Third Quarter

66 Improving the impact of federal aid to the states
Richard H. Mattoon, Vanessa Haleco-Meyer, and Taft Foster

83 What is the relationship between large deficits and inflation in industrialized countries?
Marco Bassetto and R. Andrew Butters

Fourth Quarter

101 The asset-backed securities markets, the crisis, and TALF
Sumit Agarwal, Jacqueline Barrett, Crystal Cun, and Maria Cristina De Nardi

116 Educational attainment and household location:
The case of Chicago’s lakefront
William A. Testa and William Sander

132 Index for 2010
Third and Fourth Quarters 2010, Volume XXXIV, Issues 3 and 4

Third Quarter

66 Improving the impact of federal aid to the states
Richard H. Mattoon, Vanessa Haleco-Meyer, and Taft Foster
In response to recessions beginning in 1973, 2001, and 2007, the federal government provided financial aid to states, with the dual goals of stabilizing state finances and stimulating the economy. The timing of fund provision and the ultimate allocation of funds were often less than optimal. The authors look at how to design a more effective process for starting and stopping state aid.

83 What is the relationship between large deficits and inflation in industrialized countries?
Marco Bassetto and R. Andrew Butters
Examining industrialized countries, the authors find that large deficits are not associated with higher inflation contemporaneously, nor are they associated with the emergence of higher inflation in subsequent years. This finding suggests that countries that can afford large deficits have built solid reputations and institutions supporting a sound monetary policy and the reversion to a stable fiscal regime.

Fourth Quarter

101 The asset-backed securities markets, the crisis, and TALF
Sumit Agarwal, Jacqueline Barrett, Crystal Cun, and Mariacristina De Nardi
The authors explain the role of asset-backed securities markets in generating credit and liquidity and how this role was disrupted during the financial crisis. They discuss the implementation of the Term Asset-Backed Securities Loan Facility (TALF) and argue that this program helped reestablish the ABS markets and the credit supply.

116 Educational attainment and household location:
The case of Chicago’s lakefront
William A. Testa and William Sander
The authors focus on the relationship between being a college graduate (that is, having a bachelor’s degree or higher) and household location in the city of Chicago’s lakefront neighborhoods, other parts of the city, and the suburbs in Illinois. Overall, their results indicate that being a college graduate is associated with living in the city’s lakefront neighborhoods relative to the suburbs. These results hold for non-Hispanic whites, blacks, and Hispanics across the metropolitan region.

130 Conference on Bank Structure and Competition: Call for papers

132 Index for 2010
**Introduction and summary**

On February 17, 2009, President Barack Obama signed into law the American Recovery and Reinvestment Act (ARRA). The legislation represents the most recent attempt by the federal government to provide countercyclical aid to states and localities suffering from fiscal stress stemming from a broad-based economic recession. The legislation follows the pattern of previous federal aid programs in that it provides a combination of direct program support (Medicaid, unemployment insurance, and education aid) and infrastructure grants. The intention is to provide two forms of relief. First, the program aid will serve as a stabilizer for state and local governments by allowing them to maintain (or at least minimize) the reduction in key expenditure areas. Second, the infrastructure money is intended to serve as a stimulus and potential job creator. The ARRA’s emphasis on job creation and economic growth objectives makes it a little different from past federal aid programs; traditionally these have focused heavily on fiscal stabilization.

While states and localities often support such generosity from Washington, there are several questions that remain regarding the efficacy of countercyclical federal aid. In this article, we discuss the rationale for federal assistance and examine different mechanisms for its distribution. Of particular interest is whether the aid program is calibrated to reflect changes in the business cycle. Since this is countercyclical aid, it is intended only to ameliorate changes in business cycle conditions that have a direct impact on state budgets and not to facilitate poor budget policy by state and local governments. Through empirical analysis, we model the effects of the use of different economic triggers to start and stop aid over the business cycle and examine how these triggers would have performed over previous business cycles. The triggers we use are the unemployment rate, measured as the excess rate above a specific unemployment threshold; the change in sales tax revenues, relative to a four-quarter moving average decline in revenues by more than 5 percent; and the change in a state-specific business cycle indicator (the Federal Reserve Bank of Philadelphia’s state coincident indexes). Clearly, decisions about the timing and targeting of aid are critical to structuring an appropriate federal response to states’ financial difficulties. We find that the Philadelphia Fed’s coincident indexes do a relatively good job of timing aid to reflect both the local intensity of the business cycle in individual states and the duration of the recession on a national level. The use of such a trigger would improve the likelihood that the aid would reduce the stress related to the business cycle, as opposed to the stress caused by structural imbalances in a given state’s economy or fiscal system.

**Purpose and structure of aid**

The idea of federal support for state (and local) governments in a downturn is hardly a new one. For example, in response to the recession of 1973–75, Congress enacted the Antirecession Fiscal Assistance (ARFA) program, which was combined with general revenue sharing grants and the Local Public Works (LPW) program to provide unrestricted grants and infrastructure funding to the states. In addition, Congress passed the Comprehensive Employment and Training Act (CETA) in 1973 and, in conjunction with these other programs, this became an anti-recessionary mechanism.

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Richard H. Mattoon is a senior economist and economic advisor; Vanessa Haleco-Meyer was a senior associate economist and is currently a technology applications and programming analyst, and Taft Foster is an associate economist in the Economic Research Department of the Federal Reserve Bank of Chicago. The authors thank Leslie McGranahan and Lisa Barrow for their helpful comments on previous drafts.
for delivering job training. More recently, in 2003, Congress passed the Jobs and Growth Tax Relief Reconciliation Act, as states dealt with a slow recovery from the 2001 recession.

The purpose of such funding is primarily to stabilize fiscal behavior in the state government sector. This aid is intended to smooth the budgetary actions states would be forced to take in the face of declining revenues and increasing expenditure demands from programs such as Medicaid and unemployment insurance. In practice, the composition of state spending has become more countercyclical, given that health and education programs now consume larger shares (relative to spending in the past) of state budgets and tend to have rising program demands during economic downturns. The federal government sometimes adds an infrastructure element to its aid as a way of increasing demand in the construction sector and stimulating the economy. However, economic stimulus is clearly a secondary objective of this aid; if the federal government’s primary purpose were to provide an economic stimulus, it would probably be better off simply spending the money directly rather than funneling it through the states.

**Federal response to the 1973–75 recession**

The 1973–75 recession lasted 16 months and was strongly associated with the rapid rise of oil prices and the U.S. moving off the gold standard. The Organization of Petroleum Exporting Countries (OPEC) quadrupled prices in 1973 and this, combined with high inflation, led to three quarters of negative growth and an unemployment rate that peaked at 9 percent in 1975. This recession was also notable for the government’s creation of wage and price controls in an effort to restrain inflation. Inflation peaked at 12.6 percent in the fourth quarter of 1974.

In response, the federal government passed three programs in 1976 designed to help states and localities. These were expanded in 1977. The package had three components: public works, anti-recession general assistance, and public employment and work force training. In all, $14.5 billion was allocated to the states from November 1975 to March 1978.

Aid from the three programs was divided as follows: $5.7 billion for local public works, $2.5 billion for anti-recession fiscal assistance, and $6.3 billion for employment and training through the Comprehensive Education and Training Act (CETA). All three programs used measures of unemployment to trigger eligibility for aid. For the local public works and CETA programs, a national unemployment rate in excess of 6.5 percent was the baseline measure; for the anti-recessionary aid, a 6 percent national unemployment rate triggered fund allocations to states with local unemployment rates exceeding 4.5 percent.

**Evaluating the effectiveness of the aid**

Detailed evaluations of the aid programs were presented in reports by the U.S. General Accounting Office (GAO, 1977) and the Congressional Budget Office (CBO, 1978).

The GAO report specifically examined Title II of the Public Works Employment Act of 1976. This was one component of the federal government’s response to the recession. The stated goal of the program was “to offset destabilizing fiscal action of state and local governments during recessions and, in particular, to maintain basic services customarily provided with the emphasis placed on wages and salaries of public employees.”

Specifically, Title II of the act authorized the distribution of $1.25 billion over five quarters from July 1976 through September 1977. The GAO report focused on five areas of inquiry:

- Was the provision of aid to state and local jurisdictions timely so that it was an effective tool to counter economic recession?
- What was the magnitude of destabilizing fiscal action by state and local governments during the economic downturn?
- Was the aid targeted effectively so that it was directed to those state and local jurisdictions that suffered most from the impact of the recession?
- Was the level of excess unemployment (which was defined in the law as any rate above 4.5 percent) the best indicator of the impact of the recession on states and localities?
- Was the effect of the recession a less serious problem for state and local governments than long-term structural problems associated with secular decline?

The report’s findings suggested several flaws in the federal assistance program. For example, the excess unemployment rate trigger was not sensitive enough to reflect cyclical change in state economies. In addition, it was not clear that the recession by itself was sufficient to cause destabilizing state and local fiscal actions. In the case of this recession, inflation played a significant role. Further, the use of the excess unemployment rate to allocate aid also failed, as it was unclear that excess unemployment directly reflected the impact of the recession on the state or local budget. Finally, the report found that the program appeared to provide aid that was most closely related to patterns of secular/structural decline. Areas of the country that
experienced relatively low growth rates prior to the recession received disproportionate shares of aid. This was not the intent of the legislation.

The report identified a basic tension in the legislation between simply supporting the state and local government sector and anticipating that aid to state and local governments would stimulate the economy. The report had no direct findings on the degree to which the aid stimulated the economy, but suggested that this should be considered in crafting any future anti-recessionary response.3

In the CBO report, a key finding was that the intent of the federal action needed to be explicit. There can be conflicting pressures when programs are designed for both economic and fiscal stabilization. If the goal is economic stabilization (and the federal government wants to use states and localities as agents for distributing funds), the CBO suggested that targeted grants would be the best form of aid, since these can be earmarked for specific programs and populations that are in need of economic stabilization due to a recession. A further advantage is that targeted grants are less likely to serve as substitutes for state and local revenues and cannot be used to rebuild state or local surpluses. If the purpose is fiscal stabilization, unrestricted aid or broad block grants are more effective, since they allow states to maintain their aggregate spending level without (or with minimal) fiscal adjustment.4


The 1980 recession lasted only six months and was marked by record high interest rates and a spike in energy prices. This was followed by a deeper, 16-month recession beginning in July of 1981, during which the continued impact of high interest rates (peaking at 21.5 percent in June 1982) and high energy prices caused a spike in unemployment; the national unemployment rate reached 10.8 percent in November and December 1982. The federal response was along two dimensions. First, the Surface Transportation Assistance Act was passed in 1983. This was forecasted to create 320,000 jobs. The act also authorized up to six weeks of extended unemployment insurance benefits. Second, the Emergency Jobs Act of 1983 was passed. This provided $9 billion for 77 different federal programs designed to stimulate economic growth and job creation (U.S. General Accounting Office, 1986).

Evaluating the effectiveness of the aid

The GAO evaluated the Emergency Jobs Act in December 1986. Their evaluation focused on: 1) when funds were spent; 2) when and how many people were employed; 3) how many unemployed persons were provided with jobs; 4) what efforts were made to provide employment to the unemployed; and 5) what benefits, other than employment, were provided.

The GAO found that the program was enacted faster than previous countercyclical federal programs. The bill became law 21 months after the beginning of the 1981 recession. The previous average for congressional action was 27 months after the onset of a recession. However, the GAO also found that funds from the act were spent slowly and unevenly and relatively few jobs could be attributed to the program. In all, the GAO estimated that by June of 1984 only 35,000 jobs could be attributed directly to the act. Specifically the report states, “…from its review of projects and available data, GAO found that 1) unemployed persons received a relatively small portion of the jobs provided, and 2) project officials’ efforts to provide employment opportunities to the unemployed ranged from no effort being made to working closely with state unemployment agencies to locate unemployed persons” (U.S. General Accounting Office, 1986).

In conclusion, the GAO report suggested that future job creation programs should emphasize channeling money to programs that are able to spend money quickly and have projects available that can be implemented immediately. Further, it recommended that agencies should be obligated to spend funds within a specific period.

Federal response to the 1990–91 recession

The 1990–91 recession followed the savings and loan crisis of the 1980s. In addition, the first Gulf War and a spike in energy prices were drags on the economy during this period. This recession was relatively brief (eight months) and mild; GDP fell 1.3 percentage points from peak to trough. The impact of this recession was felt mostly on the East and West Coasts of the United States and, given its limited nature, no significant anti-recessionary aid was offered beyond the usual programs such as extensions in unemployment insurance. Congress also passed the $151 billion Intermodal Surface Transportation Efficiency Act, which helped serve as a stimulus for state and local transportation infrastructure, but this was not a direct response to the recession. For the most part, states drew on budget reserves and adjusted spending and tax policies to fill gaps. State revenue growth slowed during this period, but remained positive at 3.3 percent in fiscal year (FY) 1991 (U.S. Census Bureau, 1993).

Federal response to the 2001 recession

The 2001 recession reflected the bursting of the tech bubble and the September 11 terrorist attacks. Like the 1990–91 recession, the 2001 downturn was

68

3Q/2010, Economic Perspectives
relatively short and mild. The economy contracted by 
-0.5 percent in the first quarter and -1.4 percent in
the third quarter. Unemployment peaked at 6 percent
after the recession ended in June 2003. However, un-
like the 1990–91 recession, this time state tax revenues
collapsed. In particular, states with high dependence
on the income tax found that collections turned high-
ly volatile as the underlying tax base became less
predictable (see Mattoon and McGranahan, 2008). States
quickly exhausted any reserve funds and were reluctant
to raise major taxes. In addition, the labor market was
slow to recover. States also complained about increased
spending that was required to meet new security stan-
dards in the wake of the terrorist attacks. Given these
circumstances, states pressed for federal assistance.
The federal government responded with the Jobs and
Growth Relief and Reconciliation Act of 2003.

Evaluating the effectiveness of the aid

The GAO (2004) evaluated the effect of $10 billion
in fiscal relief that was provided to the states on a largely
unrestricted basis in the aftermath of the 2001–02 re-
cession. The aid was provided in even $5 billion allot-
ments for FY2003 and FY2004. The act was in response
to a slow labor market recovery from the recession
and the unanticipated sharp decline in state revenues
that had left states with large cumulative deficits (the
National Conference of State Legislatures estimated
deficits at nearly $26 billion). The act authorized fed-
eral funds to be used for “providing essential govern-
ment services” and to “cover the costs of complying
with federal intergovernmental mandate.”

The GAO review looked at two areas:

- What is known about the potential impacts of un-
  restricted fiscal relief on state fiscal behavior?
- How were the relief payments distributed among
  the states relative to their fiscal circumstances?

According to state budget officials, how were the
funds used? The GAO study noted that while the funds
were authorized 19 months after the end of the re-
cession, the slow recovery in labor markets and continu-
ing fiscal stress in the states made the timing of the aid a
secondary concern. From the outset, the funds did not
appear to be particularly targeted to reflect the relative
fiscal or economic stress each state was experiencing.
The funding formula did not take into account the
impact of the recession, fiscal capacity, or the cost of
expenditure responsibilities in any individual state. Funds
were allocated on a per capita basis with an adjustment
that provided a minimum payment for smaller states.

The report found that by April 2004, the cumulative
budget gap for the states had fallen to $720 million from
$21.5 billion the previous year. States had closed the
gap through a combination of using their own reserve
funds and the federal fiscal relief funds. The study also
found that it was hard to identify specifically where the
federal dollars went once they were commingled with
state resources. The major criticism of the program
was that, with unrestricted funds, issues of timing and
targeting were all the more important. Since the unre-
stricted funds were provided to all states, the potential
existed for states with little need to substitute the federal
funds for their own revenues to lower taxes, increase
spending, or place funds into state reserves. None of
these actions would effectively stabilize state budgets.
Of particular concern was the potential for states to
use the federal funds to avoid prudent financial plan-
ing, such as building budget reserves in anticipation of
an economic downturn.

When examining the specific pattern of relief pro-
vided, the GAO focused on the relationship between
the per capita federal aid provided and changes in each
state’s nonfarm employment and gross state product
(GSP). On the one hand, Wyoming, which had fared
relatively well in the recession—with a gain of more
than 1 percent in nonfarm employment and above the
national average gross state product per capita—received
a much larger fiscal relief payment per capita than the
national average. On the other hand, Indiana, Michigan,
and Tennessee—with below national average GSP per
capita and employment losses ranging from 1.5 percent
to nearly 2 percent—received slightly less than the
national average per capita fiscal relief.10

In conclusion, the GAO made two observations
regarding the effectiveness of the program:

1. Fiscal relief payments arrived when the economy
   was already in recovery (as measured by GDP
growth). As such, the economic stimulus value of
   the payments was doubtful.

   However, given that employment growth lagged
   the recovery, states continued to see pressure on
   income and sales tax receipts, making the aid
   important in helping to improve the fiscal stability
   of state governments. However, the formula used
   to distribute funds was relatively insensitive to
   the degree of economic stress individual states
   were experiencing, which calls into question the
targeting of the funds.

A final caution issued by the GAO concerned the
potential moral hazard of federal intervention. If states
believe that the federal government will always inter-
cede to provide countercyclical relief, they will have
little incentive to develop their own budgetary strategies
to address recessions. In particular, savings programs
such as rainy day funds may be severely undercapitalized.
Federal response to the 2007–09 recession

The most recent recession has been termed the worst since the Great Depression of the 1930s. Both the depth and duration of the recession have been notable, although GDP turned positive by the third quarter of 2009, possibly signaling the end of the cycle. For states and localities, tax revenues have suffered broad declines. Total state tax revenues turned negative in the fourth quarter of 2008 and remained negative through the fourth quarter of 2009. For local governments, property tax revenues have been falling as communities face a combination of falling real estate prices and foreclosures. In particular, localities that favored real estate taxation and construction fees have found these revenue sources drying up in the current cycle.

In response, the federal government passed the American Recovery and Reinvestment Act of 2009. The package targets three areas. The first is economic stimulus through $288 billion in tax cuts for individuals and businesses. The second is fiscal stabilization through targeted state programs of $224 billion for education, health care, and unemployment insurance. The third component is infrastructure spending targeted to job creation and investment in the form of $275 billion of federal contracts, grants, and loans. The fiscal stabilization portion of the aid package requires states to demonstrate a maintenance of effort in health care and education programs to be eligible for the aid; and the infrastructure funding is geared to “shovel ready” projects that are past the planning stage and ready for construction.

Is there a better way?

In reviewing the recent history of countercyclical federal aid, it is clear that the programs must balance many competing interests. Regardless of the relative severity of the recession in a given state, there is a desire to provide aid to all states rather than targeting aid to those suffering the most. This is most likely a political necessity needed to gain passage of an aid program. There is also a tension between simply stabilizing the performance of the state and local sector and providing stimulus to the national economy through infrastructure and capital projects. Should the federal government attach strings to the aid in an effort to redirect state fiscal policy? The intent of countercyclical aid is often muddled and this makes evaluating its effectiveness difficult.

Finally, the timing of the aid is almost always problematic. The nature of the legislative process almost guarantees that the aid arrives well after the recession’s effects are being felt in a state. A key question is whether providing aid earlier in the cycle might enable states to adapt to recessions with less dislocation.

