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Alan B. Krueger

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How Tight Is the Labor Market?

Alan B. Krueger*

It is a great honor for me to give the Martin Feldstein Lecture. I first met Marty when I was a research assistant at the NBER in the summer of 1984, shortly after he returned from serving as chairman of the Council of Economic Advisers (CEA). Later that year, I was fortunate to learn public finance at Harvard from both Marty and Larry Summers. They taught me a tremendous amount and sparked my passion for using economics in public policy. Marty also often visited me when I was chairman of the CEA, and I benefited from his wise counsel and encouragement.

Today, I'm going to talk about a question that Marty and I have discussed on many occasions: How tight is the labor market? In essence, I think this issue boils down to two questions. First, how should we think about the U-6 measure of labor slack? I won't delve into this question, however, because U-6 is elevated due to a large number of part-time workers who report that they would prefer to work full-time. The recent rebound in the average work week, however, suggests that there isn't substantial slack on the hours front. Hours appear to be back to normal. The second question, in my view, is the more important one: What's going on with long-term unemployment? Are the long-term unemployed more likely to leave the labor force or find a job? And if the long-term unemployed have already left the labor force, are they likely to come back?

By 2013 short-term unemployment had returned to normal levels. So at that time I argued that if we were going to make further progress in lowering the unemployment rate, it would be because the long-term unemployed either found jobs or left the labor force. My feeling at that time was that, unless we focused public policy on improving the odds of the long-term unemployed finding a pathway back to work, the natural forces that determine the ebb and flow of labor market participation would lead many of these workers to exit the labor force. Unfortunately, as we will see, the historical pattern in which the long-term

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**This is an edited and annotated version of the Martin Feldstein Lecture delivered on July 22, 2015. Alan B. Krueger is Bendheim Professor of Economics and Public Affairs at Princeton University and an NBER research associate. He is a former chairman of President Barack Obama's Council of Economic Advisers.*

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unemployed tend to increase their labor force exit rate over the course of the business cycle has reasserted itself during the current recovery, and this is having a significant effect on the job market.

About a year and a half ago, I wrote a Brookings paper on this topic with two Princeton graduate students, Judd Cramer and David Cho. Part of what I'm going to do in today's lecture is summarize and extend our results.¹ Specifically, I'll focus on where we got things right, where we got some things wrong, and what we can learn from this experience.

I've had the same diagnosis for the last five years: I think the outlook for the U.S. labor market has been one of gradual healing from the terrible wounds that were inflicted by the Great Recession. We've seen the unemployment rate come down from a peak of 10 percent in October 2009 to 5.3 percent as of June (Figure 1), which represents real progress. In fact, apart from the early 1980s, when Marty was CEA Chairman, the current recovery

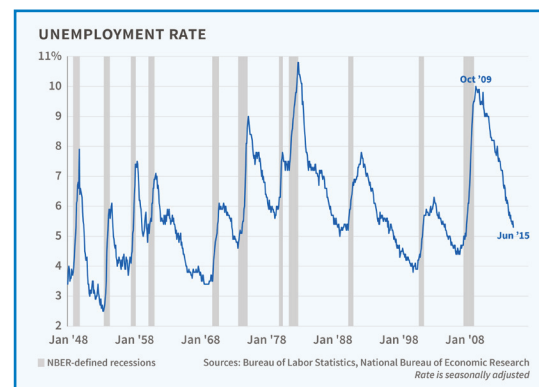


Figure 1

has produced the fastest drop in unemployment recorded in the postwar era. Moreover, the share of unemployed workers who have been out of work for more than half a year has fallen very rapidly, from a record high of 45 percent in 2010 to about 25 percent in June (Figure 2).

The picture isn't quite as rosy if you look

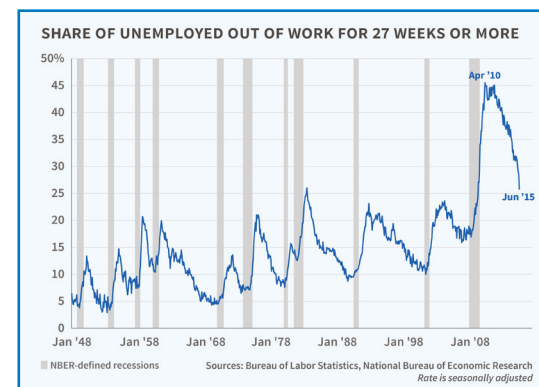


Figure 2

at the employment-to-population ratio, which peaked around the time that the 2000 census was conducted. In a first for an expansion during the postwar era, the employment-to-population ratio declined over the course of the previous recovery, from 2001 to 2007. The share of the population that was employed then plunged an additional five percentage points during the Great Recession and has only recovered by about one point subsequently.

Of course, the reason for the divergence between the unemployment rate and the employment-to-population ratio is labor force participation, which also peaked around the time of the 2000 census (Figure 3). The share of those age 16 and over who were in the labor force actually fell over the course of the recovery from the 2001 recession. And despite the considerable rise in unemployment during the Great Recession, the labor force participation rate was fairly stable during the recession itself, only falling 0.3 percentage point. The decline in labor force participation didn't accelerate until after the recession officially ended.

Today, the labor force participation rate is nearly 5 percentage points below its

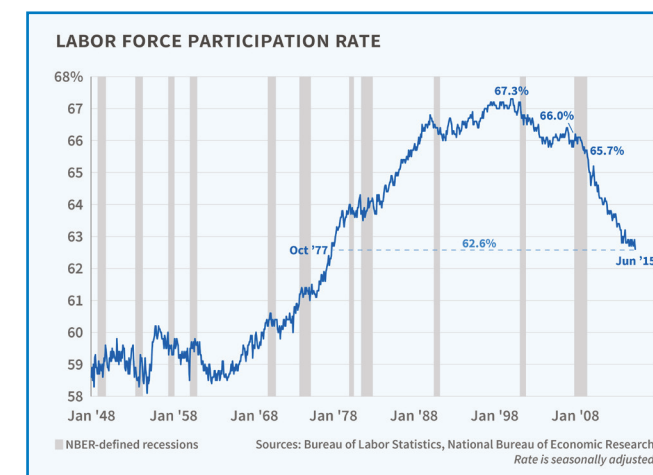


Figure 3

peak. Sensible analyses suggest that about half of the 15-year decline in labor force participation is due to predictable demographic changes, particularly the aging of the Baby Boom generation.

As for the other half, I think there are two important factors. About half of this remainder (or a quarter of the over-

all decline) can be accounted for by trends that were taking place before the Great Recession and likely continued after it. For instance, the widespread entrance of women into the workforce that had fueled the great postwar rise in labor force participation in the United States peaked around 2000. Male labor force participation, which had been steadily declining throughout the postwar period, continued to fall during the 2000s. In addition, labor force participation of younger workers declined in conjunction with an increase in their school enrollment, which should be a net positive for the economy in the long run. The remaining quarter—or a little over a percentage point—of the overall decline in labor force participation is likely attributable to cyclical factors. I will present evidence suggesting that it's unlikely we'll see much of a recovery for this segment of the population going forward.

Now, I've been on record predicting little cyclical rebound in labor force participation for quite a while. In March 2011, for example, I wrote an article for Bloomberg in which, with unusual understatement, I predicted "we might well see the labor force shrinking more even as the measured unemployment rate falls."² I faced some criticism at the time for this contrarian view. As an example of the conventional wisdom, Goldman Sachs's very well-respected

economics research group has published a series of reports over the past four years in which they've repeatedly predicted that labor force participation would stabilize or rise as the recovery continued.³ Instead, the data have clearly shown a persistent decline.

The following chart (Figure 4), an

earlier version of which accompanied my Bloomberg article, shows why I was expecting labor force participation to continue to decline. Specifically, it shows

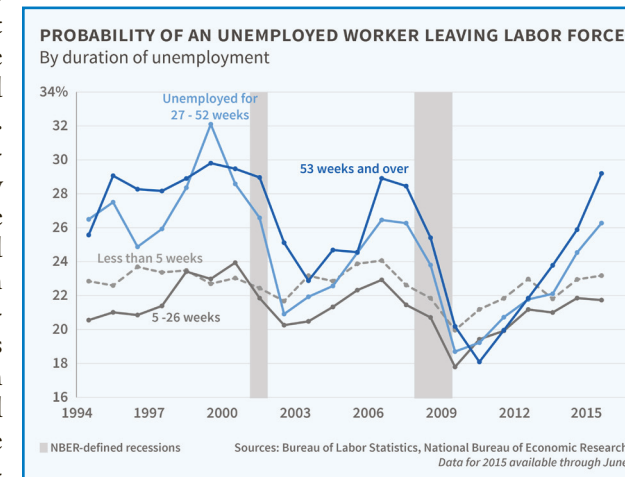


Figure 4

the monthly labor force exit rate for the unemployed by duration of unemployment according to the Current Population Survey (CPS). These data suggest that there is a strong cyclical pattern in the probability that the long-term unemployed will leave the labor force. Workers who had been unemployed for more than half a year became more likely to leave the labor force as the economy strengthened in the late 1990s but their labor force withdrawal rate collapsed in the 2001 recession. The same pattern occurred again during the recovery in the 2000s as well as in the Great Recession. Thus, when I wrote the piece for Bloomberg in 2011, I expected a rise in labor force exits for the long-term unemployed, which has transpired. This cyclical pattern comes about because (1) the composition of the long-term unemployed changes over the cycle;⁴ (2) extended unemployment insurance benefits and benefit exhaustions tend to be cyclical; and, I suspect most importantly, (3) the long-term unemployed become increasingly discouraged and detached from the job market the longer they are out of work.

Notice that while there is also a cyclical pattern in the labor force exit rate for the short-term unemployed, it tends to be much weaker than is the case

for the long-term unemployed.

In contrast to labor force exits, the job finding rate is much higher and more pro-cyclical for the short-term unemployed than it is for the long-term unemployed (Figure 5). For example, workers who have been unemployed for less than five weeks have about a 35 percent chance of finding a job in any given month. This rate tends to be higher when the economy is stronger, and it tends to be lower during a recession. Conversely, the job finding rate for workers who have been unemployed for more than a year starts off at a lower level and moves very little over the course of the business cycle. Our research suggests that changes in the observed composition of the unemployed workforce play a relatively small role in these trends, accounting for no more than 20 percent of these cyclical patterns.

If you're familiar with the CPS, you know that the data can be extremely noisy—particularly with respect to how workers report the duration of their unemployment spells from month to month. So, in our Brookings paper, we also used data from the Survey of Income and Program Participation (SIPP) to look at the likelihood of an unemployed worker returning to steady employment one year later. The SIPP data indicate that, irrespective of the business cycle, the probability that an unemployed worker will be “steadily” employed in a full-time job for at least four consecutive months a year later is strikingly low and declines further as the duration of joblessness rises. Even in the strong job market of the late 1990s, the chance of a long-term unemployed worker finding steady, full-time employment after a year was only around 20 percent. This likelihood did not change very much during the 2001 recession, and it didn't change substantially dur-

ing the Great Recession. Conversely, the likelihood that an unemployed worker will leave the labor force a year later increases substantially as the duration of joblessness rises. According to the SIPP, 35 percent of workers who became long-term unemployed during the Great Recession were out of the labor force by 2013.

Why does long-term unemploy-

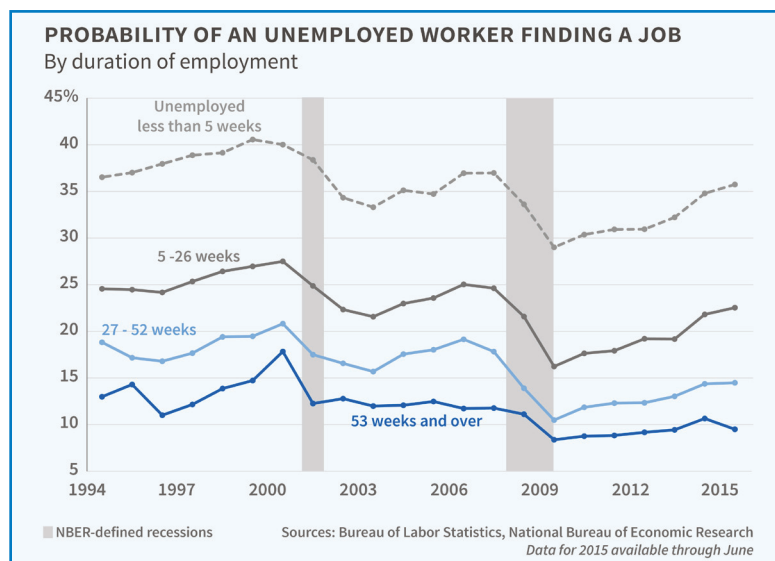


Figure 5

ment have such an adverse effect on workers? There has been a long, unresolved debate in the economics profession about whether the job finding rate is lower for the long-term unemployed because of either unobserved heterogeneity in the characteristics of such workers or something about the nature of unemployment that adversely changes people. Although this is an inherently difficult question to answer, the literature suggests that duration dependence plays a larger role than unobserved heterogeneity in explaining this phenomenon. (Although understanding the respective roles of true duration dependence and unobserved heterogeneity is important for some policy issues, it is not central for monetary policy.)

