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*Caroline M. Hoxby*

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## The 2016 Martin Feldstein Lecture

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### The Dramatic Economics of the U.S. Market for Higher Education

**Caroline M. Hoxby\***

We have in the United States what is arguably the world's only true *market* for higher education, as opposed to systems that are largely centrally controlled or financed. This market exhibits a strong positive correlation between students' college readiness (hereafter "CR") and the educational resources of the institution they attend. Moreover, my research shows, the more powerful the market forces, the stronger the correlation.

From my latest research, which breaks new ground with both data and methods, I show the productivity of institutions across this market. Strikingly, among institutions that experience strong market forces, the productivity of a dollar of educational resources is fairly similar, even if the schools serve students with substantially different CR. On the other hand, among institutions that experience weak market forces, productivity is lower and more dispersed. These facts suggest that market forces are needed to keep schools productive and to allocate resources across schools in a way that assures that the marginal return to additional resources at different institutions is roughly comparable.

If we take the productivity results and the resources-CR correlation as manifestations of market forces, then it follows that a student with higher CR must make more productive use of any marginal dollar of educational resources than a student who is less prepared for college. This property, which economists call "single-crossing," has long been hypothesized to be a law of nature, at least in tertiary education. This is the first compelling evidence. Single-crossing has profound consequences for the role of higher education in income growth, a point I clarify when concluding.

The U.S. market for higher education includes about 7,500 institu-

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*\* This is an edited and annotated version of the Martin Feldstein Lecture delivered on July 27, 2016. Caroline M. Hoxby is the Scott and Donya Bommer Professor in Economics at Stanford University. She is an NBER research associate and director of the NBER Economics of Education Program.*

# NBER Reporter

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tions. Some are publicly controlled; others are private non-profits or for-profits. Institutions are largely free to decide on pricing (tuition, fees, grants), CR requirements, students, faculty, curriculum, salaries, financial aid, and how to raise money from donors if non-profit or investors if for-profit. Although public schools have less discretion, they still have enormous autonomy by world standards, partly because they are controlled by local and state governments, not a national one, and partly because those governments recognize that public schools must be given latitude if they are to compete with local private schools. Federal intervention is mainly in forms that students can receive regardless of the school they attend: means-tested grants, tax credits and deductions, subsidized loans. On the whole, it is best to think of the U.S. tertiary sector as a market with numerous price distortions relative to *laissez-faire*, but without central control.<sup>1</sup>

U.S. institutions vary enormously in selectivity—that is, in the CR of their students. Selectivity is holistic but, roughly speaking, the “most” selective institutions’ average student has a combined (math plus verbal) SAT (or translated ACT) score above 1300, the 90th percentile among test-takers. (Since some students do not take the tests, this corresponds to the 96th percentile among all students.) “Highly” or “very” selective institutions have an average student with combined scores above the 75th percentile (about 1170). “Selective” (without a modifier) institutions ask students to submit scores, grades, and other materials and turn down those judged to be inadequately prepared. Schools with combined scores above 1000 (the 47th percentile) are at least modestly selective. Non-selective schools usually only require that a student have a high school diploma or the equivalent and often have average combined scores of 800 (the 15th percentile) or below. The divide between non-selective and modestly selective schools is rough but somewhere between 800 and 1000.

At its highly selective end, the market is well integrated across geography. Schools compete for students and faculty. Schools are highly informed about their applicants, and students are fairly well informed about schools. High CR students are so valued that they are admitted without regard to their ability to pay, and alumni-donated funds fill the gap between what a student pays and what his education costs.<sup>2</sup>