Defining criteria for distributing federal aid

If an aid program is primarily designed to counter downturns in the business cycle, the ideal program might be one that is almost mechanical in responding to business cycle movements. This would take the politics out of constructing aid packages and also would help eliminate the inevitable delay that occurs before Congress can act to authorize an aid program. As the business cycle dips, a trigger could be switched on once the decline reaches a designated point. Similarly, the trigger could be switched off once recovery is under way. In other words, the trigger would be timed to reflect the business cycle expansion and contraction.

Furthermore, aid should reflect the severity of the downturn in each state. It would seem obvious that states bearing the brunt of the recession should receive a larger share of aid than states that are less severely affected. However, a complicating factor is that the aid needs to be calibrated to only offset the cyclical stress of the recession. If a state enters a recession with a structural deficit caused by inept fiscal management, the federal aid should not act to make the state whole. Given that moral hazard is a real concern with federal aid, then ideally, federal aid should come with strings attached to encourage states to plan better for future business cycle declines through their own countercyclical measures (such as maintaining a rainy day fund).

Timing of aid

For federal countercyclical aid to be effective, it must be timed to counter the economic effects associated with a decline in the business cycle. This is easier said than done. Ideally, the aid should start arriving to the states shortly after the peak in the cycle and be discontinued either once a recovery has begun or when a recovery is firmly established. In addition, there is the question of whether the amount of aid should be scaled to reflect the severity of the downturn. Ideally, the level of aid would be recalibrated during each quarter to reflect the cyclical stress being felt by the states; this is preferable to the aid being distributed as a lump sum based on a one-time reading of the states’ economic condition.

Another issue with timing is recognizing the lags in distributing the aid. Unless there is an automatic mechanism for triggering aid, the first lag is often the time it takes to secure passage of an aid bill by Congress. Consider the current circumstances: The National Bureau of Economic Research (NBER) dates the current recession as having begun in December 2007, and the aid package was enacted in February 2009. So, nearly five quarters had passed before aid became available to the states. The second lag is the time it takes for the federal government to distribute the aid money to the states. Further, the states often have to set up mechanisms
for channeling the funds into the necessary programs. All of this slows the process of spending the money during the recession. In the GAO’s assessment of the aid programs enacted in response to the 1973–75 recession, it found that only 50 percent of the federal money appropriated had actually been spent by the states even after the recession ended. The balance went either to build surpluses or reduce the states’ deficits. In the case of the Jobs and Growth Tax Relief Reconciliation Act of 2003, the first federal funds were distributed 19 months after the end of the recession.

An experiment based on three triggers

In this article, we use three different triggers for turning aid on and off over the business cycle. Our goal in selecting the three possible triggers was to find indicators that are both state specific and reported on a timely basis. We selected the excess unemployment rate, state sales tax revenues, and the Philadelphia Fed’s state coincident indexes. As our analysis shows, each trigger performs quite differently over the business cycle.

Trigger 1: Excess unemployment rate

The excess unemployment rate has been used in the past and offers several advantages. First, it is available on a reasonably timely basis and can be reported at different geographic levels. The transparency of the measure makes it easier to assess the relative stress that different regions are facing and also allows for more precise targeting, since (in theory) intra-state variation can be considered, allowing for specific metropolitan aid strategies. A clear limitation of the unemployment rate is that it can reflect structural change in the economy and, therefore, tend to be higher in some regions and lower in others. As such, it is not necessarily a cyclical indicator. Also, unemployment is a lagging indicator, meaning it follows the business cycle’s direction with some delay in both upturns and downturns. As a result, it is likely to continue to trigger aid even when recovery is well under way. For this article, the unemployment trigger that initiates the distribution of funds will be an increase in the national unemployment rate from its most recent trough of more than 1 percentage point. Aid will be turned off when the national unemployment rate falls by at least 1 percentage point. To ensure that funding reflects cyclicality, once the unemployment trigger has begun the distribution of funds, the monthly level of funds allocated to each state will depend on that state’s net increase in unemployment relative to its most recent trough.

Trigger 2: State sales tax revenues

The general sales tax is the first or second largest source of general fund revenues in most states and is heavily relied upon for funding expenditures. Therefore, a decline in sales tax revenues is usually a harbinger of fiscal stress. Arguably, movements in sales tax revenues are best able to track macroeconomic cycles and do not suffer from the high volatility demonstrated in income tax revenues, where factors such as capital gains and bonus income can distort the tax base. In particular, since the sales tax reflects households’ big ticket expenditures, a downturn in the economy (particularly in housing or auto sales) will be reflected in sales tax receipts. Finally, sales tax data are available on a timely basis.

The disadvantage to sales tax receipts as an indicator is that policy changes enacted by states can impact the sales tax base or rate. For example, many states have gradually added services as taxable activities. This has expanded the sales tax base, but the treatment of services is hardly uniform from state to state. Similarly, states have varying sales tax rates and often allow for local optional tax add-ons. The fact that neither the rate nor base is static makes assessing how much is raised in a given year somewhat harder. Ideally, you would want to measure the natural rate of growth in a fixed sales tax base. In our experiment, the sales tax trigger will turn on when the four-quarter moving average of national sales tax revenues falls by 5 percent and turn off when it returns to previous levels. Finally, there is also the difficulty that some states do not have a general sales tax. Therefore, the behavior of what for these states would be a hypothetical revenue stream would have to be imputed. (We exclude the states without a sales tax from our experiment.)

Trigger 3: Philadelphia Fed’s state coincident indexes

The biggest advantage to the state coincident indexes is that they provide a state-specific index reading for how each state responds to the business cycle. As such, they allow for a measurement of variation in state response that permits a better understanding of which states are seeing the largest effects from the recession. In addition, the indexes are available monthly, allowing for reasonably current analysis. Also, since they are published for all 50 states, they allow for transparency and offer a clear methodology that can be easily understood. Specifically, the coincident indexes consist of four state-level variables: nonfarm payroll employment, average hours worked in manufacturing, the unemployment rate, and wage and salary disbursements deflated by the consumer price index (U.S. city average). The trend for each state’s index is set to the trend of its gross state product, so long-term growth in the state’s index matches long-term growth in its GSP. For this trigger in our experiment, a drop of
0.1 percentage points in the month-over-month difference in the log measure of the national index (which is a summary measure of all the state indexes) will turn aid on and the return of the monthly change in the national log measure to 0 will turn aid off.

Defining the experiment

The first stage of this experiment is to examine how the three potential triggers behave over the business cycle. Specifically, how long does it take for aid to be triggered after a recession is under way, and when does the aid turn off when recovery is detected? The second stage of the experiment concerns targeting of the aid. Using a set of rules for how the aid is distributed based on state-specific criteria, we distribute a hypothetical aid package. Then we evaluate the level of aid received by each state. Figures 1, 2, and 3 demonstrate the pattern of aid that each trigger would have produced from 1979 through 2009. In each figure, a period in which aid would have been dispersed is indicated by a plateau in the “aid” line (the specific values attained on the respective vertical axes by the aid lines are meaningless). The vertical axis in each figure corresponds to the values of its respective trigger. In the case of figure 3, the left axis corresponds to the coincident index, and the right axis corresponds to the difference log coincident index.

As the figures demonstrate, both the unemployment rate trigger and the sales tax trigger perform unpredictably. The unemployment rate trigger appears to “turn on” in a relatively timely fashion but given the significant lag in employment growth relative to overall economic growth in the past several recessions, aid would have continued flowing to the states well after these recessions were technically over. While it would be possible to simply change the sensitivity of the trigger so that it turns off with only a modest improvement in unemployment, this might be difficult for political reasons because it would mean ending aid to the states when high unemployment is still present (and state safety net programs are under stress). Similarly, the sales tax indicator shows idiosyncratic behavior. In the double-dip recession of the early 1980s, aid would have turned on too early and would have stayed on well past the turn in the cycle. In 1990, it turns on and turns off after the recession ends; and in 2001, it turns on late and then persists well into the recovery. In the current cycle, it turns on a little early.

In terms of matching the business cycle, it is not surprising that a business cycle indicator would do the best job of switching aid on and off. From a purely technical view, a rule based on changes to the Philadelphia Fed’s state coincident indexes would switch aid on and off based on cyclical movements in the economy. It would appear then that this would be our winning candidate. States might argue that if this trigger were used, they could be exposed to continuing fiscal stress after the aid stopped due to lags in their expenditure cycles. The argument for the use of such a trigger is that the goal of the aid is only to maintain state spending during the contraction of the business cycle.

Rules for distributing the aid

Once the trigger has been activated in our experiment, aid will be distributed to reflect the severity of the downturn in the indicator for each state. Specifically, states will be divided into quintiles each period (either month or quarter, depending on the availability of data) according to the change in their indicator relative to
let \( x_q \) be the fraction of $z$ in aid per capita allocated to states in quintile \( q = 1, 2, 3, 4, \) or 5 during an entire recession; and let \( y_r \) be the fraction of this aid allocated per capita to states during the \( r \)th quarter of aid distribution. In other words, the \( x_q \) values determine the distribution of aid per capita across quintiles, and the \( y_r \) values determine the distribution of aid across quarters. The only restrictions on these variables are \( 0 \leq x_q < x_{q+1} \) for all \( q \) and \( 0 \leq y_r < y_{r+1} \) for all \( r \), which must hold in order for the distribution plan to satisfy the equity principles. Using this notation, a state in quintile \( q \) during the \( r \)th quarter of aid distribution will receive \( S_q y_r z \) of aid per capita, as long as it meets the initial aid criteria; otherwise, it will not receive aid. In the analysis that follows, the values we use for these variables are \( z = \$130, \ x_1 = 10\%, \ x_2 = 15\%, \ x_3 = 20\%, \ x_4 = 25\%, \ x_5 = 30\%, \ y_1 = 30\%, \ y_2 = 25\%, \ y_3 = 20\%, \ y_4 = 15\%, \ y_5 = 10\%, \) and \( y_n = 0 \) for all \( n > 5 \).

At this point, we must emphasize that this is a purely illustrative distribution plan. Although it was designed to satisfy certain constraints, its parameters are somewhat arbitrary, and there is surely room for improvement. For example, it might well be the case that to have the largest macro effect, the distribution of aid should be further front-loaded to ensure that as much as possible is spent in the first two quarters of a recession. Another important question (that we do not deal with here) is what should be the size of the federal aid package? While this proposal has the advantage of not distributing money to states that do not need the money (making it possible for the aid package to distribute less than what is originally appropriated), it does not offer guidance on the size of the original appropriation. It is possible that the package could be calibrated to some projection of aggregate state deficits, but these numbers are notoriously volatile and often in dispute. If the states are going to receive federal aid, then there is little incentive for them to underestimate the size of a deficit. Ideally, the size of the federal aid should only reflect the cyclically related portion of state deficits and not structural imbalances that are unrelated to a decline in the business cycle.

**Attaching strings to the aid**

Another possible modification to countercyclical aid is to limit how much of the federal money is

its most recent peak or trough. Aid will then be allocated according to a set of rules that rely on these quintile rankings. And if a state does not have a change in its individual indicator to match that of the national trigger, it will receive no aid.

The specific rules that govern the distribution of aid are designed to satisfy three guidelines that we refer to as “equity principles.” Each of these equity principles is intended to prevent allocations that would likely be regarded as unfair or unjust from the perspective of the states. They are as follows: 1) during a given month, all states in a given quintile should receive equal aid per capita; 2) during a given month, states in higher quintiles should receive more aid per capita than states in lower quintiles; and 3) within a given quintile, aid per capita during earlier quarters of a recession should meet or exceed aid per capita during later quarters.

One type of distribution plan that conforms to these equity principles requires policymakers to first select a parameter, \( z \), which governs the size of the aid program. When the trigger deems necessary, each state then receives aid per capita equal to the product of \( z \) and two other constants. More specifically,
available in outright grants. We would propose that some of the aid be reserved as loans that states would have to repay once revenues are restored. This would help limit the moral hazard problem of simply bailing out the states; and, like any loan program, the terms could be constructed to reflect the specific conditions of the borrower.

**Aid projections based on triggers and formula allocation**

Tables A1, A2, and A3 in the appendix show the quintile rankings for all states across four different recessions based on our three triggers—excess unemployment (table A1), sales tax revenues (table A2), and the state coincident indexes (table A3). Unlike the other two triggers, the state coincident indexes trigger treats the 1980–82 recession as two separate recessions, 1980 and 1982 (see figures 1–3). The quintile assignment is based on the average quintile rank over the cycle and, therefore, is simply an illustration of where the stationary rank would fall if the entire recession were treated as one period. In practice, what we propose is a system where the quintile ranks would be recalibrated upon the release of new data, so that states could move up and down rankings as conditions either improved or worsened. As such, a state showing significant improvement might move down from the fifth quintile (most in need of aid based on the indicator) to the first quintile (least in need). Such a move would significantly reduce the level of aid the state receives. What these tables illustrate is that the group of states that would receive the largest share of aid (quintile 5) would differ from recession to recession. For example, the 1980 and 1982 recessions had a more significant impact on manufacturing states, while the 1991 recession had an East Coast/New England bias.

Due to the poor timing of the sales tax trigger (as shown in figure 2), we will focus this part of our experiment on the coincident index and unemployment triggers. One way to compare the quintiles that these two indicators generate is with scatter plots like those in figure 4. The vertical axis in each chart corresponds to the average coincident index quintile, and the horizontal axis gives the average unemployment quintile. So each data point reveals the values of these two variables for a given state during a given recession. The two charts depicted here are of the 2001 (panel A) and 2008 (panel B) recessions. For the 2001 recession, the average quintiles for the two indicators have a correlation coefficient of 0.6716; and for the 2008 recession, their correlation coefficient is 0.6994. In other words, the quintile rankings generated by the coincident index and unemployment indicators are similar but not identical.

Since the quintile rankings of the various indicators often differ, it is possible that one indicator may favor certain states over another, which could have political repercussions. For example, if the unemployment quintiles of a given state have been historically higher than its coincident index quintiles, then we might expect the state’s legislators to push for the use of the unemployment trigger. Table A4 lists the states in ascending order according to the average ratio of their coincident index quintiles to their unemployment quintiles. A value of less than one for this ratio indicates that the state’s unemployment quintiles were higher, on average, than its coincident index quintiles; and a value of greater than one indicates the reverse. So we might expect states with ratios significantly lower than one to prefer the unemployment quintile because

---

*FIGURE 3*

Philadelphia Fed state coincident indexes trigger

Note: Shaded areas represent periods of recession as defined by the National Bureau of Economic Research.

Source: Authors’ calculations based on data from the Federal Reserve Bank of Philadelphia and the National Bureau of Economic Research provided by Haver Analytics.
it would result in more federal aid, and vice versa for states with ratios significantly greater than one.

**Distributing the aid**

The results of a hypothetical implementation of our aid plan, with $z = 130$, are displayed in figure 5. These charts contrast the amounts of per capita aid that each state would have received under the unemployment and coincident index triggers for the 2001 (panel A) and 2008 (panel B) recessions. The diagonal line in each chart is a 45 degree line, so states that fall below this line would have received more aid per capita with the unemployment trigger than with the coincident index trigger. This feature is most visible in the 2001 recession, reflecting the fact that the unemployment trigger was active for a longer period than the coincident index trigger.
Conclusion

This article examines the use of three automatic triggers for starting and stopping countercyclical aid to state governments during a recession. While none of the triggers is perfect, it appears that the Philadelphia Fed’s state coincident indexes would do a better job of timing aid to reflect both the local intensity of the business cycle in individual states and the duration of the recession on a national level. The use of such a trigger would ensure that the aid is designed to reduce the stress related to the business cycle and not the stress caused by structural imbalances in a state’s economy or fiscal system.

What this article does not address is whether there should be a standing federal policy of providing recessionary aid to the states. The use of any automatic
stabilizing policy assumes that maintaining state government programs should be a primary concern of federal policy. While the current structure allows for an arbitrary decision as to when the federal government does intervene, creating a federal insurance policy for state fiscal behavior clearly would raise some concerns. Some might argue that periodic budget crises may be necessary to force states to re-examine their spending priorities and bring them in line with what taxpayers are willing to pay. It may be possible to address the possible moral hazard concerns by creating additional mechanisms that would prevent states from undertaking risky budget behavior or punish them for doing so. For example, more robust rainy day funds might be required or a “stress test” for each state’s budget under different economic scenarios. Similarly, it might be wise to require states to pay into a national rainy day fund, thereby creating their own insurance system so they could self-fund countercyclical aid without relying on federal assistance (see Mattoo, 2003).

A related issue is a closer examination of the efficiency with which states might spend recessionary aid. States will always prefer unrestricted aid that permits them to substitute new federal dollars for state dollars, but should federal aid come with strings attached? Further, is the state the proper recipient of the money? State funding formulas are often criticized for distributing aid to less populated areas, whereas money directed to large metropolitan areas might have a greater impact. Should the federal government take a larger role in targeting the aid to promote the efficiency of aid spending?

Finally, further research is needed to examine whether the state fiscal cycle is significantly different from the business cycle. If it is likely that there are lags in which states experience fiscal pressure both entering and exiting a business cycle downturn, the timing of aid might need to be adjusted to reflect this. This might favor a trigger that starts aid several quarters after a national recession begins and extends aid past the end of the recession.

NOTES

1The breakdown for expenditures related to the American Recovery and Reinvestment Act of 2009 is: $288 billion in tax cuts for individuals and businesses; $224 billion for education, health care, and unemployment insurance; and $275 billion for federal contracts, grants, and loans. See www.recovery.gov/About/Pages/The_Act.aspx.

2The business cycle refers to the periodic but irregular up-and-down movements in economic activity, measured by fluctuations in real gross domestic product and other macroeconomic variables. Countercyclical aid, provided by the federal government, is intended to smooth revenue contractions and expenditure increases that are associated with business cycle declines.

3The ARRA differs from previous aid programs in that its stated goals emphasize economic stimulus and job creation, even though most of the money going to the states will go toward stabilizing Medicaid, education, and unemployment insurance. Specifically, the act’s three immediate goals are to: 1) create new jobs and save existing ones; 2) spur economic activity and invest in long-term economic growth; and 3) foster unprecedented levels of accountability and transparency in government spending. See www.recovery.gov/About/Pages/The_Act.aspx.

4Throughout this article, we refer to official periods of recession as identified by the National Bureau of Economic Research.

5Amadeo (2010).

6Advisory Commission on Intergovernmental Relations (1978).


8Ibid., p. 19.


### Table A1

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<tr>
<th>Quintile 1 (lowest need)</th>
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<th>Quintile 4</th>
<th>Quintile 5 (highest need)</th>
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Source: Authors’ calculations based on data from the U.S. Bureau of Labor Statistics provided by Haver Analytics.
### TABLE A2

**Ranking of states’ need for aid based on sales tax rate trigger**

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<th>Quintile 1 (lowest need)</th>
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Note: States that do not have a sales tax were excluded from the analysis. As a result, each quintile in this table lists nine states instead of ten.