Much research suggests that long-term unemployment has a negative impact on both the supply side and the demand side. On the supply side, an individual's mental health and self-

esteem can be affected by the experience of long-term unemployment. Till von Wachter has done good work showing that one's physical health and mortality are adversely impacted by joblessness.⁵ Andy Mueller and I did a longitudinal study where we asked workers who were receiving unemployment insurance about the intensity of their job searches.⁶ We found that job search activity tends to decline the longer people are unemployed. We also found that the long-term unemployed tend to be socially isolated. A fascinating new study by Jameson Toole and co-authors analyzed cell phone records for a European country and concluded that workers who lost their job in a plant closing received and made fewer phone calls, and were geographically more isolated.⁷ Furthermore, long-term unemployment tends to be associated with repeated job loss and lower

re-employment earnings. All of these findings point to a decline in human capital and disengagement from the labor market as a result of long-term unemployment.

On the demand side, studies have shown that employers discriminate—at least statistically—against the long-term unemployed. Kory Kroft, Fabian Lange, and Matt Notowidigdo conducted a study in which they sent out resumes with varying gaps of joblessness, and they found that the likelihood of receiving an interview depended upon the duration of unemployment.⁸ Rand Ghayad also found similar results.⁹

My take on the evidence is that the experience of being unemployed makes it harder for people to get back on their feet, and that even a strong economy doesn't solve this problem. In addition, once a person leaves the labor force, he or she is extremely unlikely to return. The labor force flows data

TRANSITION RATE FROM NOT IN LABOR FORCE

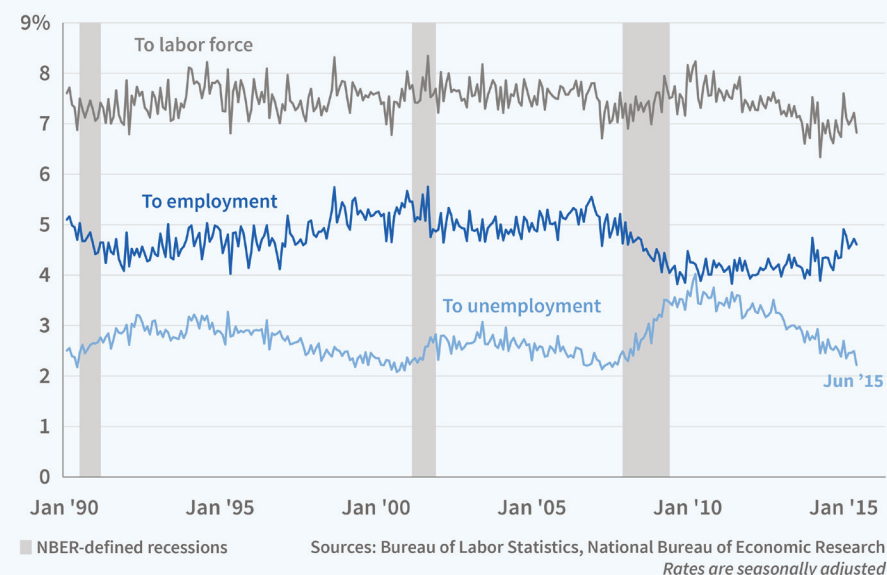


Figure 6

from the CPS bear this out (Figure 6). According to CPS data, the monthly rate for transitioning from out of the labor force to back in the labor force is unrelated to the business cycle. We didn't see a wave of people returning to the labor force either in the late 1990s or earlier in the 2000s, and we're not seeing one now.

Personally, I think the presumption that labor force participation would bounce back in the current recovery comes from a misreading of what happened during the 1980s. A lot of people remember that labor force participation rose sharply after the double-dip recession ended in 1982. However, if you make a linear forecast based on the data from 1970 to 1979, the labor force participation rate stayed about a percentage point below the previous trend line and never caught up (Figure 7).

We did a more sophisticated version of this analysis when I was at the CEA. We looked at the trends in labor force participation for various demographic groups both during the decade before the 1980 recession as well as the decade before the Great Recession. We concluded that, after adjusting for the business cycle, both recessions caused the overall labor force participation rate

to be roughly a percentage point lower than it would have been otherwise.¹⁰

Thus, I think there is a coherent story on labor force participation. Over the course of the business cycle, the long-term unemployed increasingly withdraw from the labor force, and they do not tend to return in large numbers as the economy strengthens.

The Beveridge Curve

An implication of the cyclical patterns in transition rates for the long-term unemployed is that the relationship between vacancies and unemployment will vary over the course of the business cycle. Indeed, previous studies have found that the Beveridge curve, which measures the inverse relationship between job openings and the unemployment rate, tends to shift outward during a recession. For instance, research by Peter Diamond and Ayşegül Şahin suggests that the Beveridge curve typically loops around as the economy recovers from a downturn and eventually returns to its previous position.¹¹

Kory Kroft, Fabian Lange, Matt Notowidigdo, and Larry Katz did very nice work where they estimated a structural job matching model in order to explain the cyclical behavior of the long-term unemployed during the Great Recession.¹² Specifically, Kroft et al. were able to account for the observed rise in the share of unemployed workers who had been out of work for more than six months as well as reproduce an outward shift in the Beveridge curve using their matching model.

In our Brookings paper, we extended their model along two dimensions to more

LABOR FORCE PARTICIPATION RATE

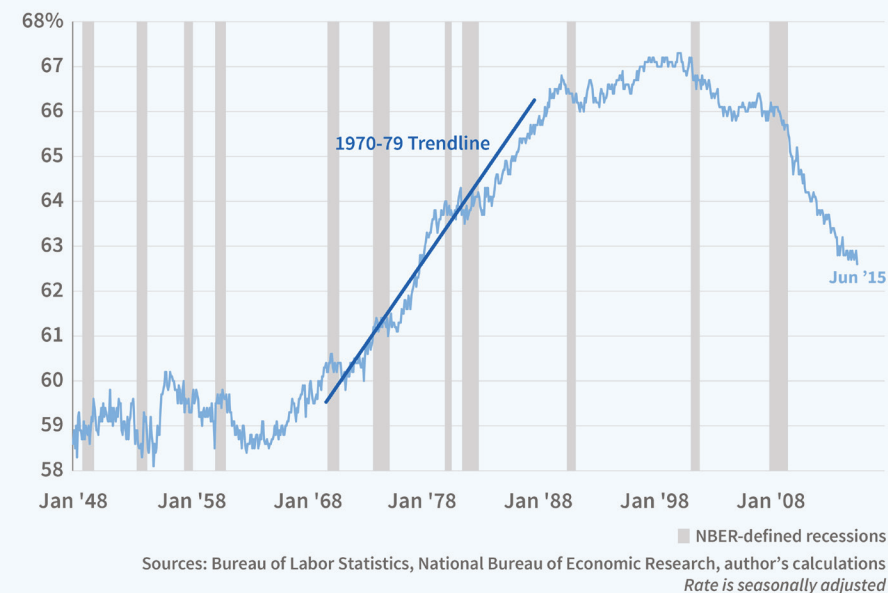


Figure 7

accurately reflect the differential experiences of the short-term and long-term unemployed. First, we allowed the long-term unemployed to have a lower coefficient in the matching function itself. Second, we allowed the short-term and long-term unemployed to transition out of the labor force at different rates. This latter change was particularly important because the labor force exit rates for the short-term and long-term unemployed diverged after 2010. We estimated the parameters of the model from 2002 to 2007 in order to simulate the path of unemployment, the loop in the Beveridge curve, and the rise in the share of workers who were long-term unemployed since the Great Recession. It's worth noting that the period over which we fit the matching function did not coincide with any notable extensions of the duration of unemployment insurance benefits. So the matching model does not rely on the passage of extended unemployment benefits in order to explain the rise in long-term unemployment during the Great Recession. In addition, we restricted our analysis to workers who were 25 to 54 years old to limit the impact of workers either retiring early or returning to school, both of which are key avenues whereby workers leave the labor force. Despite these restric-

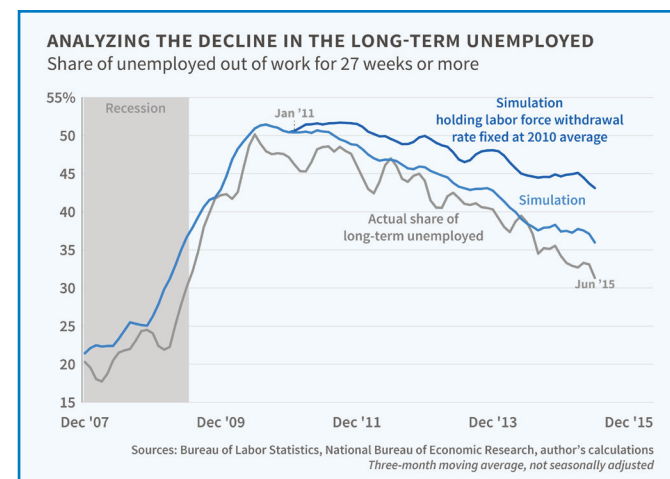


Figure 8

tions, the long-term unemployed are still relatively more likely than the short-term unemployed to exit the labor force as the economy strengthens.

We used the model to conduct some counterfactual exercises with respect to the current recovery. For instance, the share of

unemployed workers who had been jobless for more than six months has fallen substantially since 2010. Using the matching model, we estimated how the share of long-term unemployment would have behaved if we held the probability that the long-term unemployed exit the labor force fixed at its 2010 level (Figure 8). This exercise suggests that the rise in the rate of labor force withdrawal for the long-term unemployed over the course of the recovery explains about half of the observed decline in the share of long-term unemployment.

Alternatively, we also considered how much the share of unemployed workers who had been jobless for more than six months likely would have declined if the job finding rate for such workers had remained at its average for 2010 instead of rising modestly as the economy strengthened. This counterfactual exercise indicates that the improved job finding rate for the long-term unemployed only accounted for about 10 percent of the decline in the share of long-term unemployment since 2010.

We also conducted counterfactual analyses for the nearly 4 percentage point decline since 2010 in the unemployment rate itself. The rise in the labor force withdrawal rate for the long-term unemployed appears to have been responsible for roughly 20 percent of the decline in the overall unemployment rate. The improvement in the job finding rate, by contrast, accounts for only about 5 percent of the drop in the total unemployment rate since the Great Recession.

There is one area in which the

forecast from our Brookings paper fell notably short. Our matching model has not done a particularly good job in predicting the recent path of the Beveridge

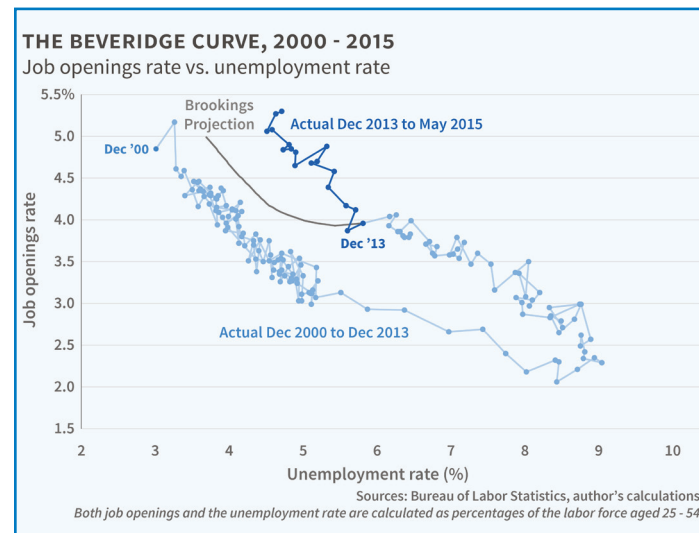


Figure 9

curve (Figure 9). In our Brookings paper, we projected that the Beveridge curve would nearly return to its pre-recession position if vacancies continued to increase at the pace that had been observed from 2011 to 2013 and if the various transition rates in the model returned to their 2006 averages by the year 2016. However, job openings have grown much more quickly than we initially projected, which is a positive sign regarding the strength of the economy but bad news for our projection. Furthermore, the unemployment rate has not declined as quickly as we forecasted that it would in the Brookings paper, even though it has fallen rapidly since 2010.

Our model provides an important explanation for why the Beveridge curve could shift out and eventually loop back to its original position over the business cycle: As the share of unemployed workers who are long-term jobless declines, the matching efficiency for the unemployed should improve correspondingly. Although I still expect the withdrawal of the long-term unemployed to result in a leftward turn toward the original Beveridge curve,

one has to acknowledge that it has not occurred yet.

These results raise the question of whether the U.S. labor market is more inefficient now than it had been in the past. I have to say that I'm skeptical of this view, and research by Eddie Lazear and Jim Spletzer also casts doubt on such an interpretation.¹³ Steve Davis and John Haltiwanger have proposed an alternative explanation for the shift in the Beveridge curve: Companies may have become more selective in their hiring processes and, as a result, the nature of vacancies may have changed in recent years.¹⁴ The longer the shift in the Beveridge curve persists, the more seriously I take their hypothesis.

What About Wages?

If the labor market is getting tight — as the decline in the unemployment rate from 10 percent in October 2009 to 5.3 percent in June would indicate — and the long-term unemployed are on the margins of the labor market and place less downward pressure on the job market, a natural question is: What is happening to wage growth? So I will now turn to the Phillips curve, which captures the relationship between inflation and unemployment.