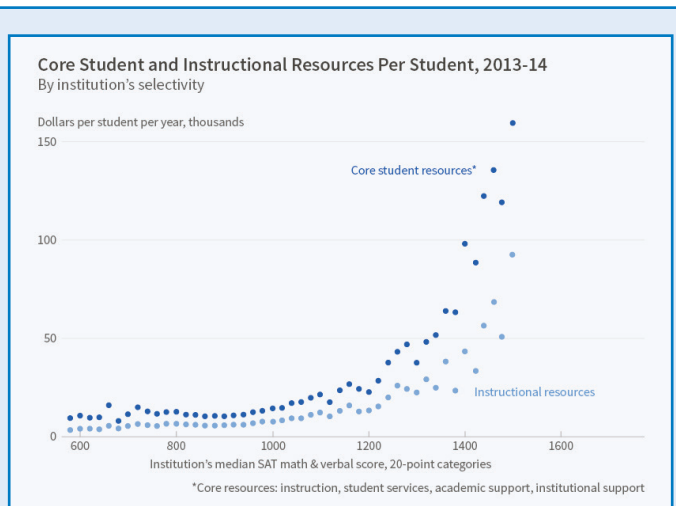
The high CR students who populate this part of the market make college choices that are elastic with respect to schools' academic and other resources. Such students have strong incentives to internalize the effects of their tertiary education on their future outcomes because they pay for most of their education themselves using family funds or loans they can expect to repay with near certainty. Even alumni-supported grants, which allow lower-income students to attend highly selective schools, generate strong incentives since the schools have every incentive to internalize the effects of educating one generation on their ability to finance the next. (It is worth noting that the market has not always been like this. Rather, the aforementioned features have arisen as information and mobility costs have fallen. I describe the market's evolution in the full-length lecture.<sup>3</sup>)

At the non-selective end of the market, fairly opposite conditions prevail. Geographic integration, competition, and information are poor. Students, who typically but not universally have low CR, seem not to look outside a set of local schools. Even within this set, they appear insensitive to differences in schools' resources. Because many of these students rely heavily on government funds—including veterans' benefits and loans that will predictably remain unrepaid—their incentives to internalize the effects of their education on their future outcomes is somewhat weak.

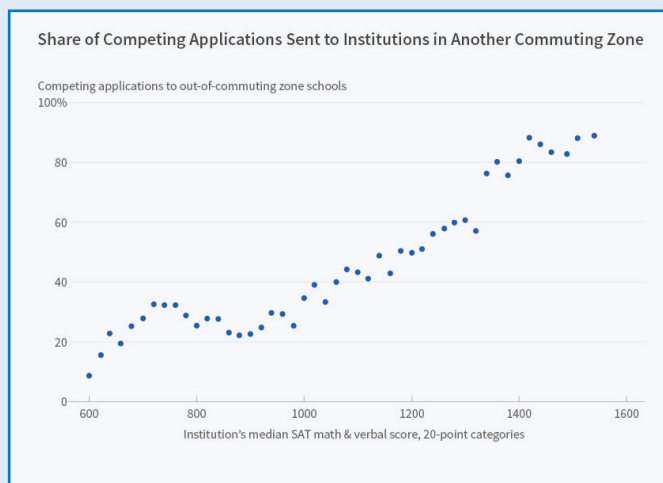
I provide evidence in Figures 1 through 3. Figure 1 shows that the educational resources a student experiences tend to rise monotonically with her CR and that the most selective schools' per-student resources are an order of magnitude greater than those of non-selective schools. Figure 2 shows that nearly all students who apply to a very selective school send most of their (approximately 10) "competing applications" to schools located in a community other than that of the first school. Hardly any applicants to a non-selective school do this, partly because they usually apply to only one school and partly because those who do send multiple applications do so within a small geographic radius. Figure 3 shows that, at non-selective schools, students themselves account for only about 40 percent of undergraduate-related revenue. In contrast, they account for 80 to 95 percent of such revenue at highly selective schools. Information about schools is easily characterized: 100 percent of highly selective schools and about 0 percent of non-selective schools provide comparable information to the common dataset that is used to construct college guides. The availability of information jumps dramatically between non-selective and selective schools.

In short, every indicator—integration, competition, information, financing that generates incentives to internalize consequences—points to market forces being far stronger among highly selective than among non-selective schools.