Source: Authors’ calculations based on data from the U.S. Bureau of the Census provided by Haver Analytics.
### TABLE A3

Ranking of states’ need for aid based on Philadelphia Fed state coincident indexes trigger

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<td>1991 recession</td>
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<td>Wisconsin</td>
<td>Missouri</td>
<td>Washington</td>
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</table>
### TABLE A3 (continued)

**Ranking of states’ need for aid based on Philadelphia Fed state coincident indexes trigger**

<table>
<thead>
<tr>
<th>Quintile 1 (lowest need)</th>
<th>Quintile 2</th>
<th>Quintile 3</th>
<th>Quintile 4</th>
<th>Quintile 5 (highest need)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>Utah</td>
<td>Arkansas</td>
<td>North Carolina</td>
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<tr>
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<td>Virginia</td>
<td>Connecticut</td>
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<td>Wyoming</td>
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<td>New Mexico</td>
<td>Massachusetts</td>
<td>Tennessee</td>
<td>Maine</td>
<td>Oregon</td>
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<tr>
<td>West Virginia</td>
<td>Mississippi</td>
<td>Hawaii</td>
<td>Pennsylvania</td>
<td>South Carolina</td>
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<tr>
<td>Colorado</td>
<td>Montana</td>
<td>Illinois</td>
<td>Ohio</td>
<td>Washington</td>
</tr>
</tbody>
</table>

2008 recession

Source: Authors' calculations based on data from the Federal Reserve Bank of Philadelphia provided by Haver Analytics.

### TABLE A4

**Average ratio of state coincident index to unemployment**

<table>
<thead>
<tr>
<th>State</th>
<th>Quintile ratio</th>
<th>State</th>
<th>Quintile ratio</th>
</tr>
</thead>
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<tr>
<td>Louisiana</td>
<td>0.60</td>
<td>Kentucky</td>
<td>1.07</td>
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<tr>
<td>Virginia</td>
<td>0.74</td>
<td>Nebraska</td>
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<tr>
<td>Oklahoma</td>
<td>0.80</td>
<td>New Hampshire</td>
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<tr>
<td>California</td>
<td>0.81</td>
<td>North Dakota</td>
<td>1.09</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>0.82</td>
<td>Maine</td>
<td>1.09</td>
</tr>
<tr>
<td>North Carolina</td>
<td>0.82</td>
<td>West Virginia</td>
<td>1.12</td>
</tr>
<tr>
<td>Mississippi</td>
<td>0.83</td>
<td>Maryland</td>
<td>1.13</td>
</tr>
<tr>
<td>Texas</td>
<td>0.84</td>
<td>Oregon</td>
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<td>Florida</td>
<td>0.86</td>
<td>Alaska</td>
<td>1.19</td>
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<tr>
<td>New Mexico</td>
<td>0.87</td>
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<td>Alabama</td>
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<tr>
<td>Colorado</td>
<td>0.88</td>
<td>New York</td>
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<td>Utah</td>
<td>0.90</td>
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<tr>
<td>Connecticut</td>
<td>0.90</td>
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<tr>
<td>Indiana</td>
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<tr>
<td>New Jersey</td>
<td>0.94</td>
<td>Washington</td>
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<td>Minnesota</td>
<td>0.94</td>
<td>Wyoming</td>
<td>1.42</td>
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<tr>
<td>Illinois</td>
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<td>Georgia</td>
<td>1.43</td>
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<td>Missouri</td>
<td>0.97</td>
<td>Wyoming</td>
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<tr>
<td>Tennessee</td>
<td>0.99</td>
<td>Idaho</td>
<td>1.54</td>
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<tr>
<td>South Carolina</td>
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<td>Nevada</td>
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<td>Michigan</td>
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<tr>
<td>Kansas</td>
<td>1.04</td>
<td>Pennsylvania</td>
<td>1.67</td>
</tr>
</tbody>
</table>

Note: A value less than 1.0 indicates that the state’s unemployment quintiles were higher, on average, than its coincident index quintiles; a value greater than 1.0 indicates the reverse.

Source: Authors’ calculations based on data from the Federal Reserve Bank of Philadelphia provided by Haver Analytics.
REFERENCES


What is the relationship between large deficits and inflation in industrialized countries?

Marco Bassetto and R. Andrew Butters

Introduction and summary

In the aftermath of the recent financial crisis, the U.S. government ran a deficit of 9.9 percent of gross domestic product (GDP) in 2009—an unprecedented level during peacetime. Figure 1 shows the United States’ deficit experience since World War II. Because U.S. history does not provide us with a guide for how fiscal balance will be restored, we look at the experiences of other countries that have faced similar budget shortfalls. In our investigation, we restrict our attention to industrialized countries since 1970. We do this because of the availability and quality of data published on these countries. Also, the institutions and economic fabric of these countries are closest to those of the United States, so their experiences are more likely to be informative for our current situation.

In this article, we address the following questions: Is there evidence of a relationship between high deficits and inflation? And how was fiscal balance restored in industrialized countries that experienced large deficits? Did governments do this primarily by restoring fiscal discipline, by defaulting on debt, or by devaluing debt by means of high inflation?

In the next two sections, we explain the intuition and then review empirical evidence concerning the first question. Deficits and inflation are mechanically linked because inflation causes higher nominal interest payments and thus swells public spending. However, as we explain in box 1 (p. 85), these large interest payments simply cover the depreciation in the real value of debt and do not increase the real burden of debt. After appropriately accounting for these interest payments, we find that large deficits are not associated with higher inflation contemporaneously, nor are they associated with the emergence of higher inflation in subsequent years. This finding should not necessarily be interpreted as implying that high deficits never cause inflation; rather, it is likely that the countries that can afford large deficits have built solid reputations and institutions that support a sound monetary policy and the reversion to a stable fiscal regime.

Having shown that inflation does not appear to be the universal outcome of large fiscal deficits in our main sample, we examine the specific experiences of three countries that ran among the largest public deficits on record while retaining low inflation: Finland and Sweden in the early 1990s and Japan in the 1990s and 2000s. In the case of Finland and Sweden, the fiscal imbalance was short-lived; after a large but brief rise, the level of public debt returned to a sustainable path, thanks to fiscal surpluses and healthy macroeconomic growth. In Japan, public deficits were much more persistent, partly as a result of economic stagnation. Consequently, public debt there has continued to increase over the past 20 years, and a full resolution of fiscal imbalances has yet to occur.

One commonality of the Finnish, Swedish, and Japanese experiences is that each nation’s large deficits were the consequence of a banking crisis and the ensuing recession—this is analogous to the current U.S. experience. Our analysis complements Reinhart and Rogoff’s (2008a, 2008b, 2009) broader and more systematic work, which specifically looks at the onsets and aftermaths of financial crises across the world. Reinhart and Rogoff pay particular attention to macroeconomic performance and fiscal policy; our findings confirm Reinhart and Rogoff’s (2009) conclusion that banking

Marco Bassetto is a senior economist and economic advisor and R. Andrew Butters is an associate economist in the Economic Research Department at the Federal Reserve Bank of Chicago. The authors thank Lisa Barrow, R. Anton Braun, Martin Flodén, Simon Gilchrist, Paul Klein, Thomas J. Sargent, Juha Seppälä, and Harald Uhlig for useful suggestions.
cites are associated with large jumps in public indebtedness. In this article, our focus is on the consequences of these episodes for inflation and monetary policy.

Theoretical background on deficits and inflation

To establish our framework for examining the link between large deficits and higher inflation, we start by looking at a simple version of the government budget constraint relating nominal government debt to government surplus:

1) \[ B_t = (1+i_t)B_{t-1} + P_t(G_t-T_t) - S_t, \]

where \( B_t \) is the nominal value of government debt in year \( t \), \( i_t \) is the nominal rate of return on government debt, \( P_t \) is the price index, \( G_t \) is real government expenditure (including transfers, but excluding interest payments on debt), \( T_t \) is real tax revenues, and \( S_t \) is seigniorage (that is, central bank profits remitted to the treasury).\(^1\)

Since we will concentrate on the experience of low-inflation countries, \( S_t \) will not play a significant role in our analysis. Nonetheless, we include it explicitly because it has been emphasized by much of the prior research on the connections between inflation and budget deficits. King and Plosser (1985) discuss several different measures of seigniorage and show their similarities and differences in the case of the United States. The measure we adopt here starts from a simple version of the central bank’s balance sheet: On the liability side is the monetary base, made up of cash and bank reserves;\(^2\) and on the asset side are bonds, paying the nominal interest rate \( i_t \). If no interest is paid on bank reserves, the central bank’s profits are then given by \( S_t = i_t M_t \), where \( M_t \) is the monetary base.

Equation 1 describes the evolution of public debt from one year to the next in nominal terms. Growth in debt need not lead to fiscal imbalances if it is purely driven by inflation or if it is matched by growth in the real economy that supports debt repayments. We thus rescale the equation by (nominal) GDP.

\[
2) \quad \frac{B_t}{PY_t} = \frac{1+i_t}{(1+i_t)(1+g_t)} \frac{B_{t-1}}{PY_{t-1}} + \frac{G_t-T_t}{Y_t} - \frac{i_t M_t}{PY_t},
\]

where \( Y_t \) is real GDP, \( \pi_t = P_t / P_{t-1} - 1 \) is inflation, and \( g_t = Y_t / Y_{t-1} - 1 \) is the real growth rate of the economy.

We make explicit the link between nominal interest rates and inflation by writing

\[
3) \quad 1 + i_t = (1 + \pi_t')(1 + \pi_t') \Rightarrow i_t \approx \pi_t' + \pi_t'^2.
\]

Equation 3 states that the nominal interest rate is approximately the sum of the real rate of return that savers expect to obtain from bonds (\( \pi_t' \)) and their expectations about inflation.\(^3\) We substitute equation 3 into equation 2 and obtain

\[
4) \quad \frac{B_t}{PY_t} = \frac{(1+i_t')(1+\pi_t')}{(1+i_t')(1+g_t)} \frac{B_{t-1}}{PY_{t-1}} + \frac{G_t-T_t}{Y_t} - \frac{(\pi_t' + \pi_t'^2)M_t}{PY_t}.
\]

According to equation 4, the following five factors would shrink the debt/GDP ratio (or increase it if reversed).

- High primary surplus relative to GDP: Like any other debtor in the economy, the government can reduce its debt by spending less than its revenues.
- Increased seigniorage: When expected and realized inflation coincide (\( \pi_t' = \pi_t \)), high inflation increases seigniorage and reduces debt. This source of funds
To understand the importance of adjusting the deficit measure, we start with equation 1 (p. 84). In that equation, net lending is \(- (B_t - B_{t-1})\). As the equation shows, nominal interest payments by the government \((i_t B_{t-1})\) contribute to the deficit, since the government’s balance sheet counts them as expenses. However, the balance sheet does not take into account that in the presence of inflation, the real value of nominal debt is reduced. In nominal terms, investors lent \(B_{t-1}\) to the government in period \(t - 1\) and receive \((1 + i_t)B_{t-1}\) in period \(t\). However, in real terms, the resources lent by the investors are \(B_{t-1}/P_{t-1}\), and the resources received are

\[
B_{t-1}(1 + i_t) = B_{t-1}(1 + i_t) = \frac{B_{t-1}}{P_{t-1}}(1 + \pi_t) = \frac{B_{t-1}}{P_{t-1}}(1 + i_t - \pi_t),
\]

where the last approximation is accurate when inflation is small. Equation B1 suggests that the true interest cost to the government is only approximately \(i_t - \pi_t\). Accordingly, from now on we correct the deficit according to the following definition:

\[
\text{B2) Corrected deficit}_t = B_t - (1 + \pi) B_{t-1}.
\]

Equation B2 would be the precise correction if all government assets and liabilities were nominal and all debt lasted one period. In practice, the precise correction should take into account the following complications.

- Governments issue long-term, as well as short-term debt. The real value of long-term debt fluctuates not just because of inflation, but also because of changes in future interest rates. The future rate may fluctuate both because expectations about future inflation may change and because real interest rates may vary.

- Some governments issue debt indexed to inflation, or some issue debt denominated in a foreign currency. In this case, the real value of debt will be preserved even if interest payments do not track domestic inflation, and a correction based on domestic inflation would be inappropriate.

- An important distinction arises between gross and net government liabilities. One particularly stark example is Norway, which issues some government debt and thus has some nominal liabilities that are subject to erosion; at the same time, its Government Pension Fund uses oil revenues to purchase a very large amount of assets. When government assets are stakes in real companies (or are invested abroad), correcting for domestic inflation should be done only on the liability side, since the real value of a company will not be affected by inflation. However, in some cases, large nominal assets may also be relevant. In Japan, a large fraction of government liabilities are held by other government entities, such as public financial institutions and social security funds.

In this article, we ignore the first two factors. For our main sample, based on Organization for Economic Cooperation and Development (OECD) countries, this does not constitute a large problem, since most borrowing undertaken by these countries is nominal. The larger sample from International Monetary Fund statistics does include countries whose borrowing is primarily indexed to prices or foreign exchange rates. As was the case for Catão and Terrones (2005), a deficit correction is impossible in the larger sample because we lack data on the stock of government liabilities \((B_{t-1}\) in equations B1 and B2). Hall and Sargent (1997, 2010) use detailed information about individual government securities to compute the value of government debt at each point in time in the United States since World War II. Their exercise provides a much more accurate account of the factors that drove the evolution of U.S. government debt. Unfortunately, a similar exercise is not available for other countries. Over short horizons, the Hall–Sargent measure of deficits is much more volatile than the one adopted here, and is mainly driven by changes in interest rates. At longer horizons, however, the two measures are more similar.

We deal with the third factor by conservatively assuming that government assets are nominal, and we thus compute the inflation correction based on net government financial liabilities. Figures based on correcting deficits based on gross liabilities would strengthen our conclusion—that deficits are not associated with higher inflation in our OECD sample; in fact, the opposite relationship would emerge—that is, countries with higher deficits (after the correction) would tend to have lower inflation.
has been important for many developing countries that have experienced high inflation. As an example, Sargent, Williams, and Zha (2009) report that seigniorage frequently raised revenues of more than 5 percent of GDP for Argentina and Brazil during their high-inflation years, with occasional higher spikes. In the case of low-inflation economies, however, this number is always very small. In the case of the United States, seigniorage revenues averaged 0.36 percent of GDP between 1959 and 2009, and were never more than 0.8 percent, even in the 1970s, when inflation was relatively high. Any link between deficits and inflation that concerns us will thus come from a different channel.

- High unexpected inflation: When unexpected inflation comes, it reduces the real value of previously issued debt. Unexpected inflation acts thus as a hidden default on debtors’ obligations. A government dealing with larger deficits faces a greater incentive to lean on the central bank and encourage higher inflation to alleviate its fiscal imbalance. This is a well-known source of the time inconsistency of monetary policy: Once the private sector’s expectations are locked into the nominal interest rate, any movement in inflation becomes “unexpected,” and the temptation to “inflate debt away” emerges. In our simple version of the budget constraint, inflation expectations are locked in for a single year, since all debt matures at the end of the year. However, in reality government debt has a longer average maturity; for example, the current average maturity of U.S. debt is 54 months. This gives extra time for inflation to act, and correspondingly increases the temptation for a government to inflate its debt away.

- A smaller real interest rate: The debt/GDP ratio decreases (or increases more slowly) if lenders require a smaller real interest rate. To the extent that government debt crowds out private investment, we would expect higher debt/GDP ratios to put upward pressure on the real interest rate. However, large deficits may be associated with other circumstances that lower the real interest rate paid by the government. For instance, the recent financial market turmoil has led to a “flight to quality” that has greatly reduced yields on government bonds while sharply increasing rates for less creditworthy borrowers. The government may also be tempted to use capital taxes, capital controls, or other direct measures to divert credit away from private markets and toward its own needs. A prominent recent example was the Argentinian government’s takeover of private pension plans. For the United States after World War II, Berndt, Lustig, and Yeltekin (2010) find that real interest rates decrease after a negative fiscal shock, hedging 7.8 percent of the risk stemming from these shocks.

- High real economic growth: Growth spreads the burden of debt onto a bigger productive base. In most economic models of a closed economy, high growth is associated with high real interest rates, and no direct fiscal benefit would ensue from such growth. However, empirically, the link between growth and interest rates is not as strict, and this is particularly true in an open economy, where interest rates are also affected by the saving decisions of foreigners.

Equation 4 does not explicitly allow for a reduction in debt through default; this is not an important omission, since we are mainly interested in the experience of countries that experienced high deficits and low inflation (none of them having defaulted on their debt). Nonetheless, an implicit default is allowed by equation 4, in the form of a capital levy on holders of government debt that would be counted among the tax revenues.

The empirical link between deficits and inflation

In the previous section, we noted that engineering higher inflation is a temptation for governments facing fiscal imbalances, since it devalues previously issued debt. In this section, we explore the relationship between deficits and inflation in the data.

A very large literature on this topic already exists. Sargent (1982, 1983) finds evidence of a strong link between deficits and inflation in several European countries in the aftermath of World War I. Furthermore, inflation was brought under control in these countries only when fiscal reforms placed government finances on sound footing. While there is widespread consensus that hyperinflations are caused by fiscal imbalances, at more-moderate inflations the evidence of a link is murkier. The case of France in the 1920s analyzed by Sargent (1983) is not as typical of the post-World War II experience.

Rather than looking at inflation, several researchers have studied the link between money creation and deficits. For the United States after World War II, Hamburger and Zwick (1981) find that monetary growth is influenced by deficits, but only in specific episodes. Likewise, King and Plosser (1985) show that whether deficits can predict monetary growth depends on what other variables are used in the forecasting exercise; they
conclude that there is no evidence of a link between monetary growth and deficits in the United States. King and Plosser also extend the analysis to 11 other countries and again find no evidence of a link between deficits and seigniorage.

Catao and Terrones (2005) expand the analysis of inflation and deficits to a very large number of countries by relying on the International Monetary Fund's (IMF) International Financial Statistics. They also allow for a richer dynamic specification of the inflation process and test whether there is a long-run relationship between deficits and inflation. They do find such a link: Specifically, when deficits are rescaled by GDP, a 1 percent increase in the deficit/GDP measure is associated with about 5 percent extra inflation. However, even in their paper, no such evidence is found among advanced economies with low inflation. Furthermore, data limitations do not allow them to correct deficits to properly account for real interest payments on debt.

In this article, we take the view that an economy with inflation is like a person with a fever: The fever tells you something is wrong, but it can have many causes. The question we address is whether high deficits are one of the conditions that is invariably associated with inflation. To answer this question, we work mostly in reverse, looking at low-inflation countries and checking whether their fiscal house is always in order.

In figure 2, panel A, we look at the relationship between government surplus as a fraction of GDP (more formally, net lending as a fraction of GDP) and inflation, as measured by the consumer price index (CPI), in our main sample. This sample consists of data for countries in the Organization for Economic Cooperation and Development (OECD), excluding Mexico, Turkey, and some other ex-communist countries, over the period 1970–2008 (for details, see the appendix). The marks in panel A of figure 2 represent the inflation-surplus pairs for all the countries in each year of available data. To gain a better understanding of the pattern, we sort all observations by their inflation level and divide them into ten bins. Within each bin, we then compute the median, represented by the black line, and the 5th and 10th percentiles, represented by the two red lines. While the median shows little, if any relationship between surpluses and inflation, the two red lines suggest a negative relationship: It appears that, at high deficit levels (very negative surpluses), further increases in deficits are associated with higher inflation.

