

June 2017

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## When Government Borrows Heavily, Firms Reduce Leverage

Most governments in developed countries responded to the financial crisis of 2008 by pursuing expansionary fiscal policies, raising budget deficits and issuing government debt. Some warned that growing supplies of government debt might have unintended consequences in the realm of corporate finance. In **Government Debt and Corporate Leverage: International Evidence** (NBER Working Paper No. 23310), [Irem Demirci](#), [Jennifer Huang](#), and [Clemens Sialm](#) find robust evidence of “crowding out,” a tendency for higher levels of government debt to reduce the level of corporate borrowing.

The researchers explain that an increased supply of government debt could lead fixed-income investors to demand a higher rate of return on both government and corporate bonds. Although government and corporate debt are not perfect substitutes, with the latter typically being viewed as riskier than the former, there are likely to be linkages between the two markets. As the cost of issuing corporate debt rises, firms may respond by shifting their capital structure toward greater reliance on equity rather than debt.

The researchers test the impact of government borrowing on corporate financial

behavior with data from more than 38,000 firms in 40 different countries between 1990 and 2014. They observe that higher levels of

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Higher levels of government borrowing are associated with lower leverage ratios in the corporate sector.

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government debt to GDP are associated with lower levels of book leverage, market leverage, and the corporate debt-to-capital ratio. They also find that the effects of government debt levels on corporate financing are more pronounced when government debt and corporate debt are more similar and are thus in

direct competition. They also find a larger crowding out effect of government debt on larger and more profitable firms, whose debt

is likely to be viewed as a closer substitute for government debt than the debt of smaller, less stable firms.

The researchers hypothesize that firms with more flexibility to switch between debt and equity financing are more likely to respond to increases in the levels of government debt.

They find that government debt levels have a larger impact on corporate borrowing in countries with large equity markets and in which companies are less dependent on bank financing.

The researchers also study the crowding out effect around the establishment of the European

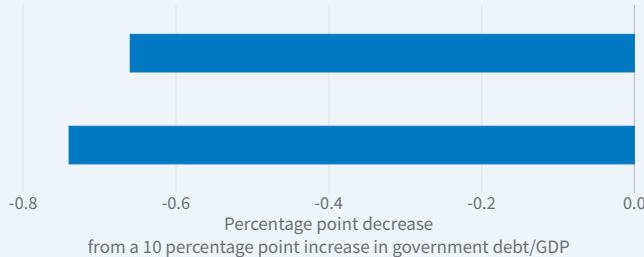
Economic and Monetary Union (EMU). They hypothesize that the financial and monetary integration increased foreign demand for bond securities of EMU members. Consistent with this, they find that the local crowding out effect is reduced for EMU countries after the integration.

### Government Debt Crowds Out Corporate Borrowing

#### Corporate debt measure

Book leverage  
 $\text{Book debt}/\text{book assets}$

Debt-to-capital  
 $\text{Book debt}/(\text{book debt} + \text{equity})$



Source: Researchers' calculations using Compustat and International Monetary Fund data

closer competition with each other. For example, when the level of government debt held by domestic investors rises, the crowding out effect on corporate debt is particularly strong. The researchers posit that this is due to the fact that corporate debt is primarily held by domestic investors, so domestically held government debt and corporate debt are in more

—Dwyer Gunn

## Benefits and Costs of Healthier School Lunches

Policies that provide subsidized school lunches are designed to improve student nutrition and support student achievement. The lunches available in different school districts vary along a number of dimensions, and, by standard metrics, some are healthier than others. In **School Lunch Quality and Academic Performance** (NBER Working Paper No. 23218), [Michael L. Anderson](#), [Justin Gallagher](#), and [Elizabeth Ramirez Ritchie](#) study the consequences of variation in the composition of student lunches. They find that offering healthier lunches delivers test-score improvements at a fraction of the cost of other interventions that strive for the same goal. They do not find, however, any association between the healthiness of lunches and student obesity rates.

The researchers analyze standardized-test and food-service vendor data from all public elementary, middle, and high schools (about 9,700 schools) over a five-year period in California. About 12 percent of schools in their data sample contract with outside vendors for student lunches, and vendor contracts turn over frequently. They find that test scores are directly affected by both the introduction and the removal of healthy lunch providers, defined as vendors whose offerings scored above the median on an enhanced version of the Healthy Eating Index, a metric used by the U.S.