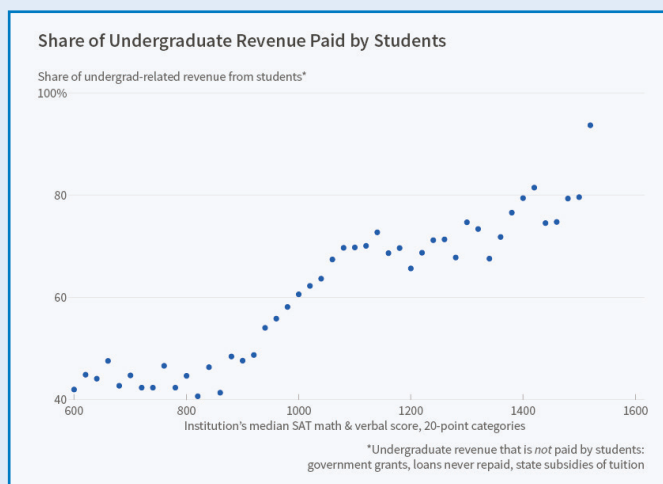
Measuring the productivity of institutions is crucial if we are to gain a deeper understanding of the market. But producing reliable measures has traditionally been extremely challenging, principally because the strong positive correlation between CR and educational resources generates a formidable selection problem. Do Harvard's graduates have such high lifetime earnings because



**Figure 1**



**Figure 2**



**Figure 3**



the school spends so much on their education or because they had such high CR when admitted that they would have had high earnings regardless of their college? To measure productivity, I need data and methods that allow me to deal with selection and estimate a school's *value-added*, as opposed to the raw outcomes of its graduates. Value-added is the numerator of productivity.

A lesser but still-serious problem plagues the denominator of productivity: the resources devoted to students' education, not only what they spend personally but what society spends in total, including the government and philanthropic funds. I call this "social investment" and it includes not only investment in initial undergraduate schooling but all follow-on education that students are induced to take up. For instance, a Harvard education not only uses more resources (funded by students, donors, and taxpayers) per student each year. Its graduates are more likely to persist as undergraduates and more likely to go to graduate school. Thus, its graduates' lifetime earnings reflect more years, as well as more expensive years, of education. Therefore, individuals' longitudinal educational histories are needed.

My productivity measurements use such histories for virtually all individuals who were in the U.S. during the prime ages for tertiary education—18 to 25—and who were age 32 in 2014. Measurements based on adjacent cohorts are very similar; I use age 32 because it is the earliest age at which one can predict earnings through age 65 well.<sup>4</sup>

I address the selection problem by comparing students who attend different schools but who have identical college assessment scores—indicating extremely similar CR—and who apply to the same schools, thus demonstrating similar taste and motivation. Some of the comparisons are between students who get into two

schools of equal selectivity but can choose only one. (From a statistical point of view, it is best if they make such choices "quasi-randomly"—that is, based on some arbitrary factor that matters to them but does not affect long-term outcomes in a significant, consistent way. Examples would

would otherwise be underrepresented in the class being admitted.) My procedure combines all of these student-student matchups using paired comparison statistical methods which ensure that the resulting measures rely solely on "apples-to-apples" comparisons (common support, in the language of econometrics). The procedure generates value-added measures for nearly all institutions.

Because there is no broadly applicable way to account for the decision to attend a non-selective post-secondary institution as opposed to common alternatives such as the military and on-the-job training, I do not attempt to compute the value-added of the lowest selectivity schools relative to such alternatives. Instead, I normalize their value-added to zero; it is plausibly greater than or less than zero. It is important to keep this normalization in mind when assessing the figures that follow.

Figure 4 shows value-added versus raw lifetime earnings for nearly all schools, from the non-selective to the most selective. Value-added rises with selectivity, though not nearly as fast as raw earnings. This shows that much of the earnings increase is due to students' higher CR. However, Figure 5 shows that the denominator of productivity, the lifetime educational resources students experience, rises greatly with selectivity. Notice that these resources rise more steeply with selectivity than a single year of resources, shown in Figure 1. This indicates that higher CR students attend more years of higher education.