Figure 2, panel B shows a similar pattern for a broader set of countries—52 countries from the IMF's International Financial Statistics (see the appendix for details). Panels A and B of figure 2 paint a misleading picture of the true economic relationship between deficits and inflation. The nominal deficit measure adopted in these panels shows the change in nominal debt. In the presence of inflation, nominal interest payments may be high and swell the nominal deficit measure, even though the real cost of servicing the debt is not particularly high, as shown by equation 3. This generates a mechanical link between inflation and deficits that is not related to the underlying economic situation. A more accurate description of the fiscal burden left to repay is the change in real debt. Therefore, we exclude the part of the nominal interest payments that compensates investors for the erosion of the real value of debt that comes from inflation.

From now on, we focus on our main sample, which uses data on OECD countries. Figure 2, panel C shows how the relationship changes after the surplus measure is corrected. Here, we observe no relationship between surpluses and inflation. Table 1 presents the same evidence through the lens of a parametric statistical model. Specifically, we regress the surplus in country i and in year t (measured in percentage points of GDP) on CPI inflation (measured in percentage points):

\[
\text{surplus} = a + \beta \text{inflation} + \epsilon
\]

where \(\epsilon\) is an error term that captures all the reasons why inflation and surpluses are not perfectly linked. As in figure 2, we are interested in capturing how the relationship fits at different deficit levels, paying particular attention to countries experiencing high deficits. We achieve this by estimating equation 5 with three separate quantile regressions: The 5 percent and 10 percent quantiles show the relationship at very low surplus levels (high deficits), and the median (the 50 percent quantile) shows the relationship closer to more typical levels. Each regression suggests a very weak, statistically insignificant, and positive relationship between inflation and surpluses, as shown by the positive coefficients on inflation; these results confirm the picture emerging from the figure 2, panel C.

So far, we have concentrated on the contemporaneous correlation between inflation and deficits. There are several reasons, however, why this relationship may show up with a delay. First, Sargent and Wallace (1981) show that the timing of an inflationary response to deficits may depend on the details of monetary policy. Second, if engineering higher inflation is a response to the temptation to devalue nominal debt, this temptation will gradually grow as deficits swell the size of debt. In figure 3 (p. 90), we look for evidence that large deficits are precursors to higher inflation in subsequent
FIGURE 2
Government surplus and inflation

A. Organization for Economic Cooperation and Development sample
surplus, percent of gross domestic product

B. International Monetary Fund sample
surplus, percent of gross domestic product

C. Organization for Economic Cooperation and Development sample with debt-adjusted surplus
surplus, percent of gross domestic product

Notes: Inflation is measured by the consumer price index. Panel C uses the debt adjustment described in box 1.
We will not attempt to distinguish which is the correct interpretation. However, previous literature has provided indirect evidence in favor of the second hypothesis. Many researchers have emphasized the link between low inflation and central bank independence from the executive branch of government; it is likely that this institutional arrangement played an important role for many countries that had low inflation, though they were running (or had previously run) high deficits. Furthermore, Reinhart, Rogoff, and Savastano (2003) identify thresholds of “external debt intolerance” that differ across countries. A country more intolerant of debt faces macroeconomic instability and market expectations of a default at levels that do not cause concern for a less intolerant country.

In figure 2, panel C (p. 88), we established that there are several instances of countries that ran very large deficits and pursued low inflation at the same time. Figure 5 magnifies the bottom left corner of figure 2, panel C, and identifies these instances. Of the points identified here, three are due to large one-off accounting adjustments that do not reflect the true deficit: This is the case of Germany and the Netherlands in 1995 and Japan in 1998 (although Japan’s deficit in 1998 remains substantial even after adjusting for one-off measures). Two countries appear repeatedly in the picture: Sweden in the early 1990s and Japan in the late 1990s and at the beginning of this century. Furthermore, while Finland appears only once, its macroeconomic and fiscal performance in the early 1990s was similar to that of Sweden. In the next two sections, we discuss these particular deficit experiences in Finland, Sweden, and Japan in further detail.

**Finland and Sweden**

In both Finland and Sweden, the 1980s were a decade of financial deregulation. The improved ability to access foreign capital markets led to a boom in asset prices. Figure 6, panel A (p. 92) shows the performance of major stock market indexes in the two countries; for Sweden, the stock market appreciation of the late 1980s is even faster than the high-flying dot-com era of the late 1990s. Both countries adopted a fixed-exchange-rate regime in this period: Both the Finnish markka and the Swedish krona were pegged to a basket of foreign currencies. The interest rate differential with respect to Germany and other countries with a stronger tradition of price stability induced domestic borrowers to take loans denominated in foreign currencies; while this saved interest costs during the pegged-exchange-rate regime, it magnified the balance sheet difficulties when central banks were forced to devalue their currencies and let them float in the wake of the crisis.

---

**TABLE 1**

<table>
<thead>
<tr>
<th></th>
<th>Fifth</th>
<th>Tenth</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation</td>
<td>0.059</td>
<td>0.061</td>
<td>0.063</td>
</tr>
<tr>
<td></td>
<td>(0.091)</td>
<td>(0.072)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Constant</td>
<td>−7.140</td>
<td>−5.617</td>
<td>−4.96</td>
</tr>
<tr>
<td></td>
<td>(0.554)</td>
<td>(0.461)</td>
<td>(0.238)</td>
</tr>
</tbody>
</table>

Notes: Inflation is measured by the consumer price index (CPI). Each column corresponds to a different quantile regression. The standard errors, which appear in parentheses, are not corrected for clustering, so the precision of the estimates are overstated. The cluster correction would lead them to be even less statistically significant. For more details, see the text.

Source: Authors' calculations based on data from the Organization for Economic Cooperation and Development; Source: OECD.
By 1990, the combination of a rise in interest rates throughout Europe (following the German reunification) and the increasing risk of a devaluation of the Finnish markka and the Swedish krona led to a surge in interest rates, first stopping and later dramatically reversing the asset price appreciation. This led to large losses in the banking sector, and eventually forced the governments of both Finland and Sweden to step in, guarantee the banks' creditors, and take over some of the most troubled institutions. The financial crisis was accompanied by a severe recession, as highlighted in figure 6, panel B, which measures real GDP. Figure 6, panel C plots government surpluses as a fraction of GDP (that is, net lending as a fraction of GDP) in Finland and Sweden. As seen in this panel, the large deficits documented in figure 5 were a (slightly delayed) consequence of the recession. They were mostly caused by the need to recapitalize the banks and by the so-called automatic fiscal stabilizers, that is, the natural tendency of tax revenues to drop and unemployment and other welfare payments to increase during recessions. There was no intentional "fiscal stimulus;" rather, discretionary fiscal policy actually started tightening by 1993, with tax rate increases and the containment of public expenditure,
as discussed by Honkapohja et al. (2009) and Jonung, Schuknecht, and Tujula (2005). Figure 6, panel D displays government gross financial liabilities. The financial crisis and the recession saddled Finland and Sweden with substantial liabilities. Nonetheless, the ratio of debt to GDP in both countries started to decline shortly after the end of the recession. This decline was entirely driven by solid growth rates in GDP and fiscal surpluses—and not by inflation, to which we turn next, in figure 6, panel E. As seen in that panel, Finland and Sweden did experience moderate degrees of inflation, but this preceded the crisis, rather than followed it.
FIGURE 6
Finland and Sweden: Macroeconomic indicators

A. Stock market indexes
index, log scale, 2005 = 100

B. Real gross domestic product
index, log scale, 2005 = 100

C. General government surplus
percent of gross domestic product

D. General government gross financial liabilities
percent of gross domestic product

E. Inflation
year-over-year percent change

Notes: Panel A plots the performance of the Helsinki Stock Exchange (HEX) All Share Index for Finland and the Affärsvarldens Generalindex (AFGX) for Sweden. Panel E plots inflation as measured by the consumer price index.
Sources: Authors’ calculations based on data from the Organization for Economic Cooperation and Development, SourceOECD; and Haver Analytics.

92
3Q/2010, Economic Perspectives
Inflation was one of the causes of the crisis: In combination with a fixed exchange rate, it led to a loss in competitiveness, which was only restored after the currency pegs were abandoned in 1992. However, neither country attempted to rely on a monetary policy accommodating high inflation during or after the deficit years to erode the large stock of accumulated financial liabilities.\textsuperscript{26}

\textbf{Japan}

As with Finland and Sweden, Japan also experienced a dramatic rise in asset prices during the 1980s. In late 1991, the value of the land underneath the Emperor’s Palace in Tokyo was estimated to be worth about the same as the value of the land in the entire state of California.\textsuperscript{27} Panel A of figure 7 shows the performance of Japan’s stock market, which peaked a little earlier than those of Finland and Sweden, in 1989. The causes of the Japanese boom and bust are more complex than those of Finland and Sweden; a more complete discussion can be found in Kuttner and Posen (2001), Posen (1998), Hayashi and Prescott (2002), and Hoshi and Kashyap (2004). An important difference is that Japanese assets never recovered from the crisis, and still remain well below their peaks registered 20 years ago.

Panel B of figure 7 displays Japan’s real GDP, whose path is similar to that of Japan’s stock market. While Finland and Sweden experienced a quick recovery after the recession, Japan entered into a prolonged period of stagnation. The extent to which Japan resorted to expansionary fiscal policy to overcome its weak macroeconomic performance is debated. Kuttner and Posen (2001) and Posen (1998) argue that Japan’s fiscal deficits were largely a natural consequence of weak growth, with only small discretionary fiscal expansion; fiscal policy even turned contractionary in 1997, as discussed in some detail by Braun and Díaz-Giménez (2009). Whether it was a consequence of automatic stabilizers or a conscious choice to use fiscal policy to stimulate growth, panel C of figure 7 shows that Japan has run large public deficits since the early 1990s, particularly in the early 2000s.\textsuperscript{28} As a consequence of these deficits, Japan has accumulated a large debt position. In figure 7, panel D, we plot the gross financial liabilities of the Japanese government. Panel D of figure 7 exaggerates the Japanese indebtedness, since a significant fraction of these liabilities are held by government agencies, as emphasized by Broda and Weinstein (2004). Government net financial liabilities, as shown in figure 7, panel E, provide a clearer picture of the Japanese fiscal situation. Even by this measure, Japan has been accumulating a large stock of debt. Since our debt metric is the ratio of debt to GDP, the lack of growth in GDP is an important cause of this accumulation: Had Japan grown as much as Sweden between 1992 and 2008, its ratio of debt to GDP would have been about 20 percent smaller than it is, even with no change in deficits.\textsuperscript{29} Unlike for Finland and Sweden, a full fiscal adjustment to restore stability in the debt/GDP ratio has not yet materialized in Japan, so it is still possible in principle that the large debt accumulation will be eventually eroded away through higher inflation. Nonetheless, the experience of the past 20 years shows no evidence that Japan has given in to this temptation; in fact, as is well known, Japan often experienced deflation in this period, as shown in figure 7, panel F. Market interest rates on Japanese government bonds remain low, suggesting that lenders do not yet perceive a significant risk of default or inflation in the future.\textsuperscript{30} This is yet another difference from the Finnish and Swedish experience in the 1990s: In Finland and Sweden, interest rates spiked during their financial crisis, providing strong incentives for fiscal adjustment that Japan never faced.\textsuperscript{31}

\textbf{Conclusion}

The evidence presented in this article shows that large fiscal deficits in industrialized countries did not coincide with higher inflation, nor did large deficits precede higher inflation. Facing sizable fiscal imbalances, central banks in these countries were nonetheless able to maintain an orderly monetary policy.\textsuperscript{32} A tempting interpretation is that these central banks stood fast because their independence allowed them to do so and they wanted to preserve their solid reputations; at the same time, central bank independence shielded governments from the temptation to force the monetization of debt, and led fiscal authorities to revert quickly to a sustainable debt path. However, a full account of the institutions that supported price stability in the face of large fiscal shocks is beyond the scope of this article.
FIGURE 7
Japan: Macroeconomic indicators

A. Stock market index
index, log scale, 2005 = 100

B. Real gross domestic product
index, log scale, 2005 = 100

C. General government surplus
percent of gross domestic product

D. General government gross financial liabilities
percent of gross domestic product

E. General government net financial liabilities
percent of gross domestic product

F. Inflation
year-over-year percent change

Notes: Panel A plots the performance of the Tokyo Stock Exchange Stock Price Index (TSE TOPIX). Panel F plots inflation as measured by the consumer price index.
Sources: Authors' calculations based on data from the Organization for Economic Cooperation and Development, SourceOECD; and Haver Analytics.
NOTES

1One simplification is that equation 1 treats government debt as if it had a one-year maturity. In practice, a large fraction of government debt has longer maturity. The deficit implications of correctly valuing long-term debt are studied by Hall and Sargent (1997, 2010). This equation also treats the government as a single entity. In practice, even at the U.S. federal level, the Social Security and Medicare trust funds keep separate accounts from the rest of the federal government. Moreover, states and numerous local governments have their own budgets. Throughout this article, we consolidate all of these budgets into one (whenever possible). A further simplification is that we lump purchases of capital together with other forms of spending in $G_t$ and that we lump sales of capital together with other revenues in $T_t$. In the case of the United States, spectrum auctions (auctions to sell the rights to transmit signals over specific electromagnetic wavelengths) are the only major source of revenues from privatization of public capital.

2The liability side also contains the bank’s capital; however, this is a relatively small entry, so we abstract from it here.

3The approximation is accurate as long as inflation and interest rates are small.

4The primary surplus is the difference between government revenues and expenditures, excluding interest payments, and is captured by the second term on the right-hand side of equation 4.

5For this computation, we used interest rates on one-year Treasury constant maturities and the monetary base from Federal Reserve Statistical Releases H.15 (www.federalreserve.gov/releases/h15/data.htm) and H.3 (www.federalreserve.gov/releases/h3/H3hist/), respectively.

6For early treatments, see, for example, Calvo and Guidotti (1990).


8Missale and Blanchard (1994) analyze the relationship between the size of debt and its maturity structure in the case of Belgium, Ireland, and Italy, and show that the maturity structure varies inversely with the size of the debt/GDP ratio. They interpret this as evidence that a shorter maturity is needed to contain the temptation to inflate debt away when debt is larger.


10For example, the low interest rates of the last decade have sometimes been attributed to a “global saving glut,” see Bernanke (2005).

11It should be noted that hyperinflations exacerbate underlying fiscal imbalances; when inflation is so high that it impacts the real value of money on a day-to-day basis, even minor delays in the collection of taxes have a large effect on the real value of tax revenues.

12More precisely, Catão and Terrones (2005) use a logarithmic specification for one plus the inflation rate, and they find that a 1 percent increase in the deficits/GDP ratio is associated with 0.044 log points for their logarithmic measure. At low levels of inflation, this translates to 5 percent extra inflation, but this effect becomes bigger at higher inflation rates.

13To mention but one example, Barro and Gordon (1983) stress the time inconsistency problem that arises when the central bank wishes to push employment beyond its equilibrium level. Ireland (2000) views this as a cause for the inflation experienced by the United States in the 1970s.

14The 5th (10th) percentile is defined so that 5 percent (10 percent) of the points in the bin lie at or below it.


16It may seem more natural to treat inflation as the dependent variable and the surplus as the independent variable. However, ours is a purely statistical exercise, trying to establish correlation patterns among two variables with no pretense of establishing causation. In this form, the regression allows us to concentrate on the low-surplus quantiles that we are most interested in. We have run similar regressions inverting the dependent and independent variables, and our results are similar.

17The figure for gross financial liabilities would be even more striking, mainly because of the recent Japanese experience, where very large gross financial liabilities coexisted with stable or declining prices.

18Sometimes governments resort to forced lending; in this case, a proper economic accounting would require us to disentangle how much lenders would willingly offer the government from the hidden tax that is imposed by the mandatory government scheme. Fortunately, this is not an issue for the OECD countries in the period we consider.

19See, for example, Grilli, Manciandaro, and Tabellini (1991); Cukierman (1992); and Alesina and Summers (1993).

20In the case of Japan, the central bank only gained operational independence in 1997, well after the crisis had started, but still well before government debt grew to alarming levels. See, for example, Bernanke (2010).

21See Joumard et al. (2008).

22For more detailed accounts of the financial crisis in Finland and Sweden, see, for example, Honkapohja et al. (2009); Jonung, Schuknecht, and Tujula (2005); and Englund (1999).

23See Holden and Vikoren (1996). In later years, the basket corresponded to the accounting unit of the European Community—the ECU.

24Unlike in figure 5, the actual occurrence of deficits without the correction for inflation is plotted in figure 6, panel C. The pattern is very similar even with the correction.

25Plotting net liabilities would show a similar pattern. However, both the Finnish and Swedish governments own substantial interests in private companies, whose market values fluctuated in the late 1990s and early 2000s. These movements confound the underlying evolution of the debt/GDP ratio driven by growth and stable fiscal finances.

26It is interesting to note that the macroeconomic and fiscal policy evolution continued to be very similar in both Finland and Sweden, even though their respective institutional environments became very different from the mid-1990s onward. Finland opted to join the Economic and Monetary Union of the European Union (EU), relinquishing its ability to run an independent monetary policy and accepting the fiscal constraints implied by the EU’s Stability and Growth Pact. Sweden remained outside of the eurozone, but pursued similar fiscal and monetary policies to those of Finland, even though it was not bound by external constraints.

As we already mentioned, the large outlier in 1998 is due to one-off debt assumptions. The actual occurrence of deficits without the correction for inflation is plotted in figure 7, panel C. The pattern is very similar even with the correction.

Additional growth would also have helped tax revenues, and would thus most likely have reduced the deficits. At the same time, the Japanese government paid very low real interest rates on its debt; had the economy grown faster, higher rates might have prevailed, increasing the burden of debt.

Of course, the recent experience in Greece shows that market expectations can change abruptly.

We are indebted to R. Anton Braun for suggesting this observation.

In fact, many economists have complained that the Bank of Japan was too restrictive given the economic conditions; see, for example, Bernanke and Gertler (1999).
APPENDIX: DATA

Two separate samples were created for our analysis. We present further details on our primary sample comprising data from most countries in the Organization for Economic Cooperation and Development and our larger sample composed of data on 52 countries in the International Monetary Fund’s International Financial Statistics.

**OECD sample**

The primary sample for our article was compiled using the OECD Economic Outlook Database on SourceOECD (www.sourceoecd.org). While this sample does not include all OECD countries, for exposition purposes it will be labeled as such. We gathered annual statistics of general government net lending, net and gross general government financial liabilities, and the inflation as measured by the CPI for 23 countries over the period 1970–2008. The Czech Republic, Hungary, Luxembourg, Mexico, the Slovak Republic, and Turkey were not included because of data availability issues with the particular series of interest. For an exhaustive list of the data availability of the net lending statistic, as well as the countries used, see table A1. In the OECD Economic Outlook Database, the general government sector consolidates accounts of the central, state, and local governments, plus social security. Additionally, net lending, net financial liabilities, and gross financial liabilities are all scaled as a percentage of GDP.