Department of Agriculture and public health researchers to assess diet quality relative to the Dietary Guidelines for Americans. State achievement test scores increased by 0.028 standard deviations in a healthy-vendor contract year, relative to the year before

the contract. Increases were greatest among economically disadvantaged students, who were eligible for reduced-price lunches.

California data suggest that increasing the healthfulness of school lunches raises test scores for comparatively little cost, but that it does not appear to affect obesity rates.

The researchers found that the positive effect of healthy lunches persisted for the duration of a long-term contract. They also noted that

not change upon introduction of healthier lunches, suggesting both that the test-score improvements were due to nutritional quality rather than

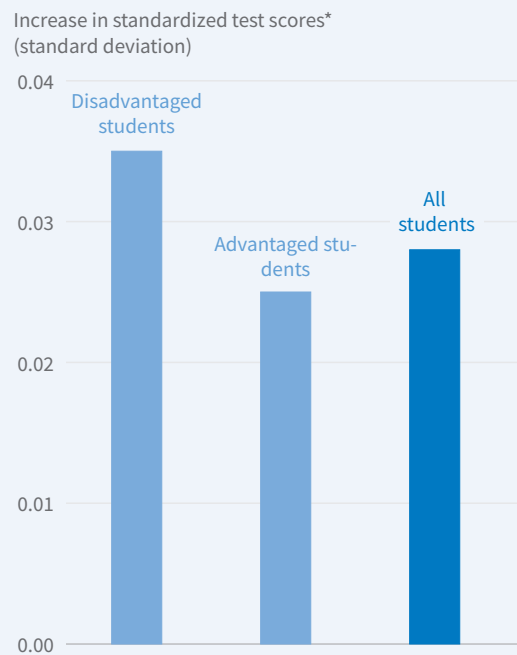
a mere increase in calories consumed, and that the students did not find the healthier meals less palatable than the less-healthy alternatives.

The researchers conclude that providing nutritious meals is a relatively cost-effective means of achieving modest improvements in student performance on standardized tests, particularly for the most economically disadvantaged students. They compare the relative cost of this approach with that of another well-known intervention: the oft-cited Tennessee STAR experiment, which was estimated to increase test scores by 0.22 standard deviations by reducing class size by one-third. The researchers note that “it would cost about \$222 per year to raise a student’s test score by 0.1 standard deviations through switching from in-house preparation to a healthy lunch provider. In contrast, it cost \$1,368 per year to raise a student’s test score by 0.1 standard deviations in the Tennessee STAR experiment.”

The researchers also examined state-mandated Physical Fitness Test results to determine whether the healthy lunches reduced the percentage of students with body composition measurements outside of the “healthy zone” — that is, overweight and obese students. These percentages did not change significantly during the study period.

— Deborah Kreuze

**Test Score Effect of Healthy Lunch Vendors**



\*Relative to in-school lunch preparation  
Source: Researchers' calculations using California Department of Education data

districts that contracted with any outside lunch vendor — healthy or not — tended to have fewer economically disadvantaged students, and more Asian students, than districts that did not.

The number of lunches sold did

# The Long-Run Effects of Immigration during the Age of Mass Migration

Studying immigrant flows during the period of highest immigration in U.S. history, Sandra Sequeira, Nathan Nunn, and Nancy Qian find that counties that received large influxes of immigrants experienced both short- and long-term economic benefits compared with other regions. In *Migrants and the Making of America: The Short- and Long-Run Effects of Immigration during the Age of Mass Migration* (NBER Working Paper No. 23289), they report that these benefits were realized without loss of social and civic cohesion and the long-term benefits persisted to the dawn of the 21st century.

The researchers recognize that immigrants may have been drawn to locations with particular attributes, and that these attributes may also have contributed to those locations' subsequent growth. They therefore focus on differences in the dates on which counties became connected to the railway network, which made it much easier for immigrants to reach a particular location, as a source of quasi-random variation in immigrant inflows.

Using census data along with historical railway maps and other source information, the researchers track county-level immigration, along with the decade-by-decade fluctuations in immigrant flows to the United States. The gradual expansion of railway networks, which connected only 20 percent of the nation in 1850 but 90 percent by 1920, together with the timing of waves of immigration, provide vari-

ation in how accessible different locations were to immigrants from 1850 to 1920.