In my highly stylized model of how the labor market operates, companies and workers meet around the beginning of the year and bargain over wages for the coming 12 months. Both sides are concerned about real wages, but since neither one precisely knows how prices will change in the coming year, they use the previous year's inflation rate as their best estimate of inflation in the coming year. Consequently, we can consider an "accelerationist" version of the Phillips curve in which the previous year's change in prices serves as a proxy for inflation expectations. This is a fairly common specification, and my results are robust to

allowing an unrestricted coefficient on last year's inflation rate.

A number of observers have noted that price inflation did not decline by very much during the Great Recession despite a sharp rise in unemployment. Indeed, if we estimate a price Phillips curve using the core personal consumption expenditures price index, we find a puzzling shift in the relationship between inflation and the unemployment rate from 2009 to 2011. However, if one uses the short-term unemployment rate to estimate the Phillips curve, the rate of inflation changed by about as much as would have been expected during this period.

Several economists have done analyses along these lines using aggregate time series data and concluded that the long-term unemployed put less pressure on inflation.¹⁵ An older paper by Ricardo Llaudes found that the Phillips curve fit better for various OECD countries using the short-term unemployment rate rather than the overall rate.¹⁶ These results are consistent with the view that the long-term unemployed are on the margins of the labor market.

Of course, others have presented alternative explanations for why inflation did not decline by very much during the Great Recession. Ben Bernanke argued that the anchoring of inflation expectations prevented prices from falling by as much as the Phillips curve would have predicted.¹⁷ Laurence Ball and Sandeep Mazumder¹⁸ and George Akerlof, William Dickens, and George Perry¹⁹ have argued that the Phillips curve is convex, which could also explain the behavior of inflation during the recession.

Because my interest in this lecture is on the extent of labor market tightness, I will focus on wage Phillips curves. Also, we should not be fooled by money illusion, so I focus on the real wage Phillips curve.

I take the conventional wisdom on wage Phillips curves to be a 1999

Brookings paper that Larry Katz and I wrote entitled, "The High-Pressure U.S. Labor Market of the 1990s."²⁰ We estimated Phillips curves using expected real wage growth as the dependent variable, which we defined as the percentage change in wages for a given year less the previous year's rate of consumer price inflation. We calculated that the unemployment rate threshold at which expected real wages would start to grow was around 5.5 percent, and this threshold was notably similar for various deciles of the wage distribution in the 1990s. Thus, with the unemployment rate falling below 5.5 percent in June, the conventional wisdom, as I see it, predicts that we will begin to see real wage growth right around now.

Last year, Cramer, Cho, and I estimated the Phillips curve by regressing expected real wage growth on various measures of labor market slack, including short-term and long-term unemployment rates.²¹ We found that the coefficient on the short-term unemployment rate was much larger than that on the long-term unemployment rate, and a test of the difference between these two effects was statistically significant. Although this analysis generated some controversy at the time, it has actually held up fairly well.

Consider first the Employment Cost Index (ECI), which is widely regarded as the best measure of wage pressures. It measures compensation growth within the same firms and occupational groups. On a nominal basis, the ECI rose 2.8 percent over the four quarters ended in 2015:Q1. If we subtract the previous year's rate of core consumer price inflation, expected real wages grew by 1.5 percent over that period, the strongest pace in over a decade.

The Phillips curve that Cramer, Cho, and I estimated using data on the short-term unemployment rate and the ECI from 1976–2008 does a good job of predicting expected real wage growth over the last couple of

years (Figure 10), suggesting that real wage growth has been consistent with the pace of improvement in the labor market as reflected by the decline in the short-term unemployment rate. Moreover, we continue to find a better fit with the short-term unemployment rate than the total unemployment rate, which is consistent with the long-term unemployed exerting less pressure on the job market.

Although the ECI presents the strongest picture in terms of wage growth, other measures of wages tell a similar story. For instance, the average hourly earnings of production and nonsupervisory workers from the BLS establishment survey also shows a pickup in real wage growth in the first half of 2015 consistent with the Phillips curve.

Our work set off a cottage industry of research estimating state-level Phillips curves. A number of economists, primarily in the Federal Reserve System, have recently produced analyses of the Phillips curve using state-level data. The state-by-year level of analysis is often justified by the argument that national time series data do not provide sufficient variability to distinguish between the effects of short-term and long-term unemployment. I have found five such studies that analyze state-level wage growth.²² They yield a remarkably discordant picture of the relationship between wage growth and short-term and long-term unemployment. While some studies find that only short-term unemployment predicts wage growth, others find that both short-term and long-term unemployment are equally strong predictors. One theme that emerges, however, is that studies that utilize growth in the average wage, as opposed to the median wage, as the

dependent variable tend to find that the short-term unemployment rate is a significantly stronger predictor of wage growth than is the long-term unemployment rate.

Given the disparity in these findings, I conducted my own investigation using a panel of state-level data from the CPS. My results were simi-

These results — together with the low rate of job finding among the long-term unemployed and their relatively high labor force withdrawal rate — suggest that, if anything, the standard U-3 measure of the unemployment rate *understates* the degree of labor market tightness in the current environment. A variety of evidence points to the long-term unemployed being on the margins of the labor market, with many on the verge of withdrawing from searching for a job altogether. As a result, the long-term unemployed exert less downward pressure on wages than do the short-term unemployed. They are increasingly likely to transition out of the labor force, which is a loss of potential for our economy and, more importantly, a personal tragedy for millions of workers and their families.

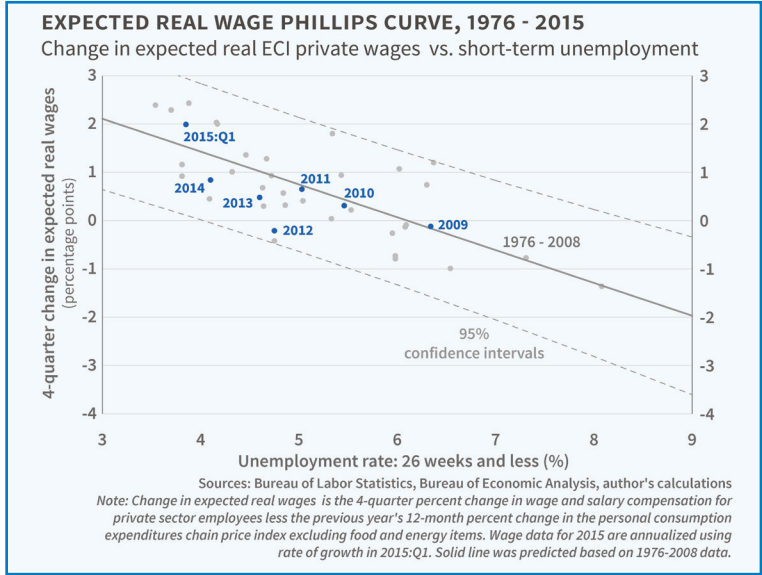


Figure 10

lar to those of Anil Kumar and Pia Orrenius at the Dallas Fed as well as Pat Higgins at the Atlanta Fed, who found that the short-term unemployment rate is a significant predictor of average wage growth, while the long-term rate is not. Thus, my interpretation of these studies is that they are consistent with Phillips curve research using aggregate time series data. The short-term unemployment rate appears to be more meaningful than the long-term unemployment rate in the determination of average real wage growth at both the state and national level. It is unclear why, and whether, both measures of labor market slack predict median wage growth, but if one is interested in analyzing the relationship between slack and wage growth because of potential pass-through effects of factor costs on prices, then understanding the determinants of growth in the average wage is key.

Conclusion

To conclude, I will briefly comment on policies to address the problem of long-term unemployment. One of the overriding lessons that I take away from this body of research is that, if left untreated, long-term unemployment can have hysteresis-type effects on the labor market. A cyclical recovery does not cure the problems created by long-term unemployment. Going forward, I think one of the lasting legacies of the Great Recession is that the labor force participation rate will be about one percentage point lower than it otherwise would have been. This analysis argues in favor of using “overwhelming force” in a deep recession to prevent those who lose their jobs from becoming long-term unemployed in the first place.

Since long-term unemployment

has been so widespread throughout sectors of the economy, “industry-specific” policies are insufficient to solve the problem. In 2012, for example, only 10 percent of long-term unemployed workers were from the construction sector, and only 11 percent were from manufacturing, despite the fact that these industries were hit particularly hard by the Great Recession.

Instead, I would prefer more targeted measures geared specifically toward helping the long-term unemployed stay in the labor force and find employment, such as a tax credit for employers who hire the long-term unemployed or direct employment. There also has been some research to support the notion that volunteering can help jobless workers make new connections, learn new skills, and stay engaged in the labor force. In the United States, job search assistance has typically been found to be effective in helping workers regain employment. I also think wage loss insurance might be worth considering, especially for older long-term unemployed workers.

Lastly, given that many of the long-term unemployed have already left the labor force, we should consider policies that address the structural decline in labor force participation. For example, more family-friendly policies might help greater numbers of women either enter or remain in the labor force. Likewise, reforms to the disability insurance system could possibly prevent some workers from permanently exiting the labor force.

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⁸ K. Kroft, F. Lange, and M.J. Notowidigdo, “Duration Dependence and Labor Market Conditions:

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⁹ R. Ghayad, “The Jobless Trap,” Working Paper, 2013.

¹⁰ Council of Economic Advisers, The Economic Report of the President, Washington D.C.: United States Government Printing Office, 2013, Table 2-1.

¹¹ P.A. Diamond and A. Şahin, “Shifts in the Beveridge Curve,” Federal Reserve Bank of New York Staff Reports No. 687, August 2014.

¹² K. Kroft, F. Lange, M.J. Notowidigdo, and L.F. Katz, “Long-Term Unemployment and the Great Recession: The Role of Composition, Duration Dependence, and Non-Participation,” NBER Working Paper No. 20273, July 2014, and forthcoming, Journal of Labor Economics.

¹³ E.P. Lazear and J.R. Spletzer, “The United States Labor Market: Status Quo or a New Normal?” NBER Working Paper No. 18386, September 2012, and The Federal Reserve Bank of Kansas City’s Jackson Hole Economic Policy Symposium, 2012, pp. 405–51.

¹⁴ S.J. Davis, R.J. Faberman, and J.C. Haltiwanger, “The Establishment-Level Behavior of Vacancies and Hiring,” NBER Working Paper No. 16265, August 2010, and The Quarterly Journal of Economics, 128(2), 2013, pp. 581–622.

¹⁵ Examples include: J.H. Stock, “Discussion of Ball and Mazumder,” Brookings Papers on Economic

¹⁶ A.B. Krueger, “The Labor Market in the Great Recession,” NBER Working Paper No. 18387, September 2012, and The Quarterly Journal of Economics, 128(3), 2013, pp. 1123–67.

¹⁷ R. Ghayad, “The Jobless Trap,” Working Paper, 2013.

¹⁸ Council of Economic Advisers, The Economic Report of the President, Washington D.C.: United States Government Printing Office, 2013, Table 2-1.

¹⁹ P.A. Diamond and A. Şahin, “Shifts in the Beveridge Curve,” Federal Reserve Bank of New York Staff Reports No. 687, August 2014.

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Research Summaries

The Effects of Austerity: Recent Research

Alberto Alesina and Francesco Giavazzi

What are the costs in terms of output losses of so-called “austerity” policies designed to reduce large government deficits and mounting public debt? The debate on this issue is raging, especially after the latest round of austerity in Europe.

The question is difficult to answer for at least three reasons. The first is “endogeneity,” the two-way interaction between fiscal policy and output growth. Suppose you observe a reduction in the government deficit and an economic boom. It would be highly questionable to conclude that deficit reduction policies generate growth, since it could be easily the other way around. Second, major episodes of austerity are often accompanied by changes in other policies: monetary policy, exchange rate movements, labor market reforms, regulation or deregulation of various product markets, tax reforms, and so on. In addition, they are sometimes adopted at times of crisis due to runaway debts, not in periods of “business as usual.” Third, virtually all austerity programs are based upon multi-year plans announced in advance and then revised along the way. To the extent that expectations matter, the multi-year nature of these plans cannot be ignored.

An early literature started by Francesco Giavazzi and Marco Pagano¹ and reviewed and summarized by Alberto Alesina and Silvia Ardagna² reached two conclusions regarding austerity policies in advanced industrial economies. First, expenditure-based adjustments, namely those based upon cutting spending and not raising taxes, or relying less on tax increases than on spending cuts, were found to be much less costly in terms of

output losses than tax-based approaches. Second, expenditure-based adjustments accompanied by an appropriate set of related policies can sometimes be expansionary, even in the short run.