In the OECD Economic Outlook Database, government net lending is defined as general government current tax and nontax receipts less general government total outlays.\(^1\) Tax receipts of the government sector include the sum of direct taxes on household and business sectors, indirect taxes, and social security contributions. Nontax receipts pertain to operating surpluses, property income, user charges and fees, and other current account and capital transfers received by the general government. Total outlays consist of current outlays plus capital outlays. Current outlays are the sum of current consumption, transfer payments, subsidies, and property income paid (including interest payments).\(^2\)

Gross financial liabilities refer to all the debt and other liabilities (short- and long-term) of all the institutions in the general government sector. Subsequently, net financial liabilities measure these gross financial liabilities of the government sector less the financial assets. Such assets may be cash, bank deposits, loans to the private sector, participation in private sector companies, holdings in public corporations, or foreign exchange reserves, depending on the institutional structure of the country concerned and data availability.\(^3\) The status and treatment of government liabilities with respect to their employee pension plans in the national accounts vary across countries, making international comparability of government debts difficult. The current interpretation of the 1993 System of National Accounts distinguishing between “autonomous” funded pension plans and “nonautonomous” pension plans is maintained for this sample.\(^4\)

**IMF sample**

The second sample was created by collecting the government deficit, the inflation as measured by the CPI, and the GDP of each country from the country pages of the International Monetary Fund’s International Financial Statistics Yearbooks.\(^5\) This sample will be referred to as the IMF sample. Annual figures were recorded over the period 1970–2008 for 52 countries. For some countries the only reported government budget was that of the central government; however, the general government budget was used for every country in which it was available over the entire history. For an exhaustive list of the data availability of deficit statistic, as well as the countries used, see table A1. The deficit calculated by the IMF in its International Financial Statistics is the difference between revenue, including grants received, and the sum of expenditures and lending minus repayments.\(^6\) Subsequently, this deficit calculation is also equal, with the opposite sign, to the sum of the net borrowing by the government plus the net decrease in government cash, deposits, and securities held for liquidity purposes, and parallels the OECD net lending statistic accordingly.

Table A1 summarizes the two samples by listing the particular countries used in each, the data availability of the particular deficit/surplus statistic; and the particular aggregation of the government budget reported in the IMF sample.

\(^1\)Sources and Methods of the OECD Economic Outlook, annex table 27, available at www.oecd.org/document/14/0,3343,en_2649_34573_1847822_1_1_1_1,00.html (with general information available at www.oecd.org/eco/sources-and-methods).

\(^2\)Ibid., annex tables 25 and 36.

\(^3\)Ibid., annex table 33.

\(^4\)Ibid.

\(^5\)To construct the full time series for each country, we used International Monetary Fund, Statistics Department (1990, 1995, 2000, 2009).

### TABLE A1

**Countries included in the analysis**

<table>
<thead>
<tr>
<th>Country</th>
<th>OECD</th>
<th>IMF</th>
<th>Government unit</th>
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</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1970–2004</td>
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<td>Central</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>1973–2005</td>
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<td>Central</td>
</tr>
<tr>
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<td>1970–2008</td>
<td>Central</td>
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<td>Colombia</td>
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<td>Central</td>
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<td>Costa Rica</td>
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<td>1970–2006</td>
<td>Central</td>
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<td>Cyprus</td>
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<td>1970–2003</td>
<td>Central</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td>1970–2008</td>
<td>Central</td>
</tr>
<tr>
<td>Iran</td>
<td></td>
<td>1972–2007</td>
<td>Central</td>
</tr>
<tr>
<td>Kenya</td>
<td>1970–2006</td>
<td></td>
<td>Central</td>
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<td>Malaysia</td>
<td>1970–99</td>
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<td>Central</td>
</tr>
<tr>
<td>Mexico</td>
<td>1972–2008</td>
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<td>Central</td>
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<td>1970–2007</td>
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<tr>
<td>Uruguay</td>
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</table>

**Notes:** The years in the second and third columns indicate the periods for which data are available. The second column indicates the data availability of countries in the Organization for Economic Cooperation and Development (OECD) sample, and the third column indicates the data availability of countries in the International Monetary Fund (IMF) sample. Government unit, in the fourth column, refers only to the particular aggregation of government budget reported in the IMF sample (all data in the OECD sample are reported for the general government).

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Federal Reserve Bank of Chicago 99


100

3Q/2010, Economic Perspectives
The asset-backed securities markets, the crisis, and TALF

Sumit Agarwal, Jacqueline Barrett, Crystal Cun, and Mariacristina De Nardi

Introduction and summary

Credit performs the essential function of moving funds from the savers who want to lend to the investors and consumers who wish to borrow. Under ideal conditions, this process ensures that funds are invested by the most skilled and productive individuals, thus improving efficiency and stimulating growth, and that consumers can get funds when they need them the most to satisfy their consumption needs.

Many different instruments of borrowing and lending have emerged to better address the needs of borrowers and lenders. Examples are trade credit, banks, stocks and commodities markets, and an enormous variety of financial institutions.

For many years, banks and financial institutions were collecting and lending funds while keeping the resulting loans on their books until they were repaid. Regulations and the need to follow sound and prudent lending practices were generating a need for collateral, thus tightly linking the amount of funds collected to the amount of loans created, even in the presence of more profitable and productive lending activities. For example, a bank generating lots of mortgage loans, which are typically financed by short-term deposits, had to keep a significant share of collateral to ensure that they could repay their depositors in case they wanted their money back at short notice.

To alleviate firms’ need to hold large amounts of collateral and allow investors and institutions to share risk, asset-backed securities products were introduced in 1970. Asset-backed securities (ABS) are bonds backed by the cash flow of a variety of pooled receivables or loans. ABS can be securities backed by any type of asset with an associated cash flow, but are generally securities collateralized by certain types of consumer and business loans as opposed to mortgage-backed securities, which are backed by mortgages. Firms issue ABS to diversify sources of capital, borrow more cheaply, reduce the size of their balance sheets, and free up capital.

For example, a bank holding consumer loans on its books could pool a large number of loans together and issue bonds with specific income streams generated by this pool of loans. In addition, the bank would transfer the loans to a separate entity. Selling the loans would generate cash flows that could be used to issue additional loans on the market.

ABS issuance grew steadily, increasing liquidity and reducing the cost of financing. From an annual issuance of $10 billion in 1986, the ABS market grew to an annual issuance of $893 billion in 2006, its peak in the U.S.1 This growth was accompanied by expansion in the ABS market investor base from banks and institutional investors to hedge funds and structured investment vehicles (SIV).

The growth in ABS came to a sudden end with the financial crisis that started in 2007, which was characterized by a global credit crunch. The crisis began with a decline in house prices and an increase in mortgage defaults, particularly on subprime mortgages (high-risk loans to borrowers with poor credit). Uncertainty quickly spread to other consumer loan markets, such as those based on car loans, credit cards, and student loans. In July 2007, ABS issues backed by residential mortgages dried up. The failure of Lehman Brothers in October 2008 was a big shock to the financial markets and to investor confidence, and yields on ABS skyrocketed.2 In this new high-yield environment, there was no economic incentive for lenders to issue new ABS. Consumer ABS (auto, credit card, and student loan segments)

Sumit Agarwal is a senior financial economist, Jacqueline Barrett is an associate economist, Crystal Cun is a former associate economist, and Mariacristina De Nardi is a senior economist and economic advisor at the Federal Reserve Bank of Chicago.
and commercial mortgage-backed securities markets' issuances vanished. The intermedia-
tion of household and business credit between investors and borrowers stopped.

This credit crisis was in many ways also a credit rating crisis. Given the difficulty for investors to evaluate these structured financial products, most relied on ratings of ABS bonds by the major rating agencies. Prior to the crisis, more than half of the structured finance securities rated by Moody’s carried a rating of AAA, the highest possible rating and typically reserved for securities that are perceived to be extremely low risk. In 2007 and 2008, the creditworthiness of structured finance securities deteriorated dramatically. Almost 40,000 Moody’s-rated tranches (specific portions within a class of bonds) were downgraded, and almost one-third of the downgraded tranches had been rated AAA. The ensuing confusion about the true value and risk of these complicated financial products and the extent of financial institutions’ exposure to them fueled additional market uncertainty and further reduced the availability of credit.

The Board of Governors of the Federal Reserve System recognized the importance of keeping a healthy supply of credit alive and acknowledged the important role of ABS markets in this process. To get these markets working again, the Board introduced the Term Asset-Backed Securities Loan Facility (TALF) on November 25, 2008. The official document announcing the facility stated: “The ABS markets historically have funded a substantial share of consumer credit and SBA-guaranteed small business loans. Continued disruption of these markets could significantly limit the availability of credit to households and small businesses and thereby contribute to further weakening of U.S. economic activity.” The same document also explained that the TALF was “intended to assist the credit markets in accommodating the credit needs of consumers and small businesses by facilitating the issuance of asset-backed securities (ABS) and improving the market conditions for ABS more generally.”

TALF facilitated issuance of new ABS and, even more importantly, provided a safety net by allowing people holding ABS products to borrow by putting up these products as collateral at a given price. This not only allowed these investors to satisfy their liquidity needs, but also provided an important guarantee of a maximum price of liquidity for qualified borrowers. This guarantee generated a crucial backstop against irrational fears, lowering the value of these assets below what one could expect based on reasonable fundamentals.

In this article, we analyze the role of ABS markets in generating credit and liquidity. We study how this role was disrupted during the crisis, and we argue that TALF successfully helped reestablish the ABS markets and the credit supply.

First, we describe how ABS products work, the growth of the market for these products, and its collapse. Then we show that TALF helped calm the markets and helped restart ABS issuance and reduce credit spreads, thus helping to reestablish a healthy credit supply to the markets.

**Overview of the ABS market**

How does securitization work? The essence of securitization is pooling and tranching. After pooling a set of assets, the originator creates different classes of securities, known as tranches, which have prioritized claims against the collateral pool. In a tranching deal, some investors hold more senior claims than others. In the event of default, the losses are absorbed by the lowest priority class of investors before the higher priority class of investors are affected. Thus, the pooling and tranching create some securities that are safer than the average asset in the collateral pool and some that are much riskier.
To explain the mechanics of securitization, we focus on credit card ABS, which make up the largest share of consumer ABS. Credit card ABS are bonds backed by credit card receivables, which include interest charges, annual fees, late payment fees, over-limit fees (for exceeding the account maximum), recoveries on charged-off accounts, and interchange. Interchange is income from card associations (Visa, MasterCard, and Novus) paid to the issuing bank; it varies from 1 percent to 2 percent of charged amounts.

Securitization structures are designed to isolate loans from the bankruptcy or insolvency risks of the other entities involved in the transaction. This is typically accomplished by the originator’s transferring the receivables to one or more bankruptcy-remote entities, one of which will ultimately issue the ABS to investors. Bankruptcy remote refers to a subsidiary or affiliate corporation whose asset/liability structure and legal status make its obligations secure even in the event of the bankruptcy of its parent or guarantor. Since this off-balance-sheet debt is isolated from bankruptcy risks, it should be cheaper than debt that takes into account the possibility of bankruptcy (Gorton and Souleles, 2005).

The securitization is created when the financial institution (also known as the originator, transferor, seller, or sponsor) accumulates a significant volume of receivables and transfers these receivables to a wholly owned, bankruptcy-remote special purpose entity (SPE). The SPE then transfers the receivables to a securitization vehicle, typically a qualified securitization trust, or QSPE. (See figure 1.)

The trust then packages the receivables and issues investor certificates (sold to investors) and trust certificates (retained by the transferor or affiliate). Proceeds from the sale of the investor certificates go to the trust. The trust in turn pays the financial institution (seller) for the purchase of the underlying receivables.

The investor certificates noted in figure 1 are usually issued with a senior/subordinated structure. The seller/orignator often retains the bottom or most subordinated pieces, which get paid out last, in order to obtain high ratings from rating agencies. The trust certificates are also referred to as the transferor’s interest, seller’s certificate, or seller’s interest. The seller’s interest is traditionally retained by the originator, but as the ABS market expanded, an active market in subordinated sellers’ tranches developed. Credit derivatives could also be used to hedge away exposure risk. This meant that it was relatively easy for originators to sell their interest in securitizations, or at least hedge away some of the risk (Fender and Mitchell, 2009).

**Master trust format**

Rather than setting up a new trust for each securitization issued, a single master trust is used for multiple issues, as illustrated in figure 2. A master trust allows receivables to be added to the trust over time and multiple “series” of certificates to be issued, identified by specific issue dates and all backed by a single pool of receivables in the master trust. Additional series can be offered from the master trust at any time. The cash flow generated from all of the receivables in the master trust is used to fund debt service payments on each series (Fitch Ratings, 2006).

Series issued by the same master trust also have the ability to share excess finance charge collections. If finance charges allocated to one series are not needed to cover the corresponding interest, defaults, and servicing payments, the funds can instead be applied to absorb shortages in another series.

Trust assets are allocated among current and future noteholders and the seller’s interest. The seller’s interest represents the ownership interests in the trust assets that have not been allocated to any investor certificate holder’s interest. The seller’s interest insulates investors...
from non-credit-related reductions in receivables by serving as a first layer of protection to absorb such fluctuations. This ensures that the receivables balance is sufficiently high, following dilutions due to charge reversals, fraud, seasonal swings in new receivable generation, and over-concentration amounts. Credit losses, on the other hand, are shared pro rata between the seller’s interest and investors. Trusts generally have a specified minimum seller’s interest, determined by the rating agencies, to ensure a base level of collateralization.

Cash flows

The monthly payment rate (MPR) is the principal collected during the month divided by the ending or average principal balance of receivables for the same period. The MPR measures the portion of outstanding receivables paid down each month; an MPR of 50 percent indicates full loan repayment in two months.

The underlying receivables may have different maturities from the outstanding certificates. For example, credit card securitizations have a relatively short life, typically eight to ten months, while supporting outstanding certificates that may have three, five, or ten year maturities. As a result of this maturity mismatch, each series issued out of the master trust is structured to have a revolving period, typically followed by a controlled accumulation period.

During the revolving period, payments are made to the servicer for cash flows from the receivables. The servicer deposits the payments into two collection accounts, one reserved for principal and the other for trust expenses and interest payments on the investors’ certificates. New receivables generated by the designated accounts are purchased from the originating institution/seller with funds from the principal account.

During a controlled accumulation period, the principal payments are reinvested in short-term investments and become the collateral for the outstanding investor certificates. As principal payments are received, the short-term investments grow until they equal the amount of the outstanding investor certificates in the maturing series. At this point, the trustee makes a bullet payment to all investment certificate holders. During a controlled amortization period, principal collections are paid out to investors monthly throughout the period (Fitch Ratings, 2006).

If funds in the principal and interest payment reserve accounts are insufficient to repay investors on the expected maturity date, the accumulation or controlled amortization period will continue until the legal final maturity date. At this time, the trust will sell the remaining receivables to pay investors, if necessary.

Default and early amortization

Various performance events can trigger an early amortization or accelerated payment of the ABS. For most deals, early amortization is triggered when the three-month average MPR is lower than a predetermined percentage. Other early amortization events can include bankruptcy, failure to maintain receivables balances at predetermined levels, failure to pay the outstanding dollar amount of the notes by the expected payment date, and failure to pay interest for a predetermined period.

In the event of default, principal collections are distributed to investors, with senior notes paid off first. Principal collections are allocated as a percentage of the invested amount of the receivables balance at the onset of early amortization.

Credit ratings

ABS products are backed by a pool of receivables, have a complicated seniority structure, and rely on specific legal guarantees in case of default. In addition, there is asymmetric information between the issuers of the securities and the investors. To help inform investors and the market at large, rating agencies analyze ABS bonds and attach credit ratings to their various tranches.

The credit analysis of securitizations is a complex process that includes an evaluation of the originator and servicer; an assessment of the collateral and historical asset performance; an understanding of the securitization and legal structure; and modeling of cash flows under various stress scenarios.

The interaction between credit ratings and financial regulation was an important contributor to the growth in securitization markets. The use of credit ratings in the regulation of financial institutions created a large demand for highly rated (especially AAA) securities. Minimum capital requirements for banks, insurance companies, and broker-dealers depend on the credit ratings of the assets on their balance sheet. Pension funds also face rating-based investment restrictions. Securitization allowed investors to participate in asset classes to which they would otherwise not have had access. For example, an investor that was not permitted to buy B-rated corporate bonds could invest in AAA-rated ABS securities that were issued on a pool of B-rated corporate bonds, which would typically yield more than bonds rated A or higher.

In order to receive higher debt ratings and thus improve marketability and financing costs, ABS products require credit enhancements. Enhancements can be internal, external, or a combination of both. Common external credit enhancement facilities include cash collateral accounts, collateral invested amounts (CIA),
third-party letters of credit, and reserve accounts. Internal credit enhancements facilities can include senior/subordinated certificates, excess finance charges, spread accounts, and over-collateralization (Fitch Ratings, 2006).

**Growth of ABS**

The ABS market that had such a prominent role in the recent financial crisis evolved over the course of several decades. Before the 1970s, banks usually held loans on their balance sheet until they matured or were paid off. The loans were primarily funded by bank deposits and depository institutions and mainly provided credit to the areas where they accepted these deposits. As a result, geographical imbalances in the flow of credit to borrowers emerged (Sellon and Van Nahmen, 1988). Although investors traded whole loans, the market was relatively illiquid; mortgage lenders faced the risk that they would not find investors to purchase the whole loans, as well as the risk that interest rates could change.

The introduction of securitization addressed several of the shortfalls in the housing market, in particular. In 1970, the first form of securitization was brought to the marketplace. At this time, the Government National Mortgage Association (GNMA) introduced government-insured pass-through securities, in which the principal and interest payments were passed from borrowers to investors who purchased bonds that were backed by Federal Housing Administration and Veterans Administration 30-year single-family mortgages (Sellon and Van Nahmen, 1988; Ergungor, 2003). Soon after, the Federal Home Loan Mortgage Corporation (FHLMC) and the Federal National Mortgage Association (FNMA) began issuing pass-through securities of their own. The pass-throughs were structured so that interest payments on the mortgages were used to pay interest to investors of the bonds, and principal payments were used to pay down the principal of the bonds (Rosen, 2007). The launch of pass-through securities provided several advantages. Investors could buy a liquid instrument that was free of credit risk. Lenders could move any interest rate risk associated with mortgages off their balance sheet and make additional loans with the new capital that they received from securitizing older loans. Businesses and consumers faced lower borrowing costs and were given increased access to credit as the geographical inefficiencies that were previously present were eliminated. One of the drawbacks to these new securities is that they were unable to accommodate different risk preferences and time horizons of investors.

The mortgage market continued to evolve with the issuance of the first private-label mortgage pass-through security by Bank of America in 1977 and the first collateralized mortgage obligation (CMO) by FHLMC in 1983. CMOs addressed an important risk of owning pass-through securities—prepayment risk. Prepayment risk is the unexpected early return of principal as a result of refinancing. Borrowers are most likely to refinance when interest rates fall and investors are forced to reinvest the returned principal at a lower return than they previously expected. CMOs lowered prepayment risk for certain investors by providing different classes (tranches) of securities that offered principal repayment at varying speeds. The introduction of tranches in CMOs set the stage for more sophisticated debt vehicles that were tailored to the preferences of different types of investors (Ergungor, 2003). The senior tranches are highly rated and have the lowest risk. In the event that defaults occur in the underlying bonds, the losses are distributed among the junior tranches first. The senior tranches do not experience losses until all of the junior tranches have been exhausted. The junior tranches are high-risk instruments that come with the potential for high yields.

