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## Program Report

### Environmental and Energy Economics

**Don Fullerton and Catherine Wolfram\***

Researchers in the NBER's Environmental and Energy Economics (EEE) program have studied a wide range of issues, including both long-standing questions and emerging issues, in recent years. One particularly notable body of research has developed in response to the expanding discussion of the potential effects of climate change and of policy proposals designed to affect future greenhouse gas (GHG) emissions. Climate concerns have generated a host of new questions for study, and in light of the novelty as well as volume of the work that addresses them, the first five sections of this report describe this body of research. The last three sections touch on other important topics.

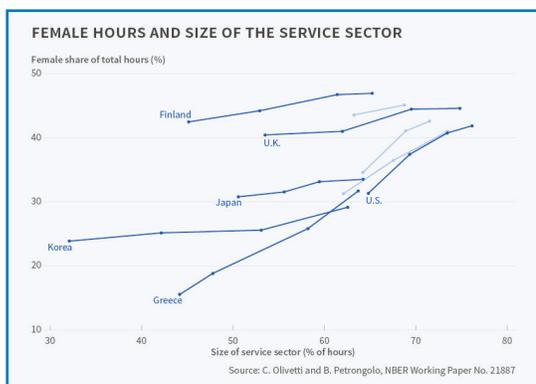
#### Consequences of Reducing GHG Emissions

Many EEE researchers focus on measuring the economic consequences of various types of emissions in order to inform the design of policies to affect those emissions. With regard to GHGs, the majority of papers have focused on the economic impacts of rising temperature. Early work measured the impact of temperature on the U.S. agriculture sector. While Olivier Deschênes and Michael Greenstone found minimal impacts of rising temperatures on agricultural outputs or profits,<sup>1</sup> Michael Roberts and Wolfram Schlenker found large negative effects.<sup>2</sup> This work sparked a debate, which has carried over to other economic outcomes, about the merits of using cross-sectional versus panel data to measure climate impacts,<sup>3</sup> and led to methodological contributions describing the merits of different weather datasets and climate forecasts.<sup>4</sup>

Researchers subsequently have analyzed the potential impact of ris-

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ing temperatures on international agriculture,<sup>5</sup> conflict,<sup>6</sup> mortality,<sup>7</sup> birth rates,<sup>8</sup> income,<sup>9</sup> test scores, and human capital formation.<sup>10</sup> Other work uses observations at a more macro level and examines the impact of temperature on output growth<sup>11</sup> and output per capita.<sup>12</sup>

An additional strand of research explores how people value temperature by examining their decisions on where to live and how much to pay for their homes. David Albouy, Walter Graf, Ryan Kellogg, and Hendrik Wolff use a hedonic model to estimate the amenity value of hot days across locations in the U.S.,<sup>13</sup> while Paramita Sinha and Maureen L. Cropper use a discrete choice approach and account for the disutility of moving.<sup>14</sup> Both papers find that people would pay to avoid the temperature patterns projected to come with climate change, although both also find considerable heterogeneity. H. Allen Klaiber, Joshua Abbott, and V. Kerry Smith suggest that local landscape choices can mitigate the urban heat island effect and thus partially offset the disutility from high temperatures.<sup>15</sup> Schlenker and coauthors Shuaizhang Feng and Michael Oppenheimer examine the link between migration, temperature, and agricultural productivity in the U.S. between 1970 and 2009.<sup>16</sup>

### Policies that Affect GHG Emissions

In addition to analyzing the value of reducing GHG emissions, other research has analyzed policies to achieve those reductions. Such papers include general comparisons of policy types, as well as specific studies of the electricity sector, the transportation sector, and energy efficiency policies.

Recent work builds on a long-standing tradition of comparing command-and-control mandates, cap-and-trade permits, and pollution taxes to control emissions.<sup>17</sup> For example, although standard models suggest that market-based instruments are cost-minimizing, Lawrence Goulder, Marc Hafstead, and Robertson Williams III describe circumstances when standards might yield greater efficiency.<sup>18</sup>

Actual policy has mostly shied away from market-based instruments such as permits or taxes, which raise the cost of production, and instead favors energy efficiency standards, voluntary conservation,<sup>19</sup> and subsidies.<sup>20</sup> Some research has focused on R&D or technology policy,<sup>21</sup> and investigated new ways to

combat climate change, such as work by Garth Heutel and coauthors, Juan Moreno-Cruz and Soheil Shayegh, and Moreno-Cruz and Katharine Ricke, on geoengineering.<sup>22</sup>

In the international context, a paper by Derek Kellenberg and Arik Levinson, and other papers by Martin Weitzman, have studied the formation of multinational environmental agreements,<sup>23</sup> and the problem posed by the possibility that a unilateral policy promulgated by one nation or coalition could provide an incentive to others to embrace policies that increase emissions.<sup>24</sup>

An emerging literature concerns adaptation policy to deal with prospective climate changes.<sup>25</sup> For example, analyses of adaptation in cities by Devin Bunten and Matthew Kahn, and by Kahn and Randall Walsh<sup>26</sup> complement work on emissions mitigation in cities.<sup>27</sup>

A substantial body of research has focused on the models that are used to analyze energy policy, considering for example the choices that have been made in the modeling of energy production<sup>28</sup> and the modeling of climate phenomena, uncertainty, and discounting.<sup>29</sup> Weitzman's seminal work on "fat tail" probability distributions for potential climate catastrophes has led to additional research on willingness to pay for current abatement.<sup>30</sup> For example, Robert Barro uses existing models of rare macro shocks and finds that optimal environmental investment can be a significant share of GDP.<sup>31</sup> But multiple types of potential catastrophes can affect the optimal response to any one such catastrophe.<sup>32</sup> An ongoing debate concerns the role of "integrated assessment models." Robert Pindyck shows that these models may

not reveal much about optimal policy in response to the possibility of a catastrophic climate outcome.<sup>33</sup>

### GHG Reductions in the Electricity Generating Sector

The burning of fossil fuels accounts for 75 percent of GHG emissions.<sup>34</sup> One-third of this total is from the electricity sector, one-fifth from the transportation sector, and the remainder from industry, including the production of fossil fuels.<sup>35</sup> Recent research has analyzed existing and proposed regulations on GHG emissions in each of these sectors.

The electricity sector has undergone several profound changes since the transformation brought on by regulatory restructuring in the late 1990s and early 2000s. These changes affect GHG emissions in the sector. Natural gas prices have fallen considerably, from a peak just above \$14 per million Btu in 2005 to roughly \$3 per million Btu in 2014. Natural gas and coal are the two primary fuel inputs to electricity generation, and as Christopher Knittel and coauthors Konstantinos Metaxoglou and Andre Trindade show, lower natural gas prices have displaced production from coal plants, particularly in regional markets that were not restructured.<sup>36</sup> Coal emits roughly twice the CO<sub>2</sub> per unit of energy as natural gas, so Joseph Cullen and Erin Mansur point out that falling natural gas prices provide insight on the impacts of a tax on CO<sub>2</sub>.<sup>37</sup>

Solar photovoltaic prices also have fallen precipitously, leading to debates about the relative value of rooftop solar versus grid-scale solar installa-

tions. Severin Borenstein describes the private incentives to invest in rooftop solar in California, pointing out the significant implicit subsidies created by the tiered rate structure.<sup>38</sup> Finally, in some parts of the country, including California and New England, the electricity sector has been brought under cap-and-trade programs.<sup>39</sup>

Proposed regulations like the Clean Power Plan may bring further change to the sector. This plan allows states flexibility in complying with standards. Most notably, states can choose to comply with either a standard based on the total tonnage of their emissions or a standard based on the rate of emissions per kilowatt hour. James Bushnell, Stephen Holland, Jonathan Hughes, and Knittel use simulations to show that this flexibility could lead to inefficiencies, for example if some states choose rate-based standards while others choose mass-based.<sup>40</sup>

### GHG Reductions in the Transportation Sector

U.S. federal gasoline taxes have remained at 18.4 cents per gallon since 1993 — falling significantly in real terms — and the average of state and local taxes adds 30.4 cents, for a total of 48.8 cents per gallon. Knittel uses historical polling data to show that consumers have preferred gasoline price controls, rationing, and vehicle efficiency standards to taxes.<sup>41</sup> He also finds that dirtier vehicles respond more to fuel prices, as seen in Figure 1 on the next page. This finding increases the second-best optimal fuel tax, but it is still far from a first-best tax on emissions.<sup>42</sup>

### About the EEE Program

The NBER's research program in Environmental and Energy Economics (EEE) was launched in 2007. It brought together participants from an NBER working group on environmental economics, which included economists in trade, productivity, and public economics, and industrial organization economists with an interest in energy markets. While drawn from different backgrounds, the members of the EEE program recognize the key role of energy markets in affecting local pollution, greenhouse gas emissions, and other environmental concerns. Research in the EEE program draws on an amazingly interesting interplay of ideas from a number of other fields.

Federal policy requires car makers to meet a minimum Corporate Average Fuel Economy (CAFE). CAFE raises the average price of new cars sold, and Mark Jacobsen and Arthur van Benthem find that it delays the scrapping of older, fuel-inefficient cars, thus reducing expected fuel savings by 13 to 23 percent.<sup>43</sup> Koichiro Ito and James Sallee find that allowing larger vehicles to meet a weaker standard can have additional welfare costs.<sup>44</sup> CAFE standards that ignore differences in vehicle longevity obtain less than half the welfare gain of policies that account for it.<sup>45</sup>

Several studies suggest that environmental subsidies to the transport sector may have counterproductive effects. For example, biofuel subsidies shift agricultural activity with unexpected social costs;<sup>46</sup> fuel subsidies increase externalities from fuel use;<sup>47</sup> the “Cash for Clunkers” subsidy in the stimulus spending bill significantly reduced total spending on new vehicles for almost a year;<sup>48</sup> and subsidies to electric cars can reduce local emissions from gasoline, but reduce overall economic welfare in significant portions of the country by increasing emissions from electric power plants.<sup>49</sup>

## Energy Efficiency Policies

Detailed engineering projections, such as those summarized by the McKinsey GHG abatement cost curves, project positive net present value investments in energy efficiency based only on private returns.<sup>50</sup> Moreover, by reducing the energy necessary to achieve a given level of energy services, these investments promise to decrease GHG emissions in addition to other local pollutants. Yet a large and persistent difference remains between the levels of investment in energy efficiency that appear to be privately beneficial and the invest-

ments that private actors undertake. This disparity is known as the “energy efficiency gap.” Several explanations have been offered for this gap, and research has touched on each of them.

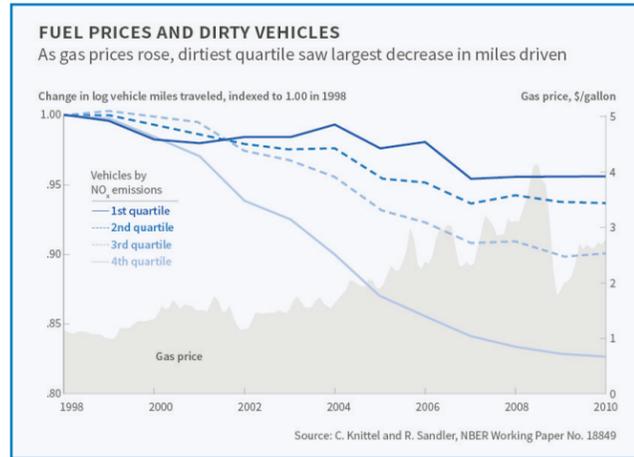


Figure 1

One explanation suggests that divergence of interests between landlords and tenants or workers and owners, information gaps, or credit constraints inhibit take-up of cost-effective, energy-efficient technologies. Several papers have explored how adding more information—for example, through sales agents at the point of purchase for water-heater consumers<sup>51</sup> or in-home displays<sup>52</sup>—can

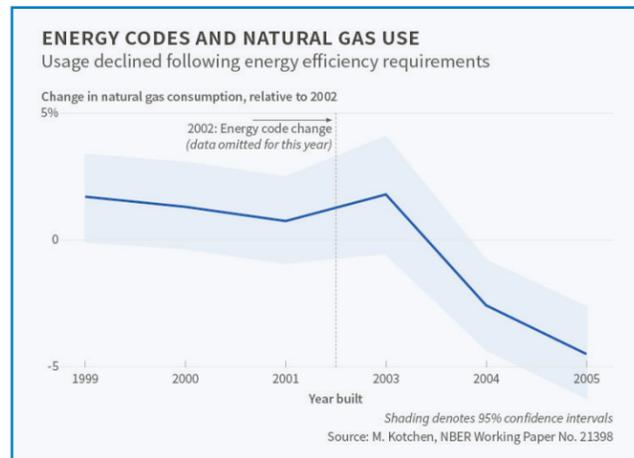


Figure 2

increase efficiency. Lucas Davis and Gilbert Metcalf;<sup>53</sup> and Richard Newell and Juha Siikamäki<sup>54</sup> all consider the role of appliance labels in providing useful information to consumers. Sallee sug-

gests that consumers may be “rationally inattentive” to information about energy efficiency.<sup>55</sup> Newell and Siikamäki find considerable heterogeneity in households’ discount rates, which are correlated with differences in credit scores.<sup>56</sup> They also find that individual time preferences play a role in willingness to adopt energy efficiency.

Codes and standards are often used to address the problem of market failures. Levinson questions whether California building codes have saved energy,<sup>57</sup> while Matthew Kotchen<sup>58</sup> finds that homes built just after Florida building codes became more stringent use less natural gas than homes built just before the change in code. [See Figure 2] Turning to appliances, Sébastien Houde and Joseph E. Aldy find that rebates for energy-efficient appliances have little additional impact on the energy efficiency of new appliance purchases in the face of state and federal standards.<sup>59</sup> Hunt Allcott and Dmitry Taubinsky consider whether minimum efficiency standards may be welfare enhancing in the presence of limited information or consumer inattention.<sup>60</sup>

Another explanation for the energy efficiency gap, which is not necessarily at odds with the foregoing explanations, is that behavioral biases prevent consumers from making privately optimal choices around energy efficiency. Allcott and Judd Kessler point out that policies that use behavioral approaches to influencing energy consumption may have unmeasured impacts on consumer welfare, and estimate that they are small and positive on average, with considerable heterogeneity in the context of energy-use social comparisons, a popular energy-efficiency nudge.<sup>61</sup>

Another possible explanation is that the supposed gap is overstated if the engineering calculations under-

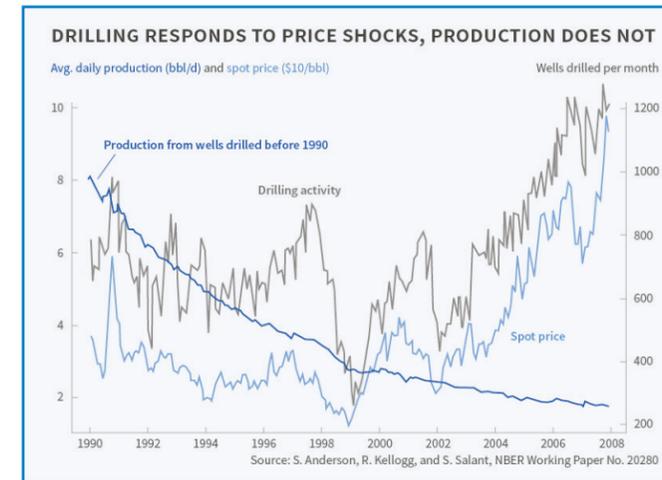


Figure 3

lying potential savings from energy-efficiency measures are too high. Borenstein elaborates on the concept of “rebound,” whereby consumers decide to consume more energy services after an energy-efficiency investment (for example, to keep their homes warmer in winter).<sup>62</sup> Rebound is often suggested as a possible explanation for discrepancies between engineering and actual estimates of savings. Meredith Fowlie, Greenstone, and Wolfram compare actual savings derived from a randomized encouragement design to before-the-fact engineering calculations and find that the engineering calculations overstated the potential savings by more than a factor of two.<sup>63</sup> They do not find significant evidence of rebound.

## Oil and Gas Production

Many studies analyze the effects of prices and policies on energy production. James Hamilton explains how policy changes over the past decade affect world oil prices.<sup>64</sup> But how do oil prices affect production? In particular, how do they affect oil exploration, drilling, and pumping from existing wells? Soren T. Anderson, Kellogg, and Stephen W. Salant find that drilling activities respond strongly to prices, but pumping from existing wells in Texas does not.<sup>65</sup> [See Figure 3] Given that output

from existing wells depends directly on reservoir pressure, which decays as oil is extracted, their analysis can help explain regional peaks of production and the way that observed patterns of price expectations follow demand shocks.

While technological innovation reduces cost and increases production of fossil fuels, Catherine Hausman and Kellogg note that the shale gas revolution also led to an increase in welfare for natural gas consumers and producers of \$48 billion per year between 2007 and 2013.<sup>66</sup> Newell and Daniel Raimi find that it led to increased local government revenue, but also increased demand for local public services.<sup>67</sup> James Feyrer, Mansur, and Bruce Sacerdote find that horizontal drilling and hydrofracturing led to extra wages and royalties within producing counties and an overall increase of U.S. employment by 725,000 jobs.<sup>68</sup>

Crude oil prices have been volatile over the past decade, ranging from \$40 per barrel in 2004 to \$145 in July 2008, and then plummeting to about \$30 by late 2008 before increasing to \$110 in 2011 and falling again to less than \$40 in parts of 2016. How much of this volatility is due to economic shocks, as opposed to speculation? Knittel and Pindyck conclude that speculators had little, if any, effect on prices and volatility.