A central finding is that the economic benefits of immigration were

U.S. counties that received larger numbers of immigrants between 1860 and 1920 had higher average incomes and lower unemployment and poverty rates in 2000.

significant and long-lasting: In 2000, average incomes were 20 percent higher in counties with median immigrant

age increase by 1930 in manufacturing output per capita and a 39 to 58 percent increase in agricultural farm values in places that received the median number of immigrants relative to those

that received none. Though some of the counties studied show a lower rate of literacy due to the influx of immi-

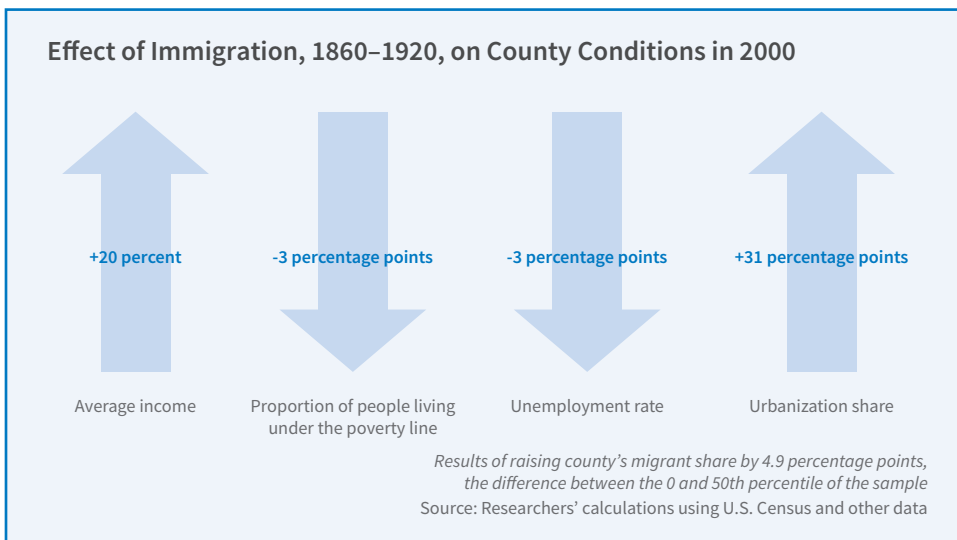
grants, many of whom did not speak English, the researchers find that illiteracy declined steadily over the years and that there was an increase in innovation activity, as measured by patents per capita, in counties with large immigrant populations.

The long-run positive effects of

immigration in counties connected to rail lines appear to have arisen from the persistence of the short-run benefits, particularly greater industrialization, agricultural productivity, and innovation.

"Taken as a whole, our estimates provide evidence consistent with a historical narrative that is commonly told of how immigration facilitated economic growth," the researchers conclude. "Despite the unique conditions under which the largest episode of immigration in U.S. history took place, our estimates of the long-run effects of immigration may still be relevant for assessing the long-run effects of immigrants today."

—Jay Fitzgerald



inflows relative to counties with no immigrant inflows, the proportion of people living in poverty was 3 percentage points lower, the unemployment rate was 3 percentage points lower, the urbanization rate was 31 percentage points higher, and education attainment was higher as well. The researchers do not find any cost of immigration in terms of social cohesion. Counties with more immigrant settlement during the Age of Mass Migration today have levels of social capital, civic participation, and crime that are similar to those of regions that received fewer immigrants.

Measuring the short-term impacts of immigration from 1850 to 1920, the researchers find a 57 percent aver-

## New Evidence on Historical Infant Mortality Rates

Vital statistics data on infant mortality rates in the United States have long shown a large disparity between African Americans and whites in the early years of the 20th century, as well as a narrowing in this disparity over the course of the century. New data, reported in **Revising Infant Mortality Rates for the Early 20th Century United States** (NBER Working Paper No. 23263) by Katherine Eriksson, Gregory T. Niemesh, and Melissa Thomasson, suggest that standard measures overstated the infant mortality rate for African Americans. Revised data suggest that black infant mortality rates in the early years were as much as 40 percent lower than officially reported, and that the degree of convergence was correspondingly overstated.

Infant mortality rates are calculated by dividing the number of registered deaths of infants by the number of registered live births within a calendar year. Using newly released Bureau of the Census data, the researchers conclude that until at least 1940, these data were distorted by severe under-registration of births, particularly among blacks living in the South. Deaths, in contrast, appear to have been accurately reported, perhaps because families were required to obtain a death certificate for a ceremonial burial.