This literature was well aware of the three problems discussed above. The first was initially addressed by considering cyclically adjusted deficit over GDP ratios as measures of fiscal policy. This variable, in principle, should eliminate the effects on deficits of output fluctuations. The second and third problems were addressed in a variety of ways, including case studies.³

In some recent research, we and our coauthors have revisited these questions, and tried to go deeper⁴ than previous work. In order to address the endogeneity problem, we adopt the “narrative method” proposed by Christina Romer and David Romer.⁵ This approach attempts to solve the endogeneity problem by identifying through direct consultation of the relevant budget documents only changes in fiscal policy not implemented to achieve cyclical stabilization, but for other goals. Implementing this technique, Romer and Romer identified episodes of tax changes in the U.S.⁶ Using a similar methodology, Pete Devries, Jaime Guajardo, Daniel Leigh, and Andrea Pescatori identified “exogenous” increases in taxes and spending cuts motivated by the explicit desire to reduce deficits for 17 OECD economies over the period 1980–2007.⁷ Guajardo, Leigh, and Pescatori⁸ analyzed these data and found results broadly consistent with those summarized by Alesina and Ardagna,⁹ although with some variation on the size of the difference between tax increases and spending cuts, depending on monetary policy.

In the previously cited work with Carlo Favero, we address the third problem mentioned above, namely that fiscal adjustments are typically carried out through multi-year plans in which announcements and revisions deeply affect the expectations of economic agents. To begin, we checked the episodes of exogenous fiscal consolidations identified by Devries, et al, and corrected a few inconsistencies. More importantly, we constructed “plans.” By going back to the original sources (National Budget Reports, EU Stability Programs, IMF documents, OECD Economic Surveys, etc.), we reconstructed actions taken at the time an austerity plan was adopted, announcements made at the time of adoption regarding future periods of up to three years, and revisions of these announcements in the actual policies then carried out.

To be more precise, a fiscal plan implemented at time *t* typically contains three components:

- Unexpected shifts in fiscal variables, announced upon implementation at time *t*
- Shifts implemented at time *t* but which had been announced in previous years
- Shifts announced at time *t*, to be implemented in future years

Each year of a fiscal plan is fully characterized by these three components, which we allow to have different effects on macroeconomic variables.

To study the potentially heterogeneous effects of plans depending on their nature, we distinguish between Tax-Based (TB) and Expenditure-Based (EB) plans. A plan is labeled TB if the sum of



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He has written columns for leading newspapers around the world, and has visited at institutions including MIT, Tel Aviv University, Stockholm University, the World Bank, and the IMF. He holds a visiting position at IGIER, Bocconi University.

Born in Italy in 1957, Alesina obtained his Ph.D. from Harvard in 1986 and served as chairman of the department of economics there from 2003–06.

all the tax measures (unexpected, announced in the past and currently implemented, and announced at t for future implementation) measured as a fraction of year t GDP is greater than the sum of the corresponding expenditure measures.

Consider as an example the Australian fiscal plan implemented between 1985 and 1988. The plan was announced in 1985 and consolidation lasted until 1988 with subsequent revisions of the original plan. In 1985 the government announced a sequence of medium-term spending cuts aimed at reducing a large, inherited budget deficit. The initial plan featured no change in taxation and spending cuts of 0.45 percent of GDP in both 1985 and 1986. In 1986, the plan was revised. The new plan called for additional spending cuts of 0.4 percent of GDP to be implemented immediately, that is, in 1986; it also announced a further spending cut of 0.26 percent of GDP to be implemented in 1987 and a small reversal of -0.08 in 1988. Eventually, in 1987, this slight spending reversal was abandoned and replaced by further cuts amounting to 0.37 percent of GDP. Revenue increases were also introduced: an unanticipated tax increase of 0.17 percent of GDP was implemented in 1986, while a further increase of 0.19 percent of GDP, and an almost complete reversal of -0.27, were announced for 1987 and 1988. In each of its four years, this plan is an “EB” plan because expenditure cuts exceed tax increases. This example shows that overlooking pre-announced plans and considering simply unanticipated shifts in fiscal variables would ignore important information available both to firms and to consumers.

When studying fiscal plans, it is important to take into account the correlation between tax changes and spending cuts. Governments never decide the two components in isolation, but design the plan as a whole. For instance, a government may first decide it needs to implement an adjustment of, say, 2 percent of GDP and also decide that 0.5 percent of that adjustment will take place through spending cuts. Once this decision is adopted, tax increases are endogenous: They will amount to $(2-0.5) = 1.5$ percent of GDP. Similarly, one should also consider the correlation between unexpected measures and those announced for future implementation, because they are also jointly determined within a plan. We categorize plans according to what we call their “style,” which reflects the correlation

between unanticipated shifts in fiscal variables and those announced for the future. In some countries — Italy, for example — actions such as spending cuts often are reversed after being implemented. In other countries — Canada, for example — fiscal actions are persistent. Country

| Year | Tax hikes | | | | | Spending cuts | | | | |
|------|------------|----------------------|---------------------------------|-------|-----|---------------|----------------------|---------------------------------|-------|-----|
| | Unexpected | Previously announced | Announced for implementation at | | | Unexpected | Previously announced | Announced for implementation at | | |
| | | | t+1 | t+2 | t+3 | | | t+1 | t+2 | t+3 |
| 1985 | 0 | 0 | 0 | 0 | 0 | 0.45 | 0 | 0.45 | 0 | 0 |
| 1986 | 0.17 | 0 | 0.19 | -0.27 | 0 | 0.4 | 0.45 | 0.26 | -0.08 | 0 |
| 1987 | 0 | 0.19 | -0.27 | 0 | 0 | 0.45 | 0.26 | 0.37 | 0 | 0 |
| 1988 | 0 | -0.27 | 0 | 0 | 0 | 0 | 0.37 | 0 | 0 | 0 |

“styles” are particularly important when we simulate the effect of an unanticipated shift in fiscal variables, amounting, say, to 1 percent of GDP, paired with the announcement of actions to be taken in the future. Omitting announcements would amount to simulating a plan that is not the one actually adopted.

In our work with Favero, we simulate the effect of the average plan implemented over the estimation period (1981–2007).¹⁰ In work with Favero, Omar Barbiero, and Matteo Paradisi,¹¹ we simulate out of sample the plans adopted by various countries since 2010. In the first of these papers, we examine the effect of EB and TB plans on output, private consumption, investment, and consumer and investor confidence for 14 countries: Australia, Austria, Belgium, Canada, Denmark, Germany, Spain, France, United Kingdom, Ireland, Italy, Japan, Portugal and the United States. In our sample, 84 plans are EB and 51 are TB. Although our model with the TB and EB dummies could be sensitive to the categorization of plans into EB and TB, in particular if spending and tax shares were close to 50 percent, this is not the case here. The vast majority of plans in our estimation sample are far from a 50-50. In only three plans is the share of spending cuts between 49 and 51 percent and in only 15 is it between 45 and 55. The share of spending cuts in the average EB plan (in which the average total annual adjustment is 1.36 percent of GDP) is 84 percent, while in the case of TB plans (in which the average total annual adjustment is 0.89 percent of GDP) the share is

76 percent. In the estimated model, the effects of EB and TB adjustments are constrained to be the same across countries. We allow styles to differ across countries, and we allow for parameter differences between euro area and non-euro area countries.

Our main finding is that fiscal adjustments based upon cuts in spending are much less costly, in terms of output losses, than those based upon tax increases. Over our estimation period (1981–2007), the output effect of an average TB adjustment plan with an initial size of one percent of GDP is a cumulative contraction in GDP of two to three percent in the following three years.¹² In contrast, spending-based adjustments generate very small recessions, with an impact on output growth not significantly different from zero. As an example, Figure 1 shows the large differences between the effects of a one percent reduction

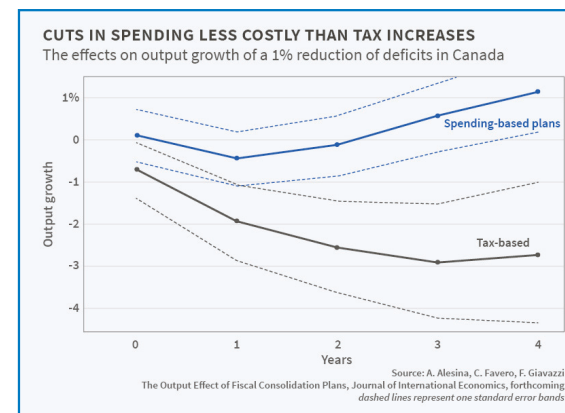


Figure 1

between the effects of a one percent reduction

In our work with Favero, Barbiero, and Paradisi, we extend the dataset up to 2013

for the following countries: Austria, Belgium, Denmark, Spain, France, Germany, United Kingdom, Ireland, Italy, Portugal, and the United States.¹³ The effects of recent episodes of austerity do not look different from previous ones. Out-of-sample simulations of our model projecting output growth conditional only upon exogenous fiscal adjustments do reasonably well in predicting the total output fluctuations of the countries in our sample over the years 2010–13, particularly for those countries in which the main shock in that period was a fiscal policy one. For example, our estimates suggest that the tax-based adjustment implemented in Italy in 2010–13 is sufficient by itself to explain the recession experienced by the country over the period 2011–12, with negative GDP growth of around 2 percent in each year. The expenditure-based adjustments implemented in countries such as the U.K. and Denmark are associated with much milder recessions, with GDP growth fluctuating around zero.

We cannot reject the hypothesis that recent fiscal adjustments had the same effect on output growth as past ones, although in some cases failure to reject is marginal. We do not find sufficient evidence to suggest that the recent rounds of fiscal adjustments have been especially costly for the economy, and we conclude that the fiscal multipliers estimated using data from the pre-crisis period give valuable information about the amount of output loss due to the post-crisis fiscal consolidation measures.

This result is at odds with Blanchard and Leigh,¹⁴ who find that the costs of fiscal adjustments have been higher in recent years than previously estimated. The difference between the two results depends

on a number of factors, including our choice not to constrain consolidations based on spending cuts and those based on increases in government revenues to have identical effects on output.



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Giavazzi is a research fellow of the Center for Economic and Policy Research and a research associate of the National Bureau of Economic Research. Jointly with these organizations and Bocconi University, he contributed to creation of IGIER, the Innocenzo Gasparini Institute for Economic Research.

Giavazzi has served as director general at the Italian Treasury, as a member of the strategic committee of Agence France Trésor, and as an adviser to the President of the European Commission. He chairs the scientific committee of the Centre d'Études Prospectives et d'Informations Internationales and is a member of the Bellagio Group. In 2003, he was the Houblon-Norman Fellow at the Bank of England. He visited the Federal Reserve Bank of New York in 2013 and 2015. He published *Limiting Exchange Rate Flexibility* with Alberto Giovannini in 1989 and *The Future of Europe: Reform or Decline* with Alberto Alesina in 2006.

Giavazzi obtained a degree in electrical engineering from the Politecnico di Milano in 1972 and a Ph.D. in economics from MIT in 1978.

In current work in progress with Favero, Barbiero, and Paradisi,¹⁵ we take our analysis a step further by exploring the potential heterogeneity in the output effects associated with different components of revenues and expenditures. We disaggregate fiscal shocks into four components: government consumption and investments, transfers, direct taxes and indirect taxes. From a theoretical point of view, each of these components should affect GDP growth through different channels. For instance, in the short run, cuts in government consumption and investment might impact GDP growth through demand-side effects; in the medium and long run, their effect on growth might depend on the government's efficiency in providing public goods and services. Transfer cuts reduce the resources available to households, which in turn may be forced to cut consumption, especially if liquidity constrained. These mea-

sures also may have supply-side effects by increasing labor supply. In addition, a reduction in both expenditure components may generate expectations of lower taxes and correspondingly reduced future economic distortions, with potentially positive wealth effects.

The previous literature has addressed the issue of composition primarily by looking at revenues versus spending in the aggregate. Recent papers by Karel Mertens and Morten Ravn,¹⁶ Romer and Romer,¹⁷ and Roberto Perotti¹⁸ are exceptions. However, they focus only on the United States. Our paper presents an international panel of disaggregated fiscal consolidation plans and analyzes their economic effects. Building on the methodology established in our work with Favero, we classify fiscal plans into four categories: direct tax-based, indirect tax-based, consumption-based, and transfers-based.

Our first finding is that plans based on different spending and rev-

enue components indeed have heterogeneous effects on GDP growth, as Figure 2 shows for the case of France. Results for the other countries are similar. While the heterogeneity in revenue components is less pronounced, on the expenditure side transfers seem to be clearly different from consumption and investment. The effect of a cut in transfers is more similar to that of an increase in taxation than to that of a

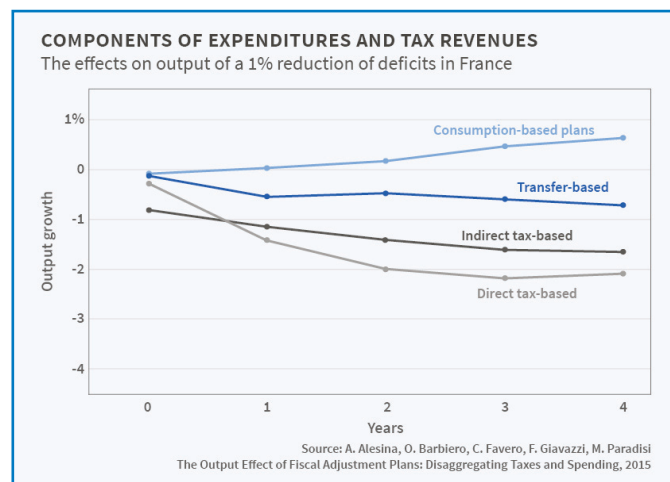


Figure 2

cut in expenditure. Looking at other macroeconomic variables, the similarity between tax hikes and transfers cuts is particularly evident in the case of consumption and consumer confidence. The impact of a cut in transfers on investment is more similar to a cut in government consumption. The overall impact on output growth is more negative than that from a cut in government consumption, but less negative than a tax increase.