Thus, productivity may rise or fall with selectivity depending on the "race" between its rising numerator and rising denominator. In fact, as shown by Figure 6, the average productivity of a dollar is fairly flat among schools that are selective. There is, however, a notable increase in the level of productivity as we move from the non-selective to selective schools. Figure

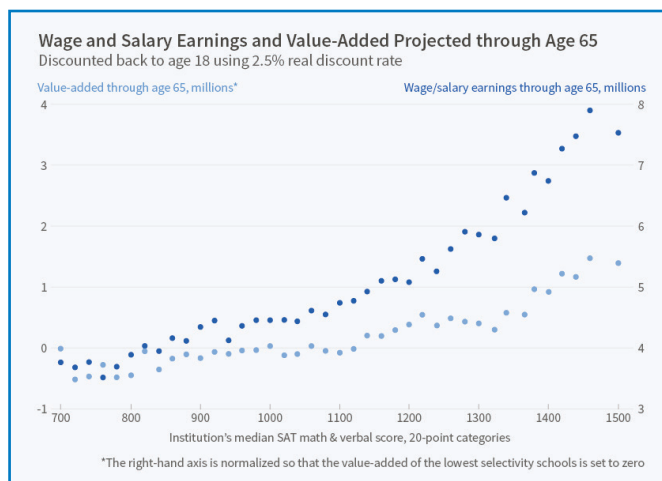


Figure 4

be the school's architectural style or the weather on the day they visited.) Other comparisons are between two students who are both "on the bubble" for admission. Admissions staff admit one, quasi-randomly; the other student ends up attending a slightly less selective school.

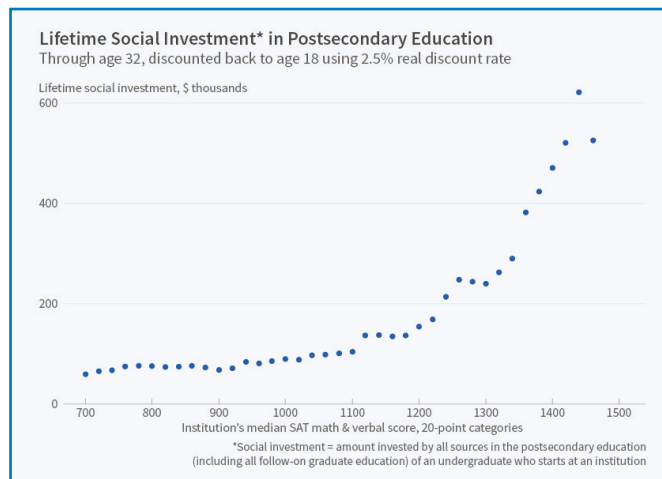


Figure 5

(Admissions staff often make quasi-random decisions. For instance, two students may have equal academic qualifications, but one may be from an area or have an extracurricular interest that

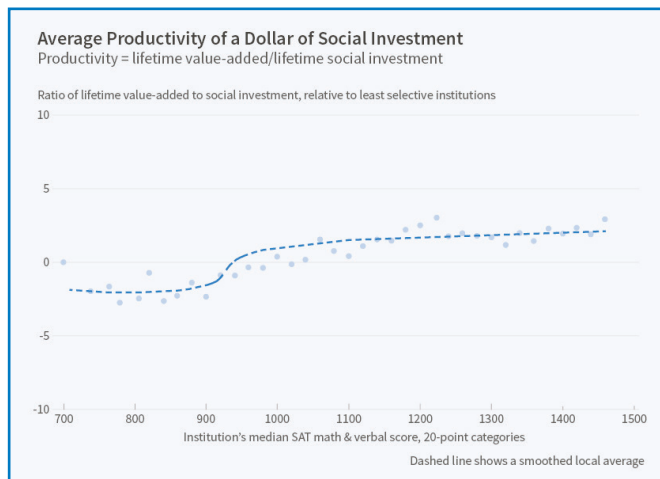
7 shows, in addition, that very selective schools whose students have the same CR tend to have similar productivity. In contrast, non-selective schools differ widely in productivity.