In the mid 1980s, securitization techniques that were developed for the mortgage market were applied to nonmortgage assets. Other types of receivables such as auto loans and equipment leases involved predictable cash flows, which made them attractive for securitization. Banks also soon developed structures to normalize the cash flows of credit card receivables, facilitating the creation of credit card ABS. In order to provide additional protection to investors on these securities, which were not government-insured, the pools of assets were over-collateralized, so that the value of the underlying loan portfolio was larger than the value of the security. Additional credit enhancements, such as the excess spread, the creation of reserve accounts, and letters of credit, were also implemented. The purpose of these credit enhancements was to limit losses for investors in the event of defaults. The market grew to include the securitization of additional asset types, including home equity loans, manufactured housing loans, and student loans.

The ABS market increased dramatically from 1996, when the value of outstanding securities was $404.8 billion, to 2008, when the value of outstanding securities reached $2,671.8 billion (figure 3). Although each type of security exhibited growth during this period, the largest expansions were seen in home equity ABS, student loan ABS, and collateralized debt obligations (CDOs), which are securities that can be backed by several different types of debt. Securities backed by credit card receivables made up the largest portion of ABS in 1996; by 2009, home equity ABS and CDOs made up the bulk of the market (figure 4). The value
of monthly ABS issuance also increased steadily until June 2006, when it peaked at $110 million (figure 5, panel A).

**The crisis**

The formation and bursting of the housing bubble played an important role in starting and subsequently deepening the financial crisis. Among the factors contributing to the housing bubble were programs aiming at increasing home ownership, low interest rates, and reduced credit standards.

For decades, increasing homeownership has been a government policy objective, implemented through subsidies, tax breaks, and dedicated agencies. These policy interventions, coupled with historically low interest rates, encouraged unprecedented borrowing. As home prices surged, many households borrowed against the value of their homes by refinancing mortgages or taking out home equity lines of credit. At the same time, the banks that originated the loans were selling them rather than keeping them on their balance sheets. By securitizing mortgages, banks were able to originate more mortgages, but the quality of these mortgages deteriorated as the quantity increased. Lenders allowed borrowers with poor credit to purchase homes with low or no down payments. The credit rating companies compounded the problems by rating the ABS securities under the assumption that house prices would keep appreciating. This critical assumption turned out to be false (Sabry and Okongwu, 2009).

In 2007, the housing market started to decline: Home sales and construction starts slowed, home prices dropped, and interest rates began to rise. Defaults on sub-prime loans, especially those that had not required a down payment or income verification, started to surge. As interest rates started rising, adjustable mortgages started to reset at higher levels and fears spread that foreclosures would increase. Lenders and mortgage buyers responded to the defaults by tightening credit standards. Several sub-prime lenders suffered losses and eventually were forced to file for bankruptcy. As it became clear that many of the mortgages in default had been securitized, the previously highly rated securities were downgraded, causing demand for outstanding asset-backed securities to collapse. At the same time, a banking panic in the sale and repurchase agreement (repo) market forced banks to sell their assets at unfavorable prices (Gorton and Metrick, 2009). There was also a sharp decline in the issuance of new housing-related securities. Although securities backed by housing-related collateral made up the majority of new ABS issuances in 2005 and 2006, starting in 2007, issuances for housing-related securities dried up (figure 5, panel B). By 2008, securities that were backed by student loans, credit card receivables, and automobile loans made up the majority of new ABS issuance because there were so few securities backed by real estate loans.

Bennmichel and Dlugosz (2009, 2010) show that the deterioration in the credit ratings of structured financial products began in 2007, when there were more than 8,000 downgrades, an eightfold increase over the previous year. In the first three quarters of 2008, there were almost 40,000 downgrades, which overshadowed the cumulative number of downgrades since 1990. In 2007, downgrades were not only more common, but also more severe. The average downgrade was 4.7 notches (defined as the distance between two adjacent ratings) in 2007 and 5.8 notches in 2008, compared with an average 2.5 notches in both 2005 and 2006.

The unforeseen nationwide decline in the housing market and the related economic downturn were important factors that led to the deterioration in credit quality.
of these securities, but it is also natural to wonder how the credit agencies’ risk assessments could have been so far off the mark.

Benmelech and Dlugosz provide empirical evidence that rating shopping also played a role in the collapse of the structured finance market. Rating shopping occurs when an originator chooses the rating agency that will assign the highest rating or has the most lax criteria for obtaining a desired rating. Most rating agencies are hired and paid by the originator to provide credit ratings. The probability that a tranche will be downgraded within a year after issuance is higher for tranches rated by only one rating agency. Also, the drop in rating is more severe in this case.

When the market broke down, the banks that were holding securities off their balance sheets until their expected sale were forced to bring them back onto their balance sheets under provisions in the original ABS issuance contracts. These banks incurred large and unplanned regulatory capital charges. At a time when these institutions needed to raise new capital to cover the losses, investors were unwilling to provide it, except at a very large premium. These problems were further exacerbated by the fact that financial firms were reluctant to lend to each other. The insolvencies that emerged led to additional distress through defaults on payment obligations. The credit crisis caused the demise or bailout of Bear Stearns, Lehman Brothers, Fannie Mae, Freddie Mac, Merrill Lynch, Washington Mutual, Wachovia, AIG, and many other financial institutions around the world.

**Assessing the impact of TALF**

At the height of the crisis in the fall of 2008, following the collapse of Lehman Brothers, interest rate spreads on AAA-rated tranches of ABS skyrocketed to historical highs, reflecting unusually large risk premiums. Issuance of ABS slowed to a trickle in September and October, significantly limiting the availability of credit for small businesses and households. These market disturbances further weakened the U.S. economy (Dudley, 2009).

On November 25, 2008, the Federal Reserve announced the creation of the Term Asset-Backed Securities Loan Facility (TALF). This program was designed to meet the credit market needs of households and small businesses by facilitating the issuance of ABS collateralized by auto loans, student loans, credit card loans, and loans guaranteed by the SBA. The aim of the program was to stimulate demand for ABS in order to lower the cost and increase the availability of new credit. Under the terms of this program, the Federal Reserve Bank of New York would lend up to $200 billion to holders of AAA-rated ABS, backed by newly originated loans from the designated sectors. The New York Fed would lend an amount equal to the market value of the ABS less a fraction of their value, called a “haircut.” The haircuts served as a form of credit protection and minimized the risk that the purchaser would not repay the loan if the assets that they pledged for collateral declined in value. These non-recourse loans would have a term of one year and be secured by the ABS. The TALF would stop making new loans on December 31, 2009, unless the Federal Reserve found it necessary to extend the program. In addition, the Treasury Department would provide $20 billion as an additional form of credit protection to the New York Fed to protect against the possibility that the loans
would not be repaid (Board of Governors, 2008b).

In the subsequent months, additional changes were made to TALF. On December 19, 2008, the maturity of TALF loans was extended from one year to three years. On February 10, 2009, the Federal Reserve announced that, along with the Treasury Department, it was prepared to expand the scope and size of TALF. Under the Treasury’s Financial Stability Plan, the Treasury would use $100 billion to leverage up to $1 trillion in lending (up from the previous levels of $20 billion and $200 billion, respectively). On March 17–19, 2009, the first TALF operation was conducted—the total amount of TALF loans settled was $4.71 billion dollars, split between $1.91 billion in auto loans and $2.8 billion in credit card loans.

The Federal Reserve announced on March 19, 2009, that the set of collateral eligible for loans through TALF would be further expanded to include residential mortgage servicing advances, loans backed by business equipment, floorplan loans, and vehicle fleet leases. Soon after, the list was further expanded to include commercial mortgage-backed securities (CMBS) and insurance premium finance loans. The CMBS market had ground to a halt in mid 2008, and the inclusion of CMBS for TALF loans was designed to prevent defaults on viable properties and facilitate the sale of distressed properties. The Federal Reserve also announced it would allow up to $100 billion of TALF loans to have an extended maturity of five years. On May 19, the Federal Reserve said that beginning in July, certain commercial mortgage-backed securities issued before January 1, 2009, would be eligible collateral for TALF loans.

On August 17, 2009, the Federal Reserve and Treasury announced an extension to TALF. Newly issued ABS and legacy CMBS would be eligible to receive TALF money through March 31, 2010, and newly issued CMBS would be eligible to receive loans through June 30, 2010. They also announced that they did not foresee the addition of other types of collateral.
Market volatility before November 2008, lack of stability in the mortgage market, and the absence of a consistent subordinated market were important factors generating the need for the TALF program. TALF helped unlock ABS issuance by providing a backstop to market uncertainty and fears by providing credit to people holding eligible ABS products. This helped generate some new ABS issuances. Figure 6 displays TALF-eligible credit card issuances and TALF credit card loans settled, starting from the first TALF issuance. The graph shows a close match between the two: Basically all credit card TALF-eligible loans received TALF support, with the difference being explained by the required haircut.

There was, to be sure, ABS market activity outside TALF, and it is likely that the TALF program still had a lot to do with the success of these offerings by providing a floor to the market. In this way, TALF may also have had a beneficial effect on non-TALF deals by helping to reduce spreads and decrease market volatility more broadly.

Since the introduction of TALF, ABS interest rate spreads have narrowed from historical highs in the fourth quarter of 2008, which suggests a significant improvement in liquidity and availability of credit in the market. Panels A and B of figure 7 illustrate the spreads on two-year and three-year AAA-rated ABS (the highest quality rating) backed by credit card receivables and auto loans, along with sequentially numbered lines indicating the dates of various TALF announcements. Before the creation of TALF, spreads soared to up to 600 basis points for auto ABS and 550 basis points for credit card ABS. Soon after the creation of TALF on November 28, 2008 (date line 1), spreads dropped by over 200 basis points in both of these sectors. After the announcement that TALF could be expanded to up to $1 trillion (date line 2) and the first TALF operation was conducted (date line 3), these spreads continued to fall for both types of securities. The markets also responded favorably to additional announcements that expanded the set of collateral eligible for TALF loans to include residential mortgage servicing advances, business equipment loans, floorplan loans, vehicle leases (date line 3), CMBS (date line 4), and legacy CMBS (date line 5). By the time TALF was extended for three additional months for newly issued ABS and legacy CMBS and six additional months for newly issued CMBS, spreads were only about 50 basis points above historical levels (date line 7). At the completion of TALF, spreads have fallen to approximately pre-crisis levels.

With spreads tightening and volatility declining, analysts say that traditional cash investors have re-entered
FIGURE 7
ABS spreads to swaps

A. Auto ABS
basis points

Legend: 1, TALF announcement; 2, expand TALF size; 3, TALF start/expand collateral; 4, TALF CMBS announcement; 5, TALF legacy CMBS announcement; 6, TALF CMBS start; 7, extension of TALF announcement.

B. Credit card ABS
basis points

Legend: 1, TALF announcement; 2, expand TALF size; 3, TALF start/expand collateral; 4, TALF CMBS announcement; 5, TALF legacy CMBS announcement; 6, TALF CMBS start; 7, extension of TALF announcement.

Note: ABS indicates asset-backed securities; TALF indicates Term Asset-Backed Securities Loan Facility; CMBS indicates commercial mortgage-backed securities.

Source: Deutsche Bank.
the market. Auto finance companies that have issued multiple deals this year have seen funding costs fall with successive deals. Figure 8 illustrates the spreads on ABS backed by Nissan auto loans both before TALF was put into effect and after. Since the securities were issued by the same manufacturer, the deals are comparable. The spreads reached 450 basis points before TALF was enacted and ultimately fell to 150 basis points by September of 2009. This indicates greater liquidity in the ABS markets and improved capital funding options for firms.

Inspection of ABS spreads for sectors that were not the focus of TALF operations suggests that TALF may also have played a beneficial role in the broader market. In Figure 9, panel A, AAA-rated ABS spreads are shown for various sectors. After the announcement of TALF’s expansion to as much as $1 billion on February 10, 2009, spreads for the credit card, auto, and student loan sectors narrowed.

Issuance for the consumer ABS market has also increased across the credit card, auto loan, and student loan segments (figure 9, panel B). Even before the first TALF operation, student loan ABS reemerged in February 2009, the first issuance in the sector since August 2008. TALF loans in March and April 2009 supported the first credit card deals since October 2008, and more auto loan ABS were issued in those two months than in the previous four months combined.

As markets resumed more normal levels of issuance, new issuance was increasingly done without TALF support. TALF loans settled peaked in the June 2009 round of funding, with a decrease in loan requests through the rest of 2009 (figure 10, panel A). Overall issuance, particularly for both auto sector ABS (figure 10, panel B) and credit card ABS (figure 10, panel C) remained healthy, as originators were able to issue ABS without reliance on TALF support. In the second quarter of 2009, half of the ABS in these two sectors were supported by TALF; by the fourth quarter, the issuances supported by TALF had dwindled to a small number.

In addition, TALF has eased funding pressure by providing alternative funding for firms. After issuing TALF-eligible ABS, 80 percent of issuers were able to decrease their funding costs, with approximately half of issuers reducing costs by over 100 basis points and about one-quarter reducing costs by over 200 basis points. Importantly, the TALF program was conducted with minimal risk to the Federal Reserve and the Treasury. As of February 2010, the Treasury anticipated realizing a profit from the TALF program (U.S. Government Accountability Office, 2010).

A paper by Johnson, Pence, and Vine suggests that programs such as TALF that restored credit to the markets helped prevent the broader U.S. economy from sinking even further into distress. The authors found a strong link between financing conditions and the sale of vehicles when using both household level data and aggregate data. Specifically, they found that 38 percent of the decline in vehicle sales between the end of 2007 and the beginning of 2009 could be attributed to increases in the interest rates on new vehicle loans and households’ perception that credit conditions were unfavorable. The purchases of households that were likely to face borrowing constraints were extremely sensitive to changes in credit conditions, but were not sensitive to expected changes in income. The study found that aggregate vehicle sales fell 130,000 units for every 1 standard deviation increase in the interest rate. This suggests that by making credit more accessible and affordable to consumers, TALF supported vehicle sales and the economy as a whole.
FIGURE 9
Impact of TALF on ABS spreads and issuance

A. AAA-rated ABS spreads by sector

Legend: 1, TALF announcement; 2, expand TALF size; 3, TALF start/expand collateral; 4, TALF CMBS announcement; 5, TALF legacy CMBS announcement; 6, TALF CMBS start; 7, extension of TALF announcement.
Notes: Spreads for auto, credit card, and home equity sectors are to swaps. Spread for the student loan sector is to three-month Libor.

B. ABS issuance by sector post-TALF

Note: ABS indicates asset-backed securities; TALF indicates Term Asset-Backed Securities Loan Facility; CMBS indicates commercial mortgage-backed securities.
Sources: Panel A data from Deutsche Bank; panel B data from JPMorgan.
A. TALF loans by sector
billions of dollars

B. Auto ABS issuance backed by TALF
billions of dollars

C. Credit card ABS issuance backed by TALF
billions of dollars

Note: ABS indicates asset-backed securities; TALF indicates Term Asset-Backed Securities Loan Facility.
Sources: Panel A data from Federal Reserve Bank of New York; panel B and panel C data from Federal Reserve Bank of New York and JPMorgan.
Conclusion

The ABS market augments the banking industry’s balance sheet capacity and provides an important source of funding for market participants. Liquid and well-functioning ABS markets help to keep credit flowing freely between consumers, firms, and investors. The TALF program offered a liquidity backstop and leverage to investors in the ABS and CMBS markets. The resulting increase in market liquidity helped spreads in core ABS classes, such as credit card and prime auto, to fall back to levels similar to those seen before the Lehman bankruptcy. TALF was also instrumental in funding new issuance to return ABS markets to pre-crisis operations. As ABS markets have recovered, increasing amounts of ABS have been issued without TALF support.

ABS spreads for many sectors, including prime auto, equipment, and credit cards, are pricing below the TALF loan rate and have not been adversely affected by the conclusion of the TALF program. However, spreads for ABS backed by longer maturity and subprime assets, such as subprime credit card, private credit student loans, and floorplan, will likely widen following the end of TALF. This is because issuance in these asset classes is more reliant on TALF financing; and spreads may increase modestly to make the deals attractive enough to investors to replace levered TALF investors.

NOTES

1ABS data from JPMorgan include U.S. issuance for the following sectors: student loan, auto, credit card, equipment, floorplan, global RMBS (residential mortgage-backed securities), subprime/HELOC (home equity line of credit), manufactured housing, franchise, insurance, servicing advances, marine, stranded assets, RV (recreational vehicle), tax lien, tobacco, and time share.

2Data from Deutsche Bank; see figure 7.

3Data from JP Morgan show that subprime/HELOC ABS issuance fell from $31 billion in June 2007 to $9 billion in July 2007. ABS issuance backed by auto and credit cards fell to zero in August and October 2008, respectively.

4The material in this section draws on several press releases issued by the Board of Governors of the Federal Reserve System as cited in the references.

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________, 2009c, “Federal Reserve and Treasury Department announce extension to Term Asset-Backed Securities Loan Facility (TALF),” press release, August 17.

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________, 2009f, “Federal Reserve announces two new interest rates applicable to loans extended under Term Asset-Backed Securities Loan Facility (TALF),” press release, April 21.

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Educational attainment and household location: The case of Chicago’s lakefront

William A. Testa and William Sander

Introduction and summary

In the latter half of the twentieth century, central cities in the United States, like Chicago and Detroit, tended to fall into decline—in contrast with the rapid growth they experienced until the 1950s. In search of better housing and often in response to improved highway access to jobs in central cities, many households relocated to the suburbs. In addition, over time, employers tended to follow households to the suburbs. For example, by the mid-twentieth century the changing technology of factory production and goods transportation had prompted manufacturing firms to move toward the suburbs and the urban fringe.

As suburbanization progressed, city governments were often left cash-strapped and resource-poor, straining to fund public services and public schools for the relatively low-income populations that remained. A surge of federal government aid (and some state government aid) to cities during the late 1960s through the early 1980s provided some relief for cities’ fiscal stress.

More recently, resettlement and gentrification of some parts of central cities have been a boon to central cities’ tax bases. The rising property values associated with gentrifying neighborhoods can translate into much-needed tax revenues for city services and public schools. Moreover, the broad landscape under the jurisdiction of city governments ensures that rising revenues associated with gentrifying neighborhoods subsidize public services and public schools citywide. In addition, the relatively recent repopulation of cities may in turn attract employers with their attendant tax base, local spending, and job opportunities.

In light of such potential benefits, city government administrators and policymakers would like to know more about what types of households are attracted to urban living, as well as what specifically attracts them. In this article, we focus on the relationship between the educational attainment of households and their choice of living in a central city. Some have claimed that urban gentrification has been spearheaded by more-educated, more-affluent households, though this by no means is the exclusive factor. If this is indeed the case, then policymakers may be able to fashion some urban amenities—for example, through the preservation of architectural landmarks, the creation and maintenance of public parks and beaches, and the financial support of cultural venues—to attract even more of these households to the city.

Chicago’s experience represents a compelling case study. Among Northeast and Midwest cities, Chicago has been comparatively successful in attracting highly educated households in recent years. Chicago’s long-running Daley administration is sometimes touted as having been influential in altering the city’s landscape and public services; such improved amenities may have played a key role in attracting growing numbers of highly educated, high-income households to reside in the city.