The combination of accurate death

figures and undercounted births inflated infant mortality statistics. For example, in 1915, previously available data suggested that 18.9 percent of black infants

Earlier data had shown that infant mortality was higher among blacks in the North than in the South; the new data suggest that the gap was wider than pre-

The incidence of African American infant mortality in the early 20th century and its subsequent decline both were less dramatic than standard data suggest.

died; the revised data put that figure at 11.1 percent.

The new study was made possible by

viously reported and that it did not close until 1940. The researchers conclude that “accounting for underregistration

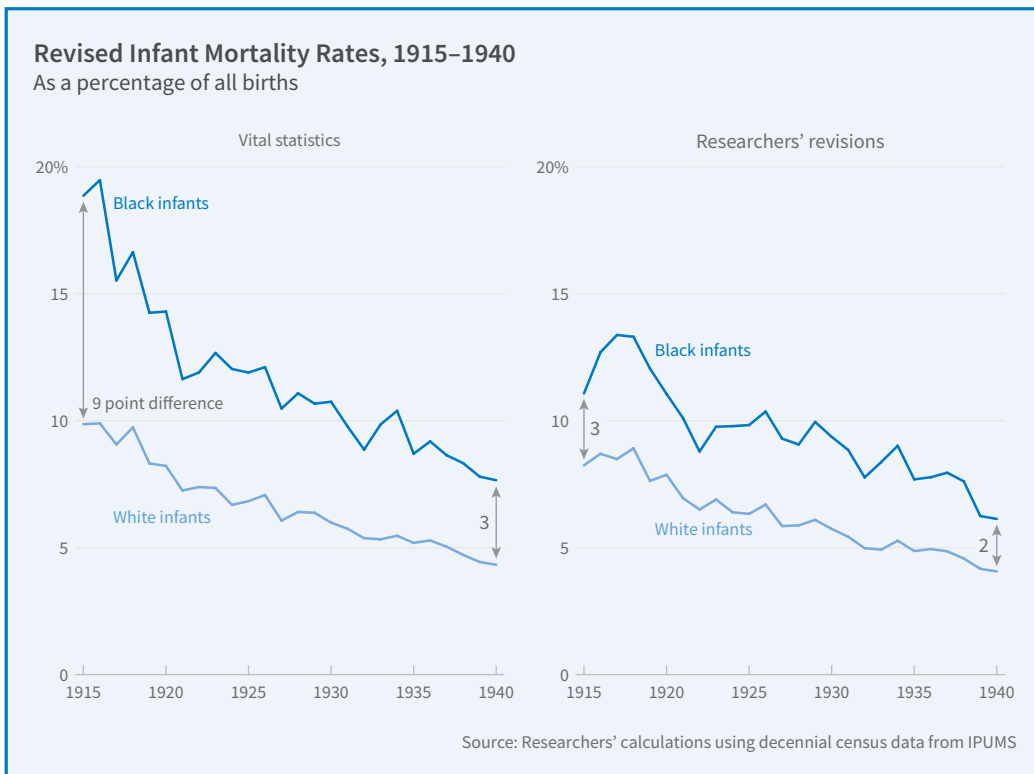
bias ... dramatically changes the interpretation of the differential health risks faced by black infants across the two regions.”

One consequence of the finding that black infants in the early part of the century had lower mortality rates than previously thought is that the decline in the mortality rate was less pronounced. The revised figures

suggest that the mortality rate fell less sharply from 1915 to 1940 — by 44 percent rather than 59 percent.

By the 1960s, there was almost no gap between the revised and published rates. The researchers attribute this to the increasing proportion of babies delivered in hospitals and to increased incentives to register births in order to provide proof of age for school attendance, a driver’s license, and government benefits.

— Steve Maas



the release of micro-level data from the 1940 census. Under federal privacy laws, such personal data cannot be made public until 72 years after a census is taken. Combing through the 1920, 1930, and 1940 censuses, the researchers tally discrepancies between the number of children counted for each state by age and race with corresponding figures from certificates filed in their birth year.

Babies born in the more urbanized North had a higher registration rate than those born in the largely rural South.