Overall, our findings suggest that major fiscal adjustments based upon cuts in government consumption, excluding transfers, are much less costly than tax-based fiscal adjustments in terms of foregone output growth. In fact, cuts in government consumption seem to have virtually no costs in terms of output losses on average — a result which probably balances some recessionary and some expansionary cases. Tax-based fiscal adjustments are very costly in terms of output losses. Cuts in government transfers seem to lie

somewhere in between the extremes of government consumption and tax increases, though they are closer to tax hikes. Perhaps the smaller effect of transfers cuts relative to tax increases may have to do with a supply-side response, but more research is needed on this point. Regarding which tax increases are more costly, direct and indirect taxes seem to have overall similar effects, though this is also an issue to be explored further.

We also find that the differences in tax-based and expenditure-based fiscal adjustments cannot be explained by different responses of monetary policy, although the evidence points to a slightly more expansionary response of monetary policy in the case of expenditure-based adjustments, perhaps because tax-based adjustments tend to raise prices, while expenditure-based adjustments tend to lower them, or because central banks believe that expenditure-based adjustments are more long lasting and credible.

Our findings seem to hold for fiscal adjustments both before and after the financial crisis. We cannot reject the hypothesis that the effects of the fiscal adjustments, especially in Europe in 2009–13, were indistinguishable from previous ones. They certainly show the same relative patterns between tax-based and expenditure-based adjustment. This does not mean, however, that expenditure-based and tax-based plans have identical effects during periods of economic expansion and contraction. This question, in the context of disaggregated fiscal plans, remains hard to answer.

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Campello's research has dealt with issues such as the impact of capital market imperfections on companies, the limits of the firm, product markets, corporate capital structure, monetary policy transmission, financial crises, financial development, and econometrics. His work has been discussed by policy authorities, cited in congressional hearings, and featured in the financial press. Campello earned his Ph.D. in finance from the University of Illinois in 2000, a M.Sc. in business administration from the Pontifical Catholic University of Rio de Janeiro in 1995, and a B.Sc. in economics from the Federal University of Rio de Janeiro in 1991. A native of (sunny) Rio de Janeiro, Brazil, Murillo lives in (snowy) Ithaca, NY. When he is not working, he is playing drums or parenting his two young sons.

Corporate Liquidity Management

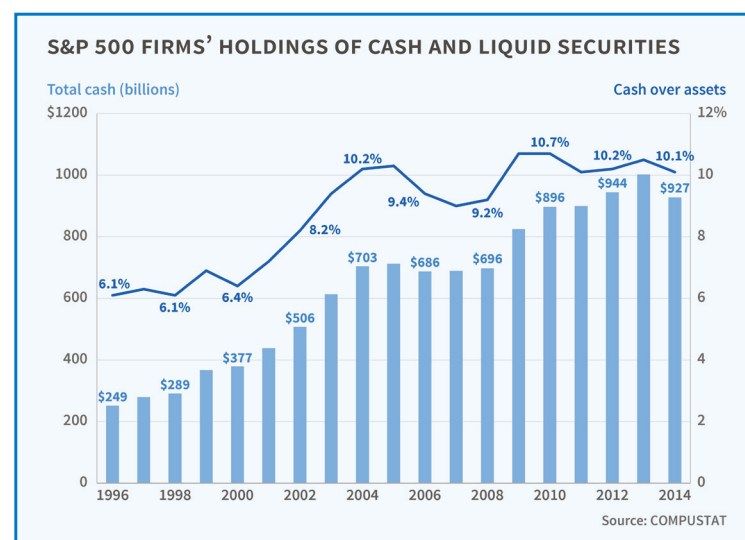
Murillo Campello

The global financial crisis drew fresh attention to the way firms manage liquidity, as credit markets dried up and internal savings became key to corporate survival.

Liquidity management is an old topic; it has been discussed at least since John Maynard Keynes' examination in the 1930s. It attracts much attention today, as large companies world-wide have amassed some \$4 trillion in "idle cash" on their balance sheets. Figure 1 depicts S&P 500 firms' holdings of cash and liquid securities over the last 20 years. The holdings of liquid assets are the highest both in absolute values as well as a fraction of total corporate assets since at least WWII.¹ Apple Inc., alone, has recently reported holding nearly \$180 billion in cash, enough to acquire the combined equity and debt values of its industry rivals, and comparable to the GDP of Portugal or Greece.

Academic work on corporate liquidity took off around 2000. The notion of corporate liquidity management has since evolved to encompass not only how firms administer their cash balances, but how they deal with credit lines, manage their debt capacity, and use derivatives for hedging. Central to this research is the idea that managers use liquidity as a way to maintain financial flexibility if their firms should face difficulties securing funds in the capital markets. In the corporate world, financial flexibility can be key to sustaining firms' real-side operations at close to optimal levels. In that regard, the broad conclusion is that cash remains "king," at least for certain groups of firms. Debt capacity does not provide the same degree of downside pro-

tection as cash, and derivative instruments can only help with a limited set of risks that are traded in the market. While credit lines are good all-around substitutes for cash, firms may still prefer cash when their liquidity risk is systemic in nature, and thus hard for banks to insure. The global financial crisis taught us



that, in bad times, banks are unable to insure against surges in corporate liquidity needs, as banks themselves may experience liquidity shortages too.

Is There an "Optimal Level" of Cash?

There is a general fascination with the level of cash companies carry on their balance sheets. Various figures are discussed in the media, among academics, practitioners, and even in Federal Reserve Board meetings. But this focus on — or search for — the optimal corporate cash level may be misplaced.

In practice, the literature's focus on cash has been driven by lack of data on alternative mechanisms of liquidity provision such as credit lines and derivatives-based hedging. Now, however, it is becoming possible to incorporate data associated with these other

mechanisms into the analysis of corporate liquidity. For example, recent studies have documented that the existence of undrawn credit lines can add substantially to a firm's liquidity. Firms that hold undrawn credit lines also hold some cash, but firms without access to credit lines hold significantly more cash.² Credit line facilities, too, add up to trillions of dollars nowadays and the message one should take from this is that the cash balances are a by-product of trade-offs that firms face in dealing with their liquidity needs. There should be less focus on observed cash balances per se, and more awareness that cash management is just one piece of a multi-faceted process.

In joint work, Heitor Almeida, Michael Weisbach, and I proposed looking beyond corporate cash levels to examine how firms handle their marginal savings decisions.³ We look at why firms may choose to save funds from operating cash flows, and which firms are likely to do so. We show that firms can engage in very active liquidity management processes independent of the level of cash shown on their balance sheets.

We model and discuss a concept that we dub "the cash flow sensitivity of cash." In essence, we isolate the fraction of incremental cash flows that firms retain as additional cash in each period. In our model, firms with easy access to fairly-priced external funds ("financially unconstrained firms") invest at first-best levels. As such, cash flow innovations have no effect on investment spending. Firms facing financial constraints, on the other hand, need to channel part of their cash flow into savings as a way to increase their ability to invest today and in the future. The fraction of cash flows that a firm retains will reflect management's view as to whether the firm is likely to have profitable investment opportunities and whether the capital markets will provide sufficient, fairly-priced financing for those investments.

We perform a number of tests of the hypothesis that a firm's cash balance depends positively on its cash flow, a situation that indicates the existence of financial constraints. Using a large sample of U.S. companies, we show that firms that are small, that do not pay dividends,

and that do not have rated bonds or commercial paper ("constrained firms") display a pronouncedly positive association between cash flows and cash savings. Financially unconstrained firms, in contrast, display no such savings sensitivity. These patterns have since been reported in a number of studies, including some analyzing data from other countries.⁴

Cash versus Debt Capacity

Firms can use external debt to fund their projects even when they face some financial constraints. In these situations, too, cash policy can be quite active, with corporate savings responding to firms' needs to optimize debt policy across time and economic environments. I studied this type of problem in work with Viral Acharya and Almeida.⁵ We look jointly at firms' cash and debt policies, identifying key differences between "savings" in the form of cash accumulation and in the form of built-up debt capacity. When facing financing constraints, firms may use up their debt capacity even when they have enough internal cash to fund current investments. The reason is that if constrained firms' future cash flows are low, they likely will be shut out of the credit markets, interrupting their investment plans. If they have conserved cash, on the other hand, firms are able to continue their investment plans over time. Our theory is substantiated by empirical analysis showing that cash is not equivalent to "negative debt" for firms facing financial constraints. Cash uniquely allows constrained firms to maintain financing capacity across good and bad states of the world.

Alternative Forms of Liquidity

The foregoing work shows that cash creates financial flexibility because it ensures liquidity. Other forms of financing that rely on spot contracting, such as equity issuance and commercial paper borrowing, share the same drawback as reliance on debt capacity: Access may not be there when firms need it most. However, cash is not the only way in which firms can access pre-

committed financing.

Derivative instruments can substitute for cash holdings in securing the continuity of the investment process because they transfer cash flows to states of the world in which liquidity is needed.⁶ In a 2011 study, Chen Lin, Yue Ma, Hong Zou, and I explore how hedging affects access to external funding and investment.⁷ We argue that when firms hedge with derivatives, they make commitments that lower the cost of financial distress and reduce their odds of going bankrupt, which enhances their access to bank credit. Consistent with this idea, we show that firms with active hedging programs in place face lower loan spreads. Importantly, the terms of their loan contracts become more lax, with credit facilities placing far fewer covenants on their investment decisions.

Bank credit lines can be structured so as to replicate derivative instruments that ensure corporate access to liquidity. The key feature of a credit line is that it allows a firm to access pre-committed financing up to a certain quantity in exchange for the payment of a commitment fee. Notably, the degree to which this insurance works in practice has limitations; for one thing, lines can be revoked by the bank if the situation at the firm materially deteriorates (MAC clauses). But, critically, credit line-based liquidity management relies on the ability of the banking sector to honor drawdowns. This can be problematic if corporate liquidity needs and banking sector shortages are correlated.

In a 2013 paper, Acharya, Almeida, and I use this insight to derive key predictions about the choice between cash and credit lines.⁸ We show that the most efficient liquidity allocation is one in which firms with idiosyncratic liquidity risk use more credit lines, while firms with more systematic risk exposure rely more on cash. The reason is that while banks are natural candidates to insure the liquidity needs of the first group of firms, they may at times be unable to insure the needs of the latter. Cross-sectional analyses using U.S. data over several decades yield results consistent with our predictions. Time-

series analyses further show that firms' cash reserves rise in times of high aggregate volatility. At such times, credit line initiations fall, their spreads widen, and maturities shorten.

The Role of Liquidity When Capital Markets Collapse

The relation between corporate liquidity and real activity came to the forefront of the academic and policy debate during the global financial crisis. The credit market breakdown started in 2008 and became acute in the spring of 2009. Firms' inability to obtain external funding allowed researchers to look at corporate liquidity management at a time of acute liquidity scarcity.

In the fall of 2008, as the crisis started to engulf the economy, John Graham, Cam Harvey, and I sent out survey questionnaires to thousands of CFOs in 39 countries asking them about their corporate plans for the coming year.⁹ These data provided us uniquely forward-looking information about corporate liquidity management, and they revealed that managers thought of internal liquidity as a way to guard against a crash that was about to happen. We found that, in anticipation of a severe liquidity contraction, financially constrained firms put together plans to cut their cash stocks by as much as 15 percentage points, compared to only 2 percentage points, on average, among financially unconstrained firms. These planned cuts in liquidity were accompanied by other major changes. In particular, constrained firms reported plans to reduce employment (by 11 percent), technology spending (by 22 percent), capital investment (by 9 percent), as well as cash dividend payments (by 14 percent) in the year ahead. Financially unconstrained firms, in contrast, reported much milder changes in their planned policies for 2009. Notably, firms reported plans to resort to their bank credit facilities — drawing unprecedented amounts of cash from their lines — as a way to insulate against the effects of the crisis.

After gathering information on how access to funds modulated corporate plans during the crisis, Graham, Harvey, and

I teamed up with Erasmo Giambona to assess how firms chose between different liquidity instruments.¹⁰ We used a new series of CFO surveys to gauge how firms' cash positions and cash flow impacted their access to credit lines and their plans with regard to saving. Pre-2008 cash positions proved to be of paramount importance. For firms coming into the crisis with healthy cash balances, cash flows had no bearing on their access to bank credit lines. Only the firms with low cash exhibited a positive correlation between operating cash flows and credit line access. Notably, firms with more cash had their investment plans boosted by greater access to credit lines. At the same time, lack of access to credit lines forced firms to choose between saving and investing. In the absence of pre-crisis savings, access to credit lines was crucial in allowing firms to invest and to survive in the years ahead. Our work extended to Europe, where bank-based economic systems made credit line access particularly important for corporate financing during the global downturn.¹¹ These analyses show that corporate liquidity management should not be restricted to the study of corporate cash, and that credit lines can play a fundamental role in insuring firms' access to liquidity in difficult times.