Not all parts of Chicago have experienced the same level of gentrification. We have identified the neighborhoods along Lake Michigan as the locus of gentrification in Chicago, though such activity has often spread westward over time. Also, little is known about the educational attainment of minority households that have recently chosen to live in city neighborhoods versus the suburbs. On average, the statistics for the

William A. Testa is a vice president and the director of regional programs in the Economic Research Department at the Federal Reserve Bank of Chicago. William Sander is a professor of economics at DePaul University and a consultant in the Economic Research Department at the Federal Reserve Bank of Chicago. The authors thank Vanessa Haleco-Meyer and Dan Eldidine for their assistance.
Chicago metropolitan area suggest a trend of rapid suburbanization among upper- and middle-income black and Hispanic families—households that would be expected to have higher than average educational attainment.

But what does a finer analysis of Chicago’s experience tell us about these trends? Here, we compare individual household location choices in the Chicago suburbs (Illinois only) with those in the city’s lakefront north and lakefront south, as well as the rest of the city, which we call “other Chicago” (see figure 1). We use multinomial logit statistical techniques to identify probabilistic relations in the decision to reside in a particular area among discrete choices. In this instance, our multinomial logit analysis describes the discrete choices by households among mutually exclusive residential locations, estimating the marginal or conditional probabilities of households’ decisions that reflect the characteristics of the households. In our analysis, we choose particular household characteristics—such as income, age, major race and ethnic affiliation, household composition, and educational attainment—as explanatory variables that are thought to influence residential location. We pay particular attention to the relationship between being a college graduate (that is, having a bachelor’s degree or higher) and household location. We also consider work force participation and job location in our empirical strategy, since the job and residential location decisions are interdependent.

In the next section, we briefly discuss previous studies relating to household location trends in urban environments. Then, we present an overview of the Chicago metropolitan area’s demographic and economic landscape. After this, we explain our basic empirical strategy and data, and we present the results of our analysis. We conclude with a discussion of the implications of our results for further research and public policy.
Literature review

Classic studies on household location have focused on the trade-offs between housing consumption and commuting costs: They have found that more-affluent households paid for more and newer housing in suburban areas, incurring higher commuting costs to the central city (Alonso, 1964; Mills, 1967; and Muth, 1969). More recently, Brueckner and Rosenthal (2009) showed that as suburbs become highly developed and as inner city housing depreciates, new housing development in the central city becomes more attractive.

Other research on the household location decision has focused on the effects of central city problems, such as poor schooling options, on the incentive to live in suburban areas (for example, Wheaton, 1977). Cullen and Levitt (1999) show that more-educated households have a higher demand for living in low-crime areas like many suburban communities. Such concerns about urban living have led more-affluent and more-educated households to move to the suburbs, leaving central cities increasingly poor—a trend that is a concern for many city administrators and policymakers (Wilson, 1987).

In recent research, scholars have stressed other factors that may affect where households locate. Rosenthal (2008) explains how economic change affects the economic status of neighborhoods over time. He shows that neighborhood decline and renewal are related to the quality of housing and other aspects of neighborhoods, such as the presence of architecturally significant homes, age of housing stock, and attributes of neighbors, such as race and educational attainment. Numerous studies have examined how neighborhood characteristics affect household location. Bajari and Kahn (2005) show that white suburbanization is partly driven by a greater demand to live in communities with high human capital, that is, places characterized by residents with high educational attainment and other accumulated skills and experience. Bayer, McMillan, and Rueben (2004) and Bayer, Ferreira, and McMillan (2007) show that households self-segregate throughout metropolitan areas on the basis of common race and educational attainment.

In a study on the Chicago metropolitan area, Sander and Testa (2009) separate out the effects of educational attainment from other background factors, including income and the location of work, on household location. They show that college-educated non-Hispanic whites (that is, those who have a bachelor’s degree or higher) were more likely to live in the city of Chicago relative to its suburban areas, while their black and Hispanic counterparts were more likely to live in the suburbs of Chicago. Sander (2005) also shows this to be the case in many of the largest metropolitan areas in the United States, including New York City and Los Angeles.

Across the nation, college enrollment and the educational attainment of workers have climbed steadily. Throughout the 1990s, the proportion of college graduates in the general population rose significantly as older, less educated cohorts moved into retirement ages and as younger, more-educated cohorts replaced them. In 2009, 30 percent of U.S. workers had bachelor’s degrees versus about 8 percent in 1960, with corresponding growth in those with at least some college and those with graduate degrees. In the city of Chicago, the percentage of adults aged 25 and older with at least a bachelor’s degree increased from 26 percent in 1990 to 31 percent in 2008 (Snyder and Dillow, 2010).

In the past two decades, some cities have become increasingly attractive to highly educated households (Glaeser, Kolko, and Saiz, 2001). This trend, some observe, has arisen both because households with high educational attainment are demanding the amenities that city life offers (Glaeser and Shapiro, 2003) and because knowledge industries that employ highly educated workers have located in cities as well. However, Berry, Bodini, and Weissbourd (2005) find that amenities only had a small effect on where college graduates lived, while jobs and wages had large effects. Further, it has been shown that high concentrations of human capital in cities can have positive effects on the skills of individual workers and their earning ability, thereby increasing the incentive to live and work in cities (Glaeser and Maré, 2001; and Rosenthal and Strange, 2008).

Besides the allure of good amenities and career opportunities, changes in the family can have an effect on the incentive to live in cities. Marriage and school-age (dependent) children exert a negative effect on the incentive to live in cities because of crime and relatively low-quality public schooling. That said, one of the most significant demographic trends favorable to city locations has been the rising number of adults who have never been married. For example, the U.S. Census reports that the percentage of never-married women aged 25–34 in the United States has increased from about one in ten in 1950 to one in three in 2000.

Following Becker and Murphy (2000), we note the incentive to live in a city like Chicago (or a particular neighborhood within a city) is a function of many factors, including educational attainment, income level, marital status, and family structure (particularly, whether school-age children are present or not), as well as the amenities of the city (neighborhood).
In choosing a Chicago neighborhood, households consider Lake Michigan to be a prominent amenity. Further, the likelihood of living in the city of Chicago (or a particular neighborhood within it) depends upon the characteristics of others who already live there. For example, young college graduates prefer to live in areas with high concentrations of other young college graduates (Cortright, 2005; and Florida, 2008).

**Chicago overview**

Over the past two decades, the population of the Chicago metropolitan area has shown significant gains in educational attainment. The most significant gains have been recorded in the central city. During the 1990s alone, the share of adults with a bachelor’s degree or more rose by 7 percentage points in the city, compared with 5 percentage points in suburban Chicago (Sander and Testa, 2009).

In figure 2, we assign each community area (neighborhood) in the city of Chicago into a quintile based on the percentage of adults (aged 25 and older) who have attained a bachelor’s degree or more for the years 1960, 1980, and 2000 (panels A, B, and C). The maps of the city’s 77 community areas illustrate the remarkable educational gains from 1960 to 2000. In 1960, only two community areas (Hyde Park and Beverly) reported shares of adults with at least a bachelor’s degree of 20 percent or more. By 1980, there were 13 such community areas; and by 2000, there were 28, 15 of which claimed shares of 36 percent or more.

A sharp contrast between certain segments of the city becomes apparent in these maps. Many community areas located in the interior West and Southwest Sides (and far South Side) experienced little or no gains in educational attainment between 1960 and 2000. In contrast, community areas close to other areas with higher levels of educational attainment in 1960 gained more highly educated populations over those 40 years. Educational attainment among those residing on the far North Side grew during these 40 years, and the more educated began to populate community areas west of this area, moving toward Chicago’s new jobs magnet, O’Hare International Airport. Meanwhile, Chicago’s lakefront community areas had evolved by 2000 into a somewhat uniform area comprising those with high educational attainment. The community areas from the city’s northernmost, Rogers Park, to the South Loop, just below the central business district (called the Loop), all ranked in the top two quintiles of educational attainment in 2000. Farther south, the intellectual strongholds around the University of Chicago—Hyde Park—had retained its high level of educational attainment over the decades, and the households that make up the Kenwood neighborhood just north of it had reached the same level of educational attainment, on average, by 2000.

Within the city of Chicago, there is a sharp contrast between the North Side neighborhoods, largely populated by young, non-Hispanic whites, and the South Side neighborhoods, home to several sizable black community areas, such as Hyde Park (former home of the late Mayor Harold Washington) and Kenwood (home to the Obama family). As illustrated in figure 3, the level of educational attainment was quite disparate among neighborhoods with a sizable black population in 2000. Of the 37 of such community areas, eight of them were characterized by 26 percent or more of the adult population having received a four-year college degree or higher; however, seven of these 37 areas had less than 6 percent of college graduates among their adult population.

Overall, the data from the U.S. Census Bureau indicate that educational attainment levels are slightly higher in the Chicago metropolitan area than in the nation as a whole. Within the metropolitan area, average educational levels have been higher in the suburbs than in the city of Chicago, although there is some evidence this is changing, especially for young, non-Hispanic whites. In table 1, we show data from the U.S. Census Bureau on the percentage of the adult population with a four-year college degree, by age, in the city of Chicago and its suburbs from 1990 through 2006. One of the important changes over this period was that adults aged 25–34 in Chicago in 2006 were more likely to be college graduates relative to their suburban counterparts. Further, non-Hispanic whites living on Chicago’s lakefront were substantially more likely to have a four-year college degree relative to whites elsewhere in Chicago and the suburbs across this period (see table 2, p. 122). This was particularly the case on the North Side of Chicago. Blacks living on Chicago’s lakefront were also more likely to be college graduates relative to blacks living elsewhere in the metropolitan region. This was also the case for Hispanics living on Chicago’s North Side lakefront relative to Hispanics living elsewhere in the Chicago metropolitan area.

Analyzing 2000 U.S. Census data, we find that about two out of three residents on Chicago’s North Side lakefront were non-Hispanic white in 2000, while about three out of four South Side lakefront residents were black. For the rest of Chicago, almost 40 percent of its residents were white, while over half were either black or Hispanic. For suburban areas, about three out of four were white, while 8 percent were Hispanic and 8 percent were black. According to data from the
FIGURE 2
College graduates, by quintile, in Chicago community areas, 1960–2000

A. 1960
B. 1980
C. 2000

Notes: Only adults aged 25 and older are included in the analysis. Community areas in white indicate data not available.
U.S. Census Bureau, the African-American population in the suburban areas of Chicago, especially in Cook County, increased over the period 1990–2006. The black population of suburban Cook County increased from a little over 228,000 in 1990 to about 397,000 in 2006 (a gain of about 74 percent), while the overall population of Cook County grew by about 3 percent during this period. A large part of the gain in the African-American population in suburban Cook County during this period was a product of the city of Chicago having lost about 142,000 of its African-American population from 1990 through 2006.

When we break down the 2000 U.S. Census data by age and location, we notice one of the key differences is that the population living on the North Side lakefront was relatively young compared with the population living elsewhere in the city and suburbs. In 2000, the percentage of the population aged 25–34 was almost twice as high on the North Side lakefront as it was in the suburbs.

Further, U.S. Census data indicate that a relatively low percentage of respondents were married (and married with school-age children) on the city of Chicago’s lakefront in 2000. A higher percentage of respondents were married (and married with children) in the rest of the city of Chicago. The highest percentage of married (and married with children) was to be found in Chicago’s suburbs.

Chicago’s important and changing role as an employment center must be taken into account to fully understand the city’s residential patterns, especially when considering the importance of educational attainment in the household location decision. Skill-intensive jobs surely exert an independent pull on the choice of residential location of highly educated workers.

Two of the key changes over the past few decades were the decline in the manufacturing sector
and growth in the services sectors. Over the period 1981–2008, manufacturing payroll jobs in the city of Chicago declined at an average annual pace of 2.8 percent—they fell 75 percent overall. In contrast, the remainder of the six-county Chicago region experienced only a 21 percent decline in manufacturing jobs from 1981 through 2008. The share of total jobs in manufacturing in the city of Chicago amounted to only 7.2 percent in 2008, one half of the concentration in Chicago’s suburbs (Illinois Department of Employment Security, 2008).

Instead, the central city jobs orientation of many large metropolitan areas—including the Chicago region—shifted toward those sectors having high human capital content, especially the finance sector and the business and professional services sectors (Sassen, 2004). Though the city of Chicago’s central business district experienced a loss of virtually all of its 70,000 manufacturing jobs over the period 1981–2008, there was a compensating gain of 81,000 jobs in nonmanufacturing sectors. Much of the job growth took place in financial, legal, and professional services. Payroll jobs in services sectors in the city of Chicago’s central area amounted to over 500,000 as of 2008 (Illinois Department of Employment Security, 2008).

In table 3, we provide more general evidence for where high-skilled jobs tended to be located in the city of Chicago in 2000. We use the 2000 Census of Population and Housing’s 5 percent Public Use Microdata Sample (PUMS) to estimate an index of occupational concentration in Chicago. The occupational concentration variable is computed using three-digit occupational codes. Several hundred occupations are represented in the Chicago metropolitan area. The index is measured as the percentage of jobs in an occupation in the Chicago metropolitan area that is located in the city of Chicago. We estimate this index as a function of the following variables: educational attainment of the worker (relative to a high school graduate), age and age squared, black, Hispanic, Asian, and male. The results of this estimate indicate that higher levels of educational attainment are associated with working in jobs that are more concentrated in Chicago. For example, having a bachelor’s degree increases the occupational concentration ratio measure by about 5 percentage points relative to those who are only high school graduates. Respondents with professional degrees, like lawyers and doctors, are the most likely to work in jobs that are concentrated in the city of Chicago, as indicated by an effect of 20 percentage points on our occupational concentration variable relative to those who are only

<table>
<thead>
<tr>
<th>Household location</th>
<th>All</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
</tr>
</thead>
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<tr>
<td></td>
<td>(</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago lakefront north</td>
<td>45</td>
<td>57</td>
<td>15</td>
<td>22</td>
</tr>
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<td>46</td>
<td>14</td>
<td>12</td>
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<tr>
<td>Other Chicago</td>
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<td>28</td>
<td>8</td>
<td>6</td>
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<tr>
<td>Suburbs</td>
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<td>35</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>2000</td>
<td></td>
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<td></td>
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<tr>
<td>Chicago lakefront north</td>
<td>56</td>
<td>70</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Chicago lakefront south</td>
<td>21</td>
<td>46</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Other Chicago</td>
<td>17</td>
<td>28</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Suburbs</td>
<td>32</td>
<td>36</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago lakefront north</td>
<td>62</td>
<td>75</td>
<td>26</td>
<td>33</td>
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<tr>
<td>Chicago lakefront south</td>
<td>26</td>
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<tr>
<td>Other Chicago</td>
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<tr>
<td>Suburbs</td>
<td>34</td>
<td>38</td>
<td>22</td>
<td>11</td>
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</table>

Notes: Only adults aged 25 and older are included in the analysis. For details on the geographical divisions, see figure 1. Sources: Authors’ calculations based on data from the U.S. Census Bureau, 1990 and 2000 Census of Population and Housing, Public Use Microdata Sample, 5 percent sample, and U.S. Census Bureau, 2006 American Community Survey, Public Use Microdata Sample.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Coefficient</th>
<th>p-value</th>
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<td>Less than high school</td>
<td>−1.08**</td>
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<tr>
<td>Some college</td>
<td>1.90**</td>
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<tr>
<td>Bachelor’s degree</td>
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<tr>
<td>Master’s degree</td>
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<tr>
<td>Professional degree</td>
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<tr>
<td>PhD</td>
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<tr>
<td>Age</td>
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<tr>
<td>Age²</td>
<td>0.9099**</td>
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<tr>
<td>Black</td>
<td>0.67**</td>
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<td>Hispanic</td>
<td>−1.21**</td>
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<td>Asian</td>
<td>−1.83**</td>
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</tr>
<tr>
<td>Male</td>
<td>−0.37**</td>
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</tr>
</tbody>
</table>

**Significant at the 1 percent level.

Notes: We use ordinary least squares for the estimates. Only adults aged 25 and older are included in the analysis. Source: Authors’ calculations based on data from the U.S. Census Bureau, 2000 Census of Population and Housing, Public Use Microdata Sample, 5 percent sample.
high school graduates. Respondents with the lowest level of education (less than high school) are the least likely to work in jobs that are concentrated in the city of Chicago. Such results are consistent with those of Sander and Testa (2009), who show that low-income and low-skilled Chicago residents now tend to find employment in the suburbs rather than in the city. The other significant results are that age squared and black have positive effects on the occupational concentration variable, while age, Hispanic, Asian, and male have negative effects.

Further, when we break down the U.S. Census data by educational attainment and place of work (city of Chicago versus its suburbs in Illinois) for 1990 and 2000, we see higher levels of educational attainment are associated with jobs in the city. In 2000, 42 percent of workers aged 25 and older in the city of Chicago had at least a bachelor’s degree, while 35.1 percent of workers in the suburbs had at least a bachelor’s degree (see table 4, fourth through seventh rows of the third and fourth columns). In 1990, 33.9 percent of workers in the city of Chicago had at least a bachelor’s degree and 30.4 percent of workers in the suburbs had at least a bachelor’s degree (see table 4, fourth through seventh rows of the first and second columns). These findings indicate that between 1990 and 2000 the percentage of workers with at least a bachelor’s degree increased by 8.1 percentage points in the city of Chicago and 4.7 percentage points in the suburbs.

The heightened specialization of the city as an employment nexus for high-skilled work is sometimes believed to contribute to widening income disparities in the city (Doussard, Peck, and Theodore, 2009). For the city of Chicago, this observation is supported by our deriving the Gini coefficients, which are measures of the inequality of a distribution (a value of 0 expressing total equality and a value of 1 expressing maximal inequality). Using U.S. Census data, we calculated these coefficients, which were measured for households across the Chicago metropolitan area over the period 1990–2000. The Gini coefficient for the city of Chicago rises from 0.41 in 1990 to 0.47 in 2000, indicating an increase in inequality. For Chicago’s suburbs, the same coefficient rises similarly over this period, from 0.36 to 0.42.

Although rising inequality is usually perceived as being not desirable, Glaeser, Resseger, and Tobio (2008) show that this is not necessarily the case for cities. Indeed, inequality arises in cities because of their ability to successfully attract high-skilled workers; but inequality can have some positive effects, such as providing better role models for low-income communities and generating jobs that meet the needs of the new high-income neighbors. At the same time, however, higher inequality in metropolitan areas can have a negative effect on growth and increase crime (Glaeser, Resseger, and Tobio, 2008).

The Chicago metropolitan area has experienced a marked type of widening inequality in its central city (Doussard, Peck, and Theodore, 2009). Occupations in the middle of the wage spectrum, especially manufacturing-related ones, have shifted to the suburbs.

Some studies have focused on the racial/ethnic dimension of Chicago’s shifting economy (for example, Wilson, 1987). Low-skilled jobs have become increasingly occupied by low-skilled immigrants, especially Hispanic workers. Meanwhile, job opportunities for middle-income African-American workers have been diminished because of both suburbanization of employers and competition from immigrant workers. Other studies have noted that middle- and upper-income African-American households have moved to the suburbs in the Chicago region, leaving behind low-income neighborhoods (Institute on Race and Poverty, 2006). This perception that upwardly mobile blacks (and Hispanics) are suburbanizing may be subject to further refinement. As our analysis shows in the next sections, the patterns of choosing to reside along Chicago’s lakefront of black and Hispanic households (made up of singles and those married with no children) with high levels of educational attainment hold some similarities to that of non-Hispanic whites of similar backgrounds.
Data and models

In this section, we use data from the 5 percent PUMS from the 2000 Census of Population and Housing for the Chicago metropolitan area (only the Illinois portions) to explore residential location choices of households. We also make estimates with the 5 percent PUMS from the 1990 Census of Population and Housing and the PUMS from the (smaller) 2006 American Community Survey. Although we focus on estimates for 2000 U.S. Census data, differences in our results for other periods (which we do not report) will be briefly discussed as well.

