

research review



Issue No. 9, January 2008 – June 2008

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Public Policy Discussion Papers

p-08-1

Why Does Unemployment Hurt the Employed? Evidence from the Life Satisfaction Gap between the Private and Public Sectors

by Simon Luechinger, Stephan Meier, and Alois Stutzer

complete text: <http://www.bos.frb.org/economic/ppdp/2008/ppdp0801.htm>
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Motivation for the Research

People care about high rates of unemployment even when they themselves are not unemployed. This common observation is supported by empirical findings in the literature, indicating that high general unemployment reduces individual welfare even for people who are still employed.

This paper aims to shed light on the reasons that explain why general unemployment entails costs on the rest of the adult population, even those members who are employed. These reasons can be divided into two broad categories. First, a high rate of general unemployment may have negative effects on the population as a whole because of societal effects like higher crime rates or the imposition of higher taxes to finance increased welfare spending. Reasons in this first category are not limited to the direct effects of unemployment on crime and public finances, but may also include secondary effects such as a general increase in income inequality within a society. Second, high general unemployment rates may also affect people's well-being by reducing their sense of personal economic security, for example, by depressing wages or increasing their actual or perceived risk of job loss and unemployment.

Research Approach

In order to distinguish between general negative externalities of unemployment and externalities arising from changes in individuals' perceived economic risks, the authors study workers in two sectors that differ fundamentally in their exposure to economic shocks—people employed in the private sector and those working in the public sector. Public sector employees usually enjoy extended dismissal protection and work in organizations that very rarely go bankrupt. Thus, for institutional reasons these workers face a reduced risk of losing their jobs in comparison with employees in the private sector. The fact that queues for government jobs lengthen during recessions may indicate that high unemployment rates also mean lower job security, and thus prompt people to seek more secure, meaning government, jobs.

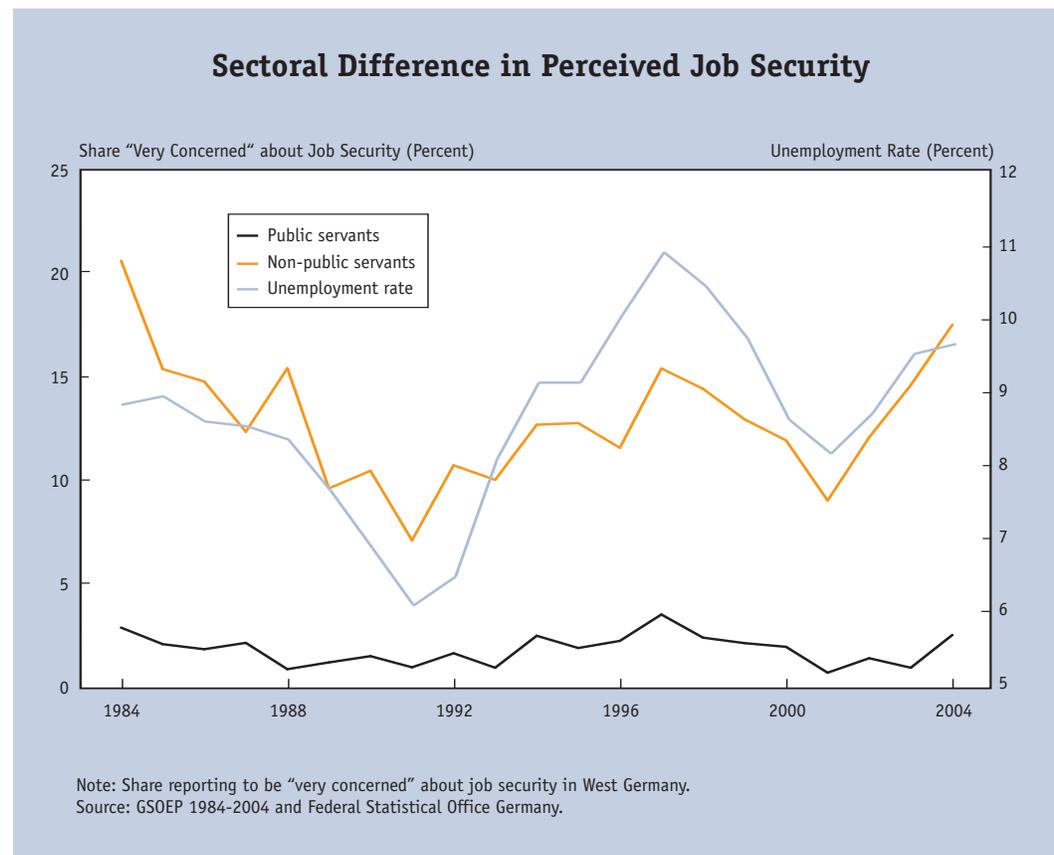
Using data on reported life satisfaction and happiness as proxy measures for individual welfare, the authors investigate whether public servants suffer less from high unemployment than private sector workers. Measures of subjective well-being allow researchers to capture an overall evaluation of people's experienced utility, including hard-to-measure aspects such as general concerns about the state of the economy, or anxiety about crime rates or job losses. In this kind of measurement, people report their level of subjective well-being without being focused on those aspects directly under study.

The main empirical analysis uses data from the German Socio-Economic Panel (GSOEP) for West Germany (the "Alte Bundesländer" or "old federal states" since unification) between 1984 and 2004. During this period, West Germany experienced large differences and fluctuations in

regional unemployment rates—from around 4 percent to almost 20 percent. These fluctuations in the unemployment rate over a long period make it possible to identify any sectoral differences in workers’ sensitivity to unemployment. Moreover, the panel dataset makes it possible to control for individual heterogeneity. The analysis is then performed for the United States, using repeated cross-sectional data from the General Social Survey (GSS), and for member countries of the European Union, using repeated cross-sectional data from the Eurobarometer (EB).

Key Findings

- People working in the private sector are affected more strongly by general economic shocks than are people working in the public sector. The life satisfaction of private sector employees decreases substantially when unemployment rates are high. People working in the German public sector experience much smaller changes in their well-being in response to fluctuations in unemployment rates. Private sector employees’ life satisfaction is reduced by 0.56 points (on a scale between 0 and 10) when regional unemployment rises from the lowest value in the sample to the highest value—similar to the effect of losing their own jobs. In comparison, the negative effect on public sector employees is about a third lower than for private sector employees.
- For the “public servants,” a particularly protected subset of public sector employees in Germany, the data exhibit no negative correlation whatsoever between regional unemployment and reported life satisfaction.
- These findings hold after controlling for differences in the wage structure and working conditions in the two sectors, as well as for demographic characteristics and time-invariant individual heterogeneity. In fact, because the public sector attracts more risk-averse individuals than does the private sector, the estimated welfare costs from exposure to economic risks are a lower bound when extrapolated to the working population. Overall, the results suggest that a substantial fraction of the psychic costs brought about by general unemployment is due to increased economic



insecurity. General regional externalities of high unemployment rates, such as higher crime, seem to have relatively minor consequences for individual well-being.

- The qualitative results also hold when the analysis is performed for the United States and for member countries of the European Union. In both data sets, the well-being of people in the public sector is less sensitive to fluctuations in unemployment rates than is the life satisfaction of people in the private sector.

Implications

Any insight as to whether the well-being of public sector workers is affected differently by economic shocks than is the well-being of private sector employees may also help us to understand issues of political economy. In many countries, public sector employees constitute a large force in the electorate. As voters and as officials implementing policies, they have a large influence on the legal rules governing the private labor markets. Since they are not insiders in the private labor market, their interests are not necessarily aligned with those of private sector employees. In contrast to private sector workers, public sector employees do not benefit directly through enhanced market power and increased salaries from legally increased turnover costs in the private labor market. Hence, they should be more inclined to abolish private-sector protections that discourage firing, such as severance pay, advance notice requirements, and seniority rules, policies that may result in persistent unemployment. Public sector employees will be supportive of such labor market reforms if their sympathy with the unemployed and fear of negative societal repercussions cause them to empathize with the plight of the unemployed. However, if the negative effects of high unemployment rates are much smaller on public sector employees than on private sector employees, the reverse may be true. With little concern about the negative consequences for others or society at large, they may be afraid that reforms to eliminate unnecessary rigidities in the private labor market may undermine the legitimacy of their own privileges and protections.

In addition, the study of differentials in individual well-being sheds light on the discussion about whether public servants enjoy any rents. Bureaucratic rents, or utility premiums of government sector workers relative to private sector workers, can be caused by high wages, fringe benefits, and job amenities, or by the possibility of extracting bribes. In previous work, the authors found a strong correlation for a cross-section of 42 countries between differentials in life satisfaction of public sector employees versus private sector workers and irregular payments to bureaucrats. The results of this study indicate that the high economic security enjoyed by public sector employees is a valuable fringe benefit of public sector employment that should be taken into account in analyses of labor market rents and of compensation differentials between the public and the private sector.

p-08-2

Subprime Facts: What (We Think) We Know about the Subprime Crisis and What We Don't

by Christopher L. Foote, Kristopher Gerardi, Lorenz Goette, and Paul S. Willen

complete text: <http://www.bos.frb.org/economic/ppdp/2008/ppdp0802.htm>

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Motivation for the Research

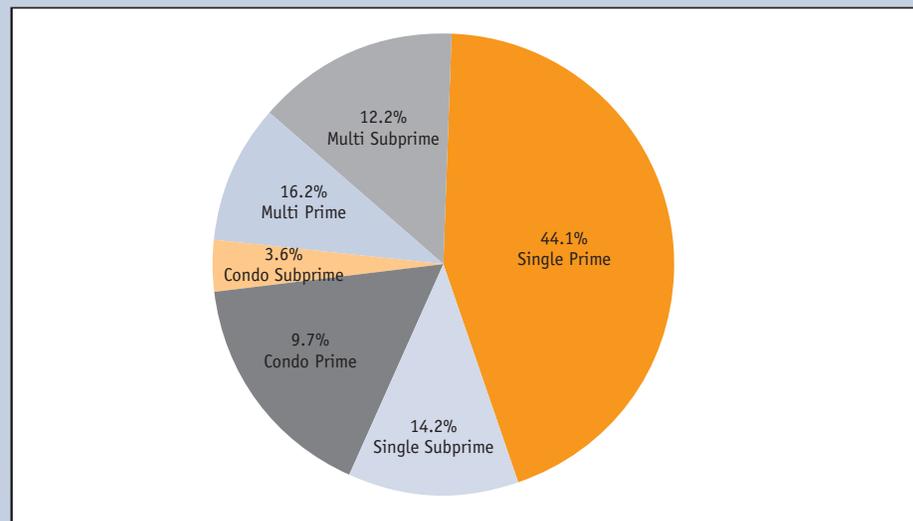
Since March 2007, the Federal Reserve Bank of Boston's research department has undertaken an intensive study of the foreclosure wave that began in 2006, sparked by problems with subprime mortgages. By compiling a unique dataset that covers, in varying degrees of detail, every mortgage issued to every Massachusetts borrower since 1987, the Bank has identified and distilled seven basic

facts that help illuminate the causes and consequences of this crisis. Some of these conclusions are relevant only to Massachusetts or New England as a whole, but many of the basic findings are broadly applicable to the national housing crisis. This paper offers a non technical summary discussion of these seven points, and is aimed at a broad audience of policymakers, researchers, and general readers.