## Consumption Growth among Low- and Middle-Income Households

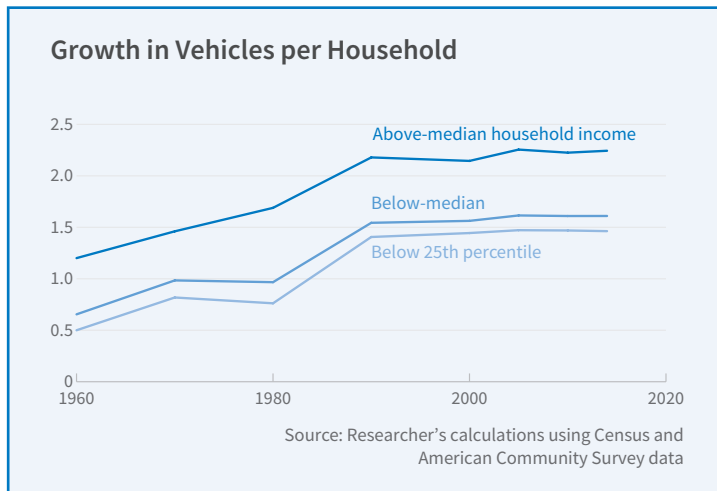
Though wage growth has slowed and income inequality has increased since 1960, consumption by lower- and middle-class U.S. families has also increased over this period, [Bruce Sacerdote](#) reports in **Fifty Years of Growth in American Consumption, Income, and Wages** (NBER Working Paper No. 23292). He suggests that the widespread use of the Consumer Price Index for Urban Consumers (CPI-U)

by the Advisory Commission to Study the Consumer Price Index in 1996 and

2015. Bedrooms per household also rose slightly between 1993 and 2009

Alternatives to conventional measures of real wages, as well as direct indicators of consumption spending, suggest that below-median income families have seen gains in material well-being since 1960.

investigated by James Hamilton and Dora Costa. When either of these alternative measures of inflation is used to construct the time series of real wages



as the price deflator in calculating real wages has understated the growth of inflation-adjusted earnings for these families. In addition, he provides direct evidence, based on consumption data, that living standards of median and below-median income households have increased.

Sacerdote notes that although the CPI-U is widely used, it suffers from a number of well-known shortcomings as a price index. These include difficulties in the treatment of new goods and the handling of quality changes for goods that evolve over time. He points out that inflation measured by the CPI-U is greater than inflation computed using the Personal Consumption Expenditures (PCE) price deflator, which in turn is greater than that from another alternative measure suggested

percent average annual growth between 1964 and 1975, but greater than the nearly constant real wage trajectory that results from using the CPI-U to deflate nominal wages.

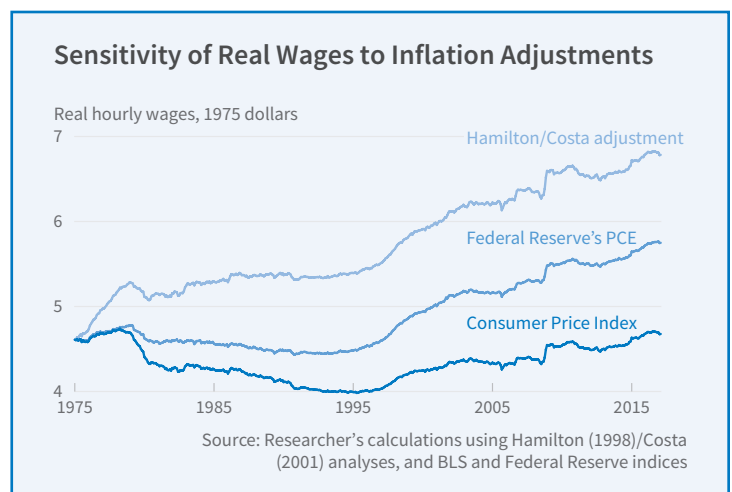
Sacerdote also points out that standards of living have increased across the board in the United States since 1964. In 1980, there were 0.76 vehicles per household in families below the 25th income percentile. That nearly doubled to 1.4 vehicles per household in the same group in

for low- and middle-income households, these wages display a more positive trend than when they are deflated using the CPI-U. The PCE adjustment implies that real wages grew by about 0.5 percent per year between 1975 and 2015, markedly weaker than the 1.2 percent

for this group. Over a longer period, five decades, there are more dramatic increases in living standards. In 1960, for example, fully 35 percent of lower-income households had no indoor plumbing. By 1970, the figure had declined to 12 percent, and by 2015 virtually all households had indoor plumbing.

The increase in consumption over the last five decades has coincided with a decline in survey-based measures of U.S. optimism about living standards. Sacerdote notes that the unresolved challenge is how to reconcile these two developments. There may be some groups for which overall consumption is falling, such as men who have not completed high school and single-parent households. The increased flow of information over personal digital devices may also contribute to the sense of deprivation, as people see the conspicuous consumption of others on a more frequent basis.

