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Housing's Role in the Slow Economic Recovery

Chapter 11 for Countries?

Regional Spotlight: Pension Gap Perils

Research Update

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On the cover: The art of foiling counterfeiters can be seen by tilting a new \$100 bill to reveal the Liberty Bell inside Ben Franklin's inkwell. Learn more about currency security features at <https://uscurrency.gov/>. Photo by Peter Samulis.





# Housing's Role in the Slow Recovery

Why has homebuilding recovered so sluggishly after the Great Recession? The evidence points to some unusual supply and demand factors.

BY BURCU EYIGUNGOR

Homebuilding contributed to overall economic growth in every previous U.S. economic recovery since 1947, yet contributed next to nothing in the first three years of the recovery from the Great Recession. Home construction had been such a reliable indicator of recovery that its failure to promptly rebound led economists during the early years of the recovery to repeatedly forecast that a housing turnaround was right around the corner. The magnitude of the housing boom in the early 2000s was unprecedented, and its effects on the housing sector lingered for years. As I will show, the slow recovery in homebuilding and the economy was partly a byproduct of the fast increase in house prices and homebuilding in the early 2000s. To explore this dynamic further, I examine some key factors at work in this period: What happened on the supply and demand sides of the housing sector during this past boom and bust cycle?

## WHAT HAD WE COME TO EXPECT AFTER A RECESSION?

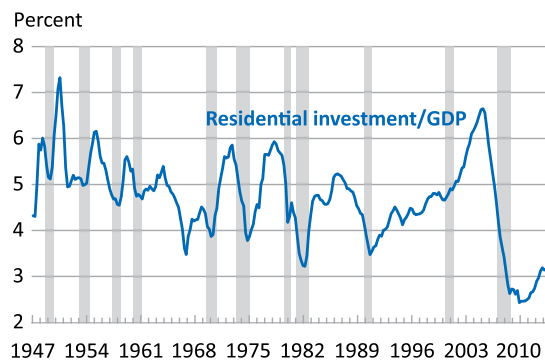
Homebuilding — measured by the amount of money spent on house and apartment construction, including major renovations — is highly *procyclical*. In every recession since 1947, the share of residential investment relative to the gross domestic product (GDP) has fallen and then recovered during the subsequent expansion (Figure 1). This pattern implies that home construction is more volatile than GDP in general: In a typical recession, residential investment declines more than GDP does.

The second well-established fact is that homebuilding leads the business cycle.<sup>1</sup> The recovery in homebuilding starts on average two quarters before the recovery in general eco-

FIGURE 1

### Homebuilding Is Highly Sensitive to Recessions and Recoveries

Private residential fixed investment as share of gross domestic product.



Source: Bureau of Economic Analysis via Haver Analytics.

nom ic activity. In that sense, home construction is an important jump-starter — that is, it precedes and makes possible the overall economic recovery. Economists have also pointed out that this lead/lag relationship might be due to monetary policy — that is, lower interest rates first trigger a recovery in housing because of easier mortgage financing, followed by recovery in other activities.<sup>2</sup> Residential investment has contributed almost 1 percentage point to real GDP growth on average in the first year of a postwar recovery.

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## HOMEBUILDING BEHAVED QUITE DIFFERENTLY IN THE LAST BOOM-BUST CYCLE

The housing boom from 1991 to 2005 was the longest uninterrupted expansion of home construction as a share of overall economic output since 1947 (Figure 1). During the 1991 recession, private home construction had constituted 3.5 percent of GDP, and it increased its share of GDP without any major interruptions to 6.7 percent in 2005. This share was the highest it had been since the 1950s.

Just like the boom, the bust that followed was also different from earlier episodes. During the bust, private residential investment as a share of GDP fell to levels not seen since 1947 and has stayed low even after the end of the recession in 2009. In previous recessions, the decline in residential construction was not only much less severe, but the recovery in housing also led the recovery in GDP. As Federal Reserve Chair Janet Yellen has pointed out, in the first three years of this past recovery, homebuilding contributed almost zero to GDP growth.

The extra volatility in residential construction since 2000 is also observable in house prices, which when adjusted for inflation had been fairly stable from 1953 until this past boom (Figure 2). The increase in real house prices from 2000 to 2006 and the following crash were a big historical anomaly.

In this article, I will try to understand why home construction recovered so slowly this time around. First, I look at the housing supply and whether the big increase in house prices during the expansion led to overbuilding, meaning that the recovery started with this extra supply hampering construction of new housing. Another possibility I will explore is whether house prices fell so much in the bust that home construction became unprofitable. As I will show, a number of things on the demand side also changed.

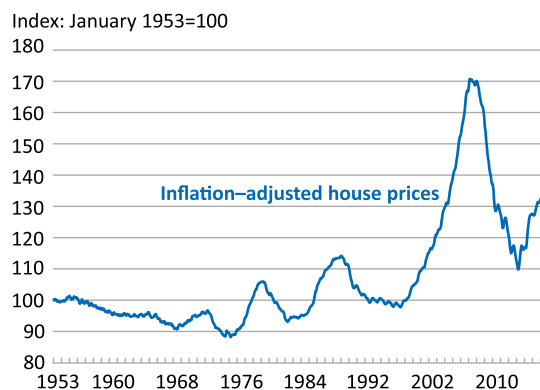
### HOUSING SUPPLY

If inventories of homes available to buy or rent are high compared with demand, the amount of construction required to satisfy that demand will be lower and might be the reason behind the recent decline in homebuilding. For a measure of inventories, I look at vacancy rates for both rental and owner-occupied units. Rental vacancy rates were higher than their historical averages during both the boom and bust, while vacancy rates for owner-occupied homes shot up in 2006, at the same time that house prices started falling precipitously (Figure 3). More important, vacancy

FIGURE 2

### An Unprecedented Rise in House Prices

House price index, 1953–2015.



Source: Census Bureau via Haver Analytics.

rates for both types of housing have recently fallen to levels that had prevailed before the boom, which would seem to indicate there is no longer an excess supply.

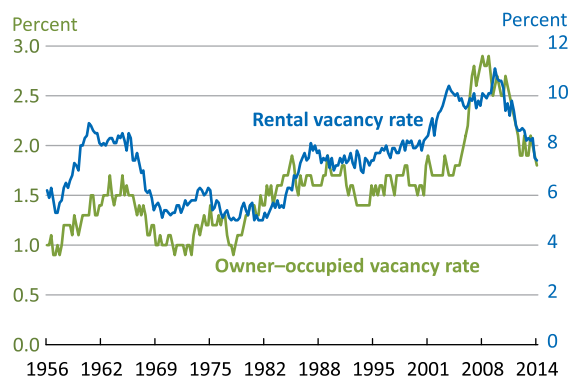
Then again, one might wonder whether these vacancy rates capture the entire housing inventory. Some vacant homes may not yet be for sale or rent but will be once they are renovated — constituting what one might call a *latent* supply of homes. Indeed, the ratio of all vacant homes — not only those for sale or rent — to the stock of total housing (excluding vacation properties) started going up during the housing boom, peaked around 2009, and has not come down much since then (Figure 4).<sup>3</sup> This latent supply might explain some of the slack in construction.

Another driver of residential construction is house prices: As demand for new houses drives up prices to profitable levels, construction firms respond by ramping up homebuilding. House prices fell steeply during the bust, but this decline had been preceded by very large increases between 1999 and 2005. When adjusted for inflation, house prices are still substantially higher than their historical averages before 1999. So, why haven't these high prices led to high levels of residential construction during the recovery?

This puzzle raises an interesting question: Could it be that prices are actually still too low? Do they need to rise further for construction to pick up again? To answer that question, we need to examine the profitability of the construction sector by comparing house prices with homebuilders' costs. As construction worker payrolls account for 72 percent of homebuilders' costs, the employment cost index for total compensation of private construction workers is a

FIGURE 3

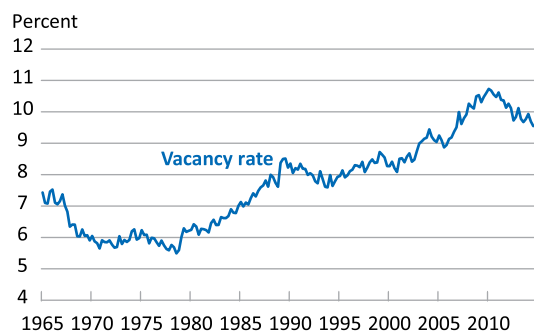
## Vacancies Have Recovered to Preboom Rates...



Source: Census Bureau Housing Vacancy Survey via Haver Analytics.

FIGURE 4

## ...But Vacancies Including Homes Off the Market Still Elevated



Source: Census Bureau Housing Vacancy Survey via Haver Analytics.

reasonable measure of total costs in this sector.<sup>4</sup>

We also need an appropriate measure of house prices. As city centers become more fashionable, it is possible that house prices are increasing simply because the price of urban land is increasing, which would not necessarily imply that homebuilders' profits are higher. Therefore, measures that track sales of existing homes such as the S&P/Case-Shiller house price index might give a misleading picture of profitability, since older homes are typically found in locations with higher land values than houses built today are. Indeed, judging by a measure that tracks prices for newly built single-family homes, profitability went up from 2000 to 2006 but crashed in the 2007–09 recession, mostly because of a plunge in the prices of new houses. The ratio of new

house prices to employment costs remained below average during much of the recovery and only by mid-2014 had returned to its preboom level (Figure 5).

We also see that profitability in the homebuilding industry indeed drives new home construction. When profits have been low, construction spending has declined, and when profits have been high, construction has gone up (Figure 5). Still, the decline in home construction in the latest recovery has been abnormally large. Given the historical correlation between residential construction spending as a share of GDP and profits as measured by the price-to-cost ratio, a normal share for residential construction spending as a share of GDP would have been more like 2.7 percent rather than the 1.3 percent we saw in the second quarter of 2014. As I will show, there was also a sharp drop in demand for housing during this recovery that may explain some of this gap between expected and actual residential construction spending.

## DEMAND FOR HOUSING

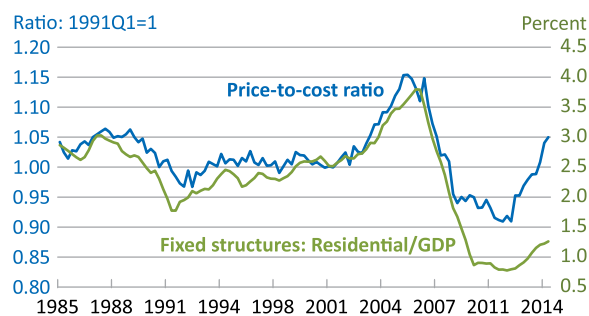
Two decisions that individuals and families make based on their own circumstances end up having a major impact on the whole housing market when taken all together. One is whether to have a household of one's own. The other is whether to buy or rent one's dwelling. Following the crash, people's responses to these two choices shifted in ways that decreased overall housing demand: Both household formation and homeownership rates fell.