Research Approach

The Warren Group, a firm that compiles information on New England real estate transactions, supplied a dataset covering all purchase mortgages, refinance mortgages, home equity loans, and purchase deeds recorded in Massachusetts from January 1987 through March 2008. Beginning in 1989, foreclosure deeds are included in this dataset, which encompasses a full foreclosure episode that took place in the early 1990s, and captures the beginning of the state's current foreclosure wave begun in 2006. This level of detail permits the Boston Fed to calculate useful statistics, including the loan-to-value (LTV) ratio for each house purchase in the data. A unique aspect of the Warren Group data is its ability to identify a homeowner's combined mortgages on a given property, which enables the construction of a borrower's complete "ownership experience" in a particular residence. The Warren Group dataset is complemented by information from two separate datasets compiled

Shares of 2006-2007 Massachusetts Foreclosures by Type of Residence and Subprime Purchase Status

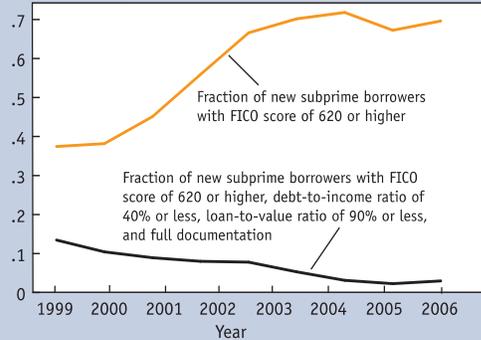


by FirstAmerican LoanPerformance (LP), a firm that collects information on individual loans that were packaged into non-agency, mortgage-backed securities (MBS) and sold to investors on the secondary market. The first LP dataset, purchased by the Boston Fed, contains loan-level data from 1992 through August 2007 for Connecticut, Massachusetts, and Rhode Island; it covers interest rates on issued mortgages and borrower information, such as credit scores and debt-to-income (DTI) ratios. The second LP dataset contains summary statistics generated from a nationwide LP database purchased by the Board of Governors of the Federal Reserve System. Subprime loans are identified in each LP dataset.

Alternative Measures of Risk in the Subprime Pool

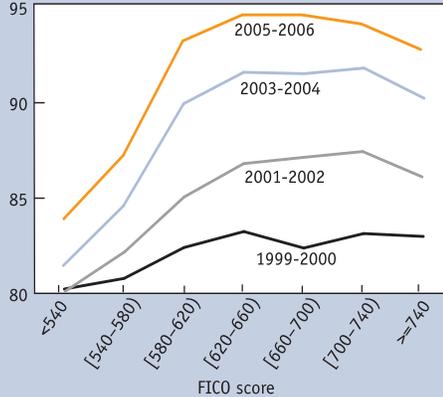
Distribution of FICO Scores

Fraction of Subprime Borrowers



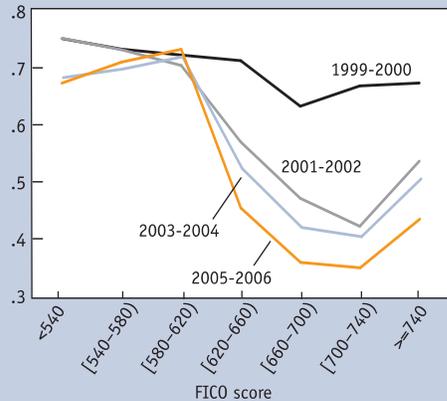
Loan-to-Value Ratios

Average Combined Loan-to-Value Ratio (Percent)



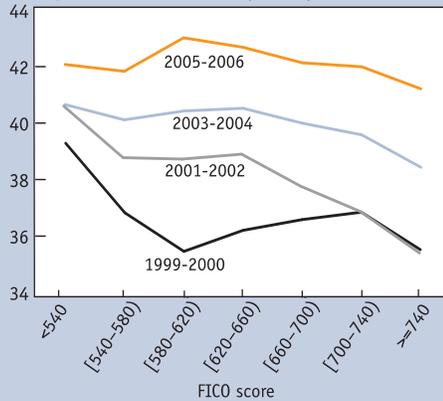
Documentation Status

Fraction of Fully Documented Loans



Debt-to-Income Ratios

Average Debt-to-Income Ratio (Percent)



Note: Figures are generated from all newly originated subprime mortgages in the Boston Fed's Loan Performance dataset, including both purchase and refinance loans.

Key Findings

- **Interest-rate resets are not the main problem in the subprime market.**

Most subprime mortgages are “hybrid” loans, which have a set interest rate for some initial period, say two years. After the initial period, the interest rate adjusts every six months for the rest of the loan’s term. Most commonly, this rate adjustment is tied to the 6-month London Interbank Offered Rate (LIBOR), and the adjustable rate is usually 6 percentage points above the LIBOR. Popular accounts of the subprime mortgage crisis often contend that it stemmed from “explosive” upward interest rate adjustments of low initial “teaser” rates. While initial interest rates on subprime adjustable-rate mortgages (ARMs) were lower than reset rates, these initial rates were always markedly higher than the interest rates offered on prime mortgages. For 2/28 30-year subprime ARMs originated between 2004 and 2007, the loan’s fixed interest rate for the first two years ranged from 7.3 percent in 2004 to 8.6 percent in 2007, then the interest rate was subject to adjustment every six months. At 3 full percentage points higher than the nearest prime equivalent, a one-year ARM, these initial fixed interest rates were exceptionally high by any reasonable standard, a fact that negates the erroneous but widespread assumption regarding interest rates on

subprime mortgages. In comparison, the higher interest rates after adjustment in 2004 and 2005 were about 3 to 4 percentage points higher than the initial interest rate. Subprime lenders expected that most borrowers would refinance their mortgages around the time of the interest-rate resets, and over 70 percent of subprime mortgages in Connecticut, Massachusetts, and Rhode Island did get refinanced. In reality, however, refinancing turned out to be less prevalent in 2005 and 2006 than in earlier years. Short-term interest rates, upon which post-reset rates are based, declined from a little more than 5 percent in early 2007 to about 3 percent by May 2008, meaning that reset rates for subprime mortgages originated in 2006 and 2007 are quite close to the initial period's interest rate. The main problem in the subprime mortgage market is many borrowers' inherent inability to afford the monthly mortgage payment, not the interest rate tied to the loan.

- **Higher foreclosure rates stem from falling house prices.**

Across the United States, foreclosure rates on both subprime and prime mortgages have risen, and more foreclosures are expected in the future. Lower market prices increase the likelihood that a borrower will have negative housing equity, meaning that the outstanding mortgage balance is higher than the house's current market value. While negative housing equity is a necessary condition for default and foreclosure, by itself it is not a sufficient condition for triggering foreclosure: homeowners with negative equity do not routinely default on their mortgages. Using the Warren Group data, the Boston Fed researchers identified Massachusetts homeowners in the early 1990s who were likely to have had negative equity in their homes during that period's downturn in the state's housing prices. Fewer than 10 percent of these at-risk homeowners actually experienced foreclosure, a result supported by economic theory and prior evidence. Adverse life events at the household level that negatively affect cash flow—job loss, divorce, or unforeseen medical expenses—typically presage foreclosures. These individual triggers occur regardless of the business cycle or the housing cycle. Individual-level variations in these adverse life events are the key to explaining default probabilities, which rise when homeowners are in a position of negative equity, meaning they will have trouble refinancing a mortgage or selling their houses. Most homeowners in a position of negative equity will not experience other financial problems severe enough to prompt them to default on their mortgage payments. So while it is true that falling house prices result in higher foreclosure rates, there is no reason to fear that homeowners en masse will elect to voluntarily “walk away” from a negative equity position that in most cases is temporary. To the contrary, it is usually in a homeowner's long-term interest to continue servicing the monthly mortgage payment.

- **Prime lenders would have rejected most of the loans originated by subprime lenders.**

Some observers have argued that many subprime borrowers could have qualified for prime mortgages. As the housing boom continued into the mid-2000s, many subprime borrowers had good credit histories and FICO scores above 620, the traditional cutoff point for distinguishing between prime and subprime borrowers. By 2004, 70 percent of subprime borrowers in Connecticut, Massachusetts, and Rhode Island had FICO scores above 620. Yet using the assembled datasets, the Boston Fed researchers found that prime lenders would not have permitted borrowing on the terms routinely obtained in the subprime market. Fewer than 10 percent of subprime mortgages issued during the peak of the recent housing cycle met all the requirements for obtaining a prime mortgage; moreover, 65 percent of these “potentially prime” borrowers obtained fixed interest rates that compared favorably to interest rates on prime mortgages. The majority of subprime borrowers had high LTV ratios, meaning little equity in the house at the time it was purchased; did not fully document their assets and income, an omission that could mask other risk characteristics; and had high debt-to-income ratios, meaning that the mortgage was financially burdensome under the best circumstances—and that a household-level shock could prove to be a tipping point triggering eventual foreclosure. Taken together, these more complete measures of loan quality illustrate the higher risk associated with subprime mortgages. The data suggest that in 1999–2000, subprime borrowers made an average downpayment of 20 percent, but by

2005–2006, subprime borrowers with low FICO scores averaged a 15 percent downpayment. Those with high FICO scores averaged a 5 percent downpayment.