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Student Borrowing: Debt, Default, and Repayment

Lance Lochner

Three significant economic trends in the United States and other developed countries have altered the landscape of higher education substantially in recent decades, with important implications for student borrowing and repayment behavior, Alex Monge-Naranjo and I argue in a series of recent papers.¹ First, the costs of college have increased markedly, even after accounting for inflation and expansions in student aid. Second, average returns to college (net of tuition payments) have increased sharply. Third, labor market uncertainty has increased considerably, highlighted by the Great Recession.

The first two trends, rising costs and returns to college, have contributed to a dramatic increase in demand for student loans. Annual student borrowing levels doubled in the 1990s and then again over the next decade.² Combined government and private student debt levels in the U.S. quadrupled from \$250 billion in 2003 to \$1.1 trillion in 2013, reflecting sizeable increases in both the incidence of debt and debt levels among borrowers.³

Figure 1 documents the changing distribution of cumulative debt among U.S. baccalaureate recipients since 1989–90. The fraction of college graduates borrowing less than \$10,000, including non-bor-

rowers, declined from over 70 percent to less than 40 percent, while the fraction of college graduates borrowing more than \$30,000 rose from 4 percent to 30 percent.⁴

The steady rise in student borrowing over the late 1990s and 2000s masks the fact that government student loan limits remained unchanged (in nominal dollars) between 1993 and 2008. Adjusting for inflation, this reflects a nearly 50 percent decline in value. In 2008, aggregate Stafford loan limits for dependent undergraduate students jumped from \$23,000 to \$31,000, although this value was still less than the 1993 limit after accounting for inflation. Not surprisingly, the share of full-time/full-year undergraduates that maxed out Stafford loans increased more than five-fold from 1989–90 to 2003–04.⁵ Undergraduates turned more and more to private lenders to help finance their education prior to the 2008 increase in federal student loan limits and contemporaneous collapse in private credit markets. Undergraduate borrowing from non-federal sources peaked at 25 percent of all undergraduate borrowing. Despite this increase in private lending, there are reasons for concern that a growing fraction of youth from low-income and even middle-income backgrounds are unable to access the resources they need to attend college.⁶

At the same time, there are concerns that many recent students are taking on too much debt. Growing levels of debt, coupled with rising labor market uncertainty and the last recession have led to a sharp increase in student loan default rates after more than a decade of decline. Borrowers who are 270 days or more (180 days or more prior to 1998) late on their Stafford student loan payments are consid-



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He serves as co-coordinator of the Markets Network of the Human Capital and Economic Opportunity Global Working Group, an international research network devoted to studying issues central to financing human capital investment. He is also an editor at the *Journal of Labor Economics* and associate editor at the *Journal of Applied Econometrics*.

Lochner's research is largely devoted to the study of human capital formation throughout the life-cycle and to understanding criminal behavior. Previous and current research explores the interaction between human capital and criminal behavior; financial returns to schooling; human capital acquisition from birth to retirement; the evolution of earnings, skills, and inequality; and issues related to financing education, with a particular emphasis on the role of student loans.

Lochner received his Ph.D. in economics from the University of Chicago in 1998. He lives in London, Ontario, with his wife and nine-year-old daughter, and enjoys playing tennis, biking, and travel adventures with his family.

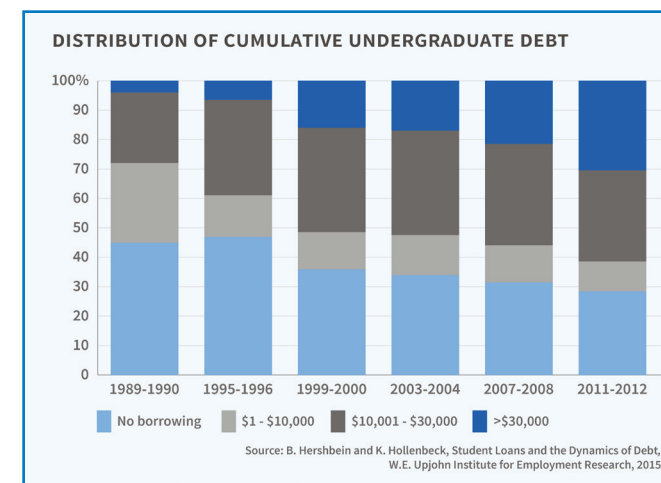
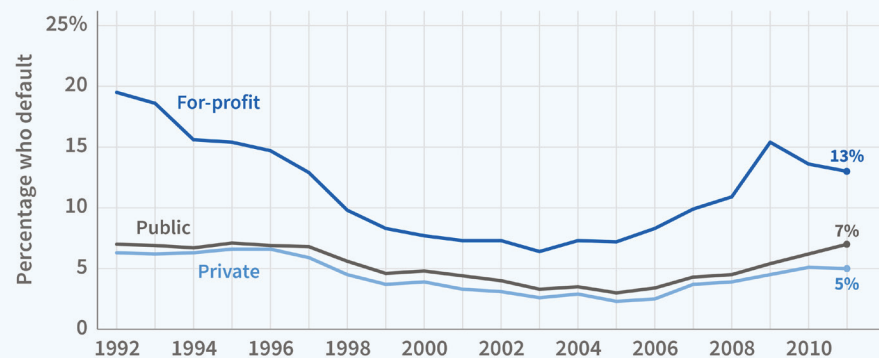


Figure 1

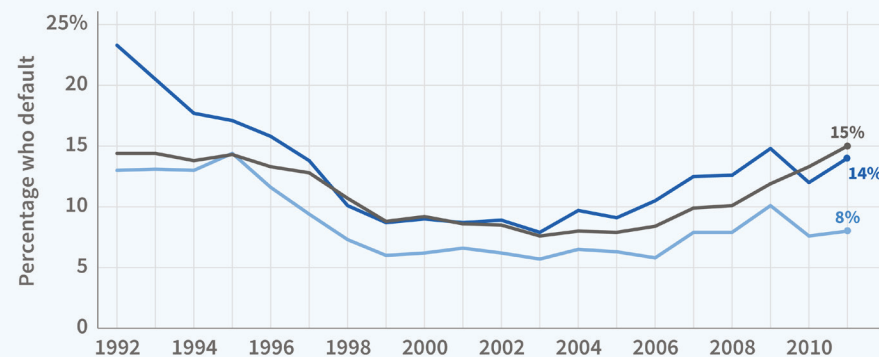
STUDENT LOAN DEFAULT RATES ON THE RISE

Two-year official cohort default rates

Four-year institutions



Two-year institutions



Source: L. Lochner and A. Monge-Naranjo, NBER Working Paper No. 20849

Figure 2

ered to be in default. Figure 2 shows that two-year cohort default rates more than doubled between 2005 and 2011, with default rates increasing most at for-profit institutions and public two-year schools.

Altogether, these trends raise two seemingly contradictory concerns: Can today's college students borrow enough? Or, are they borrowing too much? Growing evidence suggests that both concerns are justified, with important implications for the design of student loan programs.

Can College Students Borrow Enough?

Monge-Naranjo and I document that the rising costs and returns of college, coupled with declining real government student loan limits,

make it likely that credit constraints have become more salient in recent years.⁷ Indeed, one in three full-time/full-year undergraduates in 2003–04 exhausted their Stafford loan options.⁸ While many students have turned to private lenders for additional credit, the increased supply of private student credit was likely inadequate to satisfy the growing demands of many potential students. For example, private lenders typically require a co-signer for undergraduates, which leaves few alternatives for those whose parents have low income or a poor credit record.

Evidence on college-going further suggests an important increase in the extent to which credit constraints discouraged post-secondary schooling over the 1980s and 1990s. My research with Philippe Belley uses data from the National Longitudinal Surveys of Youth

to compare the relationship between family income and college attendance between cohorts completing high school in the early 1980s and the early 2000s.⁹ Consistent with previous studies,¹⁰ we estimate a weak relationship between family income and college-going for the earlier cohort. However, youth from high-income families in the later cohort are 16 percentage points more likely to attend college than their low-income counterparts, conditional on adolescent achievement and family background—roughly twice the gap observed for the earlier cohort. We further estimate that family income has become an important determinant of attendance at four-year (relative to two-year) colleges.

Uninsured labor market risk can discourage education in much the same way as credit constraints. Youth from low-income families may be unwilling to take on large debts to cover the costs of college when there is a possibility that they will not find good jobs after leaving school. By helping former students weather unexpected adverse labor market outcomes, explicit insurance mechanisms like unemployment insurance or student loan deferments and implicit insurance mechanisms such as the option to default on student loans can substantially affect the demand for credit and education.

Do Some Students Borrow Too Much?

An efficient student lending scheme should yield the same ex ante expected return from all borrowers even if ex post returns differ due to unpredictable labor market outcomes.¹¹ While the focus of considerable attention, default during the first few years following school provides only a limited picture of lifetime payments and expected returns to lenders, since many students cycle through repayment and nonpayment states such as default and deferment during the first few years after school.

Using data from the 1993–2003 Baccalaureate and Beyond Longitudinal

Study (B&B), Monge-Naranjo and I analyze several different repayment and nonpayment measures to learn about the long-term expected returns/losses on student loans taken out by different types of college graduates.¹² Our analysis simultaneously controls for individual and family background factors, college major, postsecondary institution characteristics, student debt levels, and post-school earnings.

Our results reveal considerable differences in ex ante expected losses across borrowers from different backgrounds and across those choosing different college majors. Most notably, race is correlated with student loan repayment and nonpayment. Ten years after graduation, black borrowers owe 22 percent more on their loans, are 9 percentage points more likely to be in nonpayment, and are in nonpayment on roughly 16 percent more of their undergraduate debt than white borrowers. These significant gaps cannot be explained by differences in choice of major, college type, or student debt levels.

While modest in comparison to differences between blacks and whites, there are also important differences in repayment or nonpayment across college majors. Students in engineering, health, and business programs perform well; humanities and social science majors perform relatively poorly. Differences in default by school type (public, private, for-profit) were insignificant for our sample of college graduates.

Although student debt levels and post-school income are both important determinants of repayment problems—an additional \$1,000 in debt can be roughly offset by an additional \$10,000 in income—differences in these factors explain surprisingly little of the observed variation in repayment/nonpayment rates by race and college major.

While rarely acknowledged, personal savings and family assistance can serve as important sources of insurance for some student borrowers,

influencing their post-school repayment behavior. Combining administrative data on student loan amounts and repayment with data from the Canada Student Loan Program's (CSLP) 2011–12 Client Satisfaction Surveys (CSS), Todd Stinebrickner, Utku Suleymanoglu, and I empirically examine the links between a broad array of available resources—income, savings, and family support—and student loan repayment in Canada.¹³

More than one-in-four CSLP borrowers in their first two years of repayment were experiencing some form of repayment problem at the time of the CSS. CSLP borrowers earning more than \$40,000 per year had non-payment rates of only 2 to 3 percent, while borrowers with annual incomes of less than \$20,000 were more than ten times as likely to experience a repayment problem. These sizeable gaps remain even after controlling for differences in demographic characteristics, educational attainment, views on the consequences of non-payment, and student debt.

Despite high nonpayment rates for borrowers with low post-school income, more than half of this group continued to make their standard student loan payments. Personal savings and family support are crucial to understanding this. Fewer than 5 percent of low-income borrowers with both savings and family support experienced a repayment problem, compared to 59 percent of low-income borrowers with negligible savings and little or no family help. Consistent with the hypothesis that savings and family transfers are important insurance mechanisms, we find that the likelihood of repayment problems is unrelated to post-college earnings for those with modest savings and access to family assistance. By contrast, among borrowers with negligible savings and little or no family assistance, the effects of income on repayment are extremely strong. This signals important gaps in the insurance provided by current student loan programs. Finally, we demonstrate that

measures of parental income when students first borrow are a poor proxy for these other forms of self- and family-insurance, suggesting that efforts to measure savings and potential family transfers accurately offer tangible benefits.

Designing Efficient Student Loan Programs

In our most recent work, Monge-Naranjo and I consider the efficient design of student lending programs in an environment with uncertainty and common market imperfections that limit the extent of credit and insurance that can be provided.¹⁴ Efficient student loan programs must perform a difficult balancing act. They must provide students with access to credit while in school and help insure them against adverse labor market outcomes after school; however, they must also provide incentives for students to report their income accurately, exert efficient levels of effort during and after school, and generally honor their debts. They must also ensure that creditors earn an acceptable rate of return on their loans.

Based on our analysis, we discuss important lessons for the design of government student loan programs. For example, efforts to better equate expected repayments across borrowers by linking borrowing limits to observable characteristics and educational choices can improve the efficiency of lending programs and reduce default levels. Integrating the monitoring and collection efforts with other government collections (e.g. Social Security or income taxes) can yield similar benefits by reducing income verification and repayment enforcement costs.

We underscore the importance of recognizing the response of private lenders to changes in public higher education policies. Increased public investments in higher education may be met with additional private student lending if those investments improve post-college labor market opportunities.¹⁵ More importantly, government

loan programs that offer similar terms to borrowers of different ex ante risk levels may be undercut by private creditors, leaving government programs with only the riskier borrowers.¹⁶

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³ Z. Bleemer, M. Brown, D. Lee, and W. van der Klaauw, “Debt, Jobs, or Housing: What’s Keeping Millennials at Home?” Federal Reserve Bank of New York Staff Report No. 700, November 2014.