**Household formation.** Every time a new household forms, it creates more housing demand, regardless of whether that new household decides to rent or buy a dwelling.<sup>5</sup> If there is not enough inventory to meet the demand for

FIGURE 5

## Profitability Drives Homebuilding

Ratios of new single-family house prices to employment costs and residential investment to GDP.



Sources: Bureau of Economic Analysis and Census Bureau via Haver Analytics.

more housing, higher household formation will trigger more homebuilding. Household formation peaked during the boom, and it was persistently well below its historical average from 2007 until the end of 2014 (Figure 6). In no period since 1956 has net household formation been so low for so long. One can imagine how the extra household formation during the expansion might have contributed to the decline now. Because of the easy availability of mortgages during the boom, people who ordinarily would have formed their own households later in life might have done so sooner, implying a lower household formation rate when mortgages become hard to obtain again. In addition, when households default on their mortgages and have to move in with other family members, that decreases household formation.

Maybe the stark component of this picture is not the initial decline in household formation following the crash, which would be expected, but the persistence of the decline. With the decline of foreclosure rates and unemployment, household formation is back up again, but only after seven years of sluggish performance.

One might wonder if part of this decline was due to the aging of the population. Looking at the *headship rate* — the proportion of householders in the adult population — we see very large declines for all age groups between 2006 and 2013 (Table 1), so the aging of the population does not seem to explain this persistent decline in headship rates.

There is another way of looking at this puzzle. Whether someone can afford to be the head of a household usually depends on whether he or she is employed. People move into other households because of hardship, such as unemploy-

ment, and move out again when they can afford it. The ratio of householders relative to employed people went up during the crisis, mostly because employment fell so sharply (Figure 7). As employment falls, one would expect the number of households to shrink as many unemployed householders can no longer afford to maintain a home. But this process takes time: Some householders default on their mortgages but remain in their homes rent- and mortgage-free while foreclosure proceedings continue. Some householders go through their savings before moving in with someone else or even become homeless. And households with two earners might try to keep their own dwelling while the one who is unemployed searches for a job.

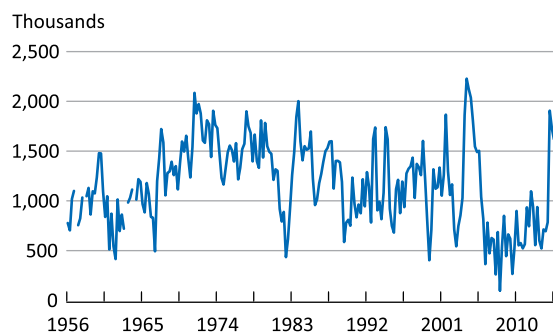
Although the number of householders relative to employed people might be affected by demographic factors and marriage rates, between 2000 and 2008 (until the recession hit), the ratio for people age 25 to 59 was quite stable at 65.8 percent. After the recession hit, the ratio went up to 68.4 percent in 2010, and it has been falling since then because of both employment growth and low net household formation. By 2014 it had reached 65.9 percent, which is remarkably close to the ratio before the crisis hit. The fourth quarter of 2014 was also when household formation went back to its prerecession rate. All this suggests that the householder-to-employment ratio might be a quite good predictor (at least in the short run) of future household formation.

**Homeownership.** Another major trend since the housing bust is the persistent decline for all age groups in the homeownership rate, which had increased uninterruptedly from 1995 to 2005 but has since fallen back in line with the pre-1995 era, making it hard to predict whether this decline

FIGURE 6

## Household Formation Well Below Long-Run Average

Number of households formed in the prior year.



Source: Census Bureau Housing Vacancy Survey via Haver Analytics.  
Note: Gaps in the 1950s and 1960s indicate incomplete data.

TABLE 1

## Headship Rate Has Fallen for All Age Groups

Percentage point change in proportion of householders in adult population.

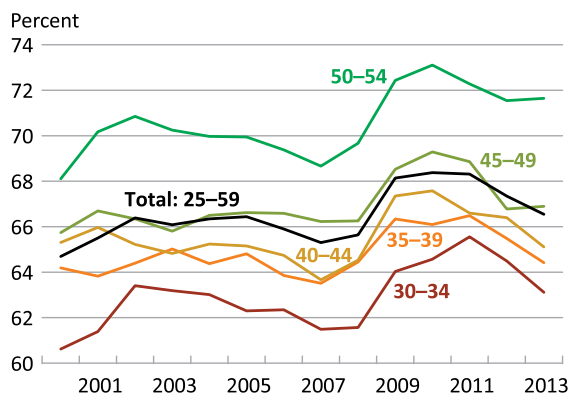
	2000–2006	2006–2013
All ages	0.056	-1.751
25–29	1.313	-3.363
30–34	0.004	-1.486
35–39	-0.944	-1.840
40–44	-1.561	-1.923
45–49	-0.453	-2.509
50–54	0.677	-1.092
55–59	0.288	-1.831
60–64	1.566	-2.095

Source: Census Bureau Housing Vacancy Survey via Haver Analytics.

FIGURE 7

## A Good Predictor of Future Household Formation?

Headship-to-employment ratio.



Sources: Census Bureau Housing Vacancy Survey; Bureau of Labor Statistics via Haver Analytics.

will persist (Figure 8).<sup>6</sup> Some have proposed that more stringent loan approval requirements have led to this decline. For example, credit scores of those approved for purchase loans have increased substantially, but it is difficult to identify how much this increase is being driven by lower demand by poorer households and how much by more stringency by banks.<sup>7</sup> One thing is certain: This decline has lowered overall housing expenditures, because homeowners on average spend more on housing than renters do because of the tax incentives of homeownership and holding a mortgage.<sup>8</sup> Together, the declines in household formation and homeownership contributed to the decline in residential expenditures as a share of GDP.

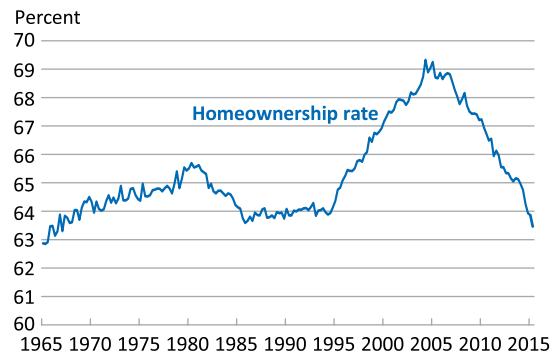
### INTERACTION BETWEEN HOUSING AND EMPLOYMENT

There is evidence that the slowness of the recovery in housing contributed to the slowness of the overall recovery. Recent research tries to understand this connection.

Atif Mian and Amir Sufi document a demand-side effect of the sharp decline in house prices on employment. Their argument is that house price declines reduced household wealth, which led homeowners to spend less and that this drop in demand for goods and services in turn led to the recession. They find wide geographic variation in how households' balance sheets were affected during the housing bust, as house prices declined more in some parts of the country than in others, and households in some locales were more debt-burdened on average than in other areas. Using

FIGURE 8

## Will Homeownership Resume Its Trend — or Keep Falling?



Source: Census Bureau Housing Vacancy Survey via Haver Analytics.

this variation, they find that locations that suffered the biggest declines in housing wealth also had the biggest declines in employment.<sup>9</sup> According to their calculations, the decline in demand due to lower housing wealth accounts for around 55 percent of the jobs lost between 2007 and 2009.

Another finding comes from Greg Kaplan: When young householders get laid off, they may use their parents as insurance and be more likely to move back in with them. In addition, there is a positive long-term income effect of moving in with one's parents after a job loss. Comparing 20-year-olds who lost their jobs with those who did not, he finds that after six years, the wages of those who lost their jobs were 25 percent lower. But this difference arises mostly because of the drop in wages suffered by people who did not move in with their parents when they lost their job. People who did move in with their parents had no statistically significant income loss six years after being laid off. Kaplan believes that this difference is due to the fact that young people who move in with their parents can afford to take longer to search for better jobs, so they end up earning higher wages in the long run. By contrast, those with no option to move back home and who have to pay rent have to settle for jobs even if they do not pay well or are not very suited to their abilities. This study implies that as young people move back with their parents, their job-finding rates fall, which might explain some portion of the recent slow recovery. This effect might be more pronounced in longer recessions such as the recent one, as more young people than usual will have moved back with their parents.<sup>10</sup>

Kyle Herkenhoff and Lee Ohanian find that, for a household that stopped paying the mortgage, the aver-



age time spent in default increased from four months to 12 months during the crisis. They propose that this increase may have led to higher unemployment rates. Being able to live rent-free longer may have served as extra unemployment insurance, giving unemployed delinquent mortgagors the financial leeway to be choosier about what jobs they would accept. They find that this effect increased unemployment rates by an estimated one-half to one-third of a percentage point in this recession and recovery.

## SOME CONCLUDING THOUGHTS

Although homebuilding constitutes a small portion of GDP — on average 4.7 percent since 1947 — it has outsize importance for the rest of the economy. In general, the housing sector leads the recovery in the rest of the economy, and the last recession suggests that without the housing sector, recovery is slow. Housing is also special in that housing wealth is spread much more evenly across society than financial asset wealth is, and so large falls in house prices affect middle-income people more than a similar decline in stocks does.

Therefore, it is important to avoid severe boom and bust episodes in the housing market in the future. The preventive steps that have been taken since the crisis — stricter regulation of the banking sector to limit risk-taking and more stringent requirements for mortgage borrowers — might have slowed down this recovery but are necessary to avoid a similar episode in the future. ■

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## NOTES

<sup>1</sup> This relationship was first pointed out by Morris Davis and Jonathan Heathcote. Edward Leamer has suggested that residential investment should be used to predict the business cycle and should play a prominent role in monetary policy.

<sup>2</sup> Finn Kydland, Peter Rupert, and Roman Sustek point out that the prevalent use of fixed-rate mortgages in the U.S. might be why homebuilding leads the business cycle in the U.S. They build a model to show how changes in interest rates might lead homebuilding to respond earlier than other economic activity.

<sup>3</sup> Unfortunately, details on whether homes are vacant because of foreclosure or for other reasons such as repairs are available only after 2012, which makes it impossible to perform a more detailed analysis on why there are still so many more vacant homes than before the crisis.

<sup>4</sup> Michael Elsby, Bart Hobijn, and Aysegül Sahin give the payroll share for a range of sectors.

<sup>5</sup> The difference in the total number of households between periods gives the number of new households formed during that interval. The Census Bureau looks at the number of households each month. One person in each household is designated as the "householder," which refers to the person (or

one of the persons) in whose name the housing unit is owned or rented. If it is a married couple living in the same unit, only the husband or wife would be listed as householder; if unrelated roommates live in the same unit, again only one would be recorded as the householder.

<sup>6</sup> Again, this does not seem to be solely due to demographic changes, as homeownership rates have declined significantly for all age groups.

<sup>7</sup> See, for example, Laurie Goodman, Jun Zhu, and Taz George's analysis.

<sup>8</sup> Martin Gervais and Satyajit Chatterjee and I have studied this phenomenon in depth.

<sup>9</sup> More specifically, they had the biggest employment declines in *nontradable* sectors — those that produce goods and services consumed domestically rather than exported.