- **Many recent foreclosees put little money down and had lived in their homes a short time.**

On average, borrowers who lost their homes to foreclosures in recent years had high LTV ratios and made very low downpayments. By constructing complete ownership experiences, the researchers found that among the Massachusetts foreclosures that took place in 2007, 40 percent of borrowers had made no downpayment when purchasing their house; 50 percent had made less than a 5 percent downpayment, and almost half of all foreclosed homeowners had lived in the house for less than three years, which means they bought near the peak of the housing cycle and then likely experienced negative equity.

- **Current Massachusetts foreclosures involve a disproportionate number of multi-family dwellings.**

Properties containing between two and four separate living units account for slightly more than 10 percent of residential housing purchases in Massachusetts, but almost 30 percent of current foreclosures. In Massachusetts, subprime mortgages were used to purchase multi-family homes more often than either single-family homes or condominiums. Multi-family units are often purchased for investment purposes, and typically have high LTV ratios; these reached 90 percent for multi-family dwellings at the height of the recent housing boom. Therefore, as housing prices fell, these property owners would be more likely to have negative equity. In a multi-family dwelling, most units are rented, so the number of Massachusetts residents affected by the current foreclosure wave significantly exceeds the number of foreclosures, because lenders typically evict tenants when foreclosing on a property.

- **Most recent foreclosures in Massachusetts involved homes that were initially purchased with prime mortgages.**

Only 30 percent of Massachusetts foreclosures that took place in 2006 and 2007 are traced to subprime purchase mortgages, while 70 percent of foreclosed borrowers bought the property with a mortgage obtained from a prime lender; 44.6 percent of these foreclosed homes were purchased before 1999.

- **Almost half of the residential foreclosures in Massachusetts came on subprime mortgages, including subprime refinances of prime purchase mortgages.**

Current foreclosures in Massachusetts involve a significant number of homes purchased with prime mortgages before 1999. Since the state's housing prices increased by more than 60 percent between 1999 and early 2008, the role of subprime lending in cash-out refinancing and subsequent defaults helps to explain the connection. Foreclosed homes experienced higher than normal refinancing activity. Houses purchased in 1999 that were foreclosed in 2007 averaged 5.1 mortgages during the entire ownership experience, while houses purchased in 1999 that were not foreclosed (some of which avoided foreclosure by being sold) averaged only 3.8 mortgages during the life of ownership.

Implications

The subprime mortgage market essentially created a class of borrowers who are particularly sensitive to declines in house prices. As the housing boom continued and house prices increased through the mid-2000s, the consistent story is one of increasingly risky subprime mortgages made to less qualified borrowers; this deterioration in loan and borrower quality partly explains the high level of foreclosures now occurring on subprime mortgages. Amid a residential real estate market that is

falling in value, many homeowners experience negative equity, but given their higher risk profiles, subprime borrowers are more likely to end up in foreclosure. Since declining house prices have made refinancing less available for many homeowners throughout the United States, in the coming months more subprime borrowers may hit their resets, find themselves unable to finance their mortgages, and be forced to pay fully indexed rates; this may continue the wave of foreclosures in the absence of intervening public policy measures. The high percentage of foreclosures taking place on homes initially financed with prime purchase mortgages but subsequently refinanced with subprime loans vastly complicates the explanation of why subprime mortgages have defaulted so frequently. The evidence summarized in this paper shows that it is not valid to conclude that the entire class of homeowners who financed their initial housing purchase with a subprime mortgage are irresponsible borrowers.

p-08-3

Negative Equity and Foreclosure: Theory and Evidence

By Christopher L. Foote, Kristopher Gerardi, and Paul S. Willen

complete text: <http://www.bos.frb.org/economic/ppdp/2008/ppdp0803.htm>

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Motivation for the Research

Following an unprecedented increase in housing prices over the last decade, the United States is currently experiencing a national decline in residential real estate prices. As a result, many Americans now owe more on their mortgage than the home's current market value, a condition described as having "negative equity" in one's housing investment. While it has long been recognized that homeowners with negative equity are more vulnerable than other homeowners to experiencing a foreclosure, pinpointing the precise manner by which a negative equity situation translates into a mortgage foreclosure has been difficult to ascertain when using most datasets common to housing research. Yet a better understanding of the link between negative housing equity and the incidence of foreclosure will enable lenders and policymakers to design programs that more effectively and efficiently mitigate foreclosures and the associated social costs.

Research Approach

Using detailed Massachusetts Registry of Deeds data compiled by the Warren Group, a firm that gathers information on real estate transactions in New England, the study constructs complete histories, starting in January 1987, for residential properties in the state tied to a particular owner. By tracking every residential purchase mortgage, including any second "piggyback" mortgages, and all subsequent housing transactions, including refinanced mortgages and foreclosure deeds, a complete "ownership experience" is established for the time an individual household occupies a particular home. Precise loan-to-value (LTV) ratios at the time of purchase are calculated, and over 100 house price indexes, which track cumulative house price appreciation and depreciation, are constructed for the 351 towns and cities in Massachusetts. Using the purchase price, the initial LTV ratio, and house price indexes to track the investment's subsequent rise or fall in value, a negative equity proxy is calculated for each borrower. The data encompass the downturn in the Massachusetts housing market of the early 1990s in terms of the percentage of homeowners likely to have had negative equity, and the researchers compare the current situation to the situation in 1991:Q4, a period they believe is analogous to the current phase in state's housing cycle. Based on the negative equity proxy, the incidence of future Massachusetts foreclosures is estimated for Massachusetts homeowners with negative housing equity as of 2007:Q4.

Key Points

- While some observers believe that homeowners with negative equity will inevitably default in large numbers, this is not a realistic expectation. A foreclosure is generally triggered by an owner's having negative equity and a household-level cash-flow problem that renders the monthly mortgage payment unaffordable.
- During the early 1990s downturn in Massachusetts housing prices, most people who had negative equity did not experience a foreclosure. Of the 100,300 borrowers identified as having had negative equity in 1991:Q4, only 6,450 owners (6.4 percent) actually lost a home to foreclosure over the following three-year period.
- In 2007:Q4, approximately 94,600 Massachusetts homeowners are estimated to have had a negative equity position; this represents about 10 percent of the state's mortgage holders who purchased a house on or after January 1, 1987. If we assume the same percentage of borrowers will default in this housing downturn as in the last one, then we would expect that 6,100 borrowers will default over the next three years; this number represents 6.4 percent of the negative equity borrowers in the state. Yet borrowers who financed a purchase mortgage through a subprime lender have higher risk profiles, and therefore a higher probability of default. Coupled with decreasing housing prices, and the fact that the subprime mortgage market did not exist in 1991, it is reasonable to expect that the default probabilities may be somewhat higher in the next few years.
- The Massachusetts default probabilities for 2008 through 2010 are recalculated according to three different future housing price scenarios using an econometric duration model of default. These calculations assume that no policy changes to modify loan terms will be implemented, and that the unemployment rate and the six-month London Interbank Offered Rate (LIBOR), an interest rate widely used to readjust rates on adjustable mortgages, will remain at their 2007:Q4 levels. Under these various scenarios, between 6.9 percent (6,519 households) and 8.0 percent of homeowners (7,613 households) with negative equity are predicted to undergo foreclosure. While these results are slightly higher than the rates of foreclosure that occurred during the state's last downturn in housing prices, and it is clear that a more severe decline will result in more foreclosures, the model implies that over 90 percent of borrowers with negative equity should continue to make their mortgage payments.

Implications

These findings have important implications for current loss mitigation proposals designed to address widespread negative housing equity and potential foreclosure issues. Loss mitigation strategies usually involve either permanently amending the loan's original terms, either by reducing the interest rate or the outstanding mortgage balance, or forbearance, whereby the lender agrees to a temporary reduction in the monthly mortgage payment, although the borrower is still liable for the original payment amount and the reduced payment amount is added to the outstanding mortgage balance. Since most borrowers with negative housing equity but no cash-flow problems will continue to service their monthly mortgage payments, offering a blanket loan modification program to all borrowers with negative equity would be a poor policy choice, as the costs would severely outweigh the benefits. Permanently modifying the terms of the loan would be an attractive offer to all borrowers, regardless of their individual default probabilities. Forbearance is much more effective policy, as borrowers who really are in danger of foreclosure will participate in this mitigation scheme, while borrowers not truly in danger of default will not find it attractive, as essentially it would raise the cost of their loan.

A New Approach to Raising Social Security's Earliest Eligibility Age

by Kelly Haverstick, Margarita Sapozhnikov, Robert K. Triest, and Natalia Zhivan

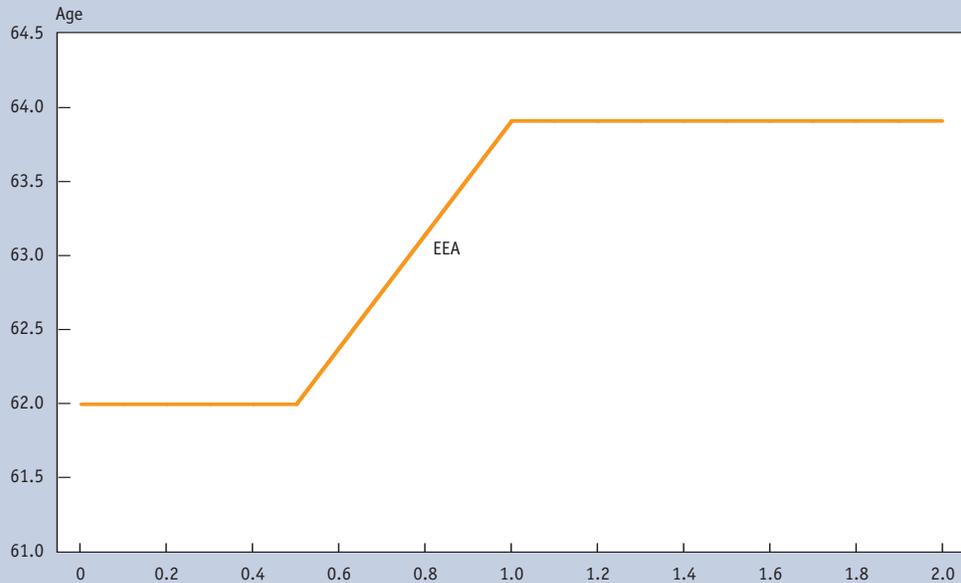
complete text: <http://www.bos.frb.org/economic/ppdp/2008/ppdp02.htm>
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Motivation for the Research

Although Social Security's normal retirement age (NRA) is increasing from 65 to 67 years of age, the earliest eligibility age (EEA) remains 62 years. This raises the question whether the EEA should be increased to 64 years to match the increase in the NRA.