## Costs and Benefits of Abating Local Pollution

Most local pollutants are coproduced with greenhouse gases, so many of the policies to reduce GHGs also reduce local pollutants. A number of studies have measured the consequences of such reductions. For example, Jessica W. Reyes examines new outcomes in her study of the effects of lead exposure on antisocial and risky behavior.<sup>69</sup> Joshua Graff Zivin, Matthew Neidell and coauthors Tom Chang and Tal Gross, examine the impact of particulate matter on the productivity of manual laborers in a pear-packing plant.<sup>70</sup> [Figure 4] Evan Herrstadt and Erich Muehlegger examine impacts on criminal activity,<sup>71</sup> while Michael Anderson and coauthors, Fangwen Lu, Yiran Zhang, Jun Yang, and Ping Qin examine impacts on self-reported happiness.<sup>72</sup> W. Reed Walker and coauthors Maya Rossin-Slater and

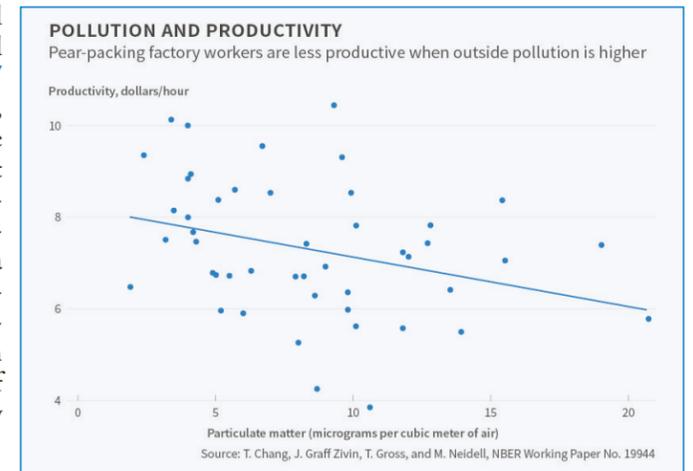


Figure 4

Adam Isen examine impacts on labor force participation and earnings.<sup>73</sup>

Research has also considered the impact of pollution exposure on fetal development. Graff Zivin and coauthors, Prashant Bharadwaj, Matthew Gibson, and Christopher A. Neilson examine fetal exposure to carbon monoxide on fourth-grade test scores.<sup>74</sup> Janet Currie, Graff Zivin, Jamie Mullins,

and Neidell review the literature on early-life exposure.<sup>75</sup> Several historians are accessing exciting new datasets to examine pollution impacts in early and mid-20th century America. For example, Karen Clay, and coauthors Joshua Lewis and Edson Severnini examine the impact of new coal-fired power plants on infant mortality between 1938 and 1962<sup>76</sup> and Alan Barreca, Clay, and Joel Tarr study the impacts of burning coal for residential heating between 1945 and 1960.<sup>77</sup>

## Energy and the Environment in Developing Countries

Many of the topics we have raised thus far have unique manifestations in the developing world. Figure 5 shows that air pollution levels are much higher in developing countries.<sup>78</sup> Kahn and coauthors Siqi Zheng and Cong Sun show that avoidance behaviors—in particular purchases of masks and air filters—increase in developing countries during periods of high pollution, though primarily for the rich.<sup>79</sup>

Weak institutions can impact the provision of both environmental and energy services. In a series of papers on Indian industrial plants, Esther Duflo, Greenstone, Rohini Pande, and Nicholas Ryan study the relationship between environmental regulators and third-party inspectors, highlighting the importance of conflicts of interest and regulatory discretion.<sup>80</sup> Ann Harrison and coauthors Benjamin Hyman, Leslie Martin, and Shanthi Nataraj find that higher coal prices constrained emissions more than command-and-control regulations in India.<sup>81</sup> Kahn and coauthors Pei Li and Daxuan Zhao demonstrate weaker enforcement of water pollution laws around political borders in China,<sup>82</sup> and Allcott, Allan Collard-Wexler, and Stephen O’Connell consider the impact of poor electricity reliability in India and find limited impact

on short-run productivity.<sup>83</sup> Natasha Chichilnisky-Heal and Geoffrey Heal model the political influence of multinational corporations extracting rents from resource-rich countries.<sup>84</sup>

In the rapidly growing economies in the developing world, the energy infrastructure is just being built, and consumers are purchasing energy-using durables such as cars and refrigerators for the first time. Edward Miguel, Wolfram, and coauthors Kenneth Lee, Eric Brewer, Carson Christiano, Francis Meyo, Matthew Podolsky, and Javier Rosa document that many households

examine determinants of cofinancing for projects supported by the Global Environment Facility.<sup>88</sup>

Finally, gender dynamics among families may be more extreme than in many parts of the developed world, which Grant Miller and Ahmed Mushfiq Mobarak find partially explains low demand for improved cookstoves.<sup>89</sup>



Figure 5

that are not connected to the electricity grid in western Kenya are in fact quite close to existing grid infrastructure, and thus more accurately described as “under-grid” rather than “off-grid.”<sup>85</sup> Randy Chugh and Cropper study the market for passenger vehicles in India, one of the world’s fastest growing car markets, and examine consumer response to relative taxes on petrol versus diesel fuel, plus a diesel car tax.<sup>86</sup>

Researchers have also studied subsidies from the developed world, implemented in developing nations, for energy and environmental projects. B. Kelsey Jack, Paulina Oliva, and coauthors, Christopher Severen, Elizabeth Walker and Samuel Bell, examine how different forms of subsidies impact the efficacy of tree-planting programs,<sup>87</sup> while Kotchen and Neeraj Kumar Negi

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<sup>9</sup> T. Deryugina and S. M. Hsiang, “Does the Environment Still Matter? Daily Temperature and Income in the United States,” NBER Working Paper No. 20750, December 2014. [Return to text.](#)

<sup>10</sup> J. S. Graff Zivin, S. M. Hsiang, and M. J. Neidell, “Temperature and Human Capital in the Short- and Long-Run,” NBER Working Paper No. 21157, May 2015. [Return to text.](#)

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<sup>12</sup> G. Heal and J. Park, “Feeling the Heat: Temperature, Physiology, and the Wealth of Nations,” NBER Working Paper No. 19725, December 2013. [Return to text.](#)

<sup>13</sup> D. Albouy, W. Graf, R. Kellogg, and H. Wolff, “Climate Amenities, Climate Change, and American Quality of Life,” NBER Working Paper No. 18925, March 2013, and Journal of the Association of

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## Research Summaries

### How Economic Shocks Affect Spending

Matthew D. Shapiro

When faced with a common economic shock, such as a temporary drop in income, individuals may respond very differently: Some individuals will cut spending while others will draw on liquid assets or borrow.

My collaborators and I use administrative account data and surveys to analyze differences both in how individuals prepare for economic risks and in how they behave when confronted with shocks. This work helps quantify the economic impact of fiscal stimulus policies such as tax rebates and temporary tax cuts. It also provides insights into how households make choices about spending and saving in a world where income is quite variable.

#### Naturally Occurring Data and the Response of Spending to Income

Using a dataset that tracks daily banking and credit card transactions and balances for over one million individuals, Michael Gelman, Shachar Kariv, Dan Silverman, Steven Tadelis, and I produce estimates of spending behavior linked to individuals’ liquidity.<sup>1</sup> These naturally-occurring account data create a comprehensive picture of spending, income, and liquidity with unprecedented precision, frequency, and timeliness, and provide a distinctive understanding of behavior.

The data shed new light on the well-established finding that individuals respond excessively to predictable changes in income. Such excess sensitivity is inconsistent with standard

economic models that imply individuals should not let predictable movements in income affect their spending plans when income changes. That some households do spend from temporary and predictable increases in income implies that economic stimulus, for example from tax rebates, will noticeably increase aggregate demand. Hence, having credible estimates of spending from such income shocks is important for predicting the likely effects of coun-

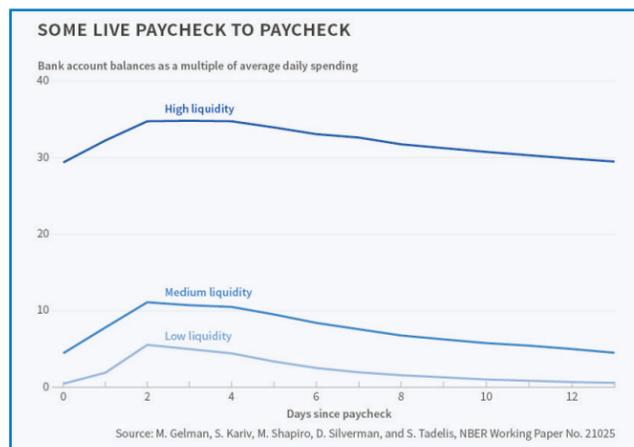


Figure 1

terrecyclical fiscal policy.

The naturally occurring account data allow a novel classification of spending. Recurring spending can be identified as payments, such as rent, mortgage payments, and utilities that occur at regular intervals and in regular amounts. Much of the measured excess sensitivity of spending to receipt of paycheck owes to the timing of recurring spending after paydays. This timing of payments after paycheck has been noticed in earlier research.<sup>2</sup> The finding that much spending after receipt of income is on recurring payments sug-

gests that this behavior results from planned, prudent bill-paying behavior rather than necessarily excess sensitivity to having more cash on hand.

Still some excess sensitivity of spending to paycheck receipt remains that is largely explained by the differences in average liquidity across individuals. For those who typically hold low liquid assets, there is evidence of hand-to-mouth spending following the receipt of a paycheck.

A substantial fraction of individuals have very low liquidity. Figure 1 shows the ratio of bank account balances to average daily spending across the paycheck cycle. Liquidity is expressed as a ratio of checking and savings balances to average daily total spending, so the numbers in the figure can be interpreted as cash on hand relative to typical daily expenditure. The three lines are medians of this liquidity for households in the top, middle, and bottom thirds of the liquidity distribution. The top

third of the liquidity distribution is well-positioned to handle an income shock. The median of this group could maintain more than a month of average spending with their checking and savings account balances, even in the days just before their paycheck arrives. The lower two-thirds of the liquidity distribution have a substantially smaller cushion. Over the entire pay cycle, the middle group has median liquid assets equal to 7.9 days of average spending. Liquidity drops to only five days of average spending in the days just before their paycheck arrives. The bottom



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Shapiro graduated from Yale University in 1979 and received his Ph.D. from MIT in 1984. Among his current research interests are modeling saving, retirement, health, insurance, and portfolio choices of older Americans; using surveys to address questions in macroeconomics and individual decision-making; modeling how changes in tax policy affect consumption, investment, employment, and output; improving the quality of national economic statistics; and using naturally occurring data such as account records and social media to measure and understand economic activity.

Shapiro is the chair of the Federal Economic Statistics Advisory Committee, which is the official advisory committee of the Bureau of the Census, the Bureau of Labor Statistics, and the Bureau of Economic Analysis. He is also a member of the Academic Advisory Panel of the Federal Reserve Bank of Chicago.

He is married to Dr. Susan L. Garetz, who is a professor of otolaryngology and neurology at the University of Michigan. They have two children.

third of this population is especially ill-prepared, with essentially no liquidity just prior to receiving the paycheck.

How do individuals—especially those who have very low liquidity prior to receiving an upcoming paycheck—cope with fluctuation in income? With so little cash on hand, they would appear very vulnerable to even a short-lived drop in income. These two facts—low liquidity combined with temporary shocks to income—might lead to the prediction that households would find it difficult to smooth spending. This prediction is hard to test, however, because the temporary shocks to income may be endogenous, or hard to observe. A recent working paper addresses these problems by examining how individuals adjusted spending and saving in response to a temporary drop in income due to the 2013 U.S. government shutdown.<sup>3</sup> The shutdown cut paychecks by 40 percent for affected employees, but the delayed pay was recovered within two weeks. Hence, the government shutdown provides quasi-experimental variation in income that bears directly on how individuals react to a negative shock affecting only the timing of income.

Though the shock was short-lived and completely reversed, spending dropped sharply, implying a naïve estimate of the marginal propensity to spend of 58 cents per dollar of lost income. Figure 2 shows the change in spending around the shutdown. The first vertical line is the week the shutdown began. (Weeks in the figure begin on Thursday, the most common payday of government workers.) The middle vertical line indicates the week in which employees affected by the shutdown were paid roughly 40 percent

less than their average paycheck. The figure shows the difference in spending between government workers who experienced the temporary pay loss and a control group on the same bi-weekly pay schedule. There is a large gap between the treatment and control group during this week. Similarly, the final vertical line indicates the week of the first regular paycheck after the shutdown. The rebound in spending is discernable for two weeks.

However, this estimate of the drop in spending overstates the decline in consumption. While many individu-

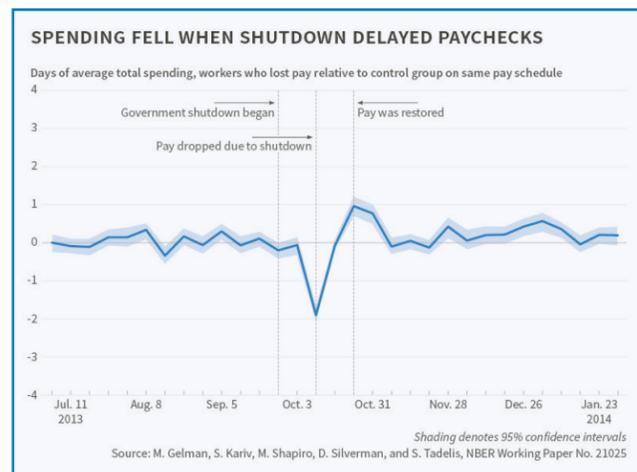


Figure 2

als had low liquidity, they used multiple strategies to smooth consumption. Interestingly, they did not draw on liquidity, of which they had little, or incremental borrowing. They had no discernable increase in new charges on credit cards. Instead, they smoothed spending by delaying payments including on mortgages and on revolving credit. Deferring a payment is a form of borrowing, and is the principle means that low-liquidity households used to smooth spending during the shutdown. This behavior—while readily evident in the account data that precisely links spending, income, and credit card balances at high frequency—would be very difficult to detect in surveys, which have less precise measurements and aggregate measurements over longer time intervals.

What emerges from these high-resolution data on consumers is a complicated picture of behavior in response to economic shocks. Many consumers do not follow the standard advice by having a substantial cash buffer. Nonetheless, they are able to smooth consumption in the face of a temporary drop in income by changing their timing of payments. Hence, the reaction of spending to a loss of income is less than one would infer from the very low liquidity of many households.

### Response of Consumers to Economic Stimulus

In response to economic slowdowns, the federal government frequently takes steps to put more disposable income in the hands of the consumers. The aim of these policies is to stimulate the economy by boosting aggregate consumer spending. To be effective, these policies require that consumers spend at least a fraction of the extra income.

Joel Slemrod, Claudia Sahm, and I have quantified how the response to receipt of such stimulus payments differs across households. Our approach is to ask survey respondents whether they mostly spend, mostly save, or mostly pay debt with the extra income. These questions have been included in the University of Michigan's Survey of Consumers around the time when new stimulus policies were put in place. This method blends the standard approach in economics of observing behavior in response to change in policy or other shock, such as the analysis of the government shutdown, with the survey approach of directly asking individuals how they responded to the stimulus. The survey question implicitly poses a counterfactual in that it asks respondents to base a response on what their behavior would have been absent the economic stimulus payment. Yet, unlike many hypothetical questions about shocks, the response concerning stimulus payments addresses a payment the respondents actually received and

about which they would have had to make a decision.

We have used this approach to study a variety of economic stimulus policies: the change in the withholding table in 1992, the tax rebates of 2001 and 2008, the 2009–10 tax credit, and both the onset and expiration of the 2011–12 payroll tax holiday.<sup>4</sup> While there are some differences across the various policies, responses to the policies since the 2001 rebate have some strong common features.

First, the implied marginal propensity to consume (MPC) is between one-quarter and one-third. This MPC is non-zero, so it implies that the stimulus policies will have a non-negligible effect on aggregate spending. The estimates from the surveys are consistently much lower than MPCs commonly used to project the effectiveness of countercyclical policies.<sup>5</sup> Hence, these findings suggest that the per-dollar of stimulus effect on aggregate demand is modest relative to standard estimates.

Second, the most common response to receiving extra income is to pay off debt. From the standpoint of aggregate demand, saving a rebate or using it to pay off debt are equivalent. That the modal response to a tax rebate or payroll tax cut is to pay off debt gives added insight into why the stimulus spending effect of these policies is attenuated. To the extent that a fiscal stimulus results from an economic downturn where consumers are cutting back spending because of a debt overhang—as was certainly the case in 2008 and its aftermath—it is not surprising that consumers use a tax rebate for balance sheet repair rather than spending. Hence, rebates or temporary tax cuts may be implemented precisely when consumers have relatively little inclination to spend, and hence such policies may be less effective in stimulating the economy than would be estimated based on consumer behavior on average.

Third, there is no evidence that the MPC from tax rebates or temporary tax cuts varies with income. This finding runs counter to the conventional wisdom that low-income individuals are

more likely to be liquidity-constrained and therefore have higher MPCs.<sup>6</sup>

A recent survey analyzing the expiration of the two percent payroll tax holiday at the end of 2012 provides additional evidence of the importance of balance sheet considerations for household decision-making. Many households that reported using the extra two percent of income during the 2011–12 payroll tax holiday to pay off debt indicated that they would continue to pay off debt at the same rate following the expiration of the tax holiday.<sup>7</sup> The behavior of these “balance-sheet households” is hard to reconcile with standard economic theories concerning the determinants of consumption, and since the survey evidence largely explains the anomalous drop in consumption after the expiration of a payroll tax cut, such behavior should be taken seriously.

<sup>1</sup> M. Gelman, S. Kariv, M. D. Shapiro, D. Silverman, and S. Tadelis, “Harnessing Naturally Occurring Data to Measure the Response of Spending to Income,” *Science*, 345(6193), 2014, pp. 212–15.

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<sup>2</sup> See, for example, M. Stephens, “3rd of the Month: Do Social Security Recipients Smooth Consumption Between Checks?” *NBER Working Paper No. 9135*, August 2002, and *American Economic Review*, 93(1), 2003, pp. 406–22.

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<sup>3</sup> M. Gelman, S. Kariv, M. D. Shapiro, D. Silverman, and S. Tadelis, “How Individuals Smooth Spending: Evidence from the 2013 Government Shutdown Using Account Data,” *NBER Working Paper No. 21025*, March 2015.

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<sup>4</sup> M. D. Shapiro and J. Slemrod, “Consumer Response to the Timing of Income: Evidence from a Change in Tax Withholding,” *NBER Working Paper No. 4344*, April 1993, and *American Economic Review*, 85(1), 1995, pp. 274–83; M. D. Shapiro and J. Slemrod, “Consumer Response to Tax

Rebates,” NBER Working Paper No. 8672, December 2001 and American Economic Review, 93, 2003, pp. 381–96; M. D. Shapiro and J. Slemrod, “Did the 2008 Tax Rebates Stimulate Spending?” NBER Working Paper No. 14753, February 2009, and American Economic Review, 99(2), 2009, pp. 374–9; and C. R. Sahm, M. D. Shapiro, and J. Slemrod, “Check in the Mail or More in the Paycheck: Does the Effectiveness of Fiscal Stimulus Depend on How It Is Delivered?” NBER Working Paper No. 16246, July 2010 and American Economic Journal: Economic Policy, 4(3), 2012, pp. 216–50. The estimates across policies are quite similar except for the 1992 change

in withholding (which had a higher mostly spend rate than the subsequent policies).