<sup>10</sup> When we look at aggregate employment rates for different age groups, we do not see that young people behaved very differently in this recession than in earlier ones. But that might be because some people in all age groups had to move in with other family members. As seen in Table 1, the headship rate fell for all age groups between 2007 and 2013.





# Chapter 11 for Countries?

Sovereign default risk has been growing, yet the world lacks an adequate mechanism for averting debt crises. It might be time to resurrect a plan modeled on the U.S. Bankruptcy Code.

BY SATYAJIT CHATTERJEE

For the past 40 years or so, every decade seems to have brought its own brand of international debt problems. In the 1980s, emerging market economies, led by Mexico, defaulted on their debt to private banks. In the 1990s, the fast-growing economies of Thailand, Indonesia, and South Korea teetered on the brink of default. The new millennium brought the 2007–2008 financial crisis, the worst the U.S. had experienced since the Great Depression. And this decade has brought the ongoing Greek debt crisis, which for about six months in 2011 had engulfed Italy, Spain, Portugal, and Ireland and threatened to destroy the euro (Figure 1).

Although outright default on foreign borrowing is relatively rare — Argentina, Russia, Ecuador, and Greece have been the only countries to default on their foreign obligations in the past 25 years — even the threat of sovereign

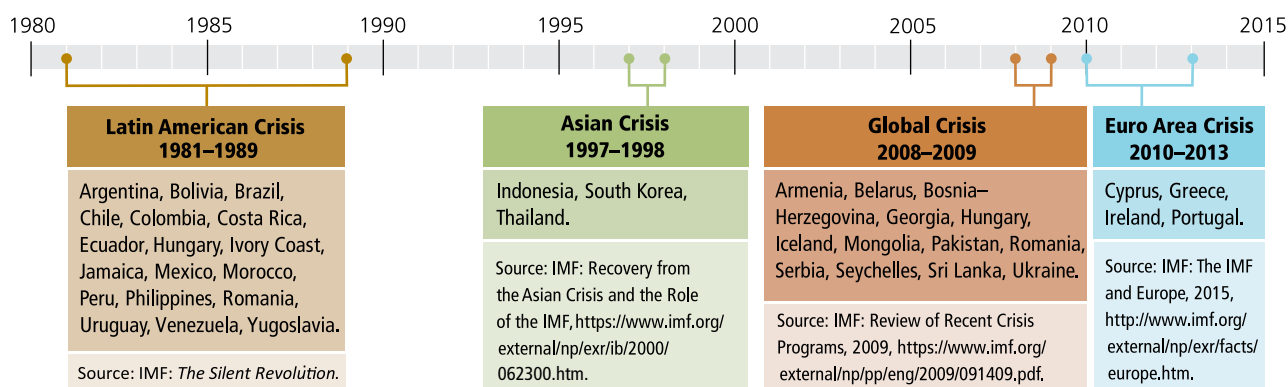
default can be very disruptive for countries that experience it.<sup>1</sup> Greece, sadly, is a poster child for the chaos that can befall a country when investors begin to doubt its ability to pay its bondholders. Greece was already suffering a recession in 2010 when it became clear to investors that its government was under severe budgetary pressure. Greece's debt was eventually restructured to avoid outright default, but the process was lengthy and extracted a heavy toll on the Greek economy: By the end of 2013, Greece's gross domestic product had fallen 25 percent below its GDP in 2010, and its unemployment rate had climbed to 27 percent. Then, the recovery that had begun in 2014 collapsed

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FIGURE 1

## Debt Crises over the Decades

Since 1980, roughly one-fifth of the world's nations have had to resort to adjustment loans from the International Monetary Fund.



amid the political fallout from five years of harsh economic policies, and in 2015 Greece defaulted on its interest payments to the International Monetary Fund (IMF). Although an exit from the euro was averted, Greece's economic situation remains dire.

In the wake of the Asian financial crisis of the 1990s, the IMF had proposed a formal sovereign debt restructuring mechanism (SDRM) that would have permitted an overly indebted country to comprehensively restructure its foreign debt quickly and equitably. Modeled on the segment of U.S. corporate Bankruptcy Code commonly referred to as Chapter 11, the proposal was intensely debated but ultimately shelved as it failed to garner the requisite support among IMF member countries, the U.S. included. But since then, the resurgence of international debt problems, in particular Greece's experience, has revived interest in adopting a sovereign debt restructuring mechanism.

As this article will explain, the risk of sovereign debt crises is expected to rise over time, yet the current system for dealing with both the threat and reality of sovereign default is ill-suited to a world in which the primary source of financing government capital projects is private investors in other countries. Moreover, it is uncertain whether the main policy initiative pursued by the U.S. in lieu of the SDRM has lowered the likelihood of protracted and costly sovereign debt restructurings. As we will see, the restructuring mechanism the IMF had proposed in 2003, or some variation of it, continues to be worthy of consideration.

## THE RISK OF SOVEREIGN DEFAULT IS RISING

For much of the developing world, the benefits of borrowing in the capital markets of advanced economies are immense. The demand in developing countries for investments in basic infrastructure such as electrification, communications, transportation, and education and health facilities far outstrips what they can fund internally. At the same time, new investment opportunities in advanced economies are growing more slowly than in the past. In the years to come, the benefits of borrowing from abroad will entice more and more developing countries into the world's international capital markets, and investors looking for high returns will gladly welcome them.

But more borrowing from abroad generally means a higher likelihood of default. An obligation owed to creditors is a fixed sum, but the amount of money available to repay that obligation fluctuates randomly. Natural disasters, wars, recessions, and political upheaval interfere with a country's

ability to meet its obligations. Since emerging economies tend to be more volatile, sovereign debt crises should become more frequent as more capital flows to the developing world.

In addition, some features of the sovereign debt market make emerging economies particularly prone to default. Borrowing in the capital markets of New York, London, or Tokyo means borrowing in dollars, sterling, or yen. But borrowing in a foreign currency exposes the country to *currency risk* — the risk that its domestic currency will fall in value relative to the currency in which its debt is denominated. Currency devaluations can greatly increase the burden of foreign debt overnight as more domestic currency is needed to repay the same amount of foreign debt, and a country can find it hard, even impossible, to pay its bondholders.<sup>2</sup>

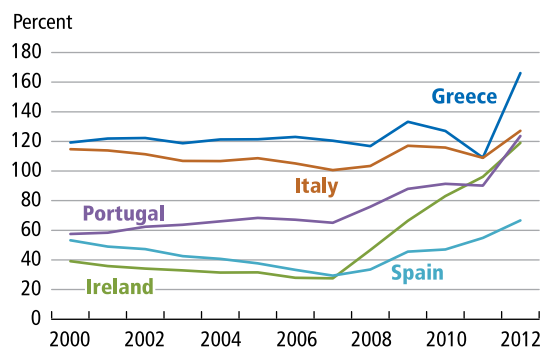
As the events of the past seven years have shown, rapidly growing national debt as a share of a country's gross domestic product can bring even advanced economies to the brink of default. For advanced economies, the threat of insolvency comes from long-term demographic trends that are rapidly increasing their national debt burdens: Aging populations are increasing government spending on social security programs, public employee pensions, and health-care subsidies while depressing tax revenue growth as labor force participation declines. The global recession that followed the 2007–2008 financial crisis contributed to these trends by temporarily shrinking government revenues and rapidly raising national debt levels (Figure 2).<sup>3</sup>

Another troubling aspect of sovereign default is the much-feared problem of *contagion*. When Argentina could not pay its debt and sank into default in 2001, Uruguay also suffered a recession, devaluation, and foreign debt crisis

FIGURE 2

## National Debt Loads Face Short- and Long-Term Pressure

Sovereign debt to gross national product.



Source: The World Bank's World Development Indicators.

because its exports to Argentina, Uruguay's main trading partner, collapsed. The interconnections among countries resulting from trade links become the conduits through which the "virus" of sovereign default jumps from one country to another. Sometimes the virus spreads through financial links.<sup>4</sup> As trade linkages continue to widen and as global financial markets increase in sophistication, such links can be expected to permeate world capital markets. In this interconnected world, sovereign defaults are unlikely to be isolated events; they are more likely to come in waves.

Thus, no matter where in the world one looks, the likelihood of sovereign debt crises is on the rise. How is the international financial system dealing with a country's inability to service its foreign debt? As we will see, the current arrangement is not well adapted to a world where countries borrow vast sums of money from private foreign investors.

### THE CURRENT ARRANGEMENT IS FLAWED

What happens when a country runs into trouble and is in danger of being unable to make timely payments to its foreign creditors? Under the current arrangement, it does two things. First, it seeks to *restructure* its existing debt, which means asking its creditors to accept a partial write-off of their loans or, failing that, to accept delayed repayment. Second, it seeks temporary help from the IMF, which was set up after World War II specifically to dispense such help. The IMF might advance the country an *adjustment* loan and simultaneously force it to cut its fiscal budget in order to generate surpluses that are then used to reduce its foreign debt to a more manageable level. Once the country resumes making timely bond repayments, international capital markets will again be willing to buy new issues of its bonds, which the country can then use to pay off its IMF adjustment loan.

As originally conceived, the IMF was intended to support a fixed international exchange rate system.<sup>5</sup> Reflecting this narrow focus, IMF rules initially forbade it from advancing loans to a country that had defaulted before reaching a restructuring agreement with its creditors. An adjustment loan was advanced only if the country was current on its obligations but was negotiating with its creditors for a restructuring and was therefore temporarily unable to issue new bonds in world capital markets. The arrangement initially worked well, since at the time, a country's foreign debt was generally owed to foreign governments, which had an implicit agreement to negotiate repayment quickly and in good faith.

But this situation changed dramatically as private capital resumed flowing during the boom years of the 1960s and early 1970s.<sup>6</sup> When Mexico and other developing countries defaulted in the early 1980s, the bulk of their foreign debt was owed to commercial banks, not governments. And reaching a restructuring agreement with the banks proved to be a huge challenge. As the years passed, the pressure on governments to get involved mounted. In 1989, the banks accepted the fact that the countries were never going to be able to repay their debts in full and, in return, agreed to accept bonds collateralized by U.S. Treasury securities as partial repayment on the defaulted loans.<sup>7</sup> Because the bonds were backed by U.S. government securities, the market value of the bonds was greatly enhanced, which helped contain the banks' losses.

The resolution of the Latin American debt crisis was a defining moment in the evolution of postwar international borrowing and lending. The IMF had to change its rules to permit adjustment loans to a country that had yet to reach a settlement on its defaulted debt. This policy of lending into arrears made it possible for the countries to purchase the U.S. Treasury securities that backed the bonds offered to the commercial banks in the settlement. Thus, the almost decade-long impasse was ended by effectively orchestrating a bailout of the commercial banks with IMF help.

However, the much-needed resolution of the Latin American debt crisis left a thorny legacy for the IMF. On the one hand, lending into arrears institutionalized a mechanism for bailing out foreign creditors following a default, although the IMF is loath to routinely activate this policy. On the other hand, the bailout increased pressure on the IMF for more bailouts.<sup>8</sup> This dilemma led the IMF to propose a formal mechanism that would smooth out the negotiation process between creditors and countries in danger of falling into default and thereby encourage them to seek a timely restructuring of their unsustainable debt, while reducing the need for the IMF to become a party to bailouts of private creditors.