Increasing the EEA would not alter Social Security's financial state, since benefit reductions for a person with average life expectancy are actuarially fair: annual benefits for workers who claim when reaching the EEA are lowered to offset the longer expected claiming period. The argument for increasing the EEA is that such a move could protect workers from an increased risk of impoverishment in old age as a result of their valuing the present too highly over the future (indicated by claiming at the EEA) or failing to take into account the risk of possible adverse developments such as poor health.

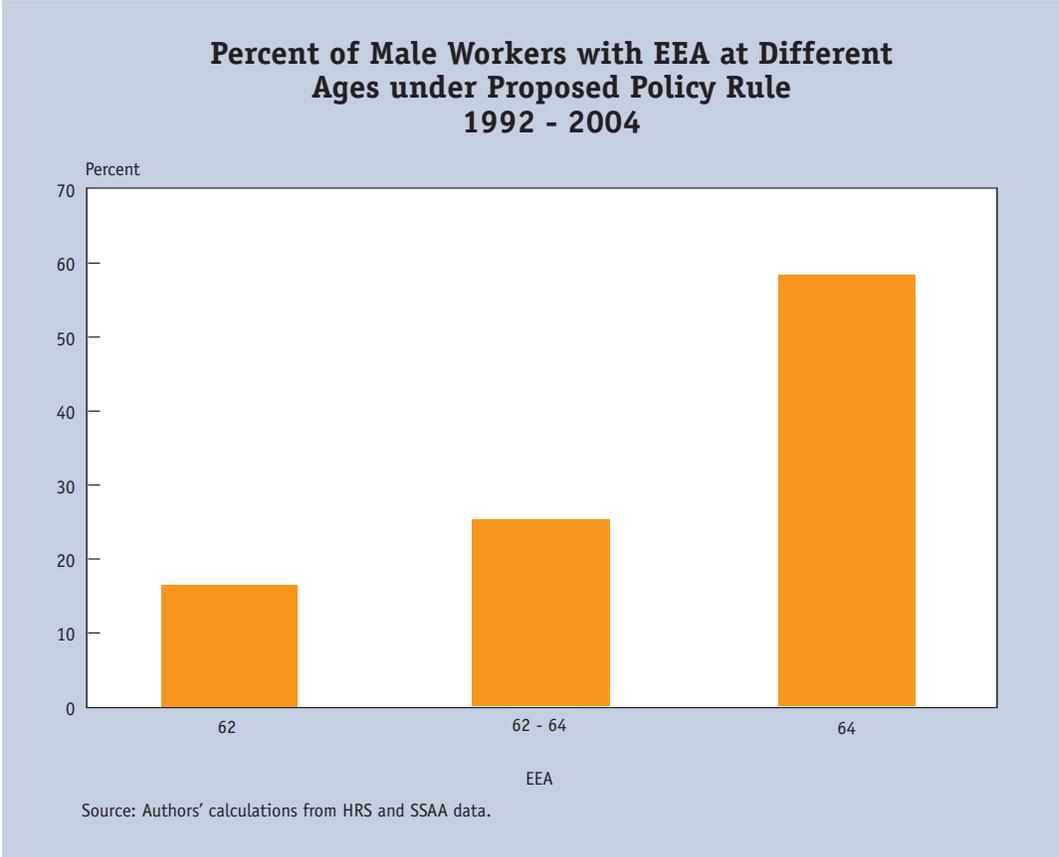
Proposed Rule: Earliest Eligibility Age (EEA) as a Function of the Ratio of Average Indexed Monthly Earnings (AIME) to Average Wage in the Economy at Age 55



Source: Authors' illustration

One simple rule that has been proposed to increase the EEA without imposing undue hardship on workers for whom continued labor force participation is ill-advised is to tie an increase in the EEA to the number of quarters of covered earnings, rather than simply to the worker's age. Proponents argue that this approach would allow those with long working lives—presumably the less educated and lower paid—to retire at an earlier age.

This paper examines the impact of using quarters of covered earnings to determine a worker's EEA and proposes an alternative policy that ties an increase in the EEA to a worker's average indexed monthly earnings (AIME).



Research Approach

This analysis uses the RAND public version of the Health and Retirement Study (HRS) and the Social Security Administration (SSA) administrative data, which contain seven waves of data (1992–2004). The sample selection process requires that respondents reach the age of 63 by the 2004 wave, that the data for the respondents include information on the Social Security benefit type and on quarters of covered earnings, and that the respondents not be widowed, not receive care for a dependent child under the age of 16, and not have clearly misrepresented information. This leaves a final sample of nearly 3,300 individuals. Each person remaining in the sample is classified into one of six categories based on the specific Social Security benefits claim. The descriptive characteristics of the individuals in each category are then compared to gain insight about the types of people who would be affected by the EEA increase.

Using the information gathered from careful analysis of the descriptive data to identify the distinguishing characteristics of those who claim Social Security benefits early versus those who postpone claiming benefits, the authors use regression analysis to estimate a reduced-form model of the choice to claim benefits and the choice to exit the labor force. Controlling for other factors that potentially affect these decisions, these regressions test for the effect of the length of labor force participation on these choices.

Key Findings

- Wealth accumulation exerts a discernable effect on the decision to exit the labor force. Individuals in the middle wealth quintile are significantly less likely to exit the labor force by 62 years of age than are individuals either at the bottom or the top of the wealth distribution. Health status is another significant factor in these decisions. As expected, being in bad health at age 63 indicates a higher likelihood of claiming early benefits and of exiting the labor force at or before age 62.
- Although one would expect the number of quarters of covered earnings to have a positive effect on claiming benefits early, the opposite effect appears: the number of covered quarters has a significant negative association with retiring early. This finding may indicate that if an individual retires at 62 because of poor health, it is likely that he or she has frequently been in bad health and thus unable to work as consistently as a healthier individual.
- One of the rationales for increasing the NRA and encouraging later retirement ages is that increases in life expectancy have increased the proportion of life spent collecting retirement benefits rather than working and paying payroll taxes. However, the self-perceived life expectancy of individuals in the low-AIME group is significantly shorter than that of those in the high-AIME group. So, on average, individuals in the low-AIME group would have to retire earlier than those in the high-AIME group in order to enjoy the same proportion of life spent in retirement, assuming that their self-perceptions reflect an accurate degree of self awareness about their true mortality prospects.
- Policy rules that tie labor force participation to eligibility for unreduced benefits at age 62 fail to help those who are in poor health. Unhealthy workers are simply unable to attain 35 years of labor force participation, while workers in good health satisfy the proposed test for eligibility. Healthy workers, however, tend to postpone claiming and retiring until a later age regardless of the EEA. Thus, tying the EEA to the length of a worker's labor force participation would not help many individuals who are unable to work because of poor health or an inability to find jobs in their 60s.
- While the number of covered quarters is a poor measure of health status, earnings are a good predictor of health, wealth, and job prospects later in life. Allowing workers with low AIME to continue to be eligible to receive benefits at age 62 has promise as a policy to protect workers who have low lifetime earnings and are in poor health from hardship associated with an increase in the EEA.
- AIME is a powerful summary measure that can be used to separate workers into groups with substantial differences in health, educational attainment, and life expectancy. It has the potential to help identify workers who would suffer hardship if their EEA were increased. AIME also has the important practical advantage of already being collected and calculated by the SSA.

Implications

A specific AIME-based proposal, with the objective of increasing the EEA for most workers while leaving it unchanged for those with the highest risk of suffering hardship from delayed eligibility, divides workers into three groups based on their AIME at 55 years of age. The EEA of workers whose AIME at age 55 is no more than 50 percent of average (economy-wide) monthly earnings would remain at 62 years. The EEA of workers with AIME between 50 percent and 100 percent of average monthly earnings would rise by approximately one-month (4 percent of a year) for every one percentage point increase in their AIME as a share of average monthly earnings above 50 percent. The EEA of workers with AIME equal to or greater than average monthly earnings would be 64 years.

Changes in the EEA are likely to create spillover effects impacting the finances of other publicly funded programs. If the EEA were increased for the low-AIME group rather than held constant, it would likely put upward pressure on expenditures in other government programs. Holding the EEA constant for the low-AIME group protects the most vulnerable workers from hardships associated with delays in benefit eligibility and reduces the fiscal externalities just mentioned, but because of the actuarial reduction in benefits, it does so at the cost of reducing the annual benefits accruing to this group after age 64.