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⁴ *Students leaving school with lesser (or no) degrees acquire much less debt as shown by P. Steele and S. Baum, “How Much are College Students Borrowing?”* New York, NY: College Board Publications, 2009.

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⁸ L. Berkner, *Trends in Undergraduate Borrowing: Federal Student Loans in 1989–90, 1992–93, and 1995–96*, Washington, D.C.: U.S. Department of Education, National Center for Education Statistics, NCES 2000-151, 2000; C.C. Wei and L. Berkner, *Trends in Undergraduate Borrowing II: Federal Student Loans in 1995–96, 1999–2000, and 2003–04*, Washington, D.C.: U.S. Department of Education, National Center for Education Statistics, 2008.

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¹¹ L. Lochner and A. Monge-Naranjo, “Student Loans and Repayment: Theory, Evidence and Policy,” NBER Working Paper No. 20849, January 2015.

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¹⁴ L. Lochner and A. Monge-Naranjo, “Student Loans and Repayment: Theory, Evidence and Policy,” NBER Working Paper No. 20849, January 2015.

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¹⁶ L. Lochner and A. Monge-Naranjo, “Student Loans and Repayment: Theory, Evidence and Policy,” NBER Working Paper No. 20849, January 2015.

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Determinants of Creativity and Innovation — Evidence from Economic History

Petra Moser

Innovation and creativity are the primary source of improvements in human welfare. Yet, due to two major empirical challenges, it is difficult to determine the factors that encourage creativity and innovation. First, modern settings often lack clean experimental variation, because policies designed to encourage innovation adapt in response to lobbying, which makes it difficult to identify causal effects. Second, innovation and creativity are exceedingly hard to measure. For example, patent counts are the standard measure of innovation, but they fail to capture important innovations that occur outside of the patent system, for example in countries without patent laws. Excluding such developments may distort economists’ views on the determinants of innovation.

My research addresses these identification and measurement challenges by exploiting a wealth of historical events that changed intellectual property laws and other policies independently of changes in innovation. In practice, this research approach combines in-depth analyses of historical records with statistical tests of large data sets. For example, I exploit a large amount of credibly exogenous variation in national patent laws in the 19th century — before interest groups had begun to lobby for changes in patent policy — to analyze data on innovations with and without patents that were exhibited at world fairs.¹ Complementary research uses the Nazi’s decision to dismiss all Jewish scientists to examine the effects of high-skilled immigrant scientists on U.S. innovation.² Another proj-

ect exploits variation in the timing of Napoleon’s military victories to examine the effects of copyrights on Italian opera.³

Does Existence of a Patent System Encourage Innovation?

My research addresses a central question in economic history: Has the creation of property rights in ideas encouraged innovation and economic growth? A strong tradition argues that secure property rights built the foundation for the industrial revolution in Britain and the United States.⁴ Innovation is, however, a cumulative process and strong property rights for early generations of inventors reduce payoffs for those in later generations.⁵ These costs are particularly severe if patents are broad and their boundaries uncertain, so that later generations are continuously at risk of infringing on existing patents. Recent patent wars over smart phones and tablet computers have moved these issues to the forefront of policy debates, but the underlying tensions are more general. My research exploits historical variation in 19th century patent laws — when countries such as Switzerland and the Netherlands had not yet adopted patent laws or had abolished them for political reasons — to investigate the effects of patent laws on innovation.

To measure effects on innovation, I construct historical data sets to capture innovations that occur within and outside of the patent system. Patent data fail to capture all such innovations, which compromises their use in empirical analyses of the effects of patent laws. To address this



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Moser combines empirical methods from economic history and applied microeconomics to examine the determinants of technological innovation and artistic creativity. She has used historical variation in patent laws to examine the how patent policies can influence the rate and direction of technical change, as well as the geography of innovation. Her research also examines the role of human capital — in the form of high-skilled immigrant scientists — on innovation. New projects investigate the effects of copyrights on creativity in literature and music, and explore the link between mental disorders and innovation.

Moser received her Ph.D. in economics from the University of California, Berkeley, and an M.A. in international relations from Yale University. As an undergraduate, she studied economics, with minors in politics and European languages, at the University of Tübingen in Germany and as a Fulbright student at the University of Missouri.

Moser grew up in a tiny medieval town in Germany, close to the Moselle Valley, and still enjoys running the local hills. This summer, she and her family have moved to Brooklyn, and are excited to explore their new neighborhood, hot dog stands and all.

major data constraint, I have used exhibition catalogues for the 1851 world technology fair in London [Figure 1] and the 1876 U.S. Centennial Exhibition in Philadelphia to collect detailed historical information on nearly 20,000 innovations with and without patents, including their industries, locations, and whether they won a prize for being particularly innovative.

These data indicate that the existence of a national patent system may not be necessary to encourage innovation. In 1851, for example, Switzerland contributed twice as many exhibits per capita as the other European countries, and won a disproportionate number of prizes for being especially innovative, even though it had no patent system. Exhibition data show that only a small share of innovations were patented,⁶ calling into question the role of patents in encouraging the Industrial Revolution. In 1851, just 11 percent of British exhibits and 15 percent of U.S. exhibits were patented.

The exhibition data also indicate that the share of innovations covered by patents varied significantly across industries. Fewer than 5 percent of Britain's chemical exhibits in 1851 and 10 percent of scientific instruments were patented, compared with 20 percent of manufacturing machinery. Remarkably, U.S. inventors relied on and avoided patents in the same industries as British inventors despite vast differences in national patent laws.

Rather than increasing the number and the quality of innovations, patents appear to influence the direction of technical change. Exhibition data reveal that innovations in countries without patent laws were concentrated in a narrow set of industries, such as scientific instruments, food processing, and chemicals, where innovations were difficult to reverse engineer, so that secrecy offered an effective

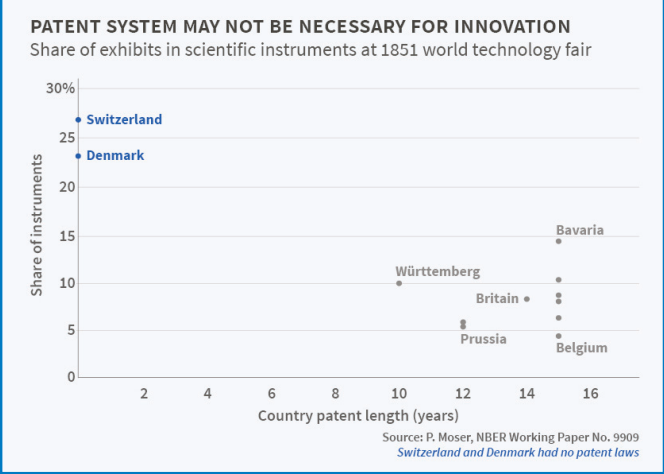


Figure 1

mechanism to protect intellectual property.⁷

Scientific breakthroughs, such as the development of the periodic table, which reduced the effectiveness of secrecy, created an exogenous shift towards patenting in chemicals without affecting other industries. I exploit this shift to examine historical data on the geographic location of innovations and workers. This analysis indicates that shifts toward patenting can encourage the *diffusion*, if not the level, of inventive activity.⁸

Complementary research on incentive prizes, which links exhibits with patents and the records of the *Scientific American*, the premiere science journal of the time, shows that prizes can be an effective alternative to patents, if they publicize promising research ideas.⁹ Extensions of this research examine the

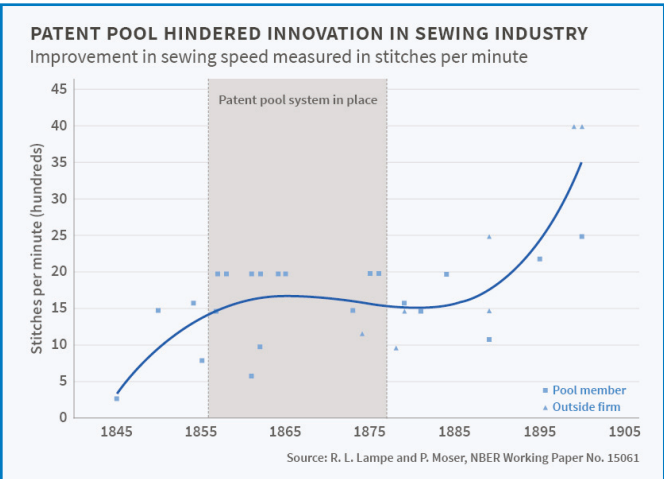


Figure 2

role of intellectual property rights in encouraging biological innovation,¹⁰ and use field trial data to measure variation in the size of patented inventions.¹¹

Patent Pools and Compulsory Licensing

If patent laws fail to encourage innovation, can they be modified to become more effective? One potential mechanism to reduce litigation risks is the creation of a patent pool, in which firms combine pat-

ents for complementary parts of the same technology; pool members can then license all patents as a package to outside firms. In recent years, pools have formed across many technologies, ranging from tablet computers to diagnostic kits for breast cancer. Yet their effects on innovation are poorly understood. My research with Ryan Lampe uses the example of the first patent pool in U.S. history, the Sewing Machine Combination (1856–77) to examine the effects of a pool on the creation of new technologies. An analysis of patents, firm entry, and quantitative measures for improvements in sewing speed suggest that innovation declined with the formation of the pool.¹² [Figure 2] We also find that the creation of a pool can divert R&D towards inferior technologies that allow non-members to avoid direct competition with the pool. These effects are particularly severe if pools increase litigation risks for non-members or if they create a system of differential license fees that put members at a disadvantage.¹³ Both of these traits are common features in modern pools. These findings are confirmed in a large-scale analysis of 20 pools that formed under the New Deal.¹⁴

Another prominent policy mechanism is compulsory licensing, which allows governments to license foreign-owned patents to domestic firms without the consent of foreign patent owners. Emerging economies, such as India, Brazil, and Thailand have used this policy to improve access to HIV medications and other essential innovations covered by foreign-owned patents. Because of its potentially significant implications for consumer welfare, compulsory licensing is one of the most controversial topics in intellectual property policy today. Yet, there is almost no systematic, empirical evidence on the effects of compulsory licensing. My research with Alessandra Voena provides such evidence by exploiting an exogenous episode of compulsory licensing in 1918, when the United States decided to subject all enemy-owned patents to compulsory licensing. [Figure 3] In the United States, compulsory licensing led to a 20 percent increase in patenting by domestic inventors, who were allowed to produce and improve German-owned technologies.¹⁵ Notably, compulsory licensing also encouraged invention in Germany, possibly by increasing the threat of entry in research fields that had been dominated by a small number of firms.¹⁶

Along with intellectual property rights, science and immigration policies are critical levers that help determine innovation. Biographical evidence suggests that German Jewish scientists who fled Nazi Germany revolutionized American science. In physics, émigrés such as Edward Teller and Hans Bethe formed the core of the Manhattan Project, but due to the strategic nature of their work, it is impossible to quantify their contributions. In chemistry, patents are an effective mechanism to protect intellectual property, and patent counts create a useful proxy for changes in innovation.

Émigré Scientists and U.S. Innovation

Along with intellectual property rights, science and immigration policies are critical levers that help determine innovation. Biographical evidence suggests that German Jewish scientists who fled Nazi Germany revolutionized American science. In physics, émigrés such as Edward Teller and Hans Bethe formed the core of the Manhattan Project, but due to the strategic nature of their work, it is impossible to quantify their contributions. In chemistry, patents are an effective mechanism to protect intellectual property, and patent counts create a useful proxy for changes in innovation.

An analysis of historical patents suggests that U.S. invention increased by 31 percent in fields in which émigrés were active inventors.¹⁷ New inventor-level data indicate that émigrés encouraged U.S. invention by training younger scientists and by attracting U.S. scientists to research in émigrés' fields.

Can Copyrights Encourage Creativity?

Another alternative policy mechanism is the copyright, which creates much narrower property rights than a patent and may thereby avoid many problems with the current patent sys-

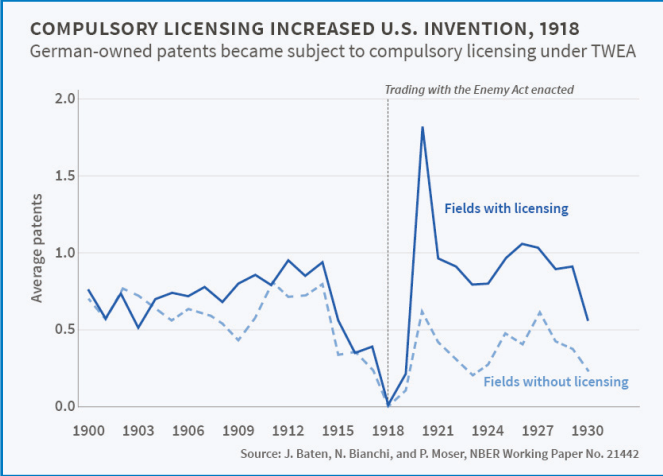


Figure 3

tem. However, systematic empirical evidence on copyrights is scarce due to a lack of experimental variation and to severe selection problems. At copyright lengths of 95 years for corporate owners, modern copyrights are extremely long-lived, which implies that commercially viable works that are *off* copyright today are an extremely selected sample of durable works. Nicknames for modern laws, such as the 1998 "Mickey Mouse Protection Act" bear witness to intense lobbying, which makes it difficult to disentangle the causal effects of copyright policies and other forces that may affect innovation.