### HOW WOULD THE SDRM PROMOTE ORDERLY RESOLUTIONS?

Since debt crises occur only when countries lack the money to make timely debt payments, any money that goes to pay one creditor necessarily comes at the expense of some other creditor. This basic fact pits one creditor against another, with potentially adverse consequences. In the corporate context, a creditor has the incentive to not



agree to the restructuring plan (making him a *holdout*) if he believes that his threat of intransigence will compel other creditors to accept bigger losses in favor of his getting more. Such uncooperative behavior can unleash a war of attrition among creditors — each holding out in the expectation that others will capitulate first — and greatly delay agreement on a restructuring plan. Since delays hurt all creditors, one key purpose of bankruptcy law is to constrain the rights of individual creditors for the benefit of all creditors. The U.S. bankruptcy code serves this purpose by giving the bankruptcy judge the authority to bind all creditors to a restructuring plan approved by a majority of creditors — a cramdown provision. Thus, an individual creditor gains nothing from acting opportunistically when others act cooperatively.

A similar holdout problem can delay restructuring of sovereign debt. The typical strategy of a holdout creditor is to refuse to participate in a restructuring and to simply wait for other creditors to agree to a restructuring plan and then sue the country for full repayment. Because the country's debt burden is lower following a restructuring, the government may think it advisable to pay off the holdout and avoid the nuisance of a suit, giving all creditors an incentive to hold out. Again, the resulting delay ends up hurting both creditors and the debt-strapped nation. Thus, as in the corporate context, a legal mechanism is required to counter opportunistic behavior on the part of individual creditors.

The sovereign debt restructuring mechanism that IMF officials proposed to their governing body in 2003 was designed to provide this legal mechanism.<sup>9</sup> It gave a country the right to unilaterally activate the mechanism if it believed that its current debt exceeded its capacity to repay (in U.S. bankruptcy law, the corresponding provision is known as *filing for reorganization*). Upon activation of the mechanism, the country would be required to cease all payments to creditors, and the creditors were enjoined from litigating for full repayment (a *stay*) and would be required to register their claims. Once all debts had been registered and verified, the sovereign would be tasked with coming up with an acceptable restructuring proposal (a *reorganization plan*). During this renegotiation stage, the country could get new loans that were outside the scope of the restructuring process and that would have priority for repayment over all existing loans, provided a majority of creditors approved such financing (*priority* or *debtor-in-possession* financing). If creditors holding 75 percent of all claims accepted the plan, it would become binding on all parties, including any dissenting creditors (a cramdown). The mechanism envisaged a dispute resolution forum composed of impartial experts who

would mediate disputes that arose along the way. To give the mechanism legal force, its adoption would occur via a treaty among IMF member countries and, once adopted, would govern the resolution of payment problems on all existing and future sovereign debt.

The key to understanding the structure of the mechanism is the cramdown feature. In default, individual creditor rights are constrained to eliminate the holdout problem. Given this suppression of their rights, all other features of the mechanism are designed to protect creditor interests. The mechanism is not an exact copy of U.S. bankruptcy law: There is no bankruptcy judge who can impose a reorganization plan on all creditors. The role of the dispute resolution forum is to facilitate agreement among creditors, not to impose any particular plan on them. Instead, the mechanism requires a majority of creditors to agree to the restructuring plan, which then becomes binding on all creditors.

Ostensibly, the mechanism does not ascribe a special role to the IMF, but it is understood that the IMF would have an important role to play. A country that activates the mechanism loses access to world capital market but may greatly need temporary priority financing. The entity most well placed to provide such temporary priority financing is the IMF. As per its rules, the IMF's priority financing would come with conditions: The country must announce a plan to reduce its debt and then follow it. In this regard, the mechanism institutionalizes the original conception of IMF lending and much current practice, except that IMF help becomes part and parcel of an overarching debt restructuring plan agreed to by the debtor country and its private foreign creditors.

## WHY WAS THE SDRM SPURNED?

Why did the SDRM fail to take wing? In the debates that led up to its rejection, two sorts of objections were voiced. The first type questioned the wisdom of formalizing the restructuring process at all because of what that might mean for all countries' access to credit in the future. The second type was more procedural: The need for an efficient sovereign debt restructuring process was accepted in principle, but concern focused on the nature of the proposed mechanism.

The first type of objection held that if restructurings were made too easy, countries might be tempted to restructure too frequently.<sup>10</sup> And, knowing this, lenders would lend very little to governments in the first place. In economic terms, this is the classic tradeoff between *ex post* benefits

and *ex ante* costs. *Ex post*, a country in default would be better off having access to a restructuring mechanism that can quickly and equitably reduce the burden of the debt. But *ex ante*, the increased likelihood of a debtor-friendly restructuring following default will make creditors wary about lending too much to them in the first place. Thus, credit will be granted at worse terms — higher interest rates — making repayment more costly, reducing a country's *debt capacity*. This concern resonated with investors and some emerging market governments. Brazil, for instance, argued that the existence of the SDRM might make foreign lenders reluctant to lend to emerging economies for fear they would abuse the mechanism by restructuring too frequently.

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## The question is: What would happen to governments' debt capacity if an SDRM were put into place?

The pivotal procedural objection questioned the necessity of an expensive, full-blown international mechanism for solving the holdout problem.<sup>11</sup> Instead, a contract-based approach, which was already common in the U.K., ultimately prevailed. In the U.K., a clause in corporate bond contracts permits the debtor to change the payment terms for all bonds in the same issue as long as a majority of holders of the bonds in that issue favors the change. The new terms become binding on all bondholders, including dissenters. This clause — called a majority action or collective action clause (CAC) — serves the same purpose as a Chapter 11 cramdown by taking away the incentive of individual creditors to act opportunistically. Since the use of CACs requires no change in international law — only that the clause be enforceable in the jurisdiction in which the bond is issued — it was viewed as a lower-cost alternative to a formal SDRM.

### WOULD AN SDRM HAVE SLAIN THE SOVEREIGN DEBT MARKET?

It is certainly true that because creditors cannot grab the assets of a nation in default, a costly and messy restructuring process is the main deterrent to default and that a country will weigh the alternatives carefully before seeking a restructuring of its foreign debt. As noted earlier, a strong deterrent to default lowers the interest rate that countries

must pay on their debt, since lenders will charge a lower premium to compensate them for the possibility of default. This lower cost of borrowing increases governments' debt capacity. The question is: What would happen to their debt capacity if an SDRM were put into place? As mentioned earlier, some economists are of the view that by making restructurings all too easy, the SDRM would deal a death blow to the sovereign debt market: Investors would respond by greatly reducing the amount of money they lend to governments. Taking for granted that greatly reduced debt capacities will do great harm to nations that need to borrow, an SDRM, in this view, cannot be a good idea.

However, most economists and legal scholars who have scrutinized the SDRM proposal do not share this view. Generally, it is understood that the point of the SDRM is to reduce the costs of restructuring by taming the holdout problem, not to reduce the costs of default. The thought is that by providing a forum for renegotiations, the SDRM would encourage overly indebted countries to negotiate with lenders *ahead of* default. Thus, at the time of renegotiation, the country would know that if it failed to come up with an acceptable offer, it would have to suffer the costs of default. Similarly, creditors would know that if they spurned all reasonable offers, they would end up with nothing, at least for a while. Thus, both parties have an incentive to agree to a reasonable restructuring plan.<sup>12</sup>

In this view, the presence of an SDRM should strengthen, not debilitate, the sovereign debt market. For instance, it could open the door to other innovations: If creditors publicly registered all claims against the distressed country, the country may find it easier to implement a restructuring process that gives priority to older claims over newer claims. Such a system, which is common in corporate bonds but as-yet unknown for sovereign bonds, can also protect creditors and, hence, reduce the costs of foreign borrowing.<sup>13</sup>

### CACS: AN EFFECTIVE SUBSTITUTE?

After the SDRM proposal was shelved, the U.S. Treasury made a concerted effort to get emerging market governments to insert CACs into new sovereign bonds issued in New York, where a large fraction of the world's sovereign bonds are issued. Mexico led the way in 2003, quickly followed by other Latin American countries. Now, nearly all sovereign bonds issued in New York carry CACs. In Europe, the Greek restructuring motivated the European Commission to make CACs mandatory in all sovereign bonds issued by euro member countries since 2013. Does this prolifera-

tion of CACs obviate the need for an SDRM?

There is some indication that CACs are indeed effective in reducing the perceived likelihood of prolonged restructurings. For countries with less-than-stellar credit ratings, CAC-enhanced bonds have generally sold for higher prices than bonds without CACs, suggesting that investors perceive CACs as a force in favor of a speedier restructuring, were one to become necessary.<sup>14</sup>

Still, there are reasons to think that CAC-enhanced sovereign bonds are not a substitute for an SDRM. First, CAC-enhanced bonds are relatively new, and a large stock of sovereign bonds outstanding do not bear this clause. Until this stock of pre-CAC bonds matures or is bought back, the safeguards that the new CAC-enhanced bonds offer will be less potent.<sup>15</sup> A high-profile court ruling in the U.S. has significantly enhanced the bargaining strength of holdout creditors by giving them the power to interfere with debt repayment to creditors who agree to a restructuring. This remarkable development occurred with regard to litigation between holdout investors and Argentina following a restructuring of its sovereign debt in 2005 (Argentina's bonds had no CACs). This precedent makes it more profitable for investors specializing in distressed sovereign bond funds to pursue governments for full repayment. Many commentators have pointed out that this development will make it harder for countries to reach restructuring agreements on bonds without CACs that involve a substantial reduction in indebtedness.<sup>16</sup>

Second, CAC-enhanced sovereign bonds have found willing buyers only if the threshold for collective action is relatively high. Generally, creditors holding 75 percent, and in some cases more, of a particular issue would have to agree to any binding change in payment terms. The 75 percent threshold would seem to be the same as the one proposed in the SDRM, but that is not the case. The SDRM threshold had applied to total registered debt, while the CAC threshold applies to each issuance of bonds. For many countries, the amount of debt outstanding is small compared with the overall size of international capital markets, and their bonds sell at a steep discount when they are having difficulty meeting payments. It is then relatively easy for so-called vulture funds to buy up more than 25 percent of an issue and hold out for full payment. For instance, about half of Greece's sovereign bonds issued under U.K. law escaped restructuring because it was relatively easy for holdouts to purchase blocking shares in these issues, and payments on these bonds are being made as originally contracted.<sup>17</sup>

Third, if investors indeed prefer CAC-enhanced bonds,

one has to wonder why the clause did not become popular earlier. Legal scholars have pointed out that New York bond attorneys were well aware of CACs but used them sparingly in sovereign bond contracts.<sup>18</sup> This suggests that CACs became popular largely because the U.S. Treasury leaned on governments to use them and that countries complied in form — but not in spirit — by choosing a relatively high threshold for collective action. But why, then, did CAC-enhanced bonds sell at higher prices than non-CAC-enhanced bonds? The explanation may be mismeasurement. Because the switch from regular to CAC-enhanced bonds was so quick, researchers are limited to comparing the price of regular bonds issued prior to 2003 with the price of CAC-enhanced bonds issued after 2003.<sup>19</sup> This unfortunate fact leaves open the possibility that the premiums on CAC-enhanced bonds rose because some other factors changed right around 2003. One possibility is that investors became more willing to invest in risky assets such as emerging market sovereign bonds as interest rates on safe assets such as U.S. Treasuries fell to historic lows in the post-2002 period.<sup>20</sup>

So, while CACs provide some safeguard against holdouts — a 75 percent threshold is better than a 100 percent threshold — it might be premature to conclude that the proliferation of CACs in sovereign bonds issued under New York law has paved the way for smooth restructurings.