It is difficult, or at least expensive, to devise policies that reconcile the objective of protecting the low-AIME group from potential hardships associated with an increase in the EEA while protecting early claimers from benefit erosion as the NRA increases. Applying a less than actuarially fair reduction in benefits to early claiming by members of the low-AIME group would protect benefit adequacy, but would increase program expenditures and introduce an economic incentive to claim benefits early. Making the benefit formula more progressive could solve the incentive for the early claiming problem, but potentially require an even larger increase in expenditures (unless benefits were reduced for the high-AIME group). Thus, while this policy could raise the EEA for most workers without seriously harming the most vulnerable, it involves some difficult choices. Because this proposal involves decisions concerning cutoff values for eligibility, further research is needed to determine the feasibility of such a rule.

w-08-1

Designing State Aid Formulas: The Case of a New Formula for Distributing Municipal Aid in Massachusetts

by Bo Zhao and Katharine Bradbury

complete text: <http://www.bos.frb.org/economic/wp/wp2008/wp0801.htm>
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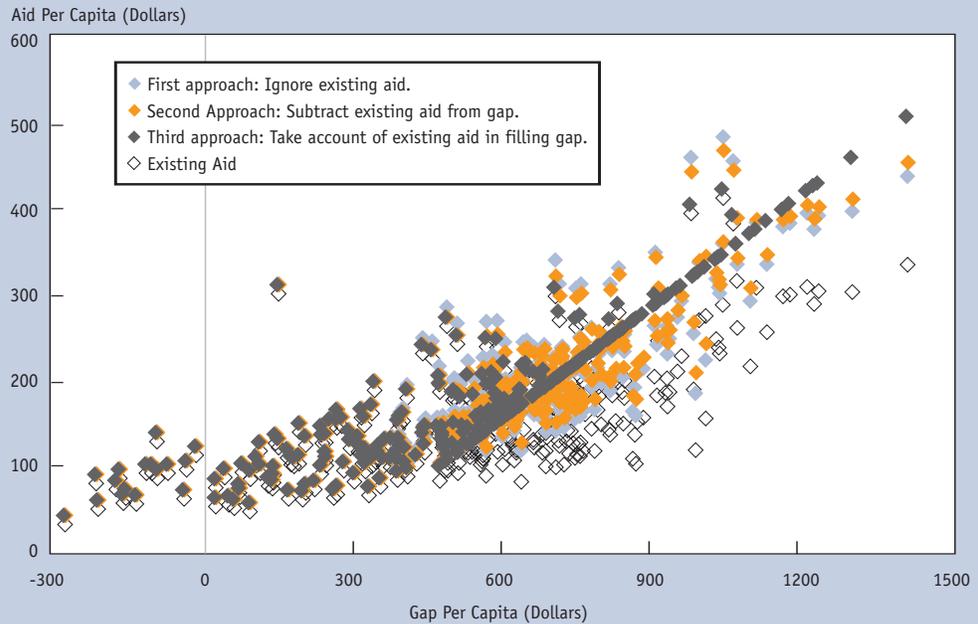
Motivation for the Research

Local governments rely on state aid as a major source of revenue. According to the U.S. Census Bureau, nationwide, intergovernmental revenue from state government accounted for 34.4 percent of local government general revenue in fiscal year 2005.

Of these intergovernmental grants, a large share aims to promote local fiscal equalization. Without aid to correct fiscal disparities, otherwise identical individuals or firms would pay different amounts of taxes for a given level of public service or receive different levels of services for a given amount of taxes, simply because they are located in different communities. In addition, fiscal disparities impose certain advantages and disadvantages on localities and may create unfair competition between them. Beyond these equity justifications, there is an efficiency argument for equalization: in the presence of fiscal disparities, individuals and firms have incentives to move from one community to another, potentially resulting in a misallocation of resources.

A large portion of state aid is distributed through formulas. Since such formulas distribute aid with a certain degree of transparency, these formulas help to build consensus and enhance the credibility of intergovernmental programs. Considering the importance of aid formulas, however, their design is an under-explored subject. None of the papers in the literature offers a consistent framework for considering existing aid when states transition to a new local aid formula. Even when a state government's objective is to create a new, separate aid program, explicit legislation or tradi-

Distribution of Per Capita Aid, Comparing Three Approaches



Source: Authors' illustration

tion usually prevents it from taking aid dollars away from existing programs. Therefore, the question of whether and how to “hold harmless” existing aid poses a challenge to the design of a new aid formula. This paper proposes a new approach that takes account of both existing and new aid within a consistent framework.

The authors use Massachusetts as an example because the Commonwealth’s cities and towns urgently need a new municipal (non-school) aid formula. Facing long-term structural fiscal difficulties, Massachusetts cities and towns are seeking additional non-school aid from the state, but the current general aid formulas in the Commonwealth either are obsolete or do not do a good job of targeting needier communities, and the state legislature is unlikely to authorize additional aid appropriations in the absence of a new formula.

Research Approach

Using conceptual analysis and simulations with Massachusetts data, the authors illustrate the trade-offs involved in deciding on a new formula for equalizing state aid for non-school expenditures to cities and towns, and they lay out general guidelines for setting values for the policy variables involved. Measuring fiscal disparities as differences among the gaps between the costs that local governments must incur to provide a standard quality and quantity of local public services (“costs”) and the ability of these governments to raise revenue from local sources (“local revenue capacity”), the authors show that previous studies and the formulas derived from them give differential weights to new and existing aid in filling the gaps, hence favoring communities that already receive relatively large amounts of aid. To remedy this situation, the authors propose a new approach that takes into account both new and existing aid in filling the local cost-capacity gap.

As state funds for local aid are often limited, no aid program is likely to achieve fiscal equalization in just a year or two. In order to achieve the goal of equalization, the state government needs to have a long-term plan for the aid formula; unlike previous studies that focus on only a single year's new aid distribution, the authors simulate the dynamics of aid distributions over multiple years.

Key Points

- The starting point for the new formula is the baseline gap, which is a threshold above which communities are eligible to receive aid in proportion to the differences between their individual gaps and the baseline gap. The formula needs a baseline gap because the statewide distribution of cost-capacity gaps may be wide and may involve negative gaps; it is practically impossible to distribute aid simply in proportion to the gap without setting a benchmark or a new “zero” point. With the inclusion of a baseline gap in the formula, communities with per capita gaps smaller than the baseline gap receive the minimum amount by design.
- According to the baseline gap formula, per capita aid to a community is equal to the relative gap (which is the community's gap minus the baseline gap) times the fraction of the relative gap filled by the aid dollars, for communities whose gap exceeds the baseline gap and for which the fraction filled times the relative gap exceeds the minimum per capita aid being disbursed; the authors call this “equalizing aid.” For other communities, per capita aid equals the minimum per capita aid; this is termed “minimum aid.”
- The goal of achieving a certain degree of equalization ultimately directs the choice of values for three policy variables: the size of the new aid pool, the minimum level of per capita new aid, and the level of the baseline per capita gap. A larger fraction of the relative gap will be filled by equalizing aid—hence achieving a higher degree of equalization—if the state provides more aid funds, sets minimum aid at a lower level, or sets the baseline gap at a higher level. With the opposite policy choices, communities with smaller gaps will receive more aid, thus sharing funds more broadly.
- The formula described above does not consider other existing state aid programs or the previous year's aid distributions. When enacting a new formula, decisions must be made about whether and how the previous year's aid dollars will be accounted for in determining the current year's aid distribution.
- One often-used approach ignores existing aid and hence distributes new aid at the minimum per capita level for communities with lower gaps and at levels directly proportional to the gap for equalizing-aid communities. In the authors' example using Massachusetts data, the correlation between the amount of combined aid and the size of the gap above the baseline is 0.80. The fraction of the gap filled by combined aid for the two-thirds of Massachusetts communities that receive equalizing aid has a very wide range—from 25 percent to about 130 percent—because existing aid is not proportional to the gap.
- The second (standard) approach—which treats existing aid dollars like any other revenues, essentially subtracting them from the cost-capacity gap—allows the state government to focus somewhat more aid on equalization than does the first approach. With this second approach, combined aid is associated slightly more closely with the gap, with a correlation of 0.84, than in the first approach. Three-fifths of the communities receive local aid and the fraction of the gap filled by combined aid for these communities lies within a narrower band than under the first approach. Because the gap net of existing aid is used in determining new aid, communities for which existing aid more than fills their gap receive minimum aid in the second approach.

- The third (new) approach—which considers existing aid along with new aid in filling a fraction of the gap—achieves a higher degree of equalization than either of the other two approaches, but because this third approach treats new and existing aid dollars as interchangeable in filling the gap, it is potentially appropriate only for existing aid that has a general equalizing purpose similar to the new aid. With the third approach, combined aid for the two highest-gap quintiles of communities is larger than with the other two, and the correlation between combined aid and the gap is 0.91. In the simulations, almost 40 percent of communities receive equalizing aid with this approach, and for every one of them, combined aid fills 44 percent of their relative gaps.
- If a state chooses not to retain the full amount of the previous year’s aid or other existing aid distribution in the current year, it can eliminate it and start afresh, but as a practical matter, states rarely do this. Alternatively, a state can ease the transition by holding harmless only a fraction of existing aid; this approach represents a compromise, reducing the potential disruption from reductions in aid while shifting more funds toward the new formula.
- Policymakers may face tradeoffs between short-term and long-term goals in a multiple-year aid plan. The long-term goal of the aid formula is to achieve fiscal equalization across communities. But in the short term, some large-gap communities could be in the minimum aid group because they already receive substantial amounts of existing aid. However, these communities could still have much larger gaps net of combined aid (in absolute terms) than some communities in the equalizing-aid group. The basic difficulty is that a constant fraction of the gap filled (and hence a constant fraction left unfilled) involves larger dollar amounts of unfilled gap for those communities that have larger gaps.

Implications

The authors’ new approach is more equalizing than the two “standard” approaches if there is existing local aid that a state wishes to hold harmless for each community, while simultaneously implementing a new formula to distribute additional aid. The standard approaches are more favorable to communities that receive more existing aid than communities with the same gap but less or no existing aid.

When some or all communities receive existing aid, it is difficult to justify the first approach, unless the existing aid is earmarked for purposes not included in the “cost” measure and/or for which general revenue (capacity) may not be substituted. Similarly, the second approach may be viewed as equitable if the policymaker values existing aid in terms of objectives that are different from those used in developing the new, gap-based formula. However, if the policymaker believes that the relative gap is the best indicator of a community’s relative current need for aid, then the appropriate indicator of a formula’s fairness (defined as its success in equalizing across the chosen measure of need) is the degree to which combined aid dollars are targeted in proportion to the size of the relative gaps across communities, and the new approach is fairest.

The formula developed in this paper is designed to distribute (non-school) municipal aid. The foundation-aid approach used by most states for education aid is implicitly consistent with this approach because foundation formulas are designed to fill 100 percent of the gap between each district’s foundation spending amount and its local revenue capacity, so that existing and new aid are treated equivalently in filling the gap. If a state is considering moving away from filling the entire foundation gap, the policymakers should consider carefully how to account for existing school aid.