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<sup>5</sup> Congressional Budget Office, “Options for Responding to Short-Term Economic Weakness,” Washington, D.C.: The Congressional Budget Office, 2008. For a point estimate of the MPC more in line with standard assumptions, see J. A. Parker, N. S. Souleles, D. S. Johnson, and R. McClelland, “Consumer Spending and the Economic Stimulus Payments of 2008,” NBER Working Paper No. 16684, January 2011 and American Economic Review, 106(6), 2013, pp. 2530–53.

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<sup>6</sup> The finding that the MPC is not a function of the level of income, however, is consistent with recent work by Greg Kaplan and Giovanni Violante: G. Kaplan and G. Violante, “A Model of the Consumption Response to Fiscal Stimulus Payments,” NBER Working Paper No. 17338, August 2011, and Econometrica, 82(4), 2014, pp. 1199–1239.

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<sup>7</sup> C. R. Sahm, M. D. Shapiro, and J. Slemrod, “Balance-Sheet Households and Fiscal Stimulus: Lessons from the Payroll Tax Cut and Its Expiration,” NBER Working Paper No. 21220, May 2015.

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## How Firms Respond to Changes in Taxation

Alexander Ljungqvist

Taxes are one of the most important microeconomic tools at governments’ disposal, touching on practically every aspect of economic activity. They potentially affect a variety of corporate decisions, ranging from how much to invest in R&D, property, plant, and equipment, to the mix of debt and equity with which firms fund operations, to the amount and structure of compensation paid to managers and employees and the dividends offered to shareholders.

A key empirical challenge when testing whether and how particular taxes affect corporate decisions is that a firm’s tax status often depends on its policies. For example, a firm’s choice of investment projects will affect its future marginal tax rate by creating tax shields in the form of depreciation charges that can be deducted from its taxable profits and by increasing its debt capacity. As a result, inference based on tests that use a firm’s actual or simulated tax rate are likely biased. The extensive literature on the effects of taxes on corporate policies therefore has looked for more exogenous sources of identification, favoring two approaches: the use of changes in a country’s tax code over time and the use of international variation in taxes. In a sequence of recent papers, I propose a third approach: variation in state-level tax rates and tax rules across U.S. states and time.

State-level variation in corporate taxation offers two convenient advantages over prior approaches. There are numerous state tax changes, and these changes allow us to get closer to a plausible counterfactual world. To see this, consider first changes in federal taxes. Variation in federal tax rates and tax rules is relatively infrequent (the 1986 Tax Reform Act is a rare example), and when it does occur, it affects virtually all firms in the economy at the same time and in a similar way, making it difficult to find control firms with which to establish a plausible

counterfactual for how firms would have behaved absent the tax change.

Cross-country approaches are designed to overcome the first shortcoming. There are many more tax changes across countries than within, and the changes don’t all happen at the same time, leaving some firms treated and others untreated. But these approaches require us to make potentially implausible assumptions about treated and untreated firms being comparable despite their operating in different countries.

State tax changes, on the other hand, lend themselves to standard difference-in-difference tests. Like the tax changes used in cross-country studies, state tax changes are numerous and staggered over time, allowing us to disentangle the effects of tax changes from other macroeconomic shocks that affect firms’ policies. Because they occur in a single country, it can more plausibly be argued that treated and untreated firms would have experienced similar economic conditions in time, space, industry, and so on, but for the consequences of a tax change.

To illustrate the logic of the approach, consider North Carolina, which in 1991 raised its top corporate income tax rate from 7 to 8.06 percent. Let’s say we are interested in the effect of taxes on leverage, and we observe that following this state tax increase, firms operating in North Carolina increased leverage from 18.8 percent to 20.8 percent, on average. Part of this leverage increase could reflect changes in economy-wide factors such as aggregate demand or interest rates that alter the attractiveness of debt relative to equity at that particular point in time. To disentangle secular changes from those induced by North Carolina’s tax increase, we can estimate the contemporaneous change in leverage among firms that experience no tax change but are otherwise exposed to the same economic forces as firms in North Carolina. We might, for example, use firms operating in the states border-



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ing North Carolina for this purpose and, if desired, we could hold industry and other factors constant as well.

The standard identifying assumption central to a causal interpretation of differences-in-differences estimates of this kind is that treated and control firms would have behaved similarly in the absence of the tax change. In addition, interpreting a given response—say, the change in leverage—as having been caused by the tax change also requires that the tax change did not coincide with, and was not triggered by, observed or unobserved factors that in turn would have caused firms to adjust their policies for reasons unrelated to the tax change itself. For example, a state may change other rules or regulations at the same time it changes its tax rates, or it may change tax rates to balance its budget at a time of negative demand shock. Finally, a causal interpretation requires that tax changes be unpredictable, or else firms’ observed behavior to a current change may reflect not the tax change itself but how the actual tax change compares to firms’ prior expectations.

I illustrate the power and limitations of this approach in three recent papers that examine the effect of taxes on firms’ capital structure choices, their risk taking, and their employment decisions, respectively. But first, a brief primer on state corporate taxation in the U.S.

### State-level Corporate Taxation

Currently, all states except Nevada, South Dakota, and Wyoming tax corporate activities within their borders. The tax is usually based on profit, though some states instead levy taxes based on gross receipts, a measure of revenue. In 2013, state tax rates varied from a low of 4.63 percent in Colorado to a high of 12 percent in Iowa. Averaged across states, tax rates increased from 4.9 percent in 1969 to a high of 7.2 percent in 1991, then fell a little, to 6.7 percent. In 2013, seven states had lower tax rates than they did in 1969; 36 had higher rates.

Given that federal corporate tax rates top out at 35 percent, it is clear that state

taxes account for a smaller share of most firms’ tax bills than do their federal taxes. Florian Heider and I estimate that state taxes account, on average, for about 21 percent of publicly listed firms’ overall tax burden.<sup>1</sup>

A firm’s state of incorporation (often Delaware) is irrelevant for state tax purposes, as it is the location of operations that triggers a tax liability. Firms that operate—and so are taxed—in a single state are called single-state firms. Multi-state firms are taxed in every state they have “nexus” with, meaning, where they have sales, property, or employees. To reduce the scope for profit-shifting and tax arbitrage, states do not attempt to measure profits earned in-state. Instead, under the 1957 Uniform Division of Income for Tax Purposes Act, a multi-state firm’s federal taxable income is apportioned to each nexus state based on an average of the fractions of the firm’s total payroll, sales, and property located in that state.

Apportionment introduces an interesting data challenge. For a multi-state firm, a given state’s tax change will apply only to that portion of its federal taxable income that is apportioned to the state. In other words, a state tax change will apply to less than the firm’s entire tax base. All else equal, a multi-state firm will therefore respond less strongly to a given state’s tax change than a single-state firm operating there. By implication, tests that ignore the geographic distribution of multi-state firms’ tax bases will understate the sensitivity of firms’ responses to corporate income taxes. Addressing this issue requires data on each firm’s tax exposure to each state. Standard data sources such as Compustat do not provide the necessary geographic breakdown. So, in a number of papers, I have used establishment-level data from the National Establishment Time Series (NETS) database, which provides information on the location of practically every subsidiary, branch, or plant for practically every firm in the U.S., along with data on sales and employees, going back to 1989. While not perfect, these data can be used to approximate nexus apportionment weights.

For the 45-year period from 1969 to

2013, Michael Smolyansky and I identify 140 corporate income tax increases in 45 states and the District of Columbia and 131 corporate income tax cuts in 35 states, or roughly one tax change per decade per state.<sup>2</sup> The changes vary in size, with increases generally being larger in absolute value than decreases: Increases average 126 basis points while cuts average 71 basis points. A quarter of the cuts and two-fifths of the increases measure one percentage point or more in absolute value. The ratio of tax increases to tax cuts has fallen from 4.75 in the 1970s to 1.29 in the 1980s, 0.51 in the 1990s, 0.54 in the 2000s, and 0.18 since 2010. With few exceptions, such as the Rust Belt states in the 1980s, tax changes show no obvious geographic clustering.

States do not change taxes randomly. Heider and I investigate the political economy surrounding each change affecting at least 100 publicly listed firms since 1989 and estimate the empirical determinants of state tax changes over the period from 1986 to 2010. Perhaps the most interesting predictor of the likelihood and magnitude of state tax changes is how the state’s current tax rate compares to that of the states surrounding it, with tax increases being substantially less likely, and smaller, if the state’s current rate is high relative to that of its neighbors, and tax cuts being more likely, and larger, if its current rate is relatively low. Tax increases are more likely when the state budget is in deficit, consistent with widespread balanced-budget rules, while tax cuts are more likely when there is a budget surplus. Taxes are more likely to be cut under Republican than Democratic governors, and by larger amounts. Using news reports and a review of the legislative record, we find no evidence that state tax changes coincide systematically with other policy changes that plausibly affect corporate behavior independently.

### Taxes and Capital Structure

One of the oldest questions in corporate finance is whether taxes affect firms’ capital structure choices. It has long been recognized that debt con-

fers a tax benefit on firms when the tax code allows interest payments to be deducted from taxable income. Some theories of capital structure hold that firms trade off this tax benefit of debt against the cost of the increased risk of default that accompanies greater use of debt. While the tax advantage of debt has been a cornerstone of corporate finance since at least the pioneering work of Franco Modigliani and Merton Miller,<sup>3</sup> its empirical relevance continues to be debated. Opinions in the literature range from irrelevance to the belief that taxes are the key driver of debt policy.

Heider and I use the state tax changes to quantify the tax sensitivity of firms’ debt policies.

Our results suggest that taxes are an important determinant of firms’ capital structure choices in the U.S. We find that firms increase the ratio of long-term debt to total assets by around 40 basis points for every percentage point increase in the tax rate. For the average tax increase, this corresponds to a debt increase of \$32.5 million from a pre-treatment average of \$570 million. Total assets are unchanged, implying that firms swap debt for equity when tax rates rise.

Interestingly, firms do not reduce their leverage when tax rates fall. This asymmetry is inconsistent with textbook (or “static”) tradeoff models and favors dynamic tradeoff models. Dynamic models combine the tradeoff between the benefit of tax shields and the cost of default with an explicit contingent-claims model for how a firm’s debt is priced. In dynamic models, shareholders have little incentive to reduce the firm’s use of debt. Doing so would reduce the value of shareholders’ option to default, benefiting debtholders at shareholders’ expense.

### Taxes and Risk-Taking

Liandong Zhang, Luo Zuo, and I focus on a different corporate choice: how much risk to take.<sup>4</sup> The kinds of corporate actions that affect an economy’s long-run growth potential nearly always involve risk. Prominent examples are investments in physical assets, production processes, and new products or technologies.

As has been recognized since at least the 1940s, income taxes affect risk-taking because they induce an

ings. We find that firms reduce earnings volatility by an average of 2.4 percent to 3.2 percent for every one-percentage-point increase in their nexus-weighted tax rates relative to other firms operating in neighboring states and in the same industry that are not subject to a tax change where they operate. This effect is estimated over the three years following a tax increase and becomes stronger when we give firms more time to adjust their risk profiles. The main way in which firms reduce risk is to shorten their operating cycles, which

puts less capital at risk, in particular in the form of inventories.

As in the case of the tax sensitivity of debt, we find evidence of asymmetry: While

firms reduce risk significantly when tax rates increase, they do not, on average, increase risk when tax rates fall. One reason to expect firms not to increase risk in response to a tax cut is that their creditors, whose claims would decline in value if risk increased, constrain their ability to do so, for example through the use of debt covenants. Consistent with this prediction, we show that firms with low financial leverage, which presumably face fewer constraints, increase risk in response to tax cuts, whereas high-leverage firms, which presumably face more constraints, do not.

### Taxes, Wages, and Employment

Smolyansky and I investigate how firm employment and wages respond to tax changes. Firm-level data on employment and wages are not systematically available, even for publicly listed firms, so instead we use county-level data from the U.S. Bureau of Economic Analysis. To disentangle the effect of corporate taxes from business cycle effects that may coincide with, or potentially even drive, state tax changes, we compare

AN EXAMPLE OF HOW TAXES AFFECT RISK						
Scenario 1: No taxes				Scenario 2: After 30% tax, assuming no loss offset		
	'Good' case	'Bad' case	Expected profit 50% chance of good and bad case	'Good' case	'Bad' case	Expected profit 50% chance of good and bad case
Project A	\$40	+	\$40 = \$40	\$28*	+	\$28 = \$28
Project B	\$100	+	-\$20 = \$40	\$70	+	-\$20 = \$25

\* \$28 = (1-.3) x 40

Figure 1

asymmetry in a firm’s payoffs. To see how, consider a firm that has access to two projects, A and B, with two equally likely outcomes, “good” and “bad.” [See Figure 1] Project A yields a profit of \$40 under both scenarios while project B yields a profit of \$100 under the good scenario and a loss of \$20 under the bad scenario. Project risk is idiosyncratic and hence diversifiable. Absent taxes, the expected profit of each project is \$40 and so a risk-neutral firm is indifferent between them. If the tax rate increases from zero to 30 percent, the expected after-tax profit of each project falls, but it falls by more for the risky project B than for the safe project A. The reason is that the government shares in the firm’s profit but not—absent full tax loss offsets—in the firm’s loss. Given this asymmetry, a risk-neutral firm will prefer the safe project to the risky project as the tax rate increases.

Again using the state tax changes, we estimate the tax sensitivity of various firm-level measures of risk-taking, such as the volatility of quarterly earn-

contiguous counties straddling state borders. The idea is to exploit a spatial policy discontinuity when forming control groups. Because a state's tax jurisdiction stops at its border, a county's immediate neighbors on the other side of the border share plausibly similar economic conditions while being subject to discretely different tax policies.

Our empirical results show that corporate tax changes affect firm employment and wages [See Figure 2], and that they do so asymmetrically: While tax increases hurt employment and income in

treated counties, tax cuts have little effect. All else equal, a one-percentage-point increase in corporate income taxes reduces employment by between 0.3 percent and 0.5 percent and wages by between 0.3 percent and 0.6 percent, net of contemporaneous changes in neighboring counties on the other side of the state border. Tax cuts, on the other hand, have no significant effect on either employment or wages unless they are implemented during a recession, when they lead to sizeable increases in both employment and wages.

One potential challenge to our contiguous-border-county strategy is that tax changes on one side of the border could trigger changes in the behavior of firms or households across the border. For example, the fall in wages following a tax increase could spill over to con-

trol counties if affected households spend less money not just at home but also in neighboring counties. This would attenuate the estimated tax sensitivity, as the tax increase would hurt both the treated and the control county. To deal with such potential spillovers, we compare border counties to hinterland counties located further inside the untreated states. To the extent that spillovers dissipate with distance from the state border, we would expect employment and wages to decline in border control counties compared to hinterland counties. Instead, we

find no difference in employment or wage growth within untreated states, regardless of proximity to the border, suggesting that spillovers do not play a major role in our setting.

## Conclusions

The examples presented above suggest that state-level variations in taxes are useful for exploring a number of tax-related research questions. While these changes are generally small, measuring perhaps a percentage point, they apparently are economically meaningful in light of the responses they elicit from firms, in terms of their use of debt, their risk-taking, and their employment decisions. Whether these responses are too large, too small, or just right is an open question.

An interesting theme that emerges from these three examples is that taxes often have an asymmetric effect. In the case of capital structure, asymmetry is a prediction of one prominent class of models but not of others, which can help us to discriminate empirically between different capital structure theories. In the case of risk-taking, asymmetry is to be expected—given the insights of the literature on risk shifting and asset substitution at highly leveraged firms. In the case of firms' employment decisions, asymmetry is more of a surprise.

There remains much interesting work to be done on the various ways in which corporate taxes affect economic activity. State taxes, modest though they may often seem, are a useful addition to our empirical toolbox.

<sup>1</sup> F. Heider and A. Ljungqvist, "As Certain as Debt and Taxes: Estimating the Tax Sensitivity of Leverage from State Tax Changes," NBER Working Paper No. 18263, July 2012, and *Journal of Financial Economics*, 118(3), 2015, pp. 684–712.

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<sup>2</sup> A. Ljungqvist and M. Smolyansky, "To Cut or Not to Cut? On the Impact of Corporate Taxes on Employment and Income," NBER Working Paper No. 20753, December 2014.

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<sup>3</sup> F. Modigliani and M. H. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction," *The American Economic Review*, 53(3), 1963, pp. 433–43.

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<sup>4</sup> A. Ljungqvist, L. Zhang, and L. Zuo, "Sharing Risk with the Government: How Taxes Affect Corporate Risk-Taking," NBER Working Paper No. 21834, December 2015.

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## The Design of Trade Agreements

Kyle Bagwell and Robert W. Staiger

Since 1947 there has been a multilateral forum—first the General Agreement on Tariffs and Trade (GATT), now the World Trade Organization (WTO)—where governments meet to agree on the rules of international trade. To interpret and evaluate the role of these organizations requires a two-step research program. The first step is to identify the central problems that a trade agreement might address. The second is then to bring economic arguments to bear on the design of an agreement that would best resolve these issues. Here we review some of our joint efforts to contribute to ongoing research in this area.

### The Purpose of Trade Agreements

Economists have identified two broad and possibly complementary rationales for trade agreements: to help governments internalize the international externalities associated with their policy choices, and to help governments solve a commitment problem with respect to the private sector.<sup>1</sup> Our recent work has focused on the former reason, specifically on this question: What form do the international externalities associated with trade policy take?

We have established previously that the terms-of-trade externality plays a central role.<sup>2</sup> If governments use trade agreements to achieve mutually beneficial policy outcomes when viewed through the lens of their own objectives, then in the absence of an agreement there must be a policy inefficiency in terms of those objectives that the agreement can correct. Whether government objectives reflect the maximization of national income or the pursuit of national distributional or political goals, we found that it is

the terms-of-trade externality—and the associated incentive for international cost-shifting it creates for governments with sufficient monopsony power—that lies at the heart of a trade agreement's reason to exist.

Governments do not need trade agreements to make adjustments to their own local-market prices; they have their own trade-policy instruments to accomplish this. If the government of a country wishes to adjust the local-market price of an import good to alter the level of protection it provides to its import-competing producers, it can accomplish this much with a unilateral change in its tariff. But trade agreements can help member governments make such adjustments without altering their terms of trade, and for governments with monopsony power in international markets trade agreements therefore expand the set of possibilities beyond what these governments could achieve on their own. At least some of these new possibilities can create mutual gains for the member governments, though this is so only for the possibilities that entail negotiated tariff reductions. According to this view, the purpose of trade agreements is to eliminate policy inefficiencies that exist when governments are free to exert monopsony power on international markets, depress foreign-exporter prices with their unilateral decisions to protect domestic markets, and thereby shift some of the costs of this protection onto foreign exporters. By eliminating these inefficiencies, trade agreements will lead to freer, though not necessarily free, trade.