## CONCLUSIONS

It is difficult to look at the postwar era of international borrowing and lending and not come away thinking that we are witness to a bad case of misaligned incentives. Creditors, reasonably confident that bailout packages will allow them to recover most of their money, lend at rates that do not reflect the true risk of default. Governments, faced with willing lenders and fearful of the costs of default, keep on borrowing until the day of reckoning is upon them. The IMF, unable to countenance a messy default by a country important to the global economy, be it emerging or advanced, comes through with the anticipated bailout, and foreign investors get their loans paid off.

This situation could be remedied by the sovereign debt restructuring mechanism proposed by the IMF back in 2003. The SDRM provides a legal mechanism for dealing with repayment problems that accompany the flow of private capital to governments. The existence of an SDRM would facilitate timely restructurings when foreign obligations become excessive (because the impediments to restructurings



would be reduced), reduce the likelihood of excessive foreign borrowing (because creditors would be more circumspect of the possibility of restructurings and attendant losses), and eliminate bailouts (because the IMF would feel less impelled to intervene if there is a palatable alternative to outright default). Although the spread of CACs has been a positive development, their effectiveness remains uncertain because of the high thresholds required for collective action and because of the large stock of foreign debt outstanding that does not carry CACs.

In the meantime, the risk of sovereign debt crises is growing, especially in the developed world, where demographics and politics are conspiring to rapidly increase countries' indebtedness. Since advanced economies have a large footprint in world capital markets, many commentators have expressed alarm over the situation. These developments — Greece's debt crisis included — led the IMF to take a second look at the desirability of an SDRM and have led some economists to strongly endorse the idea of a formal restructuring mechanism.<sup>21</sup> ■

## NOTES

<sup>1</sup> For the purposes of this article, *sovereign default* describes a situation in which a country quits trying to repay its creditors or must obtain an international bailout. Depending on how broadly default is defined, several more countries have defaulted during this time. For instance, Carmen Reinhart defines sovereign default as the failure to meet a principal or interest payment on the due date (or within the specified grace period) or episodes where rescheduled debt is ultimately extinguished in terms less favorable than the original obligation and offers a longer list of countries that defaulted from 1990 to 2015.

<sup>2</sup> Many developing countries rely on commodity exports to earn foreign currency, but commodity prices are notoriously volatile, causing large fluctuations in the value of their domestic currency. In addition, emerging economies often attempt to *peg* the value of their currencies to major foreign currencies such as the U.S. dollar. Such pegging succeeds if the country has large reserves of foreign currencies. But if reserves shrink as the country's ability to earn foreign currency is impaired, the peg becomes unsustainable and the currency devalues massively.

<sup>3</sup> In Ireland, for example, the national debt exploded because the government nationalized private sector debt in an effort to contain the fallout from the financial crisis. In the U.S., the government-sponsored enterprises Fannie Mae and Freddie Mac became wards of the state, so their debts have now become the obligation of the U.S. government.

<sup>4</sup> For instance, a mutual fund company that creates a fund focused on emerging markets would naturally include a whole raft of countries in the fund in order to diversify risk. But if default by one country in the fund causes investors to reduce their exposure to the fund itself, the fund will have to reduce its holdings of the sovereign bonds of *all* countries in the fund, including those not directly affected by the default. Thus, the threat of default in Mexico caused stock markets in Argentina and Brazil to drop in 1995 even though direct trade links among these countries are quite minimal. See Roberto Rigobon's monograph for an in-depth discussion of contagion.

<sup>5</sup> The book by Barry Eichengreen provides a concise history of the international financial system.

<sup>6</sup> For a brief history of the Latin American and emerging market debt crises, see <http://www.federalreservehistory.org/Events/DetailView/46>.

<sup>7</sup> These collateralized bonds became known as Brady bonds and the restructuring plan the Brady plan, after then U.S. Treasury Secretary Nicholas Brady, who had advanced it.

<sup>8</sup> In the aftermath of the Asian crisis, the policy was expanded to allow lending into arrears resulting from defaults on nonbank debt (bonds). See the IMF's 1999 publication for a discussion of the evolution of its lending in arrears policy.

<sup>9</sup> For details of the proposal, see Anne Krueger's 2002 IMF article and the actual proposal submitted to the governing body of the IMF in February 2003.

<sup>10</sup> See Andrei Shleifer's short article, provocatively titled "Will the Sovereign Debt Market Survive?"

<sup>11</sup> This objection was voiced by John Taylor, then undersecretary for international affairs at the U.S. Treasury Department.

<sup>12</sup> Of course, the mechanism could be abused. For instance, a rogue nation could activate it over and over again, making a mockery of the restructuring process. But such behavior could be discouraged by requiring countries to wait a certain number of years between activations. A similar limitation exists in the U.S., where one can file for personal bankruptcy no more often than every seven years.

<sup>13</sup> Giving older claims priority in a restructuring means imposing fewer losses on older claims relative to newer claims. Burcu Eyigungor's *Business Review* article explains why giving priority to older claims benefits countries, and Patrick Bolton and David Skeel's article explains how the SDRM can make it possible to implement such a priority rule.

<sup>14</sup> The premium does not apply to countries with stellar credit ratings because their likelihood of a restructuring is low. See Michael Bradley and Mitu Gulati's 2014 article for a thorough discussion of the perceived investor valuation of CACs. Also, it is worth pointing out that the evidence on the price effects of CACs is somewhat mixed. An earlier study by Torbjörn Becker, Anthony Richards, and Yunyong Thaicharoen had found no evidence that investors viewed CACs either positively or negatively.

<sup>15</sup> For most emerging market economies, the secondary market for their sovereign debt is relatively illiquid. This means that the country must offer an attractive price to its current bondholders (pension funds, for instance) to entice them back into the market and swap their existing debt for CAC-enhanced debt. Since such swapping does not seem to be occurring on a large scale, we may infer that the cost of enticing investors to trade old debt for new debt is too high — even though the pension funds would have paid more for CAC-enhanced bonds had they been offered initially.

## NOTES (CONTINUED)

<sup>16</sup> See, for instance, the *Financial Times* article and the brief filed by Anne Krueger in favor of Argentina's appeal to deny holdout creditors the power to obstruct payments to creditors who had agreed to the restructuring in 2005.

<sup>17</sup> This experience has led the euro zone to mandate "super-CAC" clauses in all sovereign debt issued by euro member countries since 2013. A super-CAC clause makes it possible for creditors as a group to override holdouts on any given issue, provided there is enough support (over all issues combined) for the restructuring. Still, even such super-CAC bonds are not entirely bulletproof against determined holdouts.

<sup>18</sup> See the 2013 article by Mark Weidemaier and Mitu Gulati for a discussion of the use of CACs in sovereign bonds issued under New York law before 2003.

<sup>19</sup> Bradley and Gulati examine the diffusion of CAC-enhanced bonds among new issuances of sovereign bonds under New York law; see their figures 1 and 2 (p. 2,050).

<sup>20</sup> The inflation-adjusted yield on long-term U.S. Treasury bonds has moved up and down over the last 200 years. Nevertheless, as documented in Eichengreen's paper, post-2002 yields are low in comparison with yields during the previous half-century (see his figure 1). Also, we know from numerous accounts that the six years preceding the 2007–2008 crisis was an era of high finance in which vast sums of money flowed into all sorts of risky investments. Also, while the crisis caused investors to retreat from mortgage-backed securities and related financial products, they thronged to emerging markets in search of higher yields.

<sup>21</sup> The IMF's second look is discussed in the 2013 article on sovereign debt restructuring. For the views of a distinguished group of economists and legal scholars regarding the desirability of a sovereign debt restructuring mechanism, see the 2013 report of the Committee on International Economic Policy and Reform. There is also growing international recognition that the world needs a multilateral sovereign debt restructuring process to replace the current flawed system. The United Nations General Assembly in 2015 adopted a resolution on the principles that should guide sovereign debt restructuring processes.

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# REGIONAL SPOTLIGHT

## Pension Gap Perils

Are the significant shortfalls in tristate public pension funds actually far worse than official reports suggest?

BY ELIF SEN

Pennsylvania and New Jersey's underfunded public pension systems have severely strained their state budgets and put their taxpayers at risk of bearing a potentially significant financial burden. Though Delaware's gap is considerably narrower, its pension assets also fall short of liabilities. By some estimates, the shortfall between promised state pension benefits and available funding in the three states totals nearly \$103 billion, and the potential per capita tax burden as of 2013 ranged from \$1,179 in Delaware to \$5,728 in New Jersey. Yet, as serious as this sounds, is the problem actually significantly worse?

The size of a state's pension gap matters of course to its active and retired workers, but also to all its residents. That's because pension obligations are promises — more legally binding in some states than others — to make payments to workers at a future time. Failing to accumulate enough money to make good on these promises can force states to raise taxes or cut programs, or both.

How can a pension plan be reasonably sure it will meet its obligations? First, a plan needs to adhere to an actuarially determined schedule of contributions to the pension fund. Second, plans rely on the growth of their funds, which are invested in stocks, bonds, and other investments.

These assets and future benefits — liabilities, from the plan's perspective — both need to be measured in today's dollars in order to determine the plan's health. Because of the time value of money, \$100 to be paid out sometime in the future is worth less than \$100 paid out today, so the *future value* of liabilities must be *discounted* to determine the *present value*.

Like most state plans in the U.S., tristate plans use

the assumed rate of return on their invested assets as their discount rate to calculate the present value of total liabilities. Although economists, analysts, and legislators debate what is an appropriate discount rate assumption for pension funds, many financial economists argue that current assumptions are too high and that the discount rate should be independent of the rate of return of assets. As this article will show, the discount rate used can make a major difference in funds' health status.