The fact that productivity is fairly flat across institutions that range from modestly to highly selective is striking because the least selective schools in this range have much lower educational resources than the most selective schools. Thus, the flatness indicates that resources somehow scale up with students' CR so that there would be no easy gains from reallocating dollars among the modestly selective and most selective schools. This is undoubtedly the most important result in this lecture because, when combined with the evidence on market forces, it has profound implications.

The evidence in Figure 6 also indicates that the productivity of a dollar at selective institutions is sufficiently positive that they are a good investment for the students who attend them. (For this not to be true, the least selective schools would need to have notably negative value-added instead of the zero to which I have normalized it.) Note that Figure 6 does not imply that selective schools make maximally productive use of resources, just that they make similarly efficient use of resources.

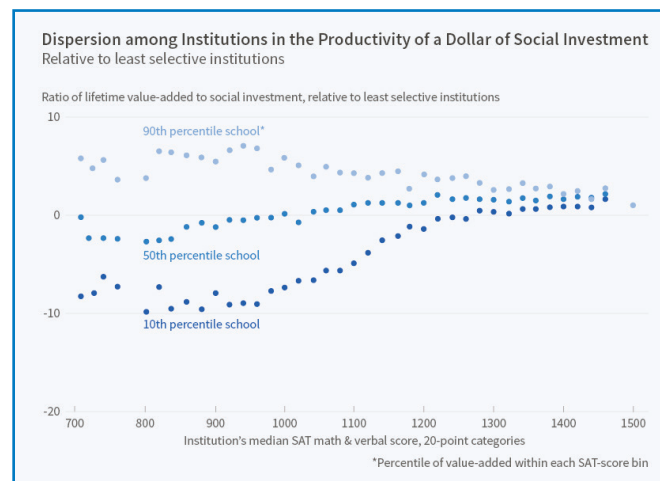
Figure 6 indicates that the average non-selective institution is less productive than selective ones. This result is concerning, especially because enrollment in non-selective schools has grown substantially faster than enrollment in selective schools since at least 1970. The proximate causes of the higher growth rate are fairly clear. The distribution of CR among U.S. secondary school students is largely unchanged since 1970. Thus, selective schools that maintain their CR standards can only grow as fast as the population grows. But non-selective

schools grow both with the population and by enrolling students of lower CR — those who would not have been candidates for tertiary education in past years.



**Figure 6**

As indicated above, it is hard to say whether the average non-selective school is a good investment relative to alternatives like the military or on-the-job training. However, Figure 7 tells us that the average is not of first-order importance anyway. The striking fact is that non-selective schools differ greatly in productivity.



**Figure 7**

This means that students choosing among non-selective schools can make mistakes that have very serious consequences for their life outcomes.

Can economics make sense of all the evidence reviewed so far? Consider a simple world in which (i) there is single-crossing in CR and educational

resources; students with higher CR make more productive use of any marginal dollar of resources. Suppose also that (ii) students maximize their return on

education; (iii) college choices are not based on geography but, instead, are elastic with respect to schools' resources and outcomes; and (iv) students are fully informed and not liquidity constrained. In this world, market forces would generate an assortatively matched allocation in which higher CR students would be paired with greater educational resources. Crucially, in this world, market forces would require that each dollar of resources be equally productive.

This model, although overly simple, aligns fairly well with what we see in the selective tertiary sector where assumptions (i) through (iv) are not grossly wrong. (It is surprising that the simple model fits as well as it does given that even the selective sector abounds in price distortions, information gaps, and financing problems.) The simple model does not align at all with the non-selective sector, and we should not expect that it would. We have seen evidence that the non-selective sector has little integration, weak competition, poor information, and blunted incentives for participants to internalize the consequences of their educational choices.

What are the broader implications of the evidence and model? If the education production function for tertiary education does indeed exhibit strong single-crossing, they are profound. To make its maximum contribution to economic growth, the higher education sector must allow educational resources to scale up with CR. Yet, the extent of scaling up that occurs in the U.S. is unique. Most countries allocate more, but only modestly more, resources to higher CR students.

