causality is hard to ascertain, but another is that a simple correlation between two vari-

Continued on page 8



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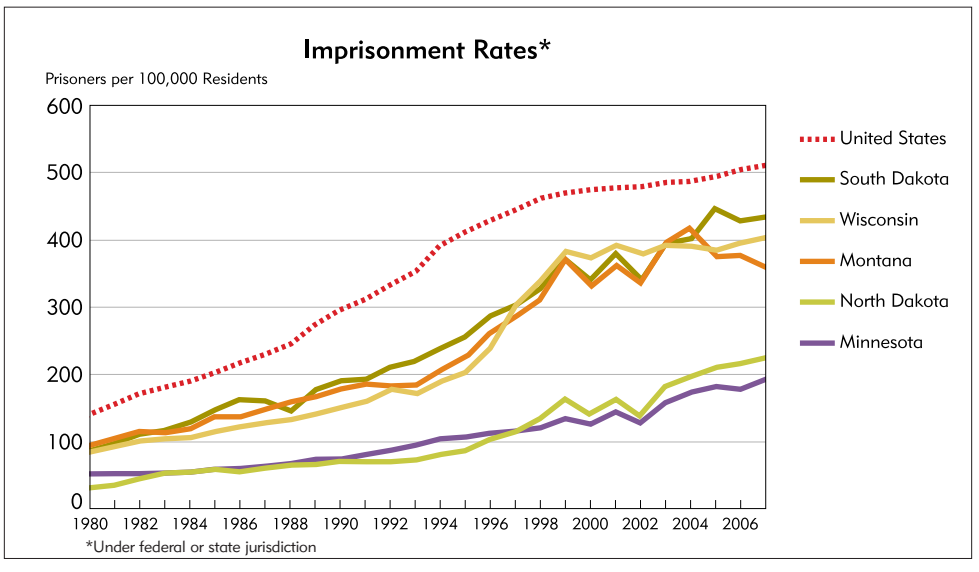

Source: Bureau of Justice Statistics

Crime from page 7

ables may obscure the influence of a third variable. Crime may be negatively correlated with imprisonment, for instance, and positively correlated with unemployment, but simple correlation analysis can't measure the independent strength of each relationship. That calls for a different statistical technique: multiple regression analysis, a method that allows the analyst to mathematically measure the individual influence of a single "explanatory" variable while holding other variables constant.

To better explain the statistical relationships between crime rates in the Ninth District and several possible explanatory variables, county-level data were gathered on several factors potentially related to crime, and a regression analysis was done. The results are informative, but they're by no means definitive. There are several reasons to read these results with caution.

First, though theory provides some guide to interpretation, even regression analysis doesn't prove causality—it simply gives a richer understanding of the correlations between variables. Regressions are more sophisticated than simple correlations, but they don't prove causality. Second, the data are incomplete and possibly inaccurate. Crime rates, as mentioned elsewhere in these articles, are especially prone to inaccuracy. But even numbers of police officers in any given county in a particular year may be mistakenly recorded.

Third, regression analysis is prone to a number of statistical shortfalls. Economists use a variety of advanced techniques in an attempt to address these shortfalls, but even then other complications (and debates) arise. This article reports the results using a fairly standard statistical procedure, a "fixed-effects" model.

A fixed-effects model has been chosen with the assumption that whatever the influence of the included variables, other unobserved and omitted characteristics inherent to each district state will affect crime rates—things like legal and political structures that are important to the level of crime and relatively consistent (or "fixed") over time within each state. Those state-by-state effects are included in the statistical model along with the more traditional explanatory variables. The model used here also accounted for these fixed effects at the county level.

Getting a fix

In this fixed-effects regression, the *fedgazette* seeks to explain the variation of one dependent variable (property crime rate) with several independent variables: per capita personal income, unemployment rates, number of police officers per capita, clearance rates, population, percentage of population between 14 and 24 years old and per capita government expenditure on education. But again, caution is needed in interpreting results: Regressions describe statistical associations, not causal mechanisms.

Economic theory suggests that unemployment rates will be positively related to crime rates, other things equal, because fewer legitimate job offers should make criminal activity more attractive. For similar reasons, per capita income should be negatively related to crime rates—if people have higher incomes, they should find illegal activity less appealing. Theory also suggests that higher numbers of police and higher clearance rates will be negatively related to crime rates, because both represent higher costs (probabilities of being caught and charged) of crime. Because young people, particularly young men, are more likely to commit crime than other population groups, a higher fraction of them is likely to be positively related to crime rates. Per capita government expenditures on education were included as a variable representing public efforts to provide better options for youth; higher levels of expenditure, other things equal, may be inversely related to crime rates.