My research with Xing Li and Megan MacGarvie addresses these issues by exploiting historical variation in copyrights. Our analysis of copy-

rights in literature exploits an unintended differential increase in the length of U.K. copyrights in 1814 — in favor of dead authors — to examine the effects of longer copyrights on book prices in Romantic Period England.¹⁸ We show that extensions in the length of copyright protection led to a significant increase in the price of books by dead authors. Archival data on contract negotiations show that payments to authors also increased after 1814, suggesting that copyright protection can benefit authors.¹⁹

To examine the effects of copyright on creativity, Michela Giorcelli and I exploit variation in the timing of Napoleon's military victories to examine the effects of copyright protection on the production of Italian operas.²⁰ Italian states that came under French influence by 1801 adopted French copyright laws, while states that came under French influence after 1804, when France's parliament adopted its *code civil*, did not adopt copyright laws. Giorcelli and I find that composers produced substantially more operas after the adoption of copyright laws. Composers also began to produce higher-quality operas, as measured through both historical popularity and longevity. Interestingly, the data yield no evidence that copyright *extensions* encourage creativity.

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NBER News

38th Annual NBER Summer Institute

The NBER hosted its 38th annual Summer Institute during a three-week period in July 2015. There were more than 2,600 registered participants, and 512 research presentations. More than 20 percent of those who attended the meetings were first-time Summer Institute participants; roughly one third were NBER affiliates.

Alan Krueger of Princeton University, the past chair of the President’s Council of Economic Advisers and a current research associate, delivered the 2015 Martin Feldstein Lecture, addressing the question “How Tight is the Labor Market?” He explored the challenge of measuring the number of long-term unemployed

workers and estimating the extent to which the behavior of these individuals is affected by public policies and labor market conditions. An [edited text](#) of his lecture appears earlier in this issue of the *NBER Reporter*.

A [panel discussion](#) during the International Finance and Macroeconomics Program provided a timely opportunity for researchers to assess developments in the Greek financial crisis. Research associates Susan Athey and Guido Imbens of Stanford University delivered the 2015 Methods Lectures on “Economic Applications of Machine Learning.” These lectures focused both on the econometric issues that arise in esti-

mating machine learning models and on the applications of these models in fields such as industrial organization and health economics. All three of these presentations have been videotaped and posted on the NBER website under the “[NBER Videos](#)” Tab.

Summer Institute participants represented 440 institutions, an increase of nearly one third from just a few years ago. The Summer Institute is highly decentralized, with 55 distinct meeting sessions organized by 119 different researchers. A complete list of sessions from the 2015 Summer Institute may be found at: <http://nber.org/confer/2015/SI2015/SI2015.html>

Conferences

International Seminar on Macroeconomics

The NBER’s 38th International Seminar on Macroeconomics took place in Zürich, Switzerland on June 26–27. The seminar was organized by research associates Jeffrey Frankel of Harvard University, Francesco Giavazzi of Bocconi University, Héléne Rey of London Business School, and Kenneth West of University of Wisconsin–Madison. These papers were discussed:

- **Tarek A. Hassan**, University of Chicago and NBER; **Thomas Mertens**, New York University; and **Tony Zhang**, University of Chicago, “Not so Disconnected: Exchange Rates and the Capital Stock” (NBER Working Paper No. 21445)
- **Lorenzo Bretscher** and **Christian Julliard**, London School of Economics, and **Carlo Rosa**, Federal Reserve Bank of New York, “Human Capital and International Portfolio Diversification: A Reappraisal”
- **Harris Dellas** and **Dirk Niepelt**, University of Bern, “Sovereign Debt with Heterogeneous Creditors”



- **Anton Korinek**, Johns Hopkins University and NBER, and **Damiano Sandri**, International Monetary Fund, “Capital Controls or Macroprudential Regulation?” (NBER Working Paper No. [20805](#))
- **Javier Bianchi**, University of Wisconsin–Madison and NBER; **Chenxin Liu**, University of Wisconsin–Madison; and **Enrique G. Mendoza**, University of Pennsylvania and NBER, “Phases of Global Liquidity, Fundamentals News, and the Design of Macroprudential Policy”
- **Luigi Guiso**, Einaudi Institute for Economics and Finance; **Helios Herrera**, HEC Montréal; and **Massimo Morelli**, Columbia University and NBER, “Cultural Differences and Institutional Integration”
- **Joel David**, University of Southern California, and **Ina Simonovska**, University of California, Davis, and NBER, “Correlated Beliefs, Correlated Returns, and the Cross-Section of Stock Market Volatility”
- **Stephen Hansen**, Universitat Pompeu Fabra, and **Michael McMahon**, University of Warwick, “Shocking Language: Understanding the Macroeconomic Effects of Central Bank Communication”

Summaries of these papers are at: <http://www.nber.org/confer/2015/ISOM15/summary.html>

Japan Project Meeting

The NBER in collaboration with the Center for Advanced Research in Finance, the Center on Japanese Economy and Business, and the Australia-Japan Research Centre held a meeting on the Japanese economy in Tokyo, Japan on July 30–31. Shiro Armstrong, Australian National University; Charles Horioka, Osaka University and NBER; Takeo Hoshi, Stanford University and NBER; Tsutomu Watanabe, University of Tokyo; and David Weinstein, Columbia University and NBER, organized the meeting. These papers were discussed:

- **Sebastian Heise**, Yale University; **Justin R. Pierce**, Federal Reserve Board; **Georg Schaur**, University of Tennessee; and **Peter K. Schott**, Yale University and NBER, “ ‘American’ vs ‘Japanese’ Procurement: Theory and Evidence from Transaction-Level Trade Data”
- **Yukiko Asai**, University of Tokyo; **Ryo Kambayashi**, Hitotsubashi University; and **Takao Kato**, Colgate University, “Careers of Married Women and the Nature of Husbands’ Work: Evidence from Japan”
- **Nobuko Nagase**, Ochanomizu University, “The Effect of Family-Friendly Regulation on Fertility: Evidence from Japan Using Natural Experiments”
- **Christina Atanasova**, Simon Fraser University, and **Jess Diamond**, Hitotsubashi University, “Japan’s Diversification Discount”
- **William N. Goetzmann**, Yale University and NBER; **Yasushi Hamao**, University of Southern California; and **Hidenori Takahashi**, Kobe University, “Selective Disclosure: The Case of Nikkei Preview Articles”
- **Koichiro Ito**, University of Chicago and NBER, and **James M. Sallee**, University of California, Berkeley, and NBER, “The Economics of Attribute-Based Regulation: Theory and Evidence from Fuel-Economy Standards” (NBER Working Paper No. [20500](#))
- **Chie Hanaoka**, Kyoto Sangyo University; **Hitoshi Shigeoka**, Simon Fraser University and NBER; and **Yasutora Watanabe**, Hong Kong University of Science and Technology, “Do Risk Preferences Change? Evidence from Panel Data before and after the Great East Japan Earthquake” (NBER Working Paper No. [21400](#))



- **Arito Ono**, Chuo University; **Daisuke Miyakawa** and **Ichiro Uesugi**, Hitotsubashi University; **Kaoru Hosono**, Gakushuin University; **Hirofumi Uchida**, Kobe University; and **Taisuke Uchino**, Daito Bunka University, “Transaction Partners and Firm Relocation Choice: Evidence from the Tohoku Earthquake”

Summaries of these papers are at: <http://www.nber.org/confer/2015/JPMs15/summary.html>

Program and Working Group Meetings

Economic Fluctuations and Growth

The NBER’s Program on Economic Fluctuations and Growth met in Cambridge on July 11. Research associates Giovanni Violante of New York University and Iván Werning of MIT organized the meeting. These papers were discussed:

- **Charles I. Jones**, Stanford University and NBER, and **Jihee Kim**, Korea Advanced Institute of Science and Technology, “A Schumpeterian Model of Top Income Inequality” (NBER Working Paper No. [20637](#))
- **Gita Gopinath**, Harvard University and NBER; **Şebnem Kalemli-Özcan**, University of Maryland and NBER; **Loukas Karabarbounis**, University of Chicago and NBER; and **Carolina Villegas-Sanchez**, Universitat Ramon Llull, “Capital Allocation and Productivity in South Europe” (NBER Working Paper No. [21453](#))
- **Gary B. Gorton**, Yale University and NBER, and **Guillermo Ordoñez**, University of Pennsylvania and NBER, “Good Booms, Bad Booms”
- **Xavier Giroud**, MIT and NBER, and **Holger Mueller**, New York University and NBER, “Firm Leverage and Unemployment during the Great Recession” (NBER Working Paper No. [21076](#))
- **Marcus Hagedorn**, University of Oslo, and **Jessie Handbury** and **Iourii Manovskii**, University of Pennsylvania and NBER, “Demand Stimulus, Inflation, and Marginal Costs: Empirical Evidence”
- **Martin Beraja** and **Juan Ospina**, University of Chicago, and **Erik Hurst**, University of Chicago and NBER, “The Aggregate Implications of Regional Business Cycles”

Summaries of these papers are at: <http://www.nber.org/confer/2015/EFGs15/summary.html>

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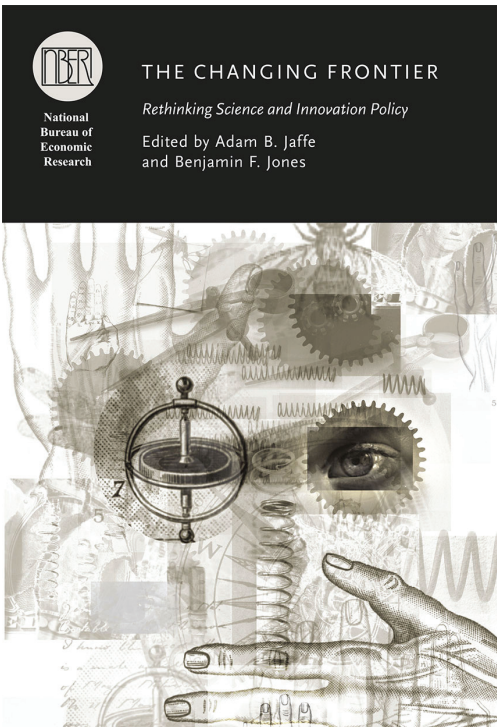
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In 1945, Vannevar Bush, founder of Raytheon and one-time engineering dean at MIT, delivered a report to the president of the United States that argued for the importance of public support for science, and the importance of science for the future of the nation. The report, *Science: The Endless Frontier*, set America on a path toward strong and well-funded institutions of science, creating an intellectual architecture that still defines scientific endeavor today.

In *The Changing Frontier*, Adam

B. Jaffe and Benjamin F. Jones bring together a group of prominent scholars to consider the changes in science and innovation in the ensuing decades. The contributors take on such topics as changes in the organization of scientific research, the geography of innovation, modes of entrepreneurship, and the structure of research institutions and linkages between science and innovation. An important analysis of where science stands today, *The Changing Frontier* will be invaluable to practitioners and policy makers alike.



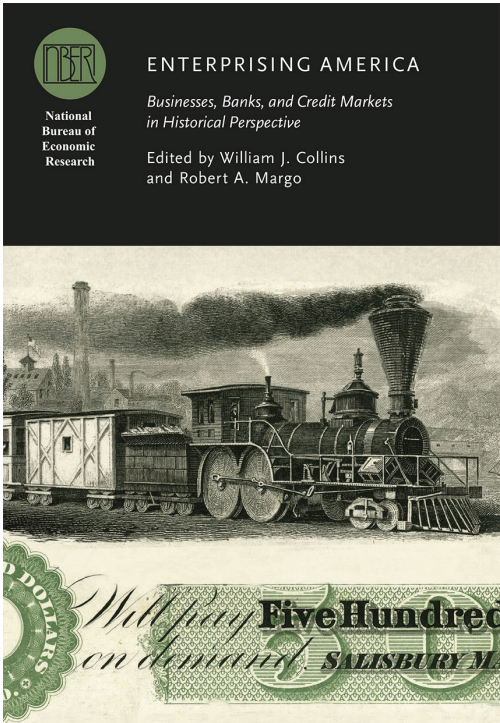
Enterprising America: Businesses, Banks, and Credit Markets in Historical Perspective

Edited by William J. Collins and Robert A. Margo
National Bureau of Economic Research Conference Report
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The rise of America from a colonial outpost to one of the world's most sophisticated and productive economies was facilitated by the establishment of a variety of economic enterprises pursued within the framework of laws and institutions that set the rules for their organization and operation.

To better understand the historical processes central to American economic development, *Enterprising America* brings together contributors who address the economic behavior of American firms and financial institutions — and the associated legal institutions that shaped their behavior — throughout the 19th and early

20th centuries. Collectively, the contributions provide an account of the ways in which businesses, banks, and credit markets promoted America's extraordinary economic growth. Among the topics that emerge are the rise of incorporation and its connection to factory production in manufacturing, the organization and operation of large cotton plantations in comparison with factories, the regulation and governance of banks, the transportation revolution's influence on bank stability and survival, and the emergence of long-distance credit in the context of an economy that was growing rapidly and becoming increasingly integrated across space.



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