### SNAPSHOT OF PUBLIC PENSIONS IN OUR THREE STATES

The state retirement systems included in this article cover approximately 1.5 million active and retired public sector employees in a variety of occupations — including state government office workers, public school employees, and law enforcement personnel — through *defined benefit* pension plans for which the state is the sponsor, administrator, employer, or funder (Table 1).<sup>1</sup>

To get a picture of the health of these systems, we examine trends for each state from 2003 to 2013 in four key pension fund status indicators — actuarial accrued liabilities and assets, funded ratios, unfunded actuarial accrued liabilities, and annual required contributions.<sup>2</sup>

**Actuarial accrued liabilities and assets.** Actuarial accrued liabilities represent the present value of future obligations to pension plan members, and assets represent the value of the

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TABLE 1

## Tristate Pension Plans Analyzed

	Plans	Members		
		Active	Retired	Total
PA	State Employees' Retirement System	372,614	329,256	701,870
	Public School Employees' Retirement System			
NJ	Public Employees' Retirement System	477,314	292,933	770,247
	Teachers' Pension and Annuity Fund			
	Police and Firemen's Retirement System			
	Consolidated Police and Firemen's Pension Fund			
	Prison Officers' Pension Fund			
	State Police Retirement System			
	Judicial Retirement System			
DE	Public School Employees' Retirement System	46,420	26,180	72,600
	State Employees' Pension Plan			
	New State Police Pension Plan			
	Judiciary Pension Plan			
	County and Municipal Police Firefighters			
	County and Municipal Other Employees			
	Volunteer Firemen			
	Diamond State Port Corporation			
	State Police Retirement System (Closed)			
	Teachers' Pension and Annuity Fund			
	Police and Firemen's Retirement System			
	Consolidated Police and Firemen's Pension Fund			
	Prison Officers' Pension Fund			
	State Police Retirement System			
	Judicial Retirement System			
	Public School Employees' Retirement System			

Sources: Pew Charitable Trusts and individual plans' Comprehensive Annual Financial Reports (CAFRs).

Note: Membership counts are as of fiscal 2013 and were obtained from individual plan CAFRs. The listed plans are those included in the Pew state pension database.

pension plan's investments, or the *valuation assets* (Figure 1).<sup>3</sup> In all three states, the growth of total liabilities outpaced the growth of assets from 2003 to 2013, though the divergence was not as sharp in Delaware. Over that same period, liabilities grew 66.3 percent in Pennsylvania, 55.4 percent in New Jersey, and 74.3 percent in Delaware, while assets grew more slowly, at 3.9 percent, 4.4 percent, and 53.0 percent, respectively.

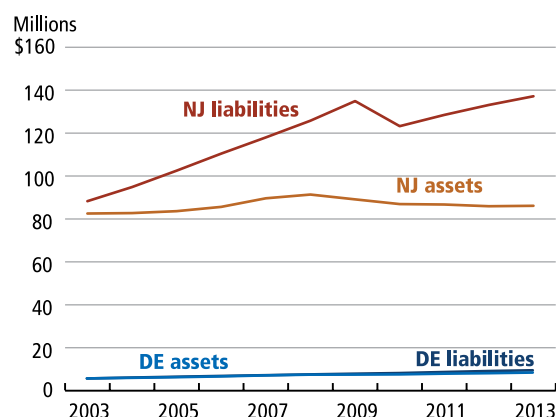
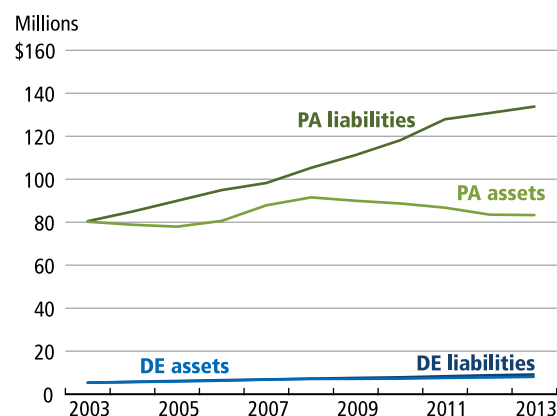
From these actuarial accrued liabilities and assets are derived two main indicators of a plan's health — the funded ratio and unfunded liabilities.

**The funded ratio.** The funded ratio is the ratio of assets to liabilities. It indicates how well funded a plan is at a given point in time. A funded ratio of less than 100 percent means a pension fund's assets do not cover its liabilities. Funded ratios declined among all 50 states on average from 2003 to 2013 (Figure 2). Though Delaware's funded ratio was comparatively high, it declined from slightly more than 100 percent — more than fully funded — in 2003 to 88 percent by 2013. Pennsylvania's funded ratio declined more, by 37

FIGURE 1

## Gaps Have Widened Since Recession

Total liabilities vs. actuarial value of assets.



Source: Pew Charitable Trusts.

percentage points, to 62 percent. Similarly, New Jersey's fell 31 percentage points to 63 percent.

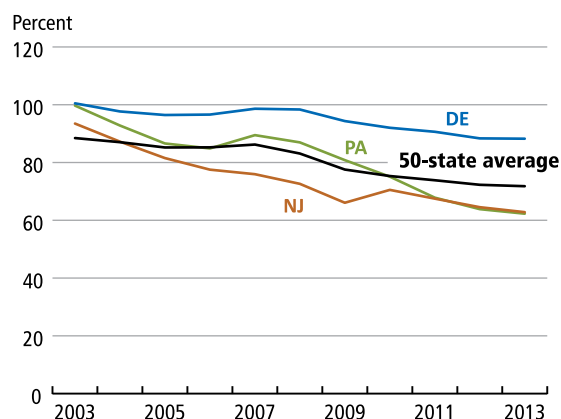
**Unfunded actuarial accrued liabilities.** The unfunded actuarial accrued liability — calculated as actuarial accrued liabilities less actuarial accrued assets — represents obligations not covered by assets, or pension debt. As one would expect given the increasing divergence of liabilities and assets, unfunded liabilities increased in all three states from 2003 to 2013 (Figure 3). Delaware's plans had been slightly overfunded in 2003, by \$26 million, yet by 2013 its unfunded liabilities exceeded \$1 billion. Pennsylvania and New Jersey's unfunded liabilities sat above \$50 billion in 2013, more than two and a half times the 50-state average of \$19.4 billion.

The trends in these indicators show deterioration in overall funding health for all three states and sharp increases in unfunded liabilities for Pennsylvania and New Jersey. So, what happened over those years? Many factors

FIGURE 2

## Funding Deteriorated Everywhere

Funded ratios.

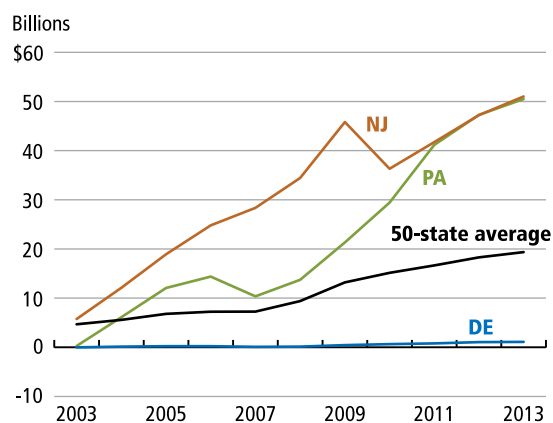


Source: Pew Charitable Trusts.

FIGURE 3

## A Damaging Decade

Unfunded liabilities.



Source: Pew Charitable Trusts.

impact the size of unfunded liabilities, and in any given year, unfunded liabilities will grow or decline based on contributions and investment returns as well as on any changes to or deviations from plan benefits or assumptions.

For instance, market downturns can play a large role in the health of pension plans. A 2015 study examined the impact of some of these factors, including investment returns and contribution cutbacks, on the growth of unfunded liabilities for 150 state and local plans in the United States from 2001 to 2013 — a period that included both the aftermath of the dot-com stock bubble and the Great Recession.<sup>4</sup> The analysis found that more than 60 percent of the increase in unfunded liabilities occurred as a result of lower-than-as-

sumed investment returns during this period. By contrast, the study attributed about 24 percent of the rise in unfunded liabilities to insufficient contributions — that is, contributions that were smaller than what was needed to cover obligations.

As might be expected, poor returns strongly affected every plan, and contributions likewise fell short for all plans during this period. Even so, plans whose average funded ratios were lower during the period generally experienced bigger increases in unfunded liabilities, with inadequate contributions accounting for a greater share of the rise than they did among well-funded plans. Among poorly funded plans, inadequate contributions accounted for about 33 percent of their increase in unfunded liabilities, versus 13 percent for well-funded plans.

By contrast, well-funded plans were hurt more than poorly funded plans by lower-than-assumed returns, which accounted for nearly 70 percent of the increase in unfunded liabilities among well-funded plans versus about 55 percent among poorly funded plans.

Unfunded liabilities pose potential financial burdens on taxpayers and increase pressure on government revenues and spending. On a per capita basis, unfunded liabilities soared in all three states from 2003 to 2013, from \$21 to \$3,950 in Pennsylvania, from \$667 to \$5,728 in New Jersey, and from negative \$32 to \$1,179 in Delaware. The size of Delaware's unfunded liabilities in 2013 amounted to nearly 33 percent of its total tax revenues. For Pennsylvania and New Jersey, unfunded liabilities amounted to 149 percent and 175 percent, respectively, of total tax revenues.

**Annual required contributions.** Pension plan financial reports also include information on annual required contributions, which are determined by actuarial methods. The required contribution for each year — “required” not in the legal sense but in the sense of staying on a path toward full funding — equals the sum of the cost of benefits earned by active employees during that year, known as the *normal cost*, and an amortization payment.<sup>5</sup> Put simply, if the annual required contribution is made over the next 20 to 30 years, the pension fund will meet all its obligations over that period. While Delaware made annual contributions in line with its required amounts, Pennsylvania's and New Jersey's contributions were consistently well below their required amounts (Figure 4).

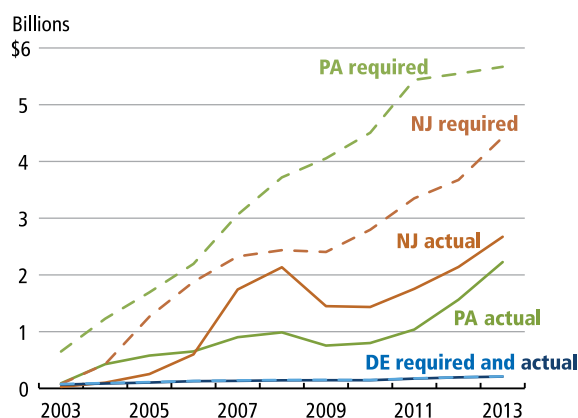
## HOW BEST TO MEASURE LIABILITIES

Clearly, the four key indicators highlight significant gaps in tristate pension plans. Yet, are these shortfalls actu-

FIGURE 4

## Pennsylvania, New Jersey Consistently Below Target

Annual required contributions vs. actual contributions.



Source: Pew Charitable Trusts.

ally far worse than official reports suggest?

The status of a pension fund, including its liabilities, depends on the actuarial methods and assumptions used, which vary by plan and state. Economists, analysts, and policymakers continue to debate how best to value plan liabilities and, thus, the true size of funding gaps.

Recall that actuaries incorporate demographic factors (retirement age, life expectancy, etc.) along with economic factors (salary increases, investment returns, inflation, etc.) in determining the total pension liability and then discount the total to arrive at the present value of future benefits. It follows then that the rate used to discount the total pension liability — another assumption that needs to be made — has a significant impact on the calculation of a plan's total liabilities.