Although the new aid formula is tailored to Massachusetts, the framework, principles, and policy recommendations are potentially applicable to other states.

Credit Card Debt and Payment Use

by Charles Sprenger and Joanna Stavins

complete text: <http://www.bos.frb.org/economic/wp/wp2008/wp0802.htm>

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Motivation for the Research

High levels of credit card debt and the consequences for the broader economy as well as for the individual debtor make the study of individuals who carry credit card balances an important topic in payments research. Credit card holders who carry unpaid balances from month to month—also called “revolvers”—face finance charges for their marginal purchases.

Two strands of economic reasoning, one behavioral, the other traditional, suggest that revolvers should substitute away from using credit cards to using alternative payment methods in paying for their new purchases. According to traditional theory, rational individuals should use alternative payment methods to avoid the relatively high cost of additional credit card debt, while behavioral theory suggests the same behavior, but for a different reason: as a self-control device. Under either explanation, revolvers should use credit cards less and alternative payment methods more at the point of sale.

Although there have been studies showing that credit card revolvers are more likely to adopt debit cards than are other credit card holders, evidence of substitution in actual payment use has been lacking. This paper attempts to develop a picture of how carrying revolving balances affects actual payment activity.

Research Approach

Using regression analysis, based on data from the 2005 Survey of Consumer Payment Preferences for over 1,800 individuals who hold both credit and debit cards, the authors explore the effects of revolving balances on payments made with four different methods: credit card, debit card, check, and cash. They complement their analysis of payment behavior with qualitative data on payment attribute perceptions, aiming to identify revolvers’ perceptions of debit cards that may be linked to their substitution behavior. Perceptions—or perceived differences in payment attributes—have been found to be important determinants of consumer payment behavior.

Key Findings

- Credit card revolvers are significantly more likely to use debit cards and less likely to use credit cards than convenience users who repay their balances each month. Individuals who regularly carry revolving balances make a significantly lower fraction of their total payments with credit and a significantly higher fraction of their total payments with debit. Furthermore, revolvers are much more likely than convenience users to report debit as being the payment method chosen most frequently at the point of sale.
- There is no significant difference in the use of checks or cash between revolvers and convenience users.
- Revolvers are significantly less likely to view debit cards as superior to credit cards with respect to ease of use and acceptability, but more likely to see debit as superior with respect to control over money and budgeting.

Implications

These results are the first to show substitution from credit to debit by individuals with revolving credit card balances, not only in the adoption of payment methods, but in actual payment use. Because revolvers are significantly more likely than convenience users to indicate that debit is better than credit in terms of budgeting and control and because they tend to substitute debit for credit more than convenience users do, the authors argue that the substitution is likely motivated by concerns of budgeting and financial control. Provided that perceptions are not fixed over time, these findings point to key attribute perceptions that marketers and policymakers can influence to affect credit card spending.

w-08-3

Blood Donations and Incentives: Evidence from a Field Experiment

by Lorenz Goette and Alois Stutzer

complete text: <http://www.bos.frb.org/economic/wp/wp2008/wp0803.htm>
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Motivation for the Research

In medical emergencies, blood transfusions are often the only way to save a life. A sufficient supply of donated blood is thus literally a matter of life and death. To meet the need for blood, a wide and healthy base of donors, willing to give blood when required, is needed.

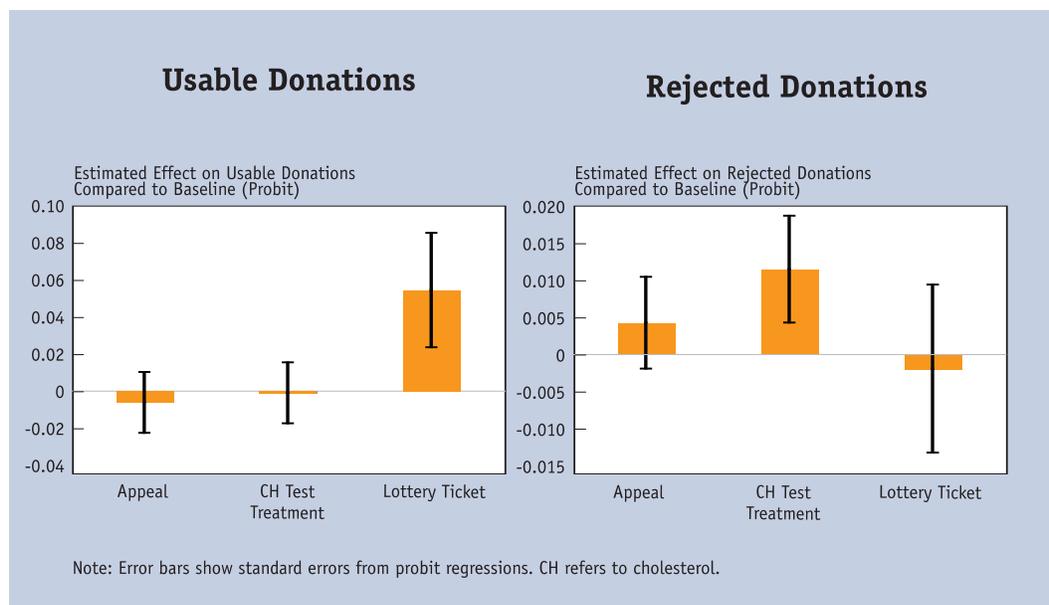
In this paper, the authors ask whether selective incentives can be used to overcome shortages in an environment that relies primarily on the prosocial motivations of its donors. Most economic models, including those incorporating prosocial preferences, explicitly predict that selective incentives increase blood donations. Yet there is a deep-rooted skepticism about using incentives in blood donations, even on a temporary basis. This skepticism is based on the conjecture that using incentives may attract at-risk donors, and—worse—undermine the prosocial motivation to donate blood. In this study, the authors examine the effectiveness of selective incentives in increasing usable blood donations, based on a large-scale field experiment they conducted with over 10,000 blood donors. Previous studies have mainly surveyed donors' attitudes toward blood donation incentives, or have conducted experiments on convenience samples that are not representative of the population of blood donors.

Research Approach

The authors conducted a field experiment spanning three months in the summer of 2006 in four blood donation centers in the canton of Zurich, Switzerland, to examine the impact of selective incentives on donors who normally donate for prosocial motivations alone. The study was conducted in close collaboration with the Zurich Blood Donation Service of the Swiss Red Cross (SRC). The subjects were 10,000 individuals registered in the database of the blood donation service. Some donors were offered a free cholesterol test in return for a blood donation, others were offered a lottery ticket. Members of a third group, the control, were not offered any incentive. The subjects were unaware that an experiment was being conducted, and the treatments were mailed privately to the donors. The data on the subjects includes information on basic demographics as well as their individual donation histories. After normalizing the data to remove possible differences among donation centers and to account for past donor frequency, the authors employ probit models to analyze the impact of the selective incentives on donations and, separately, on donations that were rejected or discarded by the donation service. Separating the analysis of the two outcomes makes it possible to distinguish the impact on donor motivation from the impact on donor selection.

Key Findings

- Material incentives had no general negative effects on the motivation to donate blood.
- Looking at the overall outcomes, offering a lottery ticket increased usable donations by 5 percentage points over a baseline donation rate of 42 percent. In contrast, offering a free cholesterol test had no economically and statistically significant effect on usable donations.
- Offering a free lottery ticket was significantly more effective than either appealing to donors without giving incentives or offering a free cholesterol test.
- The treatment effects varied between subsamples in various interesting ways. It is mainly subjects who donated only infrequently in the past who respond to the experimental treatments and increase donations. There was essentially no incentive effect on donors who had shown a strong preference for donating blood in the past. This pattern is evidence of heterogeneity in the motivations for blood donations.
- Different splits of the sample, such as by age or gender, reveal no significant differences in the responses to the treatments, reinforcing the authors' interpretation that the driving force behind the different responses is differences in the motivation to donate blood.
- With regard to the possible selection effects of the treatments, there is no evidence that offering a lottery ticket attracts donors who have a higher propensity to generate a rejected donation. There is, however, some evidence that offering a cholesterol test leads to a somewhat higher risk of rejection of the donor or the donation, especially with women donors.



Implications

These findings raise the question of why offering the lottery ticket was so effective in raising donations, when monetary incentives have been shown to interact adversely with prosocial motivations in other experiments. There are two possible explanations for this difference. First, an important difference between the other experiments and this one is that in this study all treatments were privately administered. By contrast, in the other studies, a potential public image concern was always

present. Second, one could argue that the lottery ticket was not really perceived as a payment, but rather as a signal of goodwill on the part of the blood donation service, and that this was what the potential donors were reacting to, not the face value of the ticket and the possible financial windfall it represents. However, this explanation does not explain the different response to the cholesterol test incentive. One could also argue that it was the gambling aspect of the lottery ticket that appealed to donors, rather than the money itself. This conjecture could be tested in a lab setting; however, even if it were true, using lottery tickets would be a viable strategy for increasing blood donations.

The finding that the lottery ticket had no effect on rejected donations is not very surprising, because the stakes were rather low and the donor pool was fixed. More strongly negative consequences might be expected if higher payments were used on a permanent basis because that might attract new donors with worse characteristics. The fact that offering a cholesterol test led to a slight increase in rejected donations suggests that this offer was particularly attractive to donors with temporarily impaired health, reducing even further the desirability of using a cholesterol test as an incentive.

Overall, the results suggest that selective incentives and prosocial motivations may coexist even in domains that rely heavily on people's intrinsic motivation. Thus, in light of the recurring seasonal shortages and a steady tightening of donor criteria, incentives may prove useful to motivate previous blood donors to donate more.