Our early work on these issues focused on perfectly competitive market settings. In recent work, we show that the central role played by the terms-of-trade externality in identifying the purpose of a trade agreement



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In his research, Bagwell examines a range of theoretical and empirical questions relating to the purpose and design of the GATT and WTO. He also explores theories of competition and cooperation in settings where asymmetric information is present. His research has been published in numerous academic journals, and in a book, *The Economics of the World Trading System*, coauthored with Robert W. Staiger and published by The MIT Press.

Bagwell received undergraduate degrees in economics and mathematics from Southern Methodist University in 1983 and a Ph.D. in economics from Stanford in 1986. Prior to joining Stanford's faculty at the start of 2009, he was a faculty member at Northwestern University and at Columbia University, where he was the Kelvin J. Lancaster Professor of Economic Theory.

Bagwell has served on the editorial boards of several academic journals. He was a national fellow of the Hoover Institution in 1991–92 and a fellow at Stanford's Center for Advanced Study in the Behavioral Sciences 2014–15. He was director of the Stanford Institute for Theoretical Economics 2010–13, and a reporter for the American Law Institute in its study *Principles of Trade Law: The World Trade Organization*. He is also a fellow of the Econometric Society.

extends to a wide variety of market settings. These settings include free-entry monopolistic competition and free-entry Cournot oligopoly, where firm-delocation/home-market effects create an incentive for trade policy intervention.<sup>3</sup> They also include oligopolistic settings where the number of firms is fixed and profit-shifting incentives for intervention exist.<sup>4</sup>

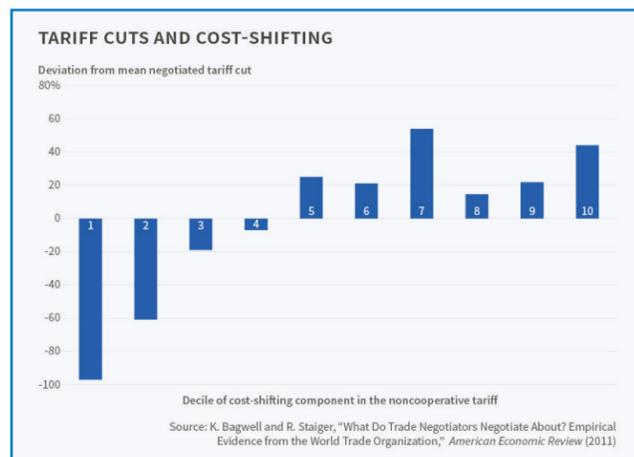
Each of these imperfectly competitive settings introduces a rich new set of local-price externalities that complement the traditional terms-of-trade externality. We show, however, that if all governments could be induced to make policy choices that were free from terms-of-trade motives, and hence not motivated by the international cost-shifting made possible by monopsony power, then these policy choices would bring governments to the efficiency frontier defined in light of their objectives, and there would be nothing further for a trade agreement to do. The key point is that local-price externalities are “shut down” at the local prices implied by each government’s policy choices if each government suppresses international cost-shifting motives when making those choices. In this sense, eliminating the cost-shifting behavior associated with the terms-of-trade externality remains the sole rationale for a trade agreement in these imperfectly competitive settings, just as in the perfectly competitive benchmark. From this perspective, the “terms-of-trade theory” of trade agreements can be understood to encompass a remarkably wide class of models.

In all of these settings, an important condition for our results is that governments have a complete set of trade policy instruments, though not necessarily domestic policy instruments. If this condition were not met, then local-price externalities would persist even if each government were to suppress international cost-shifting motives when selecting the level of intervention with the policies it does possess, and an additional purpose for trade agreements, beyond

suppressing the exercise of monopsony power, would arise: solving the missing instruments problem.<sup>5</sup>

### What Do Trade Negotiators Negotiate About?

Do governments use trade agreements to eliminate the policy inefficiencies that exist when they are free to exert their monopsony power on international markets? We provide an answer to this question by examining the negotiated tariff cuts of 16 countries that joined the WTO in the decade following its inception, under the assumption that these countries agreed to reduce their tariffs



from noncooperative (unconstrained) levels to efficient levels as the “price of admission” to the WTO.<sup>6</sup>

We use the terms-of-trade theory to estimate the component of the noncooperative tariff that embodies the international cost-shifting motive. [See Figure] In our most general version of the model, this estimate is a function of pre-negotiation import volumes, prices, and trade elasticities that gauge a country’s power to affect world prices. In a linear version of the model, the estimate is a function of just pre-negotiation import volumes and prices. We use these estimates to derive the pattern of negotiated tariff cuts that is implied by the terms-of-trade theory. If all governments sought to maximize national income, their tariffs would reflect only

the international cost-shifting component and negotiations would eliminate all tariffs. But if governments pursue national distributional or political goals, their non-cooperative tariffs reflect these goals combined with the international cost-shifting component. Estimating this cost-shifting component is then the key step to predicting the negotiated tariff cuts implied by the terms-of-trade theory; if the cost-shifting component is large, then so too should be the negotiated tariff cut.

For a subset of five of our set of 16 WTO-acceding countries for which we have data to calculate our most general measure of the cost-shifting component, the accompanying figure plots the percent deviation from mean negotiated six-digit Harmonized System product tariff cut by decile of this cost-shifting component. There is a strong positive relationship between the size of the cost-shifting component in the noncooperative tariff and the size of the negotiated tariff cut, as the theory predicts. A similar plot arises for all 16 countries when we use instead the measure of the cost-shifting component from our linear model and can exploit the wider data availability to construct this measure. And when we turn to regression analysis, we find that these basic patterns in

the data survive a number of controls and robustness checks. Subsequent work has confirmed and extended empirical support for the terms-of-trade theory of trade agreements to a wider set of countries and to additional implications of the theory.<sup>7</sup>

### The Design of Trade Agreements

Why does the purpose served by trade agreements matter? It matters for the design of trade agreements. Many of the core design features of the GATT can be understood as features that support governments’ efforts to neutralize the terms-of-trade consequences of their policy choices.

We show that the GATT’s design pillars of reciprocity and nondiscrimination

can be understood from this perspective.<sup>8</sup> Reciprocity, defined as tariff changes that lead to equal changes in the values of a country’s export and import volumes, neutralizes the terms-of-trade consequences of bilateral tariff negotiations, creating an environment conducive to tariff bargaining stripped of terms-of-trade motives. Nondiscrimination is implemented through the most-favored-nation (MFN) principle, which prevents countries from applying different tariff rates to the imports of a given product based on its country of origin. Whatever treatment is offered to the “most favored” nation must thus be offered to all nations. The MFN principle ensures that the terms-of-trade externality continues to be the key international externality associated with tariff intervention in a multi-country world. Taken together, reciprocity and MFN treatment can help to neutralize third-party externalities of tariff negotiations by preventing the terms-of-trade movements through which third-party externalities would travel. Viewed in this light, the GATT’s design pillars can be interpreted as facilitating efficiency-enhancing outcomes through decentralized bilateral tariff bargaining.

In joint work with Ali Yurukoglu, we examine the implications of reciprocity and MFN treatment in the GATT multilateral tariff bargaining records from the Torquay Round (1950–51).<sup>9</sup> In the Torquay Round, governments adopted a bargaining protocol under which they engaged in simultaneous bilateral request-offer tariff negotiations with multiple bargaining partners, and where the agreements reached in each bilateral were multilateralized to the entire GATT membership through the MFN principle. We argue that adherence to reciprocity and MFN treatment could have had the effect of dramatically simplifying these bilateral simultaneous tariff bargains, converting them from operating like an open bazaar for the exchange of market access commitments, where governments might haggle over the terms (price) of the exchange, into operating in essence like a retail store for market access where the price of market access is fixed at a recipro-

cal exchange of one for one.

Specifically, we show that if adherence to reciprocity and MFN treatment is strict in the sense that all bargaining proposals must satisfy these principles, then each country has a dominant strategy to immediately propose the tariffs that would deliver its desired level of market access at the existing terms of trade. And we show that multilateral rather than bilateral reciprocity is all that is required for this result. This second point is significant, because the innovation of the GATT’s multilateral negotiating rounds—where many countries were negotiating bilaterally but simultaneously in the same “room”—made it possible for the first time for countries to value the indirect market-access benefits they could expect from other successful bilaterals under the MFN principle, thereby relaxing the reciprocity constraint so that negotiators could achieve multilateral rather than bilateral reciprocity.

Focusing on the U.S. bilaterals with each of its 24 bargaining partners in the Torquay Round, we find evidence that supports our analysis. The U.S. and each of its bargaining partners made initial tariff-level offers that did not change through the seven-month course of the negotiations, consistent with the stance that governments abstained from strategic considerations when configuring their opening tariff-level offers. What changed through the course of the round within each bilateral was the sets of offered products on the table, as each government sought to secure the maximum exchange of market-access commitments across partners consistent with reciprocity and its individual desires. When in the middle of the round the U.S.-U.K. bilateral broke down, the subsequent response of the remaining U.S. bargaining partners was to pull back on their market-access offers to the U.S. while the U.S. was simultaneously re-issuing offers to them that it had initially made to the U.K., suggesting that before the breakdown the other U.S. bargaining partners had been counting on indirect trade benefits from the U.S.-U.K. bilateral in their efforts to secure multilateral reciprocity, and that a rebalancing of



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offers to maintain multilateral reciprocity was required once the breakdown became known.

In other recent work, we explore implications of our theoretical analysis for settings with important asymmetries.<sup>10</sup> A market-access bargaining forum built on reciprocity and MFN may work well when the desire for increased market access is relatively balanced across bargaining partners, so that the reciprocal one-for-one price of exchange is approximately a market-clearing price. But when large asymmetries exist, as when some countries have already exhausted many of the possibilities for reciprocal exchanges of commitments through earlier bargains, while other countries are just beginning to engage in the process, the reciprocity requirement itself may pose a major hurdle to successful negotiations. We develop this idea as a possible contributing factor to the difficulties faced by the WTO's Doha "development" round in achieving its goal of better integrating emerging and developing countries into the world trading system.

Another core design feature of the GATT/WTO is that governments negotiate bound tariff levels or tariff caps. When a government applies a tariff that falls strictly below the negotiated tariff cap for a given good, "binding overhang" is said to occur. To study tariff caps and binding overhang, we extend the terms-of-trade theory to allow governments to negotiate a trade agreement while uncertain about the preference shocks that they may respectively and privately experience in the future. We show that expected joint government welfare in such a setting is higher when governments negotiate tariff caps and thus allow for binding overhang than when they negotiate exact tariff levels to be applied under all shocks.<sup>11</sup> Subsequent work generalizes the analysis and characterizes settings in which a trade agreement with tariff caps maximizes expected joint government welfare among all incentive-compatible trade agreements.<sup>12</sup> Another line of subsequent work establishes that an agreement with tariff caps is also preferred to an agree-

ment with exact tariff levels in an alternative extension that features contracting costs.<sup>13</sup>

Not all dimensions of GATT/WTO design find clear support under a terms-of-trade interpretation, however. For example, WTO rules prohibit the use of export subsidies on manufactured goods. In a standard terms-of-trade model with competitive industries, a country that offers an export subsidy generates a positive terms-of-trade externality for its trading partner; by contrast, import tariffs are negotiated but not prohibited under GATT/WTO rules, even though in the standard model a country that imposes an import tariff generates a negative terms-of-trade externality for its trading partner. The treatment of export subsidies under WTO rules receives more support in alternative models with imperfect competition and an outside good, free entry, segmented markets, and positive trade costs. For such models, an export subsidy may generate a terms-of-trade loss for the trading partner by inducing exit and driving up prices.<sup>14</sup> Expanding on this logic, we study a linear Cournot firm-delocation model and provide a partial interpretation of the treatment of export subsidies in the WTO.<sup>15</sup>

### Could the Purpose of Trade Agreements Be Changing?

GATT was created in 1947, and we know that the nature of trade is very different now than it was then. How might these changes affect the relevance of a multilateral forum like the WTO, and how might it evolve in response? This is a natural question to ask in the two-step research program we describe above. To answer it, we must first ask whether the changing nature of trade has altered the central problems that a trade agreement might address; if the answer is affirmative, then the next step is to inquire into any new design features that may be efficiency-enhancing for member governments.

Viewed through the lens of the terms-of-trade theory, the key question is whether the changing nature of trade

has altered the central role of terms-of-trade externalities in defining the purpose of a trade agreement. This is an open and important question. One possible reason that the answer could be "yes" is that the rise of offshoring and global supply chains may be changing the way that international prices and the terms of trade are determined, from traditional market-clearing mechanisms to a web of bilateral bargains over the prices of customized inputs in specialized buyer-supplier relationships that are no longer tightly disciplined by market-clearing considerations. To the extent that this change has occurred, it changes the nature of international policy externalities, extending them beyond terms-of-trade channels, and thereby creating new problems for a trade agreement to solve and new features of the trade agreement designed to solve them.<sup>16</sup>

<sup>1</sup> For recent reviews of much of this literature, see K. Bagwell, C. Bown, and R. W. Staiger, "Is the WTO Passé?" NBER Working Paper No. 21303, June 2015, and forthcoming in *Journal of Economic Literature*, and also G. M. Grossman, "The Purpose of Trade Agreements," NBER Working Paper No. 22070, March 2016, and forthcoming in K. Bagwell and R. W. Staiger, eds., *Handbook of Commercial Policy, Amsterdam, the Netherlands: Elsevier*.  
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<sup>2</sup> K. Bagwell and R. W. Staiger, "An Economic Theory of GATT," NBER Working Paper No. 6049, May 1997, and *American Economic Review*, 89(1), 1999, 215–48, and K. Bagwell and R. W. Staiger, *The Economics of the World Trading System, Cambridge, Massachusetts: The MIT Press*, 2002.  
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<sup>4</sup> K. Bagwell and R. W. Staiger, "Profit Shifting and Trade Agreements in Imperfectly Competitive Markets," NBER Working Paper No. 14803, March 2009, and *International Economic Review*, 53(4), 2012, pp. 1067–1104.  
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<sup>5</sup> This point is emphasized by R. Ossa, "Profits in the 'New Trade' Approach to Trade Negotiations," *American Economic Review*, 102(2), 2012, pp. 466–69.  
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<sup>6</sup> K. Bagwell and R. W. Staiger, "What Do Trade Negotiators Negotiate About? Empirical Evidence from the World Trade Organization," NBER Working Paper No. 12727, December 2006, and *American Economic Review*, 101(4), 2011, pp. 1238–73.  
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<sup>8</sup> K. Bagwell and R. W. Staiger, "The WTO: Theory and Practice,"

NBER Working Paper No. 15445, October 2009, and *Annual Review of Economics*, 2(1), 2010, pp. 223–56; and K. Bagwell and R. W. Staiger, "Backward Stealing and Forward Manipulation in the WTO," NBER Working Paper No. 10420, April 2004, and *Journal of International Economics*, 82(1), 2010, pp. 49–62.  
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<sup>9</sup> K. Bagwell, R. W. Staiger and A. Yurukoglu, "Multilateral Trade Bargaining: A First Look at the GATT Bargaining Records," NBER Working Paper No. 21488, August 2015.  
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<sup>10</sup> K. Bagwell and R. W. Staiger, "Can the Doha Round be a Development Round? Setting a Place at the Table," NBER Working Paper No. 17650, December 2011, and in R. C. Feenstra and A. M. Taylor, eds., *Globalization in an Age of Crisis: Multilateral Economic Cooperation in the Twenty-First Century, Chicago, Illinois: University of Chicago Press*, 2014, pp. 91–124.  
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<sup>11</sup> K. Bagwell and R. W. Staiger, "Enforcement, Private Political Pressure and the GATT/WTO Escape Clause," NBER Working Paper No. 10987, December 2004, and *Journal of Legal Studies*, 34(2), 2005, pp. 471–513.  
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<sup>13</sup> H. Horn, G. Maggi and R. W. Staiger, "Trade Agreements as Endogenously Incomplete Contracts," NBER Working Paper No. 12745, December 2006, and *American Economic Review*, 100(1), 2010, pp. 394–419.  
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<sup>14</sup> A. J. Venables, "Trade and Trade Policy with Imperfect Competition: The Case of Identical Products and Free Entry," *Journal of International Economics*, 19 (1–2), 1985, pp. 1–19.  
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<sup>15</sup> K. Bagwell and R. W. Staiger, "The Economics of Trade Agreements in the Linear Cournot Delocation Model," NBER Working Paper No. 15492, November 2009, and *Journal of International Economics*, 88(1), 2012, pp. 32–46.  
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<sup>16</sup> P. Antras and R. W. Staiger, "Trade Agreements and the Nature of Price Determination," *American Economic Review: Papers and Proceedings*, 102(3), 2012, 470–76; and P. Antras and R. W. Staiger, "Offshoring and the Role of Trade Agreements," NBER Working Paper No. 14285, August 2008, and *American Economic Review*, 102(7) 2012, pp. 3140–83.  
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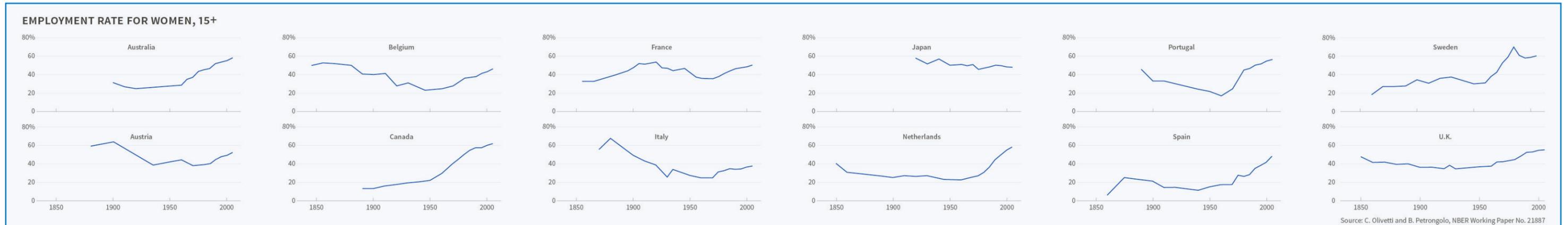


Figure 1a

## Gender Gaps in Developed Economies

Claudia Olivetti

Women in developed economies have made remarkable progress in the labor market over the past century, resulting in clear convergence in human capital investment, employment prospects, and outcomes relative to men. However, gender differences in pay and employment levels persist. A vast and still growing literature has developed on the causes, characteristics, and consequences of both the improvements for women and the remaining disparities with respect to men. In this summary, I discuss findings from my recent work that contribute to this literature.