Underlying the debate over how to value liabilities is disagreement over what an appropriate discount rate assumption is for calculating the present value of future pension fund obligations.

Most state pension plans in the U.S. apply a discount rate that corresponds to the assumed rate of return on their assets to discount liabilities. However, researchers Robert Novy-Marx and Joshua Rauh note that pension payments are extremely likely to be made, as they are legal obligations, while stocks and other risky investments have uncertain outcomes.<sup>6</sup> Therefore, they argue, liabilities should be measured independently of how pension funds are invested.

Most states, including our three states, use a discount rate of 7 to 8 percent. While this may be reasonable given

the historical average stock market return of approximately 11 percent, Novy-Marx and Rauh speculate that, to be able to call their pensions funded, states could simply adopt riskier investment strategies with higher expected returns while still holding insufficient assets.

Is there evidence of the use of such strategies? According to a recent Pew report on state pension investments, three-quarters of state retirement systems' assets in the United States are invested in stocks and "alternative investments," which is an ambiguous term but generally includes private equity, hedge funds, real estate, and some commodities. These alternative investments "can be employed to diversify investment portfolios or to achieve higher rates of return, although often at higher levels of risk." From fiscal 2006 to fiscal 2013, the share of pension funds' portfolios allocated to these alternative investments more than doubled, from 11 percent to 25 percent, while the share invested in stocks decreased from 61 percent to 49 percent.

Citing standard financial theory, Novy-Marx and Rauh argue that pension obligations should be discounted at a rate that reflects their risk, and "in the case of state pension funds, the 'risk' is the level of certainty as to whether certain payments will need to be made." That is, since there is a 100 percent certainty that pension benefits will need to be paid out, pension funds should be invested in financial instruments whose returns are just as certain. That leaves U.S. Treasury bills and bonds, which, because they are backed by the full faith and credit of the U.S. government, are considered essentially risk-free. Note that such certainty comes at a steep cost: Interest rates on Treasuries are generally much lower than returns on riskier investments and currently remain near historical lows.

When Novy-Marx and Rauh used liabilities as officially reported by the 116 largest state public pension plans in the nation in 2008, they calculated total unfunded liabilities of more than \$1 trillion. However, when they used liabilities discounted by the Treasury rate, total unfunded liabilities rose to \$3.23 trillion.

Recommending what discount rate to use is beyond the scope of this article. However, to demonstrate the sensitivity of liabilities to the discount rate used, we can create simple estimates of the unfunded pension liability for each of the three states for 2013 under alternative discount rates. Table 2 shows total liabilities at different discount rates and the resulting unfunded liabilities and funded ratios for each of the three states. Here we can see, for example, that if a discount rate of only 4 percent were applied to Pennsylvania's pension funds instead of 7.5 percent, the reported unfunded liabilities would be more

TABLE 2

## Assumed Discount Rate Has Big Impact

		As reported in 2013	Under alternative discount rates			
PA	Discount rate, percent	7.5	8	6	4	2
	Total liabilities, billions	133.8	126.0	160.6	205.8	264.9
	Total assets, billions	83.3	83.3	83.3	83.3	83.3
	Unfunded liabilities, billions	50.5	42.7	77.3	122.5	181.6
	Funded ratio, percent	62.3	66.1	51.9	40.5	31.5
NJ	Discount rate	7.9	8	6	4	2
	Total liabilities	137.1	135.5	172.8	221.3	284.9
	Total assets	86.1	86.1	86.1	86.1	86.1
	Unfunded liabilities	51.0	49.4	86.7	135.2	198.8
	Funded ratio	62.8	63.6	49.8	38.9	30.2
DE	Discount rate	7.5	8	6	4	2
	Total liabilities	9.3	8.7	11.1	14.2	18.3
	Total assets	8.2	8.2	8.2	8.2	8.2
	Unfunded liabilities	1.1	0.5	2.9	6.1	10.2
	Funded ratio	88.2	93.7	73.5	57.4	44.6

Sources: Pew Charitable Trusts and author's calculations.

Notes: Estimates are based on the assumed rate of return reported for the largest plan in each state and also use the discount rate as reported in the second column. For calculations under alternative discount rates, total liabilities as reported in 2013 were projected forward for 13 years at the assumed rate of return, and then discounted back at the alternative discount rate. Because plan durations vary, revaluations of liabilities are based on a common duration period of 13 years, consistent with Moody's Investors Service's proprietary methodology to adjust state pension data, a description of which is available with subscription at [http://www.moody.com/viewresearchdoc.aspx?docid=PBM\\_PBM151398](http://www.moody.com/viewresearchdoc.aspx?docid=PBM_PBM151398).

than double and the funded ratio would be more than 20 percentage points lower for 2013.

## CONCLUDING REMARKS

Applying a lower discount rate would, of course, not resolve the pension crisis. At best, all it can do is make the magnitude of the problem clearer. That said, a more realistic picture could be a first step toward action to close the funding gap. ■

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## NOTES

<sup>1</sup> Traditional defined benefit pensions promise set payments, while under today's more common *defined contribution* retirement plans, such as 401(k)s, no set payouts are promised.

<sup>2</sup> The data for the state retirement systems included in this article cover 2003 to 2013 and come from the Pew Charitable Trusts state pension database, which aggregates each state's plans' financial information. The systems included in the database are "those listed in the state CAFR [Comprehensive Annual Financial Reports] in which the state is a sponsor, administrator, employer, or funder," and "local pension systems with no direct state involvement are not included." For consistency in financial reporting standards, the data used in the analysis go through fiscal 2013.

<sup>3</sup> Assets are often reported as a smoothed market value to lessen the impact of short-term market volatility on reported values. The data shown in this article were reported using smooth five-year average asset values under the Governmental Accounting Standards Board (GASB) Statement 25. As a result, data for 2013 still included losses sustained in 2009 due to the financial market downturn during the Great Recession. Effective with fiscal 2014 reports, GASB adopted Statement 67, an amendment of Statement 25, which changes how assets and liabilities are disclosed in plans' CAFRs. Among the changes to reporting standards under GASB 67, unfunded pension liabilities or net pension liabilities (calculated as the difference between liabilities and assets) will be based on the market valuation of assets and not smoothed investment gains and losses over a period of years.

<sup>4</sup> See the analysis by Alicia Munnell, Jean-Pierre Aubry, and Mark Cafarelli. The Public Plans Database they used includes data for the Delaware State Employees, New Jersey Public Employees, New Jersey Police and Fire, New Jersey Teachers, Pennsylvania Public School Employees, Pennsylvania State Employees, Pennsylvania Municipal, and Philadelphia Municipal retirement systems and plans.

<sup>5</sup> The new accounting standards under GASB 67 replaced the annual required contribution with the actuarially determined employer contribution. Both measurements represent the normal cost plus an amortization payment; however, while GASB 25 had established parameters for the calculation of the annual required contribution, GASB 67 places no limitation on the calculation of the actuarially determined employer contribution. In their June 2015 brief, Munnell and Aubry found that most plans in their Public Plans Database continued to use the same methods and assumptions to calculate an annual contribution in fiscal 2014.

<sup>6</sup> The degree to which pension obligations are protected, however, varies by state. Most states, including our three states, protect pensions under contract theory. Any legislation changing the terms of the contract is subject to court review. See the brief by Alicia Munnell and Laura Quinby for more detail. Pension benefits are contractually protected for past and future accruals in Pennsylvania and past accruals in Delaware (once the employee is eligible for retirement) and New Jersey. Future accruals protection in New Jersey is unclear.





# RESEARCH UPDATE

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## **DOES INEQUALITY CAUSE FINANCIAL DISTRESS? EVIDENCE FROM LOTTERY WINNERS AND NEIGHBORING BANKRUPTCIES**

The authors test the hypothesis that income inequality causes financial distress. To identify the effect of income inequality, they examine lottery prizes of random dollar magnitudes in the context of very small neighborhoods (13 households on average). The authors find that a C\$1,000 increase in the lottery prize causes a 2.4% rise in subsequent bankruptcies among the winners' close neighbors. They also provide evidence of conspicuous consumption as a mechanism for this causal relationship. The size of lottery prizes increases the value of visible assets (houses, cars, motorcycles), but not invisible assets (cash and pensions), appearing on the balance sheets of neighboring bankruptcy filers.

*Working Paper 16–04. Sumit Agarwal, National University of Singapore; Vyacheslav Mikhed, Federal Reserve Bank of Philadelphia Payment Cards Center; Barry Scholnick, University of Alberta.*

## **CONSUMER RISK APPETITE, THE CREDIT CYCLE, AND THE HOUSING BUBBLE**

The authors explore the role of consumer risk appetite in the initiation of credit cycles and as an early trigger of the U.S. mortgage crisis. They analyze a panel data set of mortgages originated between the years 2000 and 2009 and follow their performance up to 2014. After controlling for all the usual observable effects, the authors show that a strong residual vintage effect remains. This vintage effect correlates well with consumer mortgage demand, as measured by the Federal Reserve Board's Senior Loan Officer Opinion Survey, and correlates well to changes in mortgage pricing at the time the loan was originated. The authors' findings are consistent with an economic environment in which the incentives of low-risk consumers to obtain a mortgage decrease when the cost of obtaining a loan rises. As a result, mortgage originators generate mortgages from a pool of consumers with changing risk profiles over the credit cycle.

The unobservable component of the shift in credit risk, relative to the usual underwriting criteria, may be thought of as macroeconomic adverse selection.

*Working Paper 16–05. Joseph L. Breeden, Prescient Models LLC; José J. Canals-Cerdá, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit.*

## **RELATIVE PRICE DISPERSION: EVIDENCE AND THEORY**

The authors use a large data set on retail pricing to document that a sizable portion of the cross-sectional variation in the price at which the same good trades in the same period and in the same market is due to the fact that stores that are, on average, equally expensive set persistently different prices for the same good. The authors refer to this phenomenon as relative price dispersion. They argue that relative price dispersion stems from sellers' attempts to discriminate between high-valuation buyers who need to make all of their purchases in the same store and low-valuation buyers who are willing to purchase different items from different stores. The authors calibrate their theory and show that it is not only consistent with the extent and sources of dispersion in the price that different sellers charge for the same good, but also with the extent and sources of dispersion in the prices that different households pay for the same basket of goods and with the relationship between prices paid and the number of stores visited by different households.

*Working Paper 16–06. Greg Kaplan, Princeton University and National Bureau of Economic Research; Guido Menzio, University of Pennsylvania and National Bureau of Economic Research; Leena Rudanko, Federal Reserve Bank of Philadelphia Research Department; Nicholas Trachter, Federal Reserve Bank of Richmond.*

## **UNIONS IN A FRICTIONAL LABOR MARKET**

The authors analyze a labor market with search and matching frictions in which wage setting is controlled by a monopoly union. Frictions render existing matches a form of firm-specific capital that is subject to a hold-up problem in a

unionized labor market. The authors study how this hold-up problem manifests itself in a dynamic infinite horizon model with fully rational agents. They find that wage solidarity, seemingly an important norm governing union operations, leaves the unionized labor market vulnerable to potentially substantial distortions because of hold-up. Introducing a tenure premium in wages may allow the union to avoid the problem entirely, however, potentially allowing efficient hiring. Under an egalitarian wage policy, the degree of commitment to future wages is important for outcomes: With full commitment to future wages, the union achieves efficient hiring in the long run but hikes up wages in the short run to appropriate rents from firms. Without commitment, and in a Markov perfect equilibrium, hiring is well below its efficient level both in the short and the long run. The authors demonstrate the quantitative impact of the union in an extended model with partial union coverage and multiperiod union contracting.