— Jen Deaderick



## Option Grants and CEO Risk-Taking

Raising the share of stock options in a CEO's compensation package may lead to greater corporate risk-taking, according to a new study, **How Do Quasi-Random Option Grants Affect CEO Risk-Taking?** (NBER Working Paper No. 23091). Researchers [Kelly Shue](#) and [Richard Townsend](#) find that a 10 percent increase in the CEO's option award is associated with a 2.8 percent to 4.2 percent rise in the company's stock price volatility. Increasing corporate leverage appears to be the key channel through which CEOs raise volatility.

Increasing the fraction of a CEO's pay that takes the form of option grants might raise or lower risk-taking. Because the value of an option on a given company's stock rises with the volatility of that company's stock price, and because the value of an option cannot go below zero, option-heavy CEOs have an incentive to take more corporate risk and thereby increase price volatility. However, there is a countervailing effect: As the share of the CEO's portfolio that is exposed to the company's stock price rises, as it does when option grants rise, a risk-averse CEO might try to reduce overall portfolio volatility by lowering the volatility of the company's share price. This would entail a shift toward more conservative, less risky business strategies.

The researchers test the effect of option grants on corporate risk-taking by analyzing the structure of option award programs for the

CEOs of firms included in Standard & Poor's Composite 1500 Index between 1992 and 2010. They observe that many firms have multi-year option programs, which means award grants are

An increase in the weight of options in the CEO's compensation package is associated with an increase in stock price volatility, largely because of greater firm leverage.

not likely to be driven by changing investment opportunities at the firms in the study.

There are two broad types of option-linked compensation schemes: fixed-value and fixed-number plans. Under a fixed-value plan, executives are awarded stock options with a given value during each year of the multiyear program. If the

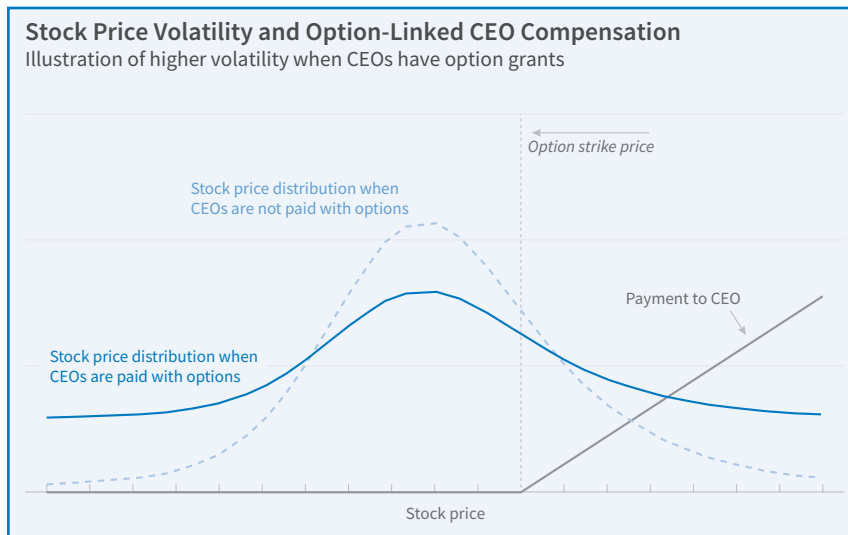
number of options in each year of the compensation program. The value of the annual awards under such a program can vary substantially as a result of movements in the company stock price

and other factors. The researchers exploit the fact that in a rising stock market, as stock prices trend higher, CEOs on fixed-number plans will receive a rising fraction of their compensation in the form of options, while the value of option awards to CEOs on fixed-value plans will not rise commensurately.

The researchers conclude that, on average, "risk-taking increases when options as a fraction of total pay increase." While they note that reduced risk-taking may occur in response to "very large option grants that are awarded to risk-averse and undiversified executives," they find that for most firms in the data sample, an increase in option grants is associated with higher stock price volatility. The effects are particularly pronounced at financial and high-tech companies.

The researchers explore the sources of increased stock price volatility and conclude that it is primarily due to an increase in corporate leverage—a strategy that is broadly available to CEOs and their firms.

—Laurent Belsie



company's stock price rises between the first and second year of the grant program, thereby raising the value of each option granted, the number of options awarded in the second year would be smaller than the number in the first. In contrast, fixed-number plans award executives a set

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