### The American Experience in Comparative Perspective

Some of my recent research, partly joint with Barbara Petrongolo, has documented historic trends in gender gaps in the United States and other OECD economies.<sup>1</sup>

I combine pre-WWII data on labor force participation rates and sectoral employment by gender from the *International Historical Statistics Series*<sup>2</sup> with comparable post-WWII data from the International Labour Organization to construct a sample of developed economies for which data are consistently available from the late 19th century to the turn of the 21st century. The sam-

ple includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States.

Figures 1a and 1b display the resulting female employment-to-population ratio for women over 15 years old, by country. The female employment rate in the U.S. was 20 percent in 1890 and surpassed 60 percent in 2005. In other OECD countries, the rise in female employment only started in the postwar period, with Canada, Australia, the U.K., the Netherlands, and Scandinavian countries reaching levels similar or higher than those in the U.S. Despite growing during at least five decades, by the end of the 20th century the female employment rate in other European countries remained below the 60 percent mark, especially in Mediterranean countries, where the current level of female employment is similar to that observed in the U.S. or the U.K. during the 1970s. Japan is the only country in which female employment stagnated (at around 50 percent) throughout the postwar period.

On average, female employment increased between the mid-19th century and the first decade of the 21st century. However, and this is perhaps less well known, this increase did

not happen monotonically. Figures 1a and 1b also show that there are large cross-country differences in the evolution of female employment between 1850 and 1950. While female employment grows monotonically in the U.S. and Canada, in most of the other countries there were important declines in female employment during these 100 years, either throughout the period (for instance in Belgium, the Netherlands, and Portugal), or after an initial rising phase (for example in the U.K., Italy, Spain, Austria, and most notably France). In fact, earlier work argues that even for the U.S., more inclusive measures of labor supply that cover both paid and unpaid work of married women deliver a U-shaped pattern, whereby female labor force participation declines during the 19th century, reaching the bottom sometime in the 1920s, before starting its steady rise during the rest of the 20th century.<sup>3</sup>

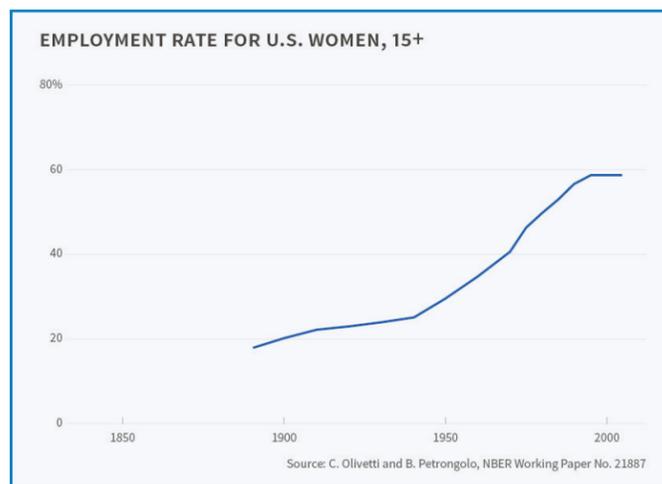


Figure 1b

Large gains in female employment were thus not a historical necessity, but largely a feature of the postwar period.

Other labor market indicators consistently available for OECD countries over the postwar period—hours worked, employment rates

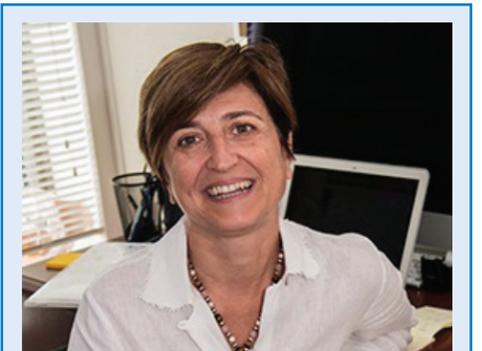
of working-age women, wage gaps—confirm gender convergence in labor market outcomes post-1950, though there are interesting differences in the remaining gaps. In countries with a more-compressed wage distribution, such as Scandinavian nations, gender differences in pay are also more compressed than in countries with a wider wage distribution, such as the U.S. and the U.K.<sup>4</sup> Countries in which the employment gap has closed faster display relatively larger gaps in wages. The resulting cross-sectional negative correlation between wage and employment gaps is suggestive of important selection effects, at least for some countries.<sup>5</sup>

### Determinants of Convergence

Women's changing roles in the economy, and the driving forces, whether technological or cultural, have been widely researched. Given the breadth and complexity of the phenomena being analyzed, there is obviously no one-size-fits-all explanation.

The expansion of the service sector with its attendant white-collar jobs greatly facilitated change.<sup>6</sup> Estimates from my work discussed earlier<sup>7</sup> indicate that the growth in female labor force participation in developed economies precedes the acceleration in growth of the service sector. Men may gain from the shift away from agriculture initially, with more robust manufacturing growth, but women who concentrate in service-sector jobs are well positioned in what will eventually be the leading sector. As intellectual skills grow in importance relative to physical power, increasing relative wages lower fertility and increase labor force participation.<sup>8</sup>

Other types of technological progress—for example in contraceptive technology<sup>9</sup> and new domestic appliances<sup>10</sup>—reinforce this process by affecting women's investment in human capital and fertility choices. Changing cultural norms and attitudes towards gender roles also played an important role.<sup>11</sup>



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Olivetti received her Ph.D. in economics from the University of Pennsylvania in 2001 and also holds a Laurea in Statistics and Economics from the University of Rome-La Sapienza. Prior to joining Boston College, Olivetti was on the faculty at Boston University from 2001–15 and a fellow of the Radcliffe Institute for Advanced Studies in 2005.

Claudia is originally from Rome, Italy. She lives in Brookline, MA, with her husband, her son, and her furry Spinone Italiano, Stella.

## Medical Progress in Maternal Health

Recent work with Stefania Albanesi shows that progress in maternity care was critical both to the rise in married women's labor force participation and to the increase in fertility between 1930 and 1960.<sup>12</sup> In the mid-1930s, maternal mortality was the second leading cause of death for women in childbearing years in the United States. Maternal morbidity was also rampant. For each death, 20 mothers suffered pregnancy-related disabilities. Medical advances improved maternal health, leading to a remarkable reduction in maternal mortality and morbidity over a 20-year span. These improvements, by enabling women to reconcile work and motherhood, contributed to dual increases in participation and fertility during the Baby Boom. The diffusion of infant formula—probably the most important innovation in infant feeding of the 20th century—also played an important auxiliary role in a period of high fertility.

## The Service Sector

The expansion of the service sector may create jobs whose characteristics better match female preferences and household roles, and at the same time may increase the relative demand for female work as long as women have a comparative advantage in the production of services.<sup>13</sup> The labor demand element of the rise in the service economy is well positioned to generate gender convergence in labor market outcomes both in terms of employment and of wages, a feature that could not be rationalized on the basis of labor supply mechanisms alone.<sup>14</sup>

Post-1970, the relationship between the rise in services and female hours in developed economies can be grasped in Figure 2. Each line represents the joint evolution of the service share and female

work hours in each country over decades, with each marker representing a decade from the 1970s to the 2000s. Positively sloped trajectories imply that both indicators are rising over time. The cross-country dynamics show clear evidence of convergence in both industrial structure and female hours over time, with some countries still lagging behind. For example, Greece and Korea in 2005 have similar female and service shares to those observed in the United States in the 1970s. The growth in the service share can explain at least half of the overall variation in female hours, both across countries and over decades.

## Heterogeneous Effects

Some aspects of gender convergence

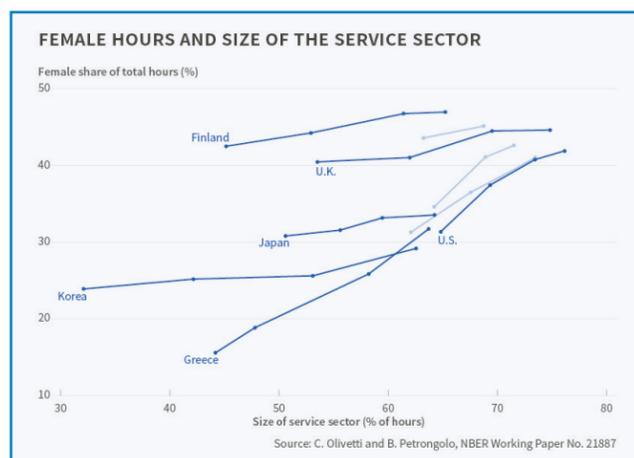


Figure 2

differ in interesting ways across skills. For example, countries with high employment gaps, typically in southern Europe, tend to have lower wage gaps than countries with low employment gaps, such as the U.S. and U.K., as the average working woman is more positively selected into employment than the average working man.

Gender gaps also vary widely across levels of human capital within countries. For example, in the U.S., the U.K., and countries in northern Europe, the gender wage gap is either rising with levels of education or roughly flat, while in southern Europe gender wage penalties are largest among the unskilled. Gender gaps in hours-worked fall with levels of educa-

tion everywhere, but the gradient is highest in southern Europe and Ireland, where employment rates of unskilled women are lowest. This pattern of variation arguably reveals the importance of demand forces.

Insofar as different industries employ a different mix of labor inputs, defined by gender and skill, we expect the industry structure to have an impact on gender gaps across countries and skills. In particular, it appears that differences in the service share are an important determinant of the cross-country variation in women's labor market outcomes.<sup>15</sup>

In the U.S., the labor supply of women was affected by World War II, but mostly among the upper half of women by level of schooling. Less-educated women were disproportionately pulled into manufacturing positions during the war and many probably did not remain in them afterward. The more-educated group, however, entered growing sectors like services that enabled them to remain to 1950 and beyond.<sup>16</sup> There is also evidence across countries and U.S. states suggesting that slowly changing social norms might give rise to a non-monotonic relationship between changes over time in women's educational choices and status in the workforce, on the one hand, and an important social outcome—the marriage market outcomes for skilled vs. unskilled women—on the other.<sup>17</sup>

## Persistence of Gender Inequalities

Despite the convergence in gender trends documented in the literature, the remaining gender gaps in wages and employment levels, as well as in the types of activities that men and women perform in the labor market, seem remarkably persistent, even more so against the backdrop of reversing education gaps in most countries and stricter equal-treatment legislation.<sup>18</sup> Women are still the main childcare providers, and a substantial portion of gender inequalities

in the labor market can be explained by fertility.<sup>19</sup>

Gender inequalities may have roots in gender differences in productivity and/or preferences, or labor market discrimination.<sup>20</sup> For example, my work with Albanesi shows that the persistence of gender gaps can be rationalized in the context of a model of gender statistical discrimination where household roles and market wages are tied through employers' beliefs about female labor force attachment and cost of work effort. In this model, factors that contribute to entrenching firms' beliefs about household roles—overly gendered family-friendly policies, for example—could contribute to increasing the gender wage gap by lowering the incidence and generosity of high-powered labor contracts for women.<sup>21</sup> The model indicates the possibility that policies aimed at encouraging the labor market involvement of women may backfire by raising the cost for employers of hiring women and by reinforcing their beliefs regarding women's comparative advantage in childcare and home production more generally. In fact, cross-country studies have shown that although generous policies are in most cases associated with higher female participation, they may have unintended negative effects on women's earnings or job segregation.<sup>22</sup> The model also suggests that the use of incentive pay might contribute to the persistent gender pay gap. Evidence from a sample of top executives for whom incentive pay accounts for a considerable share of total compensation seems to support this hypothesis.<sup>23</sup>

<sup>1</sup> C. Olivetti, "The Female Labor Force and Long-run Development: The American Experience in Comparative Perspective," NBER Working Paper No. 19131, June 2013 and in L. Platt Boustan, C. Frydman, and R. A. Margo, eds., *Human Capital in History: The American Record*, Chicago, IL: University of Chicago Press, 2014, pp. 161–97; and C. Olivetti and B. Petrongolo, "The Evolution of Gender Gaps in

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<sup>2</sup> B. Mitchell, ed., *International Historical Statistics: Europe 1750–1993*, and *International Historical Statistics: Americas 1750–1993*, *International Historical Statistics Series*, 3rd edition, Basingstoke, United Kingdom: Palgrave Macmillan, 1998.

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<sup>3</sup> C. Goldin, *Understanding the Gender Wage Gap: An Economic History of American Women*, Oxford, United Kingdom: Oxford University Press, 1990.

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<sup>5</sup> C. Olivetti and B. Petrongolo, "Unequal Pay or Unequal Employment? A Cross-Country Analysis of Gender Gaps," *Journal of Labor Economics*, 26(4), 2008, pp. 621–54.

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<sup>6</sup> C. Goldin, *Understanding the Gender Wage Gap: An Economic History of American Women*, Oxford, United Kingdom: Oxford University Press, 1990.

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<sup>8</sup> O. Galor and D. N. Weil, "The Gender Gap, Fertility, and Growth," NBER Working Paper No. 4550, November 1993, and *American Economic Review*, 86(3), 1996, pp. 374–87.

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<sup>9</sup> C. Goldin and L. Katz, "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions," NBER Working Paper No. 7527, February 2000, and *Journal of Political Economy*, 110(4), 2002, pp. 730–70; M. J. Bailey, "More Power to the Pill: The Impact of Contraceptive Freedom on Women's Lifecycle Labor Supply," *The Quarterly Journal of Economics*, 121(2), 2006, pp. 289–320.

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## NBER News

### New Directors of Two NBER Programs

In September 2016, Catherine Wolfram, the Cora Jane Flood Professor of Business Administration at the Haas School of Business at the University of California, Berkeley, and an NBER research associate, will succeed Don Fullerton of the University of Illinois as the director of the Environmental and Energy

Economics (EEE) Program. Fullerton launched the EEE Program in 2007.

In another leadership change, Stephen Redding, the Harold T. Shapiro ‘64 Professor of Economics in the Department of Economics and the Woodrow Wilson School at Princeton University, will succeed Robert Feenstra of the University

of California, Davis, as the director of the International Trade and Investment (ITI) Program. Feenstra

has led the Program since 1992, when the NBER’s International Economics Program, which had been led by William Branson, was divided into the ITI and International Finance and Macroeconomics (IFM) Programs.

## Conferences

### Economics of Culture and Institutions

An NBER conference, “Economics of Culture and Institutions,” took place in Cambridge on April 9. Research Associate Alberto Bisin of New York University and Faculty Research Fellow Paola Giuliano of the University of California, Los Angeles, organized the meeting. These researchers’ papers were presented and discussed:

- **Alberto F. Alesina**, Harvard University and NBER; **Salvatore Piccolo**, Catholic University of Milan; and **Paolo Pinotti**, Bocconi University (Milan), “Organized Crime, Violence, and Politics” (NBER Working Paper No. 22093)
- **Jeremiah Dittmar**, London School of Economics, and **Ralf Meisenzahl**, Federal Reserve Board, “State Capacity and Public Goods: Institutional Change, Human Capital, and Growth in Early Modern Germany”
- **Christian Dippel**, University of California, Los Angeles, and NBER; **Stephan Heblich**, University of Bristol; and **Robert Gold**, Kiel Institute for the World Economy, “Globalization and Its (Dis-)Content: Trade Shocks and Voting Behavior” (NBER Working Paper No. 21812)
- **Sara Lowes**, Harvard University; **Nathan Nunn**, Harvard University and NBER; **James A. Robinson**, University of Chicago and NBER; and **Jonathan Weigel**, Harvard University, “The Evolution of Culture and Institutions: Evidence from the Kuba Kingdom” (NBER Working Paper No. 21798)
- **Enrico Spolaore**, Tufts University and NBER, and **Romain Wacziarg**, University of California, Los Angeles, and NBER, “Fertility and Modernity”
- **Konrad B. Burchardi**, Stockholm University; **Thomas Chaney**, University of Chicago; and **Tarek A. Hassan**, University of Chicago and NBER, “Migrants, Ancestors, and Investments” (NBER Working Paper No. 21847)

Summaries of these papers are at: <http://www.nber.org/confer/2016/CIs16/summary.html>

## Capital Flows and Debt in Emerging Markets

An NBER conference, “Capital Flows and Debt in Emerging Markets,” took place in Washington, D.C., on April 11–12. Research Associates Sebnem Kalemli-Ozcan of the University of Maryland and Carmen Reinhart of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Laura Alfaro**, Harvard University and NBER; **Gonzalo Asis**, University of North Carolina at Chapel Hill; **Anusha Chari**, University of North Carolina at Chapel Hill and NBER; and **Ugo Panizza**, Graduate Institute of International and Development Studies (Geneva), “Lessons Unlearned? Corporate Debt in Emerging Markets”
- **Vladimir Asriyan**, **Luca Fornaro**, and **Alberto Martin**, CREI (Barcelona), and **Jaume Ventura**, CREI and NBER, “Monetary Policy for a Bubbly World”
- **Serkan Arslanalp**, International Monetary Fund, and **Takahiro Tsuda**, Ministry of Finance Japan, “Tracking Global Demand for Emerging Market Sovereign Debt”
- **Benjamin Hébert**, Stanford University, and **Jesse Schreger**, Princeton University and NBER, “The Costs of Sovereign Default: Evidence from Argentina” (NBER Working Paper No. 22270)
- **Carmen Reinhart**; **Vincent Reinhart**, American Enterprise Institute; and **Christoph Trebesch**, University of Munich, “Global Cycles: Capital Flows, Commodities, and Sovereign Defaults, 1815-2015” (NBER Working Paper No. 21958)
- **Jaume Ventura**, and **Hans-Joachim Voth**, University of Zurich, “Debt into Growth: How Sovereign Debt Accelerated the First Industrial Revolution”
- **Gita Gopinath**, Harvard University and NBER; **Sebnem Kalemli-Ozcan**; **Loukas Karabarbounis**, University of Chicago and NBER; and **Carolina Villegas-Sanchez**, ESADE (Barcelona), “Capital Allocation and Productivity in South Europe” (NBER Working Paper No. 21453)

Summaries of these papers are at: <http://www.nber.org/confer/2016/DEMs16/summary.html>

## The Economics of Energy Markets

An NBER preconference, “The Economics of Energy Markets,” took place in Cambridge on April 13. Research Associates Richard G. Newell of Duke University, Meredith Fowlie of the University of California, Berkeley, and Christopher R. Knittel and James M. Poterba, both of MIT, organized the meeting. These researchers’ papers were presented and discussed:

- **Sharat Ganapati**, Yale University; **Joseph S. Shapiro**, Yale University and NBER; and **Reed Walker**, University of California, Berkeley, and NBER, “Energy Prices, Pass-Through, and Incidence in U.S. Manufacturing” (NBER Working Paper No. 22281)
- **Karen Clay**, Carnegie Mellon University and NBER; **Akshaya Jha**, Carnegie Mellon University; **Nicholas Muller**, Middlebury College and NBER; and **Randall Walsh**, University of Pittsburgh and NBER, “External Economics of Shipping Energy Fuels”
- **Gabriel E. Lade** and **Ivan J. Rudik**, Iowa State University, “Prices, Quantities, and Gas Capture Infrastructure: Reducing Flaring in North Dakota”
- **Christiane Baumeister**, University of Notre Dame; **Reinhard Ellwanger**, Bank of Canada; and **Lutz Kilian**, University of Michigan, “Did the Renewable Fuel Standard Shift Market Expectations of the Price of Ethanol?”
- **Richard G. Newell** and **Brian C. Prest**, Duke University, “Informing SPR Drawdown Policy Using Futures Strips”
- **Joseph E. Aldy**, Harvard University and NBER, “Boutique Fuel Markets and Security-Environment-Economic Trade-offs”

- **Frank A. Wolak**, Stanford University and NBER, “Managing Reliability Risk and the Consumer and Producer Cost of Intermittent Renewables Integration”
- **Steven E. Sexton** and **Bryan Bollinger**, Duke University, and **Kenneth Gillingham**, Yale University and NBER, “Household Demand for Solar PV and Price Discriminating Subsidies”

Summaries of these papers are at: <http://www.nber.org/confer/2016/EEMs16/summary.html>

## 31st Macroeconomics Annual Conference

The NBER’s 31st Annual Conference on Macroeconomics took place in Cambridge on April 15–16. Research Associates Martin Eichenbaum of Northwestern University and Jonathan Parker of MIT organized the meeting. These researchers’ papers were presented and discussed:

- **Jeffrey R. Campbell**, **Jonas Fisher**, **Alejandro Justiniano**, and **Leonardo Melosi**, Federal Reserve Bank of Chicago, “Forward Guidance and Macroeconomic Outcomes Since the Financial Crisis”
- **Fernando E. Alvarez**, University of Chicago and NBER, and **Francesco Lippi** and **Juan Passadore**, Einaudi Institute for Economics and Finance (Rome), “Are State and Time Dependent Models Really Different?”
- **Paul Beaudry**, University of British Columbia and NBER; **Dana S. Galizia**, Carleton University; and **Franck Portier**, Toulouse School of Economics, “Is the Macroeconomy Locally Unstable and Why Should We Care?” (NBER Working Paper No. 22275)
- **Òscar Jordà**, Federal Reserve Bank of San Francisco; **Moritz Schularick**, University of Bonn; and **Alan M. Taylor**, University of California, Davis, and NBER, “Macrofinancial History and the New Business Cycle Facts”
- **Pierre-Olivier Gourinchas**, University of California, Berkeley, and NBER; **Thomas Philippon**, New York University and NBER; and **Dimitri Vayanos**, London School of Economics and NBER, “The Analytics of the Greek Crisis”
- **Olivier J. Blanchard**, Peterson Institute for International Economics and NBER; **Christopher J. Erceg**, Federal Reserve Board; and **Jesper Lindé**, Sveriges Riksbank (Stockholm), “Jump-Starting the Euro Area Recovery: Would a Rise in Core Fiscal Spending Help the Periphery?” (NBER Working Paper No. 21426)

Summaries of these papers are at: <http://www.nber.org/confer/2016/Macro16/summary.html> and video presentations are at [http://www.nber.org/macroannualconference2016/macroannual\\_2016.html](http://www.nber.org/macroannualconference2016/macroannual_2016.html)

## State Taxation of Business Income

An NBER conference, “State Taxation of Business Income,” took place in Cambridge on May 5–6. Research Associate Joshua Rauh of Stanford University organized the conference. These researchers’ papers were presented and discussed:

- **William F. Fox**, University of Tennessee, and **Zhou Yang**, Robert Morris University, “Destination Taxation: Road to Economic Success?”
- **Jason DeBacker**, Middle Tennessee State University; **Bradley Heim** and **Justin Ross**, Indiana University; and **Shanthi Ramnath**, Department of the Treasury, “The Impact of State Taxes on Pass-Through Businesses: Evidence from the 2012 Kansas Income Tax Reform”
- **David R. Agrawal**, University of Kentucky, “The Internet as a Tax Haven? The Effect of the Internet on Tax Competition”

- **Enrico Moretti**, University of California, Berkeley, and NBER, and **Daniel Wilson**, Federal Reserve Bank of San Francisco, “The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists” (NBER Working Paper No. 21120)
- **Justin Marion**, University of California, Santa Cruz, and **Erich Muchlegger**, University of California, Davis, and NBER, “Tax Compliance and Fiscal Externalities: Evidence from U.S. Diesel Taxation”
- **Brian Baugh** and **Hoonsuk Park**, Ohio State University, and **Itzhak Ben-David**, Ohio State University and NBER, “Can Taxes Shape an Industry? Evidence from the Implementation of the ‘Amazon Tax’”
- **Alexander Ljungqvist**, New York University and NBER, and **Michael Smolyansky**, Federal Reserve Board, “To Cut or Not to Cut? On the Impact of Corporate Taxes on Employment and Income” (NBER Working Paper No. 20753)
- **Eric C. Ohrn**, Grinnell College, “Investment and Employment Responses to State Adoption of Federal Accelerated Depreciation Policies”
- **Adele C. Morris**, Brookings Institution; **David Bookbinder**, Niskanen Center; and **Yoram Bauman**, Carbon Washington, “State-Level Carbon Taxes: Options and Opportunities for Policymakers”

Summaries of these papers are at: <http://www.nber.org/confer/2016/URCs16/summary.html>

## New Developments in Long-Term Asset Management

An NBER conference, “New Developments in Long-Term Asset Management,” supported by the Norwegian Finance Initiative, took place in Cambridge on May 19–20. Research Associates Monika Piazzesi of Stanford University and Luis M. Viceira of Harvard University organized the conference. These researchers’ papers were presented and discussed:

- **Assaf Hamdani**, **Eugene Kandel**, **Yevgeny Mugeran**, and **Yishay Yafeh**, Hebrew University of Jerusalem, “Incentive Fees and Competition in Pension Funds: Evidence from a Regulatory Experiment”
- **Joseph J. Gerakos**, University of Chicago; **Juhani T. Linnainmaa**, University of Chicago and NBER; and **Adair Morse**, University of California, Berkeley, and NBER, “Asset Manager Funds”
- **Ralph Koijen**, London Business School, and **Motohiro Yogo**, Princeton University and NBER, “An Equilibrium Model of Institutional Demand and Asset Prices” (NBER Working Paper No. 21749)
- **Ian R. Appel**, Boston College, and **Todd Gormley** and **Donald Keim**, University of Pennsylvania, “Standing on the Shoulders of Giants: The Effect of Passive Investors on Activism”
- **Oleg Chuprinin**, University of New South Wales, and **Denis Sosyura**, University of Michigan, “Family Descent as a Signal of Managerial Quality: Evidence from Mutual Funds”
- **Alan Moreira**, Yale University, and **Tyler Muir**, Yale University and NBER, “Volatility Managed Portfolios” (NBER Working Paper No. 22208)
- **Andrea Eisfeldt**, University of California, Los Angeles, and NBER; **Hanno Lustig**, Stanford University and NBER; and **Lei Zhang**, University of California, Los Angeles, “Risk and Return in Segmented Markets with Expertise”
- **Nathan Foley-Fisher**, **Borghana Narajabad**, and **Stephane Verani**, Federal Reserve Board, “Securities Lending as Wholesale Funding: Evidence from the U.S. Life Insurance Industry”
- **Sergey Chernenko**, Ohio State University, and **Adi Sunderam**, Harvard University and NBER, “Liquidity Transformation in Asset Management: Evidence from the Cash Holdings of Mutual Funds”

Summaries of these papers are at: <http://www.nber.org/confer/2016/LTAMs16/summary.html>

## Women Working Longer

An NBER conference, “Women Working Longer,” took place in Cambridge on May 21–22. Research Associates Claudia Goldin and Lawrence Katz of Harvard University organized the conference. These researchers’ papers were presented and discussed:

- **Claudia Goldin** and **Lawrence Katz**, “Women Working Longer: Facts and Some Explanations”
- **Nicole Maestas**, Harvard University and NBER, “The Return to Work and Women’s Employment Decisions”
- **Sean Fahle**, State University of New York at Buffalo, and **Kathleen McGarry**, University of California, Los Angeles, and NBER, “Women Working Longer: Labor Market Implications of Providing Family Care”
- **Annamaria Lusardi**, George Washington University and NBER, and **Olivia Mitchell**, University of Pennsylvania and NBER, “Older Women’s Labor Market Attachment, Retirement Planning, and Household Debt”
- **Alexander Gelber**, University of California, Berkeley, and NBER; **Adam Isen**, Department of the Treasury; and **Jae Song**, Social Security Administration, “The Role of Social Security Benefits in the Increase of Older Women’s Labor Force Participation: Evidence from the Notch Cohorts”
- **Joshua Mitchell** and **Adam Bee**, Bureau of the Census, “The Evolution of Women’s Total Income near Retirement: Evidence from Matched Survey-Administrative Data”
- **Maria Fitzpatrick**, Cornell University and NBER, “Teaching, Teachers Pension, and Retirement across Recent Cohorts of College Graduate Women”
- **Janice Compton**, University of Manitoba, and **Robert Pollak**, Washington University in St. Louis and NBER, “What about the Surviving Spouse? Life Expectancy and Retirement”
- **Claudia Olivetti**, Boston College and NBER, and **Dana Rotz**, Mathematica Policy Research, “Changes in Marriage and Divorce as Drivers of Employment and Retirement of Older Women”
- **Joanna Lahey**, Texas A&M University and NBER, “Why Aren’t Black Women Working Longer?”

Summaries of these papers are at: <http://www.nber.org/confer/2016/WWLs16/summary.html>

## International Comparisons of Income, Prices, and Production

An NBER conference, “International Comparisons of Income, Prices, and Production,” took place in Cambridge on May 27–28. Research Associate Robert Feenstra of the University of California, Davis, and Faculty Research Fellow Alberto Cavallo of MIT organized the conference. These researchers’ papers were presented and discussed:

- **Robert C. Allen**, New York University Abu Dhabi, “Absolute Poverty: When Necessity Displaces Desire”
- **Stephen J. Redding**, Princeton University and NBER, and **David Weinstein**, Columbia University and NBER, “A Unified Approach to Estimating Demand and Welfare”
- **Ingvid Almås**, IIES Stockholm University; **Timothy Beatty**, University of California, Davis; and **Thomas Crossley**, University of Essex, “Lost in Translation: What do Engel Curves Tell Us About the Cost of Living?”
- **Yuriy Gorodnichenko**, University of California, Berkeley, and NBER; **Viacheslav Sheremirov**, Federal Reserve Bank of Boston; and **Oleksandr Talavera**, University of Sheffield, “Price Setting in Online Markets: Does IT Click?” (NBER Working Paper No. 20819)
- **Robert C. Feenstra**; **Mingzhi Xu**, University of California, Davis; **Alexis Antoniadis**, Georgetown University; and **John Romalis**, University of Sydney and NBER, “What is the Price of Tea in China? Towards the Relative Cost of Living in Chinese and U.S. Cities”

- **Jonathan Eaton**, Pennsylvania State University and NBER; **Brent Neiman**, University of Chicago and NBER; and **Samuel Kortum**, Yale University and NBER, “Obstfeld and Rogoff’s International Macro Puzzles: A Quantitative Assessment” (NBER Working Paper No. 21774)
- **Gholamreza Hajargasht**, University of Melbourne, and **Prasada Rao**, University of Queensland, “Computation of Standard Errors for Purchasing Power Parity Exchange Rates from the International Comparison Program”
- **Mario J. Crucini**, Vanderbilt University and NBER, “Globalization Boom and Bust: A Study of U.S. Automobile Exports from 1913 to 1940”
- **Robert C. Feenstra**, and **Robert Inklaar** and **Marcel Timmer**, University of Groningen, “Penn World Table: Version 9.0 and Beyond”
- **Joel David**, University of Southern California; **Espen Henriksen**, University of California, Davis; and **Ina Simonovska**, University of California, Davis, and NBER, “The Risky Capital of Emerging Markets” (NBER Working Paper No. 20769)
- **Robert Inklaar**, and **W. Erwin Diewert**, University of British Columbia and NBER, “Measuring Industry Productivity across Time and Space and Cross Country Convergence”
- **Robert Hill**, **Miriam Steurer**, **Sofie Walzl**, and **Michael Scholz**, University of Graz, “The Treatment of Owner Occupied Housing in the CPI and its Implications for Monetary Policy”

Summaries of these papers are at: <http://www.nber.org/confer/2016/ICs16/summary.html>

## Productivity in Higher Education

An NBER conference, “Productivity in Higher Education,” took place in Cambridge on May 31–June 1. Research Associate Caroline Hoxby of Stanford University and Faculty Research Fellow Kevin M. Stange of the University of Michigan organized the conference. These researchers’ papers were presented and discussed:

- **Caroline Hoxby**, “Estimating the Productivity of U.S. Postsecondary Institutions”
- **Evan Riehl**, Columbia University; **Juan Saavedra**, University of Southern California and NBER; and **Miguel Urquiola**, Columbia University and NBER, “Learning and Earning: An Approximation to College Value Added in Two Dimensions”
- **Pieter De Vlieger**, University of Michigan, and **Brian Jacob** and **Kevin M. Stange**, University of Michigan and NBER, “Measuring Instructor Effectiveness in Higher Education”
- **Paul Courant**, University of Michigan, and **Sarah Turner**, University of Virginia and NBER, “Faculty Deployment in Research Universities”
- **Veronica Minaya**, Columbia University, and **Judith Scott-Clayton**, Columbia University and NBER, “Labor Market Outcomes and Postsecondary Accountability: Are Imperfect Metrics Better than None?”
- **Scott Carrell**, University of California, Davis, and NBER, and **Michal Kurlaender**, University of California, Davis, “Estimating the Productivity of Community Colleges in Paving the Road to Four-Year College Success”
- **Joseph Altonji**, Yale University and NBER, and **Seth Zimmerman**, University of Chicago and NBER, “The Costs of and Net Returns to College Major”
- **David J. Deming**, Harvard University and NBER; **Michael Lovenheim**, Cornell University and NBER; and **Richard W. Patterson**, United States Military Academy, “The Competitive Effects of Online Education”

Summaries of these papers are at: <http://www.nber.org/confer/2016/PHEs16/summary.html>

## Program and Working Group Meetings

### Health Care

The NBER’s Program on Health Care, directed by Jonathan Gruber of MIT, met in Cambridge on March 11. These researchers’ papers were presented and discussed:

- **Michael Geruso**, University of Texas at Austin and NBER, and **Timothy J. Layton**, Harvard University, “Upcoding or Selection? Evidence from Medicare on Squishy Risk Adjustment”
- **Jishnu Das** and **Alaka Holla**, World Bank; **Aakash Mohpal**, University of Michigan; and **Karthik Muralidharan**, University of California, San Diego, and NBER, “Quality and Accountability in Healthcare Delivery: Audit-Study Evidence from Primary Care in India” (NBER Working Paper No. 21405)
- **David C. Chan, Jr.**, Stanford University and NBER, “The Efficiency of Slacking Off: Evidence from the Emergency Department” (NBER Working Paper No. 21002)
- **Mark L. Egan**, University of Minnesota, and **Tomas Philipson**, University of Chicago and NBER, “Health Care Adherence and Personalized Medicine” (NBER Working Paper No. 20330)
- **Hummy Song**, Harvard University; **Robert Huckman**, Harvard University and NBER; and **Jason Barro**, Bain & Company, “Cohort Turnover and Operational Performance: The July Phenomenon in Teaching Hospitals”
- **Leila Agha**, **Keith Marzilli Ericson**, and **James B. Rebitzer**, Boston University and NBER; **Kimberley Geissler**, University of Massachusetts Amherst; and **Benjamin Lubin**, Boston University, “Coordination within Teams and the Cost of Health Care”
- **Leila Agha** and **James B. Rebitzer**, Boston University and NBER, and **Brigham Frandsen**, Brigham Young University, “Causes and Consequences of Fragmented Care Delivery: Theory, Evidence, and Public Policy”

Summaries of these papers are at: <http://www.nber.org/confer/2016/HCs16/summary.html>

### International Trade and Investment

The NBER’s Program on International Trade and Investment, directed by Robert Feenstra of the University of California, Davis, met in Cambridge on March 18–19. These researchers’ papers were presented and discussed:

- **Pol Antràs**, Harvard University and NBER; **Alonso de Gortari Briseno**, Harvard University; and **Oleg Itskhoki**, Princeton University and NBER, “Inequality, Costly Redistribution, and Welfare in an Open Economy”
- **Lorenzo Caliendo**, Yale University and NBER; **Robert C. Feenstra** and **Alan M. Taylor**, University of California, Davis, and NBER; and **John Romalis**, University of Sydney and NBER, “Tariff Reductions, Entry, and Welfare: Theory and Evidence for the Last Two Decades” (NBER Working Paper No. 21768)
- **Ferdinando Monte**, Georgetown University, and **Stephen J. Redding** and **Esteban Rossi-Hansberg**, Princeton University and NBER, “Commuting, Migration, and Local Employment Elasticities” (NBER Working Paper No. 21706)
- **Benjamin Faber** and **Thibault Fally**, University of California, Berkeley, and NBER, “Firm Heterogeneity in Consumption Baskets: Evidence from Home and Store Scanner Data”

- **Rudolfs Bems**, International Monetary Fund, and **Robert C. Johnson**, Dartmouth College and NBER, “Demand for Value Added and Value-Added Exchange Rates” (NBER Working Paper No. 21070)
- **Lee G. Branstetter**, Carnegie Mellon University and NBER, and **Matej Drev**, Georgia Institute of Technology, “Who’s Your Daddy? Foreign Investor Origin, Multi-Product Firms, and the Benefit of Foreign Investment”
- **Christoph Boehm**, **Aaron Flaaen**, and **Nitya Pandalai-Nayar**, University of Michigan, “Multinationals, Offshoring, and the Decline of U.S. Manufacturing”
- **Jean-Noël Barrot** and **Erik Loualiche**, MIT, and **Julien Sauvagnat**, Bocconi University (Milan), “The Globalization Risk Premium”

Summaries of these papers are at: <http://www.nber.org/confer/2016/ITIs16/summary.html>