*Working Paper 16–07. Leena Rudanko, Federal Reserve Bank of Philadelphia Research Department; Per Krusell, Stockholm University, Center for Economic and Policy Research, and National Bureau of Economic Research.*

### **SMALL BUSINESS LENDING: CHALLENGES AND OPPORTUNITIES FOR COMMUNITY BANKS**

The recent decline in small business lending (SBL) among U.S. community banks has spurred a growing debate about the future role of small banks in providing credit to U.S. small businesses. This paper adds to that discussion in three key ways. First, the authors' research builds on existing evidence that suggests that the decline in SBL by community banks is a trend that began at least a decade before the financial crisis. Larger banks and nonbank institutions have been playing an increasing role in SBL. Second, the authors' work shows that in the years preceding the crisis, small businesses increasingly turned to mortgage credit — most notably, commercial mortgage credit — to fund their operations, exposing them to the property crisis that underpinned the Great Recession. Finally, the authors' work illustrates how community banks face an increasingly dynamic competitive landscape, including the entrance of deep-pocketed alternative nonbank lenders that are using technology to find borrowers and underwrite loans, often using unconventional lending practices. Although these lenders may pose a competitive threat to community banks, the authors explore emerging examples of partnerships and alliances among community banks and nonbank lenders.

*Working Paper 16–08. Julapa Jagtiani, Federal Reserve*

*Bank of Philadelphia Supervision, Regulation, and Credit; Catharine Lemieux, Federal Reserve Bank of Chicago.*

### **TERM STRUCTURES OF INFLATION EXPECTATIONS AND REAL INTEREST RATES**

In this paper, the author uses a statistical model to combine various surveys to produce a term structure of inflation expectations — inflation expectations at any horizon — and an associated term structure of real interest rates. Inflation expectations extracted from this model track realized inflation quite well, and in terms of forecast accuracy, they are at par with or superior to some popular alternatives. Looking at the period 2008-2015, the author concludes that long-run inflation expectations remained anchored, and the policies of the Federal Reserve provided a large level of monetary stimulus to the economy.

*Working Paper 16–09. S. Borağan Aruoba, Federal Reserve Bank of Philadelphia Research Department Visiting Scholar.*

### **SCREENING AND ADVERSE SELECTION IN FRICTIONAL MARKETS**

In this paper, the authors incorporate a search-theoretic model of imperfect competition into an otherwise standard model of asymmetric information with unrestricted contracts. They develop a methodology that allows for a sharp analytical characterization of the unique equilibrium and then use this characterization to explore the interaction between adverse selection, screening, and imperfect competition. On the positive side, the authors show how the structure of equilibrium contracts — and, hence, the relationship between an agent's type, the quantity he trades, and the corresponding price — is jointly determined by the severity of adverse selection and the concentration of market power. This suggests that quantifying the effects of adverse selection requires controlling for the market structure. On the normative side, the authors show that increasing competition and reducing informational asymmetries can be detrimental to welfare. This suggests that recent attempts to increase competition and reduce opacity in markets that suffer from adverse selection could potentially have negative, unforeseen consequences.

*Working Paper 16–10. Benjamin Lester, Federal Reserve Bank of Philadelphia Research Department; Ali Shourideh, University of Pennsylvania Wharton School; Venky Venkateswaran, New York University Stern School of Business; Ariel Zetlin-Jones, Carnegie Mellon University.*

## A NARRATIVE APPROACH TO A FISCAL DSGE MODEL

Structural DSGE models are used both for analyzing policy and the sources of business cycles. Conclusions based on full structural models are, however, potentially affected by misspecification. A competing method is to use partially identified VARs based on narrative shocks. This paper asks whether both approaches agree. First, the author shows that, theoretically, the narrative VAR approach is valid in a class of DSGE models with Taylor-type policy rules. Second, the author quantifies whether the two approaches also agree empirically, that is, whether DSGE model restrictions on the VARs and the narrative variables are supported by the data. To that end, the author first adapts the existing methods for shock identification with external instruments for Bayesian VARs in the SUR framework. The author also extends the DSGE-VAR framework to incorporate these instruments. Based on a standard DSGE model with fiscal rules, the author's results indicate that the DSGE model identification is at odds with the narrative information as measured by the marginal likelihood. The author traces this discrepancy to differences both in impulse responses and identified historical shocks.

*Working Paper 16–11. Thorsten Drautzburg, Federal Reserve Bank of Philadelphia Research Department.*

## CAN CURRENCY COMPETITION WORK?

Can competition work among privately issued fiat currencies such as Bitcoin or Ethereum? Only sometimes. To show this, the authors build a model of competition among privately issued fiat currencies. The authors modify the current workhorse of monetary economics, the Lagos-Wright environment, by including entrepreneurs who can issue their own fiat currencies in order to maximize their utility. Otherwise, the model is standard. The authors show that there exists an equilibrium in which price stability is consistent with competing private monies but also that there exists a continuum of equilibrium trajectories with the property that the value of private currencies monotonically converges to zero. These latter equilibria disappear, however, when the authors introduce productive capital. They also investigate the properties of hybrid monetary arrangements with private and government monies, of automata issuing money, and the role of network effects.

*Working Paper 16–12. Jesús Fernández-Villaverde, University of Pennsylvania, National Bureau of Economic Research, and Center for Economic Policy and Research; Daniel Sanches, Federal Reserve Bank of Philadelphia Research Department.*

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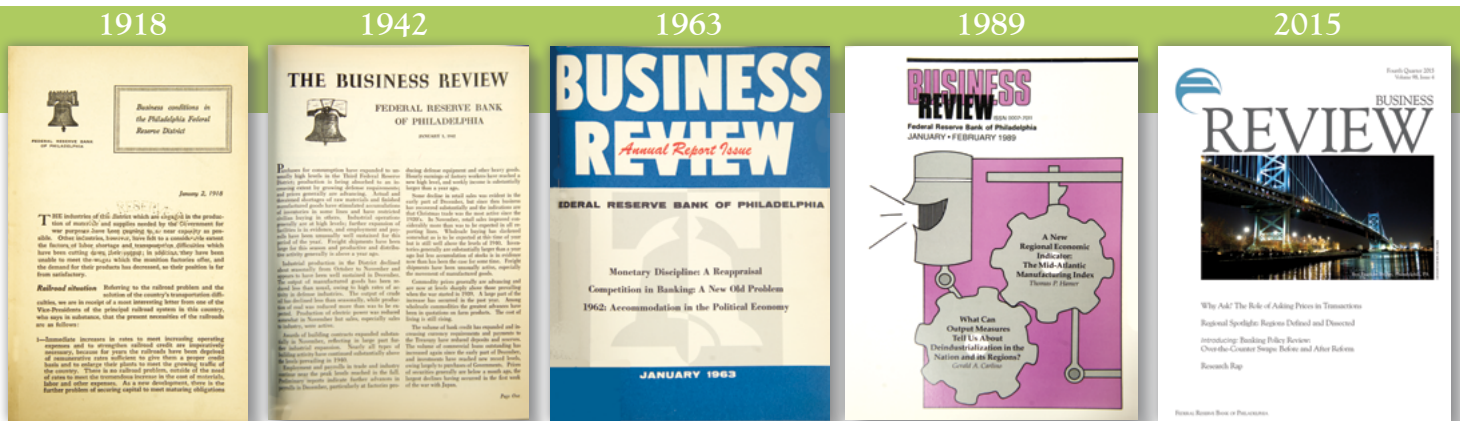
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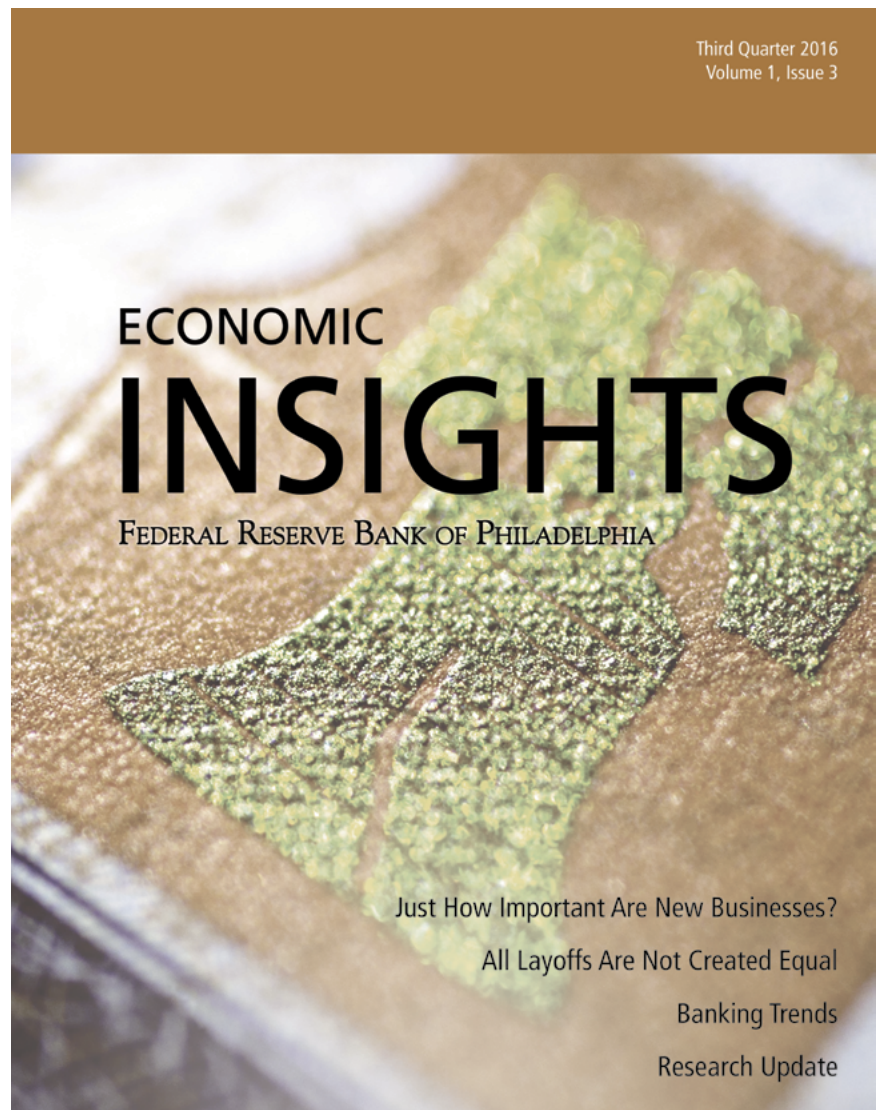
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