We estimate the likelihood of households locating within divisions of the Chicago metropolitan area. Four broad geographical areas are estimated in our models (the four areas discussed in figure 1, p. 117). To reiterate, the four areas are the Chicago lakefront north, comprising the city of Chicago’s lakefront locations from the downtown (central business district) northward; Chicago lakefront south, comprising the city of Chicago’s lakefront locations south of the downtown; other Chicago, covering the rest of the city of Chicago; and the Chicago suburbs (only within Illinois), which is the omitted area. The lakefront locations account for a little over 10 percent of the sample. The rest of the city of Chicago accounts for slightly over 20 percent of the sample, and the suburban areas make up a little less than 70 percent of the sample.

Our focus is on estimating the likelihood of living in lakefront community areas in the city of Chicago because the data that we have used thus far indicate relatively high levels of educational attainment (and growth in attainment) in such areas. For example, in our Chicago lakefront north area, which includes the central business district, 62 percent of adults aged 25 and older are college graduates in 2006. This could be a result of many factors, including the high concentration of college graduates in the area, relatively convenient access to workplaces, and the strong amenity values near Lake Michigan (for example, the myriad of recreational options, good views, and temperate climate).

We undertake multinomial logit estimates of household location by race and ethnicity for all U.S. Census respondents who are 25 and older, as well as separate estimates for all workers who are 25 and older. The variables that we use to estimate household location are as follows: educational attainment (relative to high school graduate), household income, age and age squared, three dummy variables indicating children in the household (that is, children aged less than six years old, children aged six through 17, and children aged less than six and children aged six through 17), marital status (relative to having never married), gender, and race and ethnicity.

Since the location of work is an important determinant of household location, we also estimated the household location of workers adjusting for a predicted value of working in the city of Chicago. This predicted value of working in the city is used because the location of work is endogenous—that is, it provides a distinguishable estimate of the influence on where one lives. Following previous studies (for example, Bajari and Kahn, 2005), we estimate the location of work as a function of the other variables in our model and the industry of the worker for identification purposes. The rationales for using industry of work for identification are that industries differ in their suburbanization propensities and that workers have invested in industry-specific human capital. Research by Neal (1995) also provides a justification for this approach. The industries that we use to identify working in Chicago are agriculture, manufacturing, construction, retail trade, wholesale trade, finance, information, professional services, and education. The omitted industry is arts, entertainment, and recreation. Apart from finance and professional services, which have significant positive effects on the propensity to work in the city of Chicago, the other industries have significant negative effects.

Finally, we separately estimate household location for nonworkers aged 55 and older. We discuss our estimates for nonworkers to show how non-work-related factors, such as the allure of amenities and the preference to live in certain social enclaves, might affect household location for retirees. We select U.S. Census respondents who were not working and who were not unemployed. If they were married, respondents with spouses working were excluded from the analysis. The other variables in the model are the same as we discussed earlier.

Results

Our multinomial logit estimates of household location in the Chicago metropolitan area are presented in table 5. The coefficients in our estimates indicate marginal effects at mean values for the other variables. For example, having a professional degree increases the probability of living on the city’s north lakefront by 0.09 relative to respondents with only a high school diploma or equivalent (table 5, fifth row). Overall, the results indicate having a bachelor’s degree or higher increases the likelihood of living on the North Side lakefront. This is less the case for the South Side lakefront, as indicated by very small coefficients for the variables indicating having a bachelor’s degree or higher. Respondents with higher levels of education are less likely to live in the rest of the city of Chicago (other Chicago) relative to suburban areas. Income has a significant positive effect on the probability of
TABLE 5

Multinomial logit estimates of household location in the Chicago metro area

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Chicago lakefront north</th>
<th>Chicago lakefront south</th>
<th>Other Chicago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>0.02**</td>
<td>0.001*</td>
<td>0.05**</td>
</tr>
<tr>
<td>Some college</td>
<td>0.01**</td>
<td>-0.001</td>
<td>-0.03**</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>0.05**</td>
<td>0.002**</td>
<td>-0.06**</td>
</tr>
<tr>
<td>Master’s degree</td>
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</tr>
<tr>
<td>Professional degree</td>
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<td>0.000006**</td>
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<td>Children aged &lt; 6</td>
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<td>Children aged 6-17</td>
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<td>-0.005**</td>
<td>-0.01**</td>
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<tr>
<td>Children aged 6 and 6-17</td>
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<td>-0.005**</td>
<td>-0.01**</td>
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<tr>
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<td>-0.05**</td>
<td>-0.01**</td>
<td>-0.09**</td>
</tr>
<tr>
<td>Divorced</td>
<td>-0.02**</td>
<td>-0.01**</td>
<td>-0.07**</td>
</tr>
<tr>
<td>Widowed</td>
<td>-0.03**</td>
<td>-0.01**</td>
<td>-0.06**</td>
</tr>
<tr>
<td>Male</td>
<td>-0.004**</td>
<td>-0.002**</td>
<td>0.001</td>
</tr>
<tr>
<td>Black</td>
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<td>0.01**</td>
<td>0.03**</td>
<td>0.23**</td>
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<tr>
<td>Asian</td>
<td>0.02**</td>
<td>0.01**</td>
<td>0.11**</td>
</tr>
</tbody>
</table>

Number of observations: 218,270

* Significant at the 5 percent level.
** Significant at the 1 percent level.

Notes: Coefficients indicate marginal effects. Only adults aged 25 and older are included in the analysis. For details on the geographical divisions, see figure 1.

Source: Authors' calculations based on data from the U.S. Census Bureau, 2000 Census of Population and Housing: Public Use Microdata Sample, 5 percent sample.

living in North Side lakefront locations, while it has a negative effect on the probability of living in South Side lakefront locations and other Chicago locations.

Age has a U-shaped effect on the probability of living on the lakefront. This indicates that the youngest and oldest respondents are more likely to live on the lakefront than the middle-aged individuals. Age has an inverted U-shaped effect on living in Chicago neighborhoods not along Lake Michigan, indicating that the youngest and oldest respondents are less likely to live in these areas relative to suburban areas. The key result for marriage is that currently married respondents and divorced and widowed respondents are less likely to live in the city of Chicago. This is usually the case for respondents with children as well; they are especially less likely to live in the city of Chicago’s lakefront locations. The other significant findings are a very modest negative effect of being male on the likelihood of living in the city’s lakefront locations and a positive effect of being black, Hispanic, and Asian on the likelihood of living in the city.

The pattern in the results for non-Hispanic whites (not shown) is similar to the overall results. However, estimates for blacks (also not shown) differ slightly. The effects of higher education are even more positive for blacks’ likelihood of living in the south lakefront locations and more negative for blacks’ likelihood to live in locations away from the lake in the city of Chicago. Further, with respect to blacks, the effect of higher income is negative for the likelihood of living in the city’s lakefront locations and positive for the likelihood of living in the rest of the city. Although having children has a negative effect on the likelihood of residing on the North Side lakefront for blacks, all of the variables indicating households with children are positive and significant for South Side lakefront locations and locations elsewhere in the city of Chicago. The pattern in the results among Hispanics (not shown) is similar to the pattern in the results for non-Hispanic whites, with some exceptions. The key difference is that higher income has a negative effect on the likelihood that Hispanics live in any area in the city of Chicago (including its northern lakefront area).

As noted previously, educational attainment partly affects household location through the location of work. For this reason, we undertake an estimate for workers that adjusts for a predicted value of whether the U.S. Census respondent worked in the city of Chicago (table 6). The first stage of this estimate is an estimate of working in Chicago, adjusting for the other variables in the estimate. The key result from this exercise is that the effects of earning a bachelor’s degree or higher on the likelihood of living in the city’s North Side lakefront locations are slightly lower than in the case when work location was not taken into account. For example, when the location of work is taken into account, the effect of having a professional degree declines from 0.09 (in table 5) to 0.05 (in table 6), and the effect of having a bachelor’s degree declines from 0.05 to 0.04. This suggests, once again, that part of the higher education effect works through its effect on the location of employment. We also estimate household location for workers, by race and ethnicity, adjusting for predicted work (not shown), and find a similar effect in our results.

Lastly, we make estimates for nonworkers aged 55 and older (not shown). As we mentioned, we
undertook these estimates to show how high levels of education have an effect on the choice of household location through non-work-related variables, such as proximity to amenities. The results indicate that high levels of education are associated with the likelihood of living on the city of Chicago’s lakefront, especially on the North Side of the city. That is, more-educated older respondents, who are mostly retirees, are more likely to live on Chicago’s lakefront. In an estimate that is not shown, we also adjusted for whether the U.S. Census respondent lived in the same house five years ago. We completed this additional estimate to test whether the effect of higher education on the choice of household location for older workers was being confounded by the effect of household location five years ago. We did not find this to be the case.

We also ran these regressions on 1990 and 2006 data from the U.S. Census Bureau (results not shown). There were two important changes in the results over time that are important to note. First, locations in the interior areas of the city of Chicago became more attractive over time to highly educated respondents, while locations on Chicago’s lakefront retained their attractiveness to highly educated respondents. Second, the income effect was negative for the likelihood to live in North Side lakefront locations in 1990 but positive for the likelihood to live in lakefront locations on the North Side in 2000 and 2006. This is possibly a result of North Side lakefront locations simply becoming more attractive as places to live over time, especially as other high-income households moved there.

**Discussion**

The importance of the dichotomy between central city and suburbs in characterizing urban composition and shaping urban policy has been waning for some time, as average job and population densities have fallen continually across the metropolitan areas. Central cities have lost significant shares of population and jobs. This is especially true of Northeast and Midwest cities that have fixed municipal boundaries and physical infrastructures configured for a bygone era of high-density living and working. Certain city neighborhoods have been particularly negatively affected by the departures of highly educated, high-income residents and employers providing high-paying jobs. That said, in recent decades, the changing economic landscape has pushed some central city areas to become more densely populated, and this transformation has offered opportunities for redevelopment. Rising average levels of educational attainment and other human capital investment in modern economies, coupled with complementary advancements in communication and information technology, have sharpened the productivity of so-called knowledge workplaces in high-density settings, such as central cities. In addition, greater educational attainment of the population in developed countries has rekindled the appeal of many central cities, which now offer not only desirable workplaces but also attractive residential locations for highly educated, high-income workers. The rise in the share of never-married adults in the U.S. has also been favorable to cities, which tend to draw singles.

The city of Chicago is a key example of these broad forces in action. Its economy remains somewhat healthy relative to its counterpart cities in the Midwest, and it appears to have replaced lost employment in

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**TABLE 6**

Multinomial logit estimates adjusted for predicted work in the city of Chicago

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Chicago lakefront north</th>
<th>Chicago lakefront south</th>
<th>Other Chicago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>0.02 **</td>
<td>0.001</td>
<td>0.04 **</td>
</tr>
<tr>
<td>Some college</td>
<td>0.01 **</td>
<td>-0.001</td>
<td>-0.03 **</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>0.04 **</td>
<td>-0.0004</td>
<td>-0.05 **</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>0.04 **</td>
<td>0.01 **</td>
<td>-0.05 **</td>
</tr>
<tr>
<td>Professional degree</td>
<td>0.05 **</td>
<td>0.01 **</td>
<td>-0.07 **</td>
</tr>
<tr>
<td>PhD</td>
<td>0.05 **</td>
<td>0.02 **</td>
<td>-0.11 **</td>
</tr>
<tr>
<td>Income</td>
<td>$0.46 \times 10^{-2} **</td>
<td>$-0.44 \times 10^{-3} **</td>
<td>$-0.47 \times 10^{-4} **</td>
</tr>
<tr>
<td>Age</td>
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<td>-0.001 **</td>
<td>0.001</td>
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<td>Age²</td>
<td>0.000002 **</td>
<td>0.000001 **</td>
<td>-0.00001</td>
</tr>
<tr>
<td>Children aged &lt; 6</td>
<td>-0.03 **</td>
<td>-0.003 **</td>
<td>-0.004</td>
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<tr>
<td>Children aged 6–17</td>
<td>-0.04 **</td>
<td>-0.002 **</td>
<td>-0.01 **</td>
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<td>Children aged &lt; 6 and 6–17</td>
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<td>-0.002 **</td>
<td>-0.01 **</td>
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<tr>
<td>Married</td>
<td>-0.03 **</td>
<td>-0.01 **</td>
<td>-0.07 **</td>
</tr>
<tr>
<td>Divorced</td>
<td>-0.01 **</td>
<td>-0.002 **</td>
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<td>Widowed</td>
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</tr>
<tr>
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<td>0.08 **</td>
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<tr>
<td>Work in city (predicted)</td>
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<td>0.18 **</td>
</tr>
<tr>
<td>Number of observations</td>
<td>130,331</td>
<td>130,331</td>
<td>130,331</td>
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* Significant at the 5 percent level.
** Significant at the 1 percent level.
Notes: Coefficients indicate marginal effects. Only adults aged 25 and older are included in the analysis. For details on the geographical divisions, see figure 1.
Source: Authors’ calculations based on data from the U.S. Census Bureau, 2000 Census of Population and Housing, Public Use Microdata Sample, 5 percent sample.
manufacturing with gains in industries that require more intensive interpersonal exchanges of information and employ higher-skilled workers. However, it is still unclear whether Chicago’s desirability as a place for jobs has actually come about because there have been changes in the structure of the local economy or rather because some jobs have followed educated “urban homesteaders” back toward the central city.

Our work finds that educational attainment does indeed matter for households’ choice of where to live in the Chicago metropolitan area. Examining nonworking households to tune out the effects of job location, we see that educational attainment is statistically significant in households’ choice of residential location; this suggests that the city’s amenities and concentration of high human capital are attractive to some households.

Looking more closely, we find at least one “city within a city” has taken shape in Chicago. Individuals with greater educational attainment tend to congregate in the city’s north and south lakeshore neighborhoods, while eschewing most of the inland neighborhoods. To some degree, sharpening income disparities in the city have been accompanied by spatial separation as well.

We find the same location tendencies of non-Hispanic white households generally apply to minority households. However, we do find some spatial differences among white and minority households, even at the somewhat broad geographical level we examine. In particular, blacks with higher educational attainment have concentrated on both north and south lakeshore areas rather than in other parts of the city of Chicago and the suburbs, despite the fact that black households with low incomes and low levels of education have residential strongholds in many western portions of the city.

The draw of the workplace accounts partly for households deciding to make their residence in the city of Chicago. For this reason, future research initiatives that can discern the importance of the city as a job location from its importance as a residential location will be especially helpful to city mayors and other policymakers. Specifically, more work on the Chicago metropolitan area’s evolving economic structure needs to be completed before we can more fully understand what factors attract households to live in the city.

Leaders and analysts in other Great Lakes cities are looking at the Chicago experience for such insights as Chicago works to refashion itself as a city that can draw highly educated, high-income households and knowledge industries and compete in an increasingly global economy.

NOTES

1The locational divisions that we examine in detail (for example, Chicago lakefront north) are composed of multiple public use microdata areas (PUMAs). PUMAs are sample areas with at least 100,000 people. There are 54 PUMAs in our sample. Community areas in the city of Chicago make up the Chicago PUMAs.

2In preliminary work for this article, we experimented with other geographical breakdowns of the data. We subsequently decided upon focusing on areas within the city of Chicago relative to suburban areas overall because our primary interest is in the attractiveness of the city of Chicago as a place to live and work.
REFERENCES


Institute on Race and Poverty, 2006, Minority Suburbanization, Stable Integration, and Economic Opportunity in Fifteen Metropolitan Regions, report to the Detroit Branch of the National Association for the Advancement of Colored People, Minneapolis, MN, February.


The Federal Reserve Bank of Chicago invites the submission of research and policy oriented papers for the 47th annual Conference on Bank Structure and Competition to be held May 4–6, 2011, at the InterContinental Hotel in Chicago. Since its inception, the conference has fostered a dialogue on current public policy issues affecting the financial services industry. As in past years, the program will highlight a conference theme (to be announced) but will also feature sessions on other topical financial issues. We welcome submissions of high-quality research on all topics related to financial services, their regulation, and industry structure. A list of possible session topics includes, but is not limited to:

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- Lessons from the credit crisis;
- Failure resolution for large complex financial institutions: Is too-big-to-fail behind us?;
- Mortgage markets: loan modification programs, securitization, and the future of housing finance;
- Systemic risk identification and regulation;
- The future role of Fannie Mae, Freddie Mac, and other government-sponsored enterprises;
- The future of the originate-and-distribute model (securitization);
- Asset bubbles;
- The financial safety net;
- Evaluating and implementing the Basel Capital Accord;
The shadow banking sector;
Fair lending and the Community Reinvestment Act;
The future of low-income homeownership programs;
Market value accounting issues;
Safety net reform;
The mixing of banking and commerce;
Financial industry consolidation;
Small business finance;
Competitive strategies of financial institutions;
Derivatives markets;
Consumer financial protection/education;
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BSC_2011_submissions@frbchi.org

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www.chicagofed.org/BankStructureConference

For additional information, contact the conference chairman:
Douglas Evanoff at 312-322-5814 or devanoff@frbchi.org.
# Index for 2010

## Title and author(s)

<table>
<thead>
<tr>
<th>BANKING, CREDIT, AND FINANCE</th>
<th>Issue</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>The asset-backed securities markets, the crisis, and TALF</td>
<td>Fourth Quarter</td>
<td>101–115</td>
</tr>
<tr>
<td>Sumit Agarwal, Jacqueline Barrett, Crystal Cun, and Mariacristina De Nardi</td>
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<td></td>
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</table>

## ECONOMIC CONDITIONS

What is behind the rise in long-term unemployment?

| Daniel Aaronson, Bhashkar Mazumder, and Shani Schechter                                      | Second Quarter | 28–51     |
|                                                                                              |              |           |

## MONEY AND MONETARY POLICY

Interest rates following financial re-regulation

| Jeffrey R. Campbell and Zvi Hercowitz                                                      | First Quarter | 2–13      |
|                                                                                              |              |           |

Measuring the equilibrium real interest rate

| Alejandro Justiniano and Giorgio E. Primiceri                                               | First Quarter | 14–27     |
|                                                                                              |              |           |

Do labor market activities help predict inflation?

| Luojia Hu and Maude Toussaint-Comeau                                                       | Second Quarter | 52–63     |
|                                                                                              |              |           |

Improving the impact of federal aid to the states

| Richard H. Mattoon, Vanessa Haleco-Meyer, and Taft Foster                                   | Third Quarter | 66–82     |
|                                                                                              |              |           |

What is the relationship between large deficits and inflation in industrialized countries?

| Marco Bassetto and R. Andrew Butters                                                      | Third Quarter | 83–100    |
|                                                                                              |              |           |

## REGIONAL ISSUES

Educational attainment and household location: The case of Chicago’s lakefront

| William A. Testa and William Sander                                                       | Fourth Quarter | 116–129   |
|                                                                                              |               |           |

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