These results should not be construed as evidence that instituting a permanent regime of monetary incentives would have positive effects on the level of donations. In this experiment, there was essentially no public image concerns, so an important channel by which incentives may become ineffective was shut out. Furthermore, a switch to permanent incentives may also be interpreted by donors as evidence that the donation service is not altruistic and thus may trigger counterproductive effects. Thus, while these findings suggest that incentives can be used as a stop-gap measure when shortages occur, further research is needed to address the effects of permanently switching to incentive schemes on the prosocial motivations of blood donors.

w-08-4

The Value of Risk: Measuring the Service Output of U.S. Commercial Banks

by Susanto Basu, Robert Inklaar, and J. Christina Wang

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Motivation for the Research

Service industries are an increasingly important part of modern economies, both in terms of size and for this sector's contribution to economic growth. However, for many of these service industries the output data are notoriously weak; this is particularly the case for U.S. commercial banking. This scarcity of quality data makes it hard to determine the sources of economic growth and even the size of the economy. Even measuring the value of bank output is challenging, since much of bank service output is not explicitly priced. Instead, banks charge implicitly for the services they provide. These implicit charges are bundled with interest flows between banks and their customers, chiefly borrowers and depositors. As a result, the output value of both borrower and depositor services must be imputed.

In the statistical and research community, it is generally agreed that the value of such implicit bank services is most appropriately imputed as the difference between the interest paid on loans (and interest received on deposits) and the opportunity cost of the associated funds as determined by a reference rate. The choice of this reference rate, however, is more contentious. Under the current system of National Accounts (1993) and in the U.S. National Income and Product Accounts (NIPA), the reference rate is stipulated to be a single, risk-free rate. In contrast, dynamic optimizing models of banks make clear the role of risk in inferring banks' income from services and show that, in a world with risk-averse investors, each reference rate should take account of the non-diversifiable risk of the associated financial instrument. Specifically, the opportunity cost of a risky loan is not the return on a risk-free investment, but rather the return on an investment of comparable risk. The implicit revenue from screening and monitoring services should equal the spread of the gross loan interest over the yield on an equally risky fixed-income security, not the spread of the gross loan interest over the yield on a risk-free security such as a Treasury bill or bond.

The authors apply a dynamic stochastic general equilibrium optimizing model to impute the value of bank services and examine the effect of the revised estimates on GDP, the share of capital in income, and the return on fixed capital.

Research Approach

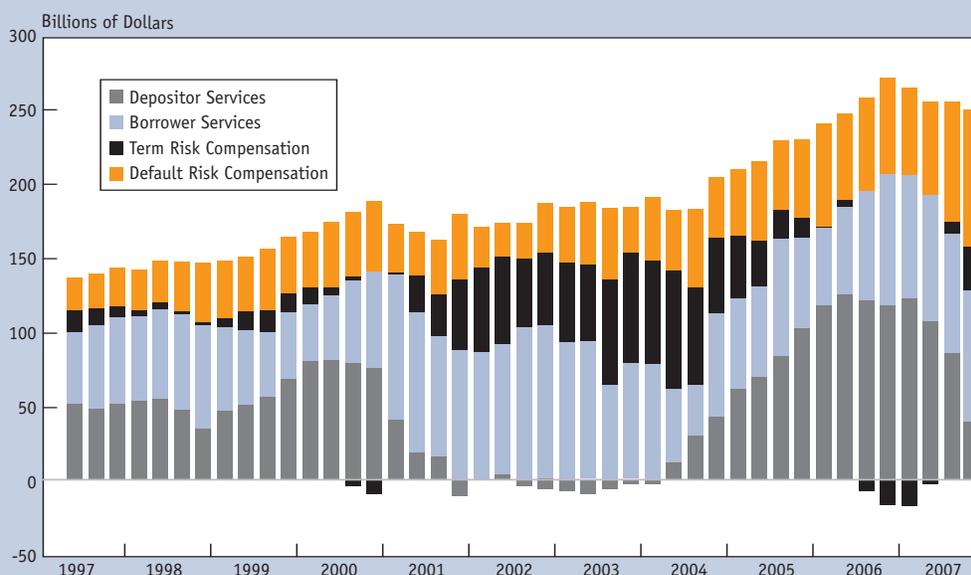
The authors generate the new model-implied measure of bank output for U.S. commercial banks, focusing on new estimates of the nominal value of services associated with loans to highlight the role of risk. The model employed is a general equilibrium model of interactions between banks, firms, and consumers, proposed in Wang, Basu, and Fernald (2004). The empirical estimates are based on data for U.S. commercial banks from 1997 to 2007. Computing the new measure calls for information on both the actual interest rate on bank loans and the interest rate on market securities with the most comparable risk characteristics.

Accounting data for individual commercial banks come from the Consolidated Reports of Condition and Income (the Call Reports), which are quarterly financial statements filed by banks to their regulators and made available by the Federal Reserve Bank of Chicago. The Call Reports data are used to estimate the average interest rate earned by banks on each category of loans and deposits. These reports also provide data on the repricing period of various categories of loans. Yields on U.S. Treasury securities of varying maturities are from the Federal Reserve Board, as are yields on commercial paper of the top two tiers of ratings. Yields on the remaining tiers are from Bloomberg, yields on mortgage- and asset-backed securities are based on indexes constructed by Citigroup Global Markets and Merrill Lynch, and interest rates charged on commercial and industrial loans for clients with various risk profiles come from the Federal Reserve Survey of Terms of Business Lending.

Key Findings

- On average, imputed bank output is overstated by 45 percent in the U.S. NIPA. This translates into an overstatement of total bank output of 21 percent, since services associated with originating loans that remain on bank balance sheets comprise only part of the banking industry's output. Netting out the lending services to nonfinancial firms, which are counted as intermediate inputs to those firms, this finding implies that U.S. GDP would have been 0.3 percent lower on average over the period 1997 to 2007 if bank output had been measured correctly. Reducing the imputed value of bank lending services to businesses also implicitly corrects nominal value added in industries where firms borrow from banks—almost every industry—since these measurements imply that borrowing industries are using fewer intermediate inputs.

Imputed Output of U.S. Commercial Banks and Risk Compensation at Current Prices, 1997:Q2–2007:Q4



Notes: "Deposit services" equals the deposit service spread times the quarterly average deposit balance. "Loan services" equals the loan services spread times the quarterly average loan balance at all banks; "Term risk compensation" denotes the value of the return on loans and deposits due to maturities longer than 3 months. "Default risk compensation" denotes the value of pure default risk-based return on loans.

- Under the NIPA output measure, the banking industry's capital share averages 59 percent, which ranks it higher than the capital share of the petroleum refining industry and similar to the share of the coal mining industry. This figure seems an implausibly high capital share, since the other industries with similar shares are generally regarded as intensive users of large-scale machinery. The new output measure, by excluding the risk premium, decreases the capital share of the banking industry to 42 percent on average—the same as the share of private industries as a whole. This is also close to the capital share of the retail trade industry but higher than that of the business services industry.
- The internal rate of return of the banking industry, based on the NIPA measure of output, also seems implausibly high, at 17.8 percent, on average, over the period. In comparison, the internal rate of return of the private sector as a whole is only 9.3 percent. The premium of 8 percentage points seems unwarranted by the systematic risk of the credit intermediaries, since many of those with publicly traded shares have a beta around one, indicating that the return on these shares will move with the market rather than being more or less volatile than the market as a whole. Once the new measure of bank output is used, the resulting lower operating surplus reduces the internal rate of return to a level close to that of the overall private sector.

Implications

In this paper, the authors show that a more appropriate measure of U.S. commercial bank output than the measure currently used in the NIPA can be implemented from 1997 onward, based on dynamic optimizing models. In particular, diverse financial markets provide adequate data on yields on debt instruments comparable to those held on banks' balance sheets to enable the derivation of

risk-adjusted reference rates, which are the appropriate rates to use in imputing the value of bank output. The authors also show that doing so is quantitatively significant.

The risk-adjusted measure of bank output is conceptually preferable and leads to more plausible outcomes than the current measures of bank output; this argues strongly for changing current statistical practice to remove the compensation for risk-bearing, in general, from bank output.

The fact that information about loan risk rating and the attendant interest rates charged by U.S. commercial banks is scarce is a troublesome obstacle to developing accurate estimates of the banking industry's output, as well as to the study of other important banking issues such as competition in credit supply. This paucity of data suggests that significant social benefits would be gained by improving data collection in this important area.

i-01

Foreclosures, House-Price Changes, and Subprime Mortgages in Massachusetts Cities and Towns

based on research by Kristopher Gerardi, Adam Hale Shapiro, and Paul S. Willen

interactive graphic: <http://www.bos.frb.org/economic/dynamicdata/module1/bmap.html#>

Description

“Foreclosures, House-Price Changes, and Subprime Mortgages in Massachusetts Cities and Towns” is the first in a series of interactive graphics modules designed to illuminate research conducted by economists in the research department of the Federal Reserve Bank of Boston.

The module comprises two interactive maps and a series of charts that enable users to view:

- The changing patterns in foreclosure rates and subprime mortgage originations across Massachusetts cities and towns over time, from 1990 to 2007;
- How movements in these rates compare with movements in house prices for any user-selected city or town;
- The association between foreclosure rates and median income in these cities and towns.

These modules are created in connection with the economists' research and are typically associated with one or more research papers by Boston Fed economists. While the papers generally use statistical, econometric, or other sophisticated analytical techniques to explain the causes and in many cases the effects and importance of what is happening in the economy, the graphics illustrate what the data reveal upon close visual examination.