Moreover, single-crossing implies that if a country can make all its students

attain high CR, it would be growth-maximizing to invest more in the tertiary education of all of them. Educational resources are investments, not consumption, so that, to a first-order, there is nothing zero-sum about them. This key point is often misunderstood: One might incorrectly think that there is a fixed pie of resources so that some students must necessarily get fewer resources if others get more.

Nevertheless, single-crossing in tertiary education puts great pressure on the primary and secondary systems to ensure that all students, regardless of background, are able to attain CR. If educational opportunities are restricted to a subset of students, single-crossing is likely to reduce income mobility and equality. It is important to note that pre-tertiary education may not exhibit single-crossing just because tertiary education does. Indeed, some economists hypothesize that, in early childhood education, every marginal dollar of resources is more productive for children from more disadvantaged backgrounds.<sup>5</sup>

The other key implication of the evidence and model is that economic growth is likely to increase with policies that facilitate market forces in higher education — better information, greater

integration, stronger competition, and financing that makes students and schools internalize the consequences of their choices. Such policies appear to drive educational resources toward a relatively efficient allocation. While we have not seen evidence here that all tertiary education investments earn higher returns than competing uses, such as investments in physical capital, policies that generate greater efficiency within higher education are almost certainly pro-growth.

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<sup>1</sup> For a succinct history of the market's evolution, see C. Hoxby, "The Changing Selectivity of American Colleges," *Journal of Economic Perspectives*, 23(4), 2009, pp. 95–118. This article also describes some of the market's key internal logic. Some of the historical evidence is reviewed in the full-length version of this lecture. See [http://nber.org/feldstein\\_lecture\\_2016/feldsteinlecture\\_2016.html](http://nber.org/feldstein_lecture_2016/feldsteinlecture_2016.html).

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<sup>2</sup> This logic is described in detail in C. Hoxby (2009) and C. Hoxby, "Endowment Management Based on a Positive Model of the University," NBER Working Paper No. 18626, December 2012, and published as "Endowment Management Based on a Positive Model of

the University," in J. Brown and C. Hoxby eds., *How the Financial Crisis and Great Recession Affected Higher Education*, Chicago, Illinois: University of Chicago Press, 2015, pp. 15–41.

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<sup>3</sup> See the video of this year's Feldstein Lecture: [http://nber.org/feldstein\\_lecture\\_2016/feldsteinlecture\\_2016.html](http://nber.org/feldstein_lecture_2016/feldsteinlecture_2016.html).

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<sup>4</sup> For more on the data and methods described in this and the next few paragraphs, see C. Hoxby, "Computing the Value-Added of American Postsecondary Institutions," *Internal Revenue Service Statistics of Income Division Working Paper*, July 2015; see also C. Hoxby, "The Productivity of U.S. Postsecondary Institutions," in C. Hoxby and K. Stange eds., *Productivity in Higher Education*, forthcoming, Chicago, Illinois: University of Chicago Press.

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<sup>5</sup> Such a phenomenon could arise simply because more advantaged parents are better substitutes for early childhood education. In other words, the phenomenon would not require that a fundamental complementarity between aptitude and educational resources reverse itself as children age.

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Dave is an applied microeconomist with primary research areas at the intersection of health and labor economics. His current research examines the demand for electronic cigarettes, the link between welfare policy and longer-term effects on behavioral outcomes for parents and their children, broader non-economic effects of the minimum wage, and labor market effects of the Affordable Care Act. He is also interested in the economics of crime, and is analyzing interventions in the juvenile justice system and how they impact youth recidivism and educational outcomes. Dave's research has been supported by the National Institutes of Health, the Agency for Healthcare Research and Quality, and various research foundations. He is currently serving as an associate editor of *Economics and Human Biology*.

A native of India, Dave grew up in northern New Jersey. He splits his residence between the New York metro area and Boston. In his spare time, he enjoys traveling and hiking, improving his chess, and reading British mystery novels and books on cosmology.