There are 303 counties in the district, including the upper Peninsula of Michigan, but because accurate, consistent data weren't available for them all, 14 were dropped from the analysis. Data were gathered on crime rates and other variables from 1990 to 2006. Ultimately, then, the analysis examines 17 years of data for about 289 counties, seeking to clarify their interrelationhips over time and across counties.

Here's what the regression found

Income and population: Initially, it appeared that per capita income had a strong positive link to crime, other variables held constant. But when population was also included in the regression equation, income lost its statistical significance, while population retained significance, suggesting that—as seems intuitive—highly populated counties will have higher crime rates, regardless of their income levels.

Unemployment: As predicted by theory, higher unemployment rates were associated with higher crime rates in district counties. But the quantitative importance of this variable (and even its statistical significance) was very small, meaning that changes in unemployment didn't have much explanatory power. This finding is consistent with the conclusions of most other empirical studies on the matter.

Police officers: The number of police officers had little or no statistical relationship to crime rates when other variables were taken into account. Economic theory suggests that more police should represent more deterrence and therefore less crime, but politics suggests that police numbers may rise when crime is prevalent. The findings here suggest a balance of the two.

Clearance rates: In this study, clearance rates are calculated as a ratio of the number of arrests to the number of offenses. While not a perfect measure of what police consider a clearance rate, the variable was strongly associated with crime, in a negative direction, meaning that higher rates of arrests-to-offenses were associated with lower crime rates, other things equal—a finding supportive of the deterrence hypothesis.

Youth: Higher percentages of youth-to-population were positively associated with crime rates, a demographic relationship found consistently in most crime research.

Education spending: More government spending on education was negatively linked to crime rates, holding constant other factors, suggesting that efforts to build human capital might provide positive alternatives to illegitimate activity.

State fixed effects: Once other characteristics were held constant, crime rates in the Upper Peninsula of Michigan and both Dakotas were lower than in Minnesota, while in Wisconsin's district counties, crime was higher. The fixed effect for Montana wasn't significantly different from zero.

What it all means

Again, because of the statistical and data problems described above, these findings should be viewed as very tentative. They are, nonetheless, generally in line with conclusions from other empirical research: Unemployment rates are positively related to crime, but they don't seem to have much explanatory power. Numbers of police per capita had no apparent association, but clearance rates did. More crime was likely in counties with higher fractions of young people. Spending on education was negatively linked with crime, indicating that schooling may reduce the relative appeal of crime. Does this mean that crime is no longer a mystery, that it's possible to know whether or not a recession will result in more crime in the district? Far from it.

Statistical analysis clarifies links among variables, but it doesn't prove causation or give powers of prediction. This brief analysis has barely scratched the surface of a problem as old as humanity itself. f

Terry Fitzgerald, senior economist; Rob Grunewald, associate economist; and Clint Pecenka, research assistant, contributed to this article.

Beware of data

The Uniform Crime Report includes four types of violent crime: murder/nonnegligent manslaughter, forcible rape, robbery and aggravated assault, and three types of property crime: burglary, larceny-theft and motor vehicle theft. (Arson is included in UCR data in a more limited fashion.) In 2007, there were 1.4 million reported violent crimes. Aggravated assaults accounted for 61 percent of them, robbery for 32 percent, rape for 6 percent and murder for 1 percent. There were 9.8 million reported property crimes, of which burglary accounted for 22 percent, larceny-theft for 67 percent and motor vehicle theft for the remaining 11 percent.

While the database is impressive, it is also flawed. Scholars recognize that it significantly undercounts actual crime levels because many crimes are not reported to law enforcement officials. Assaults and rapes may not be reported because the victim knows the perpetrator and fears retribution. Larcenies may seem too insignificant to report, given that authorities are unlikely to do much to solve, say, a bike theft. Moreover, the FBI has a hierarchical recording system: If a victim is assaulted with a weapon and then his or her car is stolen, only the more serious offense—aggravated assault—is recorded. And local authorities may undercount reported offenses in order to convey a sense of success in fighting crime.

To redress these weaknesses, the Bureau of Justice Statistics has created another database, the National Crime Victimization Survey, which surveys individuals and households across the country, asking if they've been victims of crime over the past six months, and if so, collecting information about those crimes. The numbers of reported crimes are far higher in the NCVS data than in the UCR data, especially for violent crimes. A 1995 comparison found that when the UCR reported 12.2 million property crimes, the NCVS reported 32 million; the UCR reported 1.9 million violent crimes compared with the NCVS tally of nearly 11 million. Trends have been similar, however.

—Douglas Clement