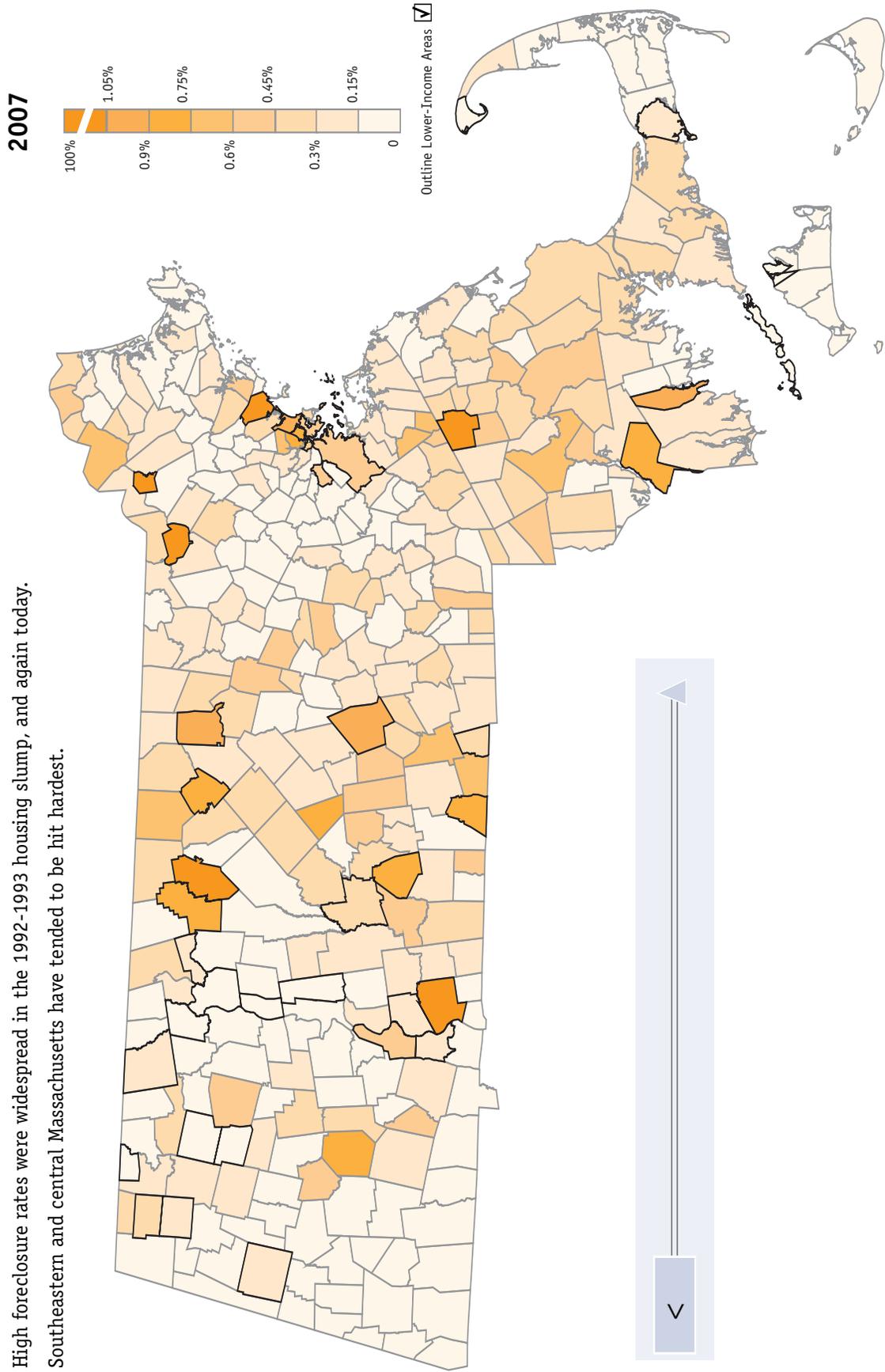
Key Points:

- High foreclosure rates were widespread in the 1992–1993 housing slump, and again in the current downturn.
- Southeastern and central Massachusetts have been hit hardest.
- The subprime lending channel developed relatively recently.
- In 2005–2007, a high rate of subprime mortgage originations tended to be associated with lower-income cities and towns.
- When house prices are rising exceptionally rapidly, foreclosure rates tend to be exceptionally low, and vice versa. We see this in the state as a whole and in most cities and towns.
- In recent years, rapid increases in house prices have been associated with rapid growth of the subprime lending channel.

Foreclosure Rates in Massachusetts Cities and Towns: 1990-2007

Key Points:

- High foreclosure rates were widespread in the 1992-1993 housing slump, and again today.
- Southeastern and central Massachusetts have tended to be hit hardest.

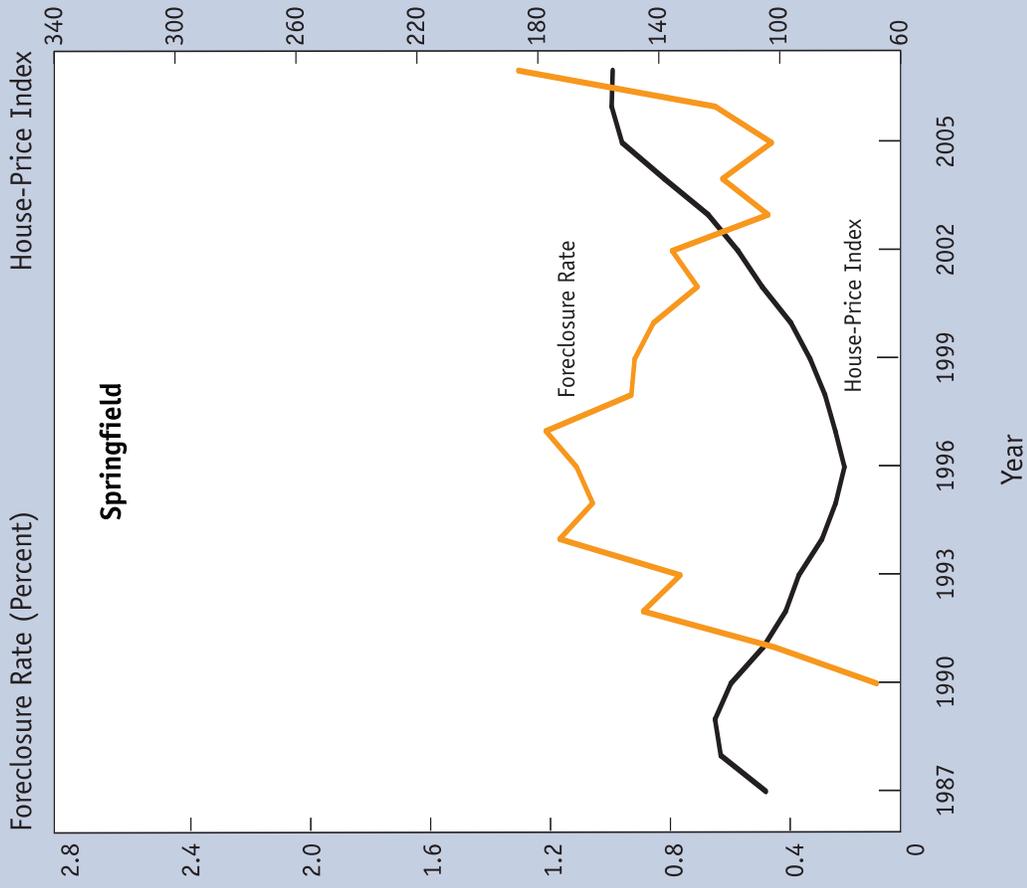
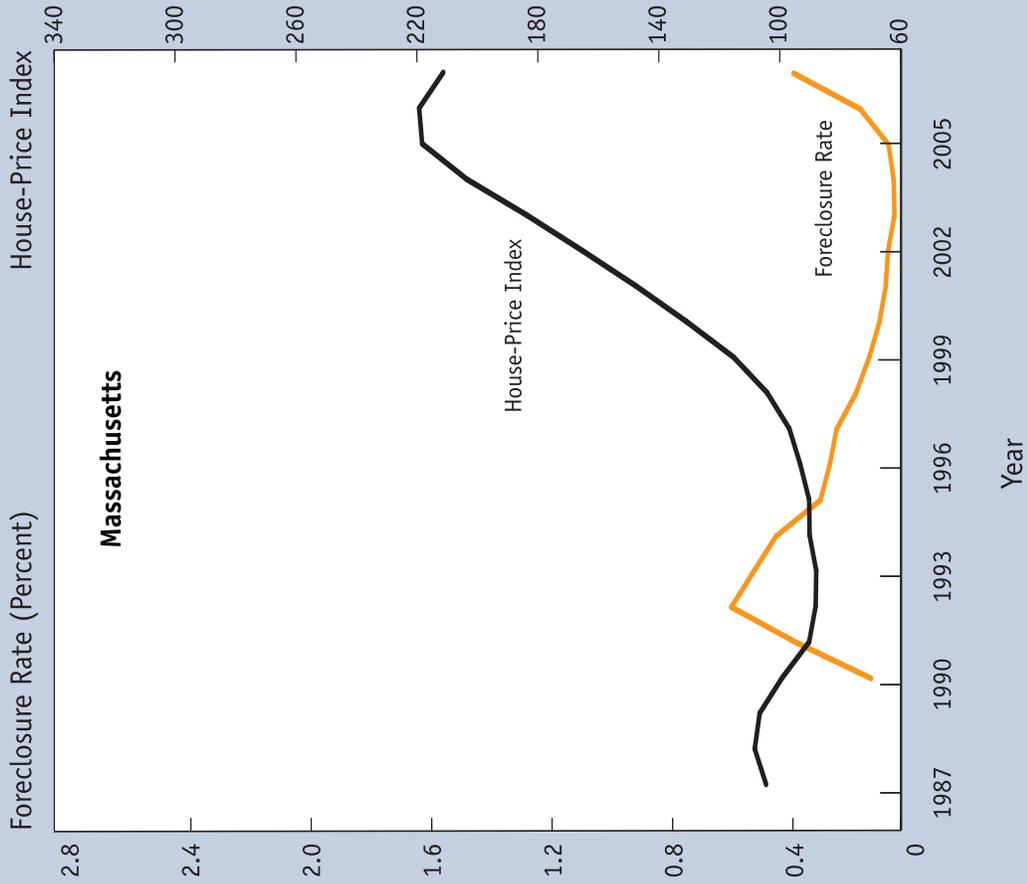


Source: Raw data on foreclosures and house prices are from the Warren Group. Rates computed per residential housing unit (raw data are from the MA Dept. of Revenue). Median income data are from the 2000 U.S. Census. Pre-2007 foreclosure data for Andover, Lawrence, Methuen, and North Andover are incomplete. Analysis: Kristopher Gerardi, Adam Hale Shapiro, and Paul S. Willen.

House-Price Changes and Foreclosure Rates: 1987-2007

Key Points:

When house prices are rising exceptionally rapidly, foreclosure rates tend to be exceptionally low, and vice versa. We see this in the state as a whole and in most cities and towns.



Source: Raw data on foreclosures and house prices are from the Warren Group. Rates computed per residential housing unit. (raw data are from the MA Department of Revenue).
 Analysis: Kristopher Gerardi, Adam Hale Shapiro, and Paul S. Willen.

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