## International Finance and Macroeconomics

The NBER’s Program on International Finance and Macroeconomics, directed by Jeffrey A. Frankel of Harvard University, met in Cambridge on April 1. Laura Alfaro and Emmanuel Farhi of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Kinda Cheryl Hachem**, University of Chicago and NBER, and **Zheng Michael Song**, Chinese University of Hong Kong, “Liquidity Regulation and Unintended Financial Transformation in China” (NBER Working Paper No. 21880)
- **Jean-Noël Barrot** and **Erik Loualiche**, MIT, and **Julien Sauvagnat**, Bocconi University (Milan), “The Globalization Risk Premium”
- **Marina Halac**, Columbia University, and **Pierre Yared**, Columbia University and NBER, “Fiscal Rules and Discretion in a World Economy” (NBER Working Paper No. 21492)
- **Michael B. Devereux**, University of British Columbia and NBER; **Eric Young**, University of Virginia; and **Changhua Yu**, Peking University (Beijing), “A New Dilemma: Capital Controls and Monetary Policy in Sudden-stop Economies” (NBER Working Paper No. 21791)
- **Gauti B. Eggertsson**, Brown University and NBER; **Neil Mehrotra** and **Sanjay Singh**, Brown University; and **Lawrence H. Summers**, Harvard University and NBER, “A Contagious Malady? Open Economy Dimensions of Secular Stagnation” (NBER Working Paper No. 22299)
- **Dmitriy Sergeyev**, Bocconi University (Milan), “Optimal Macprudential and Monetary Policy in a Currency Union”
- **Stephanie Schmitt-Grohé** and **Martín Uribe**, Columbia University and NBER, “Multiple Equilibria in Open Economy Models with Collateral Constraints: Overborrowing Revisited” (NBER Working Paper No. 22264)

Summaries of these papers are at: <http://www.nber.org/confer/2016/IFMs16/summary.html>

## Public Economics

The NBER’s Program on Public Economics met in Cambridge on April 1. Directors Raj Chetty of Stanford University and Amy Finkelstein of MIT and Faculty Research Fellows Nathaniel Hendren of Harvard University and Neale Mahoney of the University of Chicago organized the meeting. These researchers’ papers were presented and discussed:

- **Caroline M. Hoxby**, Stanford University and NBER, and **George Bulman**, University of California, Santa Cruz, “The Effects of the Tax Deduction for Postsecondary Tuition: Implications for Structuring Tax-Based Aid” (NBER Working Paper No. 21554)

- **Eric Bettinger**, Stanford University and NBER; **Oded Gurantz**, Stanford University; **Laura Kawano**, Department of the Treasury; and **Bruce Sacerdote**, Dartmouth College and NBER, “The Long Run Impacts of Merit Aid: Calculations from California’s Cal Grant”
- **Sarena Goodman**, Federal Reserve Board, and **Adam Isen**, Department of the Treasury, “Un-Fortunate Sons: Effects of the Vietnam Draft Lottery on the Next Generation’s Labor Market”
- **Jacob Mortenson** and **Andrew Whitten**, Georgetown University, and **Heidi R. Schramm**, Joint Committee on Taxation, “The Effect of Required Minimum Distribution Rules on Withdrawals from Traditional Individual Retirement Accounts”
- **Bradley Heim**, Indiana University, and **Gillian Hunter**, **Adam Isen**, **Ithai Lurie**, and **Shanthi Ramnath**, Department of the Treasury, “Income Responses to the Affordable Care Act: Evidence from the Premium Tax Credit”
- **Annette Alstadsæter**, Norwegian University of Life Sciences; **Martin Jacob**, WHU – Otto Beisheim School of Management (Germany); **Wojciech Kopczuk**, Columbia University and NBER; and **Kjetil Telle**, Statistics Norway, “Accounting for Business Income in Measuring Top Income Shares: Integrated Accrual Approach Using Individual and Firm Data from Norway”
- **Sumit Agarwal**, National University of Singapore; **Gene Amromin**, Federal Reserve Bank of Chicago; **Souphala Chomsisengphet**, Department of the Treasury; **Tomasz Piskorski**, Columbia University and NBER; **Amit Seru**, University of Chicago and NBER; and **Vincent Yao**, Georgia State University, “Mortgage Refinancing, Consumer Spending, and Competition: Evidence from the Home Affordable Refinancing Program” (NBER Working Paper No. 21512)
- **Eduardo Dávila**, New York University, “Using Elasticities to Derive Optimal Bankruptcy Exemptions”
- **Alexander M. Gelber**, University of California, Berkeley, and NBER; **Damon Jones**, University of Chicago and NBER; **Daniel W. Sacks**, Indiana University; and **Jae Song**, Social Security Administration, “Estimating Extensive Margin Responses on Kinked Budget Sets: Evidence from the Earnings Test”
- **Sharat Ganapati**, Yale University; **Joseph S. Shapiro**, Yale University and NBER; and **Reed Walker**, University of California, Berkeley, and NBER, “Energy Prices, Pass-Through, and Incidence in U.S. Manufacturing” (NBER Working Paper No. 22281)
- **Brian Baugh** and **Hoonsuk Park**, Ohio State University, and **Itzhak Ben-David**, Ohio State University and NBER, “The ‘Amazon Tax’: Empirical Evidence from Amazon and Main Street Retailers” (NBER Working Paper No. 20052)
- **Stefan Pichler**, ETH Zurich, and **Nicolas R. Ziebarth**, Cornell University, “The Pros and Cons of Sick Pay Schemes: Testing for Contagious Presenteeism and Shirking Behavior”

Summaries of these papers are at: <http://www.nber.org/confer/2016/PEs16/summary.html>

## Corporate Finance

The NBER’s Program on Corporate Finance met in Chicago on April 7–8. Faculty Research Fellow Shai Bernstein of Stanford University and Research Associate C. Fritz Foley of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Adriano A. Rampini** and **S. Vish Viswanathan**, Duke University and NBER, and **Guillaume Vuilleme**, HEC Paris, “Risk Management in Financial Institutions”
- **Viral Acharya**, **Thomas Philippon**, and **Matthew Richardson**, New York University and NBER, “Measuring Systemic Risk for Insurance Companies”

- **Sabrina T. Howell**, New York University, “Relaxing Constraints on Risk Management: Evidence from a Natural Experiment”
- **Erik Stafford**, Harvard University, “Replicating Private Equity with Value Investing, Homemade Leverage, and Hold-to-Maturity Accounting”
- **Joshua D. Gottlieb**, University of British Columbia and NBER; **Richard Townsend**, Dartmouth College; and **Ting Xu**, University of British Columbia, “Experimenting with Entrepreneurship: The Effect of Job-Protected Leave”
- **Francesco D’Acunto**, University of Maryland; **Ryan Liu**, University of California, Berkeley; **Carolin Pflueger**, University of British Columbia; and **Michael Weber**, University of Chicago and NBER, “Flexible Prices and Leverage”
- **Mark L. Egan**, University of Minnesota, and **Gregor Matvos** and **Amit Seru**, University of Chicago and NBER, “The Market For Financial Adviser Misconduct” (NBER Working Paper No. 22050)
- **Peter Koudijs**, Stanford University and NBER, and **Laura Salisbury**, York University and NBER, “Bankruptcy and Investment: Evidence from Changes in Marital Property Laws in the U.S. South, 1840–1850” (NBER Working Paper No. 21952)
- **Marieke Bos**, Stockholm University; **Emily L. Breza**, Columbia University and NBER; and **Andres Liberman**, New York University, “The Labor Market Effects of Credit Market Information”
- **Rick Harbaugh** and **John W. Maxwell**, Indiana University, and **Kelly Shue**, University of Chicago and NBER, “Consistent Good News and Inconsistent Bad News”
- **Pedro Bordalo**, Royal Holloway, University of London; **Nicola Gennaioli**, Bocconi University (Milan); and **Andrei Shleifer**, Harvard University and NBER, “Diagnostic Expectations and Credit Cycles”

Summaries of these papers are at: <http://www.nber.org/confer/2016/CFs16/summary.html>

## Political Economy

The NBER’s Program on the Political Economy met in Cambridge on April 8. Program Director Alberto Alesina of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Ernesto Dal Bó**, University of California, Berkeley, and NBER; **Pablo I. Hernández-Lagos**, New York University Abu Dhabi; and **Sebastián Mazzuca**, Johns Hopkins University, “The Paradox of Civilization: Pre-Institutional Sources of Security and Prosperity” (NBER Working Paper No. 21829)
- **Joram Mayshar**, Hebrew University of Jerusalem; **Omer Moav**, University of Warwick; **Zvika Neeman**, Tel Aviv University; and **Luigi Pascali**, Pompeu Fabra University (Barcelona), “Cereals, Appropriability, and Hierarchy”
- **Renee Bowen**, Stanford University and NBER; **Jackie M. L. Chan**, Chinese University of Hong Kong; **Oeindrila Dube**, New York University and NBER; and **Nicolas Lambert**, Stanford University, “Reform Fatigue”
- **Melissa Dell**, Harvard University and NBER, and **Pablo Querubin**, New York University, “Bombing the Way to State-Building? Lessons from the Vietnam War”
- **S. Nageeb Ali**, Pennsylvania State University, and **Roland Bénabou**, Princeton University and NBER, “Image versus Information: Changing Societal Norms and Optimal Privacy” (NBER Working Paper No. 22203)
- **Abhijit Banerjee** and **Benjamin A. Olken**, MIT and NBER; **Rema Hanna**, Harvard University and NBER; **Jordan C. Kyle**, International Food Policy Research Institute; and **Sudarno Sumarto**, SMERU Research Institute (Indonesia), “Contracting out the Last Mile of Service Delivery: Subsidized Food Distribution in Indonesia” (NBER Working Paper No. 21837)

Summaries of these papers are at: <http://www.nber.org/confer/2016/POLs16/summary.html>

## Asset Pricing

The NBER’s Program on Asset Pricing met in Chicago on April 8. Faculty Research Fellow Adrien Verdelhan and Research Associate Deborah J. Lucas, both of MIT, organized the meeting. These researchers’ papers were presented and discussed:

- **Lars P. Hansen**, University of Chicago and NBER, and **Thomas J. Sargent**, New York University and NBER, “Sets of Models and Prices of Uncertainty” (NBER Working Paper No. 22000)
- **Robert Novy-Marx**, University of Rochester and NBER, “Testing Strategies Based on Multiple Signals”
- **Nina Boyarchenko** and **David Lucca**, Federal Reserve Bank of New York, and **Laura Veldkamp**, New York University and NBER, “Taking Orders and Taking Notes: Dealer Information Sharing in Financial Markets”
- **Brian Weller**, Northwestern University, “Measuring Tail Risks at High Frequency”
- **Michael D. Bauer**, Federal Reserve Bank of San Francisco, and **James D. Hamilton**, University of California, San Diego, and NBER, “Robust Bond Risk Premia”
- **Erik P. Gilje**, University of Pennsylvania; **Robert C. Ready**, University of Rochester; and **Nikolai Roussanov**, University of Pennsylvania and NBER, “Fracking, Drilling, and Asset Pricing: Estimating the Economic Benefits of the Shale Revolution”

Summaries of these papers are at: <http://www.nber.org/confer/2016/APs16/summary.html>

## Behavioral Finance

The NBER’s Working Group on Behavioral Finance met in Chicago on April 9. Working Group Director Nicholas Barberis of Yale University organized the meeting. These researchers’ papers were presented and discussed:

- **Juhani T. Linnainmaa**, University of Chicago and NBER; **Brian T. Melzer**, Northwestern University; and **Alessandro Previtero**, University of Western Ontario, “The Misguided Beliefs of Financial Advisors”
- **Jeffrey Hoopes**, Ohio State University; **Patrick Langetieg**, Internal Revenue Service; **Stefan Nagel** and **Joel Slemrod**, University of Michigan and NBER; **Daniel Reck** and **Bryan Stuart**, University of Michigan, “Who Sold During the Crash of 2008–9? Evidence from Tax-Return Data on Daily Sales of Stock” (NBER Working Paper No. 22209)
- **Jean-Philippe Bouchaud**, Capital Fund Management (Paris); **Philipp Krüger**, University of Geneva; **Augustin Landier**, Toulouse School of Economics; and **David Thesmar**, HEC Paris, “Sticky Expectations and Stock Market Anomalies”
- **Camelia M. Kuhnen**, University of North Carolina at Chapel Hill and NBER, and **Andrei C. Miu**, Babeş-Bolyai University (Romania), “Socioeconomic Status and Learning from Financial Information” (NBER Working Paper No. 21214)
- **Stefano Giglio** and **Bryan T. Kelly**, University of Chicago and NBER, “Excess Volatility: Beyond Discount Rates” (NBER Working Paper No. 22045)
- **J. Anthony Cookson**, University of Colorado, Boulder, and **Marina Niessner**, Yale University, “Why Don’t We Agree? Evidence from a Social Network of Investors”

Summaries of these papers are at: <http://www.nber.org/confer/2016/BFs16/summary.html>

## Insurance

The NBER's Working Group on Insurance met in Chicago on April 9. Directors Liran Einav of Stanford University and Kenneth A. Froot of Harvard University organized the meeting. These researchers' papers were presented and discussed:

- **Anna V. Chorniy**, Princeton University, and **Daniel Miller** and **Tilan Tang**, Clemson University, "Mergers in Medicare Part D: Decomposing Market Power, Cost Efficiencies, and Bargaining Power"
- **Pietro Tebaldi**, Stanford University, "Estimating Equilibrium in Health Insurance Exchanges: Price Competition and Subsidy Design under the ACA"
- **A. Mitchell Polinsky**, Stanford University and NBER, and **Steven Shavell**, Harvard University and NBER, "The Theory of Insurance When Suits Can Be Brought for Losses Suffered"
- **Naoki Aizawa**, University of Minnesota, and **You Suk Kim**, Federal Reserve Board, "Advertising and Risk Selection in Health Insurance Markets"
- **Michael Geruso**, University of Texas at Austin and NBER, and **Timothy J. Layton**, Harvard University, "Upcoding or Selection? Evidence from Medicare on Squishy Risk Adjustment"
- **Adriano A. Rampini** and **S. Vish Viswanathan**, Duke University and NBER, and **Guillaume Vuillemeys**, HEC Paris, "Risk Management in Financial Institutions"
- **Sabrina T. Howell**, New York University, "Relaxing Constraints on Risk Management: Evidence from a Natural Experiment"
- **Viral Acharya**, **Thomas Philippon**, and **Matthew Richardson**, New York University and NBER, "Measuring Systemic Risk for Insurance Companies"
- **Darius N. Lakdawalla**, University of Southern California and NBER; **Julian Reif**, University of Illinois at Urbana-Champaign; and **Daniel Bauer**, Georgia State University, "Mortality Risk, Insurance, and the Value of Life"
- **Benjamin L. Collier** and **Erwann Michel-Kerjan**, University of Pennsylvania; **Daniel Schwartz**, University of Chile; and **Howard Kunreuther**, University of Pennsylvania and NBER, "Risk Preference Inconsistencies across Low and High Stakes: Evidence from the Field"
- **Amanda Starc** and **Robert Town**, University of Pennsylvania and NBER, "Internalizing Behavioral Externalities: Benefit Integration in Health Insurance" (NBER Working Paper No. 21783)
- **Juan Pablo Atal**, University of California, Berkeley, "Lock-in in Dynamic Health Insurance Contracts: Evidence from Chile"

Summaries of these papers are at: <http://www.nber.org/confer/2016/INSs16/summary.html>

## Innovation Policy

The NBER's Working Group on Innovation Policy met in Washington, D.C., on April 12. Working Group Director Scott Stern of MIT and Research Associates Shane Greenstein and Josh Lerner, both of Harvard University, organized the meeting. These researchers' papers were presented and discussed:

- **Joel Waldfoegel**, University of Minnesota and NBER, "The Random Long Tail and the Golden Age of Television"
- **Marc Rysman**, Boston University, and **Scott Schuh**, Federal Reserve Bank of Boston, "New Innovations in Payments"

- **Amalia R. Miller**, University of Virginia and NBER, and **Catherine Tucker**, MIT and NBER, "Frontiers of Health Policy: Digital Data and Personalized Medicine"
- **Michael Luca**, Harvard University, "Designing Online Marketplaces"
- **Timothy F. Bresnahan**, Stanford University and NBER, and **Pai-Ling Yin**, Stanford University, "Adoption of New Information and Communications Technologies in the Workplace Today"

Summaries of these papers are at: <http://www.nber.org/confer/2016/IPEs16/summary.html>

## Children

The NBER's Program on Children met in Washington, D.C., on April 14. Program Co-Directors Anna Aizer of Brown University and Janet Currie of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **David Figlio**, Northwestern University and NBER; **Claudio Persico**, Northwestern University; and **Jeffrey Roth**, University of Florida, "Inequality before Birth: The Developmental Consequences of Environmental Toxins" (NBER Working Paper No. 22263)
- **Ozkan Eren**, Louisiana State University, and **Naci Mocan**, Louisiana State University and NBER, "Emotional Judges and Unlucky Juveniles"
- **Jason M. Lindo**, Texas A&M University and NBER, and **Analisa Packham**, Texas A&M University, "How Much Can Expanding Access to Long-Acting Reversible Contraceptives Reduce Teen Birth Rates?" (NBER Working Paper No. 21275)
- **Alan Barreca**, Tulane University and NBER; **Olivier Deschênes**, University of California, Santa Barbara, and NBER; and **Melanie E. Guldi**, University of Central Florida, "Maybe Next Month? Temperature Shocks, Climate Change, and Dynamic Adjustments in Birth Rates" (NBER Working Paper No. 21681)
- **Ludovica Gasse**, MIT, "Little Lead Soldiers: Lead Poisoning and Public Health"
- **Mevlude Akbulut-Yuksel**, Dalhousie University (Nova Scotia), and **Adriana Kugler**, Georgetown University and NBER, "Intergenerational Persistence of Health in the U.S.: Do Immigrants Get Healthier as they Assimilate?" (NBER Working Paper No. 21987)

Summaries of these papers are at: <http://www.nber.org/confer/2016/CHEDs16/summary.html>

## Education

The NBER's Program on Education met in Washington, D.C., on April 15. Program Director Caroline M. Hoxby of Stanford University organized the meeting. These researchers' papers were presented and discussed:

- **Eric S. Taylor**, Harvard University, "Skills, Job Tasks, and Productivity in Teaching: Evidence from a Randomized Trial of Instruction Practices"
- **John Bound**, University of Michigan and NBER; **Breno Braga**, Urban Institute; **Gaurav Khanna**, University of Michigan; and **Sarah Turner**, University of Virginia and NBER, "A Passage to America: University Funding and International Students"

- **Brian G. Knight**, Brown University and NBER, and **Nathan M. Schiff**, Shanghai University of Finance and Economics, “The Out of State Tuition Distortion”
- **Jason M. Lindo**, Texas A&M University and NBER; **Peter M. Siminski**, University of Wollongong; and **Isaac D. Swensen**, Montana State University, “College Party Culture and Sexual Assault” (NBER Working Paper No. 21828)
- **Jarod Apperson**, **Carycruz Bueno**, and **Tim Sass**, Georgia State University, “Do the Cheated Ever Prosper? The Long-Run Effects of Test-Score Manipulation by Teachers on Student Outcomes”
- **David J. Deming**, Harvard University and NBER, “The Growing Importance of Social Skills in the Labor Market” (NBER Working Paper No. 21473)

Summaries of these papers are at: <http://www.nber.org/confer/2016/CHEDs16/summaried.html>

## Environmental and Energy Economics

The NBER’s Program on Environmental and Energy Economics met in Cambridge on April 14–15. Research Associates Lawrence H. Goulder of Stanford University and Rema Hanna of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Solomon M. Hsiang**, University of California, Berkeley, and NBER, and **Nitin Sekar**, Princeton University, “A Global Experiment in Black Market Dynamics: The Effect of Legal Ivory Sales on Illegal Ivory Production”
- **Kenneth Lee**, University of California, Berkeley, and **Edward Miguel** and **Catherine Wolfram**, University of California, Berkeley, and NBER, “Experimental Evidence on the Demand for and Costs of Rural Electrification” (NBER Working Paper No. 22292)
- **Joseph E. Aldy**, Harvard University and NBER; **Todd Gerarden**, Harvard University; and **Richard Sweeney**, Boston College, “Capital versus Output Subsidies: Implications of Alternative Incentives for Wind Energy”
- **Jun Yang**, Beijing Transportation Research Center; **Antung A. Liu**, Indiana University; **Ping Qin**, Renmin University of China (Beijing); and **Joshua Linn**, Resources for the Future, “The Effect of Owning a Car on Travel Behavior: Evidence from the Beijing License Plate Lottery”
- **Shaun McRae** and **Robyn Meeks**, University of Michigan, “Price Perception and Electricity Demand with Nonlinear Tariffs”
- **Robin Burgess**, London School of Economics; **Francisco J. M. Costa**, Getúlio Vargas Foundation (Rio de Janeiro); and **Benjamin A. Olken**, MIT and NBER, “The Power of the State: National Borders and the Deforestation of the Amazon”
- **Avraham Ebenstein**, Hebrew University of Jerusalem; **Michael Greenstone**, University of Chicago and NBER; **Maoyong Fan**, Ball State University; **Guojun He**, Hong Kong University of Science and Technology; and **Maigeng Zhou**, Chinese Center for Disease Control and Prevention, “The Impact of Sustained Exposure to Particulate Matter on Life Expectancy: New Evidence from China’s Huai River Policy”
- **Koichiro Ito**, University of Chicago and NBER, and **Shuang Zhang**, University of Colorado, Boulder, “Willingness to Pay for Clean Air: Evidence from Air Purifier Markets in China”
- **James B. Bushnell**, University of California, Davis, and NBER; **Stephen P. Holland**, University of North Carolina at Greensboro and NBER; **Jonathan E. Hughes**, University of Colorado, Boulder; and **Christopher R. Knittel**, MIT and NBER, “Strategic Policy Choice in State-Level Regulation: The EPA’s Clean Power Plan” (NBER Working Paper No. 21259)
- **William A. Pizer**, Duke University and NBER, and **Brian C. Prest**, Duke University, “Prices versus Quantities with Policy Updating”

- **Frank A. Wolak**, Stanford University and NBER, “Designing Nonlinear Price Schedules for Urban Water Utilities to Balance Revenue and Conservation Goals”

Summaries of these papers are at: <http://nber.org/confer/2016/EEEs16/summary.html>

## Cohort Studies

The NBER’s Working Group on Cohort Studies, directed by Dora Costa of the University of California, Los Angeles, met in Los Angeles on April 15–16. These researchers’ papers were presented and discussed:

- **Caleb Finch**, University of Southern California, “Air Pollution in Brain Development and Aging”
- **Diane Lauderdale**, University of Chicago, “Are Americans Sleeping Less Than They Used To? Evidence for Adults and Adolescents”
- **Pietro Biroli**, University of Zurich, “Genetic and Economic Interaction in Health Formation: The Case of Obesity”
- **Marcella Alsan**, Stanford University and NBER, and **Marianne H. Wanamaker**, University of Tennessee and NBER, “Tuskegee and the Health of Black Men”
- **Günther Fink**, Harvard University; **Atheendar Venkataramani**, Massachusetts General Hospital; and **Arianna Zanolini**, Centre for Infectious Disease Research in Zambia, “Do It Well or Not at All? Malaria Control and Child Development in Zambia”
- **Achyuta Adhvaryu**, University of Michigan and NBER; **Teresa Molina** and **Jorge A. Tamayo**, University of Southern California; **Anant Nyshadham**, Boston College, “Helping Children Catch Up: Early Life Shocks and the Progres Experiment”
- **Sok Chul Hong**, Seoul National University, and **Jiwon Park**, Sogang University (Seoul), “The Socioeconomic Gradient in the Inheritance of Longevity: A Study of American Genealogies”
- **Adrian Adermon**, Uppsala University; **Mikael Lindahl**, University of Gothenburg; and **Mårten Palme**, Stockholm University, “Dynastic Human Capital, Inequality, and Intergenerational Mobility”
- **Leah Platt Boustan**, University of California, Los Angeles, and NBER; **Katherine Eriksson**, University of California, Davis, and NBER; and **Philipp Ager**, University of Southern Denmark, “The Effect of Fathers’ Wealth on Sons’ Adult Outcomes in the Nineteenth Century: Evidence from the Civil War”
- **Martha Bailey**, University of Michigan and NBER, “Longitudinal, Intergenerational Family Electronic Microdata (LIFE-M) Project”
- **Daniel W. Belsky**, **Avshalom Caspi**, and **Terrie Moffitt**, Duke University, and **Richie Poulton**, University of Otago (New Zealand), “The Genetics of Success: How SNPs Associated with Educational Attainment Relate to Life-course Development”
- **Natalie A. Rivadeneira**, Emory University, and **Andrew Noymer**, University of California, Irvine, “‘You’ve Come a Long Way, Baby’: The Convergence in Age Patterns of Lung Cancer Mortality by Sex, United States, 1959–2013”
- **Steven Lehrer**, Queen’s University and NBER; **Hans-Martin von Gaudecker**, University of Bonn; and **Mårten Palme**, Stockholm University, “Gender Differences in Health Sector Utilization: New Evidence from Exploring Variation across Cohorts and the Lifecycle in Sweden”
- **Itzik Fadlon**, University of California, San Diego, and NBER, and **Torben Heien Nielsen**, University of Copenhagen, “Intra-Household Dependencies in Health: Evidence from Spousal Mortality and Severe Health Shocks”

- **Victor Lavy**, University of Warwick and NBER; **Analia Schlosser**, Tel Aviv University; and **Adi Shany**, Hebrew University of Jerusalem, “Out of Africa: Human Capital Consequences of In Utero Conditions” (NBER Working Paper No. 21894)
- **Andreas Georgiadis**, University of Oxford, “The Sooner the Better but It’s Never Too Late: The Impact of Nutrition at Different Periods of Childhood on Cognitive Development”

Summaries of these papers are at: <http://www.nber.org/confer/2016/CSs16/summary.html>

## Health Economics

The NBER’s Program on Health Economics met in Cambridge on April 29. Program Director Michael Grossman of the City University of New York and Research Associate Theodore Joyce of Baruch College organized the meeting. These researchers’ papers were presented and discussed:

- **Dave Marcotte**, American University, “Something in the Air? Pollution, Allergens and Children’s Cognitive Functioning”
- **Charles J. Courtemanche** and **Rusty Tchernis**, Georgia State University and NBER, and **Benjamin Ukert**, Georgia State University, “The Effect of Smoking on Obesity: Evidence from a Randomized Trial” (NBER Working Paper No. 21937)
- **Partha Deb**, Hunter College and NBER, and **Carmen Vargas**, Hunter College, “Who Benefits from Calorie Labeling? An Analysis of its Effects on Body Mass” (NBER Working Paper No. 21992)
- **Christopher J. Ruhm**, University of Virginia and NBER, “Taking the Measure of a Fatal Drug Epidemic”
- **Tom Chang**, University of Southern California; **Joshua S. Graff Zivin**, University of California, San Diego, and NBER; and **Tal Gross** and **Matthew J. Neidell**, Columbia University and NBER, “The Effect of Pollution on Worker Productivity: Evidence from Call-Center Workers in China”
- **Marianne Bitler**, University of California, Davis, and NBER, and **Christopher Carpenter**, Vanderbilt University and NBER, “Effects of Direct Care Provision to the Uninsured: Evidence from Federal Breast and Cervical Cancer Programs”

Summaries of these papers are at: <http://www.nber.org/confer/2016/HEs16/summary.html>

## Organizational Economics

The NBER’s Working Group on Organizational Economics, directed by Robert S. Gibbons of MIT, met in Cambridge on May 13–14. These researchers’ papers were presented and discussed:

- **Johannes Hörner**, Yale University, and **Nicolas S. Lambert**, Stanford University, “Motivational Ratings”
- **Oriana Bandiera**, London School of Economics; **Stephen Hansen**, Pompeu Fabra University (Barcelona); **Andrea Prat**, Columbia University; and **Raffaella Sadun**, Harvard University and NBER, “CEO Behavior and Firm Performance”
- **Frederico Finan**, University of California, Berkeley, and NBER; **Benjamin A. Olken**, MIT and NBER; and **Rohini Pande**, Harvard University and NBER, “The Personnel Economics of the State” (NBER Working Paper No. 21825)

- **Charles Sabel**, Columbia University; **Gary Herrigel**, University of Chicago; and **Peer Hull Kristensen**, Copenhagen Business School, “Regulation under Uncertainty: The Coevolution of Industry and Regulation in the Norwegian Offshore Gas and Oil Industry”
- **Daniel Carpenter**, Harvard University, “Recruitment by Petition: American Antislavery, French Protestantism, English Suppression”
- **Raymond Fisman**, Boston University and NBER; **Jing Shi**, RMIT University (Melbourne); **Yongxiang Wang**, University of Southern California; and **Rong Xu**, Renmin University of China (Beijing), “Social Ties and Favoritism in Chinese Science”
- **Ryan Bubb**, New York University; **Supreet Kaur**, Columbia University and NBER; and **Sendhil Mullainathan**, Harvard University and NBER, “Do Enforcement Constraints Prevent Trade? Evidence on Contracting Failures in Irrigation Markets”
- **Stefano DellaVigna** and **Ulrike Malmendier**, University of California, Berkeley, and NBER; **John A. List**, University of Chicago and NBER; and **Gautam Rao**, Harvard University and NBER, “Estimating Social Preferences and Gift Exchange at Work” (NBER Working Paper No. 22043)
- **Karen Bernhardt-Walther**, University of Toronto, “The First Time is Different: A Problem-Solving Approach to Innovation”
- **Brett Green**, University of California, Berkeley, and **Curtis Taylor**, Duke University, “Breakthroughs, Deadlines, and Self-Reported Progress: Contracting for Multistage Projects”

Summaries of these papers are at: <http://www.nber.org/confer/2016/OEs16/summary.html>

## Chinese Economy

The NBER’s Working Group on the Chinese Economy and the Chinese University of Hong Kong met in Shenzhen, China, on May 28–29. Director Hanming Fang of the University of Pennsylvania and Research Associates Shang-Jin Wei of Columbia University and Wei Xiong of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Jiandong Ju**, Shanghai University of Finance and Economics; **Justin Lin**, Peking University (Beijing); **Qing Liu**, Tsinghua University (Beijing); and **Kang Shi**, Chinese University of Hong Kong, “Excess Labor Supply, Structural Change, and Real Exchange Rate”
- **Yong Wang** and **Juanyi Xu**, Hong Kong University of Science and Technology, and **Xiaodong Zhu**, University of Toronto, “Structural Change and the Dynamics of China-U.S. Real Exchange Rate”
- **Chun Chang** and **Jingyi Zhang**, Shanghai Jiao Tong University, and **Zheng Liu** and **Mark Spiegel**, Federal Reserve Bank of San Francisco, “Reserve Requirements and Optimal Chinese Stabilization Policy”
- **Cheng Chen**, University of Hong Kong; **Wei Tian**, University of International Business and Economics (Beijing); and **Miaojie Yu**, Peking University (Beijing), “Outward FDI and Domestic Input Distortions: Evidence from Chinese Firms”
- **Lin Ma**, National University of Singapore, and **Yang Tang**, Nanyang Technological University (Singapore), “Rich and Unhappy: A Quantitative Analysis of Internal Trade and Migration in China”
- **Ayşe İmrohoroglu**, University of Southern California, and **Kai Zhao**, University of Connecticut, “The Chinese Savings Rate: Productivity, Old-Age Support, and Demographics”
- **Ziying Fan**, Shanghai University of Finance and Economics; **Wei Xiong**; and **Li-An Zhou**, Peking University (Beijing), “Information Distortion in Hierarchical Organizations: A Study of China’s Great Famine”

- **Yiming Cao**, Boston University, and **Shuo Chen**, Fudan University (Shanghai), “Robin Hood on the Grand Canal: Economic Shock and Peasant Rebellions in Qing China, 1650–1911”
- **Kaiji Chen** and **Jue Ren**, Emory University, and **Tao Zha**, Emory University and NBER, “What We Learn from China’s Rising Shadow Banking: Exploring the Nexus of Monetary Tightening and Banks’ Role in Entrusted Lending” (NBER Working Paper No. 21890)
- **Kinda Cheryl Hachem**, University of Chicago and NBER, and **Zheng Michael Song**, Chinese University of Hong Kong, “Liquidity Regulation and Unintended Financial Transformation in China” (NBER Working Paper No. 21880)
- **David Ong** and **Yu Yang**, Peking University (Beijing), and **Junsen Zhang**, Chinese University of Hong Kong, “Hard to Get: The Scarcity of Women and the Competition for High-Income Men in Chinese Cities”
- **Di Guo** and **Chenggang Xu**, University of Hong Kong; **Kun Jiang**, University of Roehampton (London); and **Yutong Wang**, University of California, Los Angeles, “Political Economy of Making an Authoritarian Constitution: The Case of China”
- **Yi Huang**, Graduate Institute of International and Development Studies (Geneva); **Prakash Loungani**, International Monetary Fund; and **Gewei Wang**, Chinese University of Hong Kong, “How do Firms React to Minimum Wage Changes?”
- **Jingting Fan** and **Weiming Zhu**, University of Maryland; **Lixin Tang**, Shanghai University of Finance and Economics; and **Ben Zou**, Michigan State University, “The Alibaba Effect: Spatial Consumption Inequality and the Welfare Gains from E-Commerce”

Summaries of these papers are at: <http://www.nber.org/confer/2016/CEs16/summary.html>

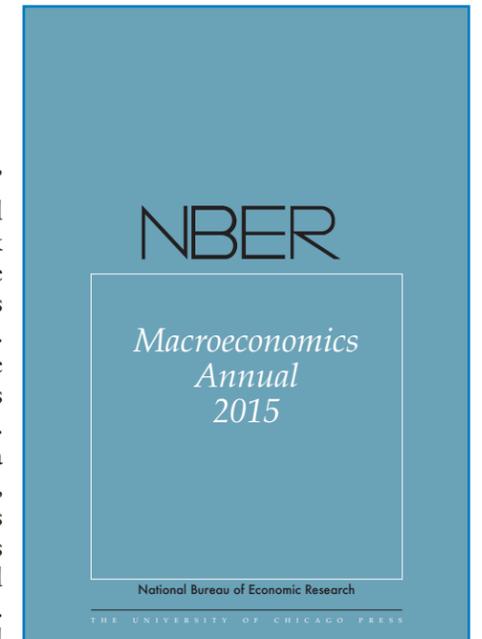
## NBER Books

### NBER Macroeconomics Annual 2015, Volume 30

Edited by Martin Eichenbaum and Jonathan A. Parker  
Cloth \$90.00

This year, the *NBER Macroeconomics Annual* celebrates its 30th volume. The first two papers examine China’s macroeconomic development. “Trends and Cycles in China’s Macroeconomy,” by Chun Chang, Kaiji Chen, Daniel F. Waggoner, and Tao Zha, outlines the key characteristics of growth and business cycles in China. “Demystifying the Chinese Housing Boom,” by Hanming Fang, Quanlin Gu, Wei Xiong, and Li-An Zhou, constructs a new house price index, showing that Chinese house prices have grown by ten percent per year over the past decade. The third paper, “External and Public Debt Crises,” by Cristina Arellano, Andrew Atkeson, and Mark Wright, asks why there appear to be large differences across countries and subnational jurisdictions in the effect of rising public debts on economic outcomes. The fourth, “Networks and the

Macroeconomy: An Empirical Exploration,” by Daron Acemoglu, Ufuk Akcigit, and William Kerr, explains how the network structure of the U.S. economy propagates the effect of gross output productivity shocks across upstream and downstream sectors. The fifth and sixth papers investigate the usefulness of surveys of households’ beliefs for understanding economic phenomena. “Expectations and Investment,” by Nicola Gennaioli, Yueran Ma, and Andrei Shleifer, demonstrates that a chief financial officer’s expectations of a firm’s future earnings growth is related to both the planned and actual future investment of that firm. “Declining Desire to Work and Downward Trends in Unemployment and Participation,” by Regis Barnichon and Andrew Figura, shows that an increasing number of prime-age Americans who are not in the labor



force report no desire to work and that this decline accelerated during the second half of the 1990s.

### Tax Policy and the Economy, Volume 30

Edited by Jeffrey R. Brown  
Cloth \$60.00

The research papers in volume 30 of *Tax Policy and the Economy* make significant contributions to the academic literature in public finance and provide important conceptual and empirical input to policy design. In the first paper, Gerald Carlino and Robert Inman consider whether state-level fiscal policies create spillovers for neighboring states and how federal stimulus can internalize these externalities. The second paper, by Nathaniel Hendren, presents a new framework for evaluating the welfare consequences of tax policy changes and explains how the key parameters needed to implement this framework can be estimated. The third paper, a collaborative effort by several academic and U.S. Treasury economists, documents the dramatic

increase in pass-through businesses, including partnerships and S-corporations, over the last thirty years. It notes that these entities now generate more than half of all U.S. business income. The fourth paper examines property tax compliance using a pseudo-randomized experiment in Philadelphia in which those who owed taxes received supplemental letters regarding their tax delinquency. The research explores what types of communication lead to higher rates of tax payment. In the fifth paper, Jeffrey Clemens discusses cross-program budgetary spillovers of minimum wage regulations. Severin Borenstein and Lucas Davis, the authors of the sixth paper, study the distributional effects of income tax credits for clean energy.



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