## Business Cycle Impacts on Health Behaviors

**Dhaval Dave**

The unemployment rate more than doubled in the United States during the Great Recession, from 4.4 percent to 10 percent, imposing a heavy financial burden on households. However, whether such economic downturns also impose a health burden is a subject of much debate. Exploiting area-level variation in measures of labor demand, a large literature, starting with Chris Ruhm's seminal work, has explored how the business cycle affects population health.<sup>1</sup>

While it may be intuitive to suppose that population health would improve with the macroeconomy, the evidence is surprisingly murky. Some adverse health effects of economic downturns are direct and undisputed, such as increases in psychological stress, depression, and related illnesses, while others are indirect and less clear. Some studies indicate that health is countercyclical, with various measures of mortality, including those from cardiovascular disease and motor vehicle fatalities, declining with reduced economic activity, while others find the opposite.

None of these studies of the link between labor demand and health outcomes presume a direct effect. Rather, the presumption is that labor demand affects workers' environment (for instance, pollution or crowding) or their behavior (for instance, physical activity, diet, tobacco and alcohol use), which then affects health. Health effects may take time to materialize, making it challenging to identify them empirically in the short term. Thus, it is important to examine the intermediate links, that is, effects on health behaviors, which may respond more readily than health itself to changes in households' time and income constraints over

the economic cycle. Examining these proximate pathways also is important for judging the validity of the prior, at times contradictory, evidence on health.

Consider, for instance, the various studies that assess whether area-level unemployment affects obesity. It is presumed that unemployment leads to a change in energy expenditure and/or energy intake, which in turn affects bodyweight. While some studies find that obesity decreases during recessions, others find the opposite, and still others find no consistent effects. Many of these studies use similar methods and data sets. Thus, additional evidence bearing on the separate links in the causal chain would help assess the credibility of the link between labor demand and obesity. Similarly, research has examined the effects of labor demand on heart disease, with one presumed causal pathway being that unemployment leads to less physical exertion which leads to fewer heart attacks.

In a series of papers with Gregory Colman and Inas Kelly, I examine how labor demand affects health behaviors, in order to shed light on the effects of the economic cycle on health.

### Energy Expenditure and Time Use

Prior evidence on the effects of unemployment on energy expenditure has been confined to recreational exercise, and has been inconsistent. While recreational exercise is certainly an important behavioral outcome, it constitutes only about 4 percent of total physical activity. Furthermore, in a study with Henry Saffer, Michael Grossman, and Leigh

Ann Leung, I find significant substitution across recreational exercise, work-related physical activity, and other modes of activity.<sup>2</sup> Thus, it cannot be presumed that, because exercise improves health, if unemployment increases exercise it must also improve health. It is total physical activity, not just recreational exercise per se, which is the salient input into the individual's health production function.

Colman and I study whether shifts in labor demand induce individuals to become more or less physically active.<sup>3</sup> We exploit within-state variation in gender-specific employment ratios matched with detailed time diary information from the American Time Use Survey (ATUS) over 2003–10, a period which included the Great Recession. The ATUS is based on a national sample drawn from the Current Population Survey (CPS) and tracks all activities undertaken by the respondent in the past 24 hours. For each activity, in addition to duration, we measure intensity using the Metabolic Equivalent of Task (MET). A unit of MET is defined as the ratio of a person's working metabolic rate relative to his resting metabolic rate.<sup>4</sup> By combining information on the duration of each activity with its MET value, we are able to group activities and also to construct a standardized and consistent measure of total physical activity or exertion during the day.

Figure 1, which compares unadjusted means before and after the recession began in late 2007, summarizes our main results. We find that a reduction in employment increases exercise, and specifically exercise activities which are relatively less vigorous, with a MET value of 4 or lower, such as walking or golfing. The increase in exercise during a recession is consistent with a recession-induced easing of time constraints. We also find that part of the time freed from a decrease in working hours over the recession flows into other time-intensive activities such as housework, childcare, eating and drinking, watching television, and sleeping. Total physical exertion, however,

declines during a recession, as the average individual's loss in work activity is not offset by the increases in exercise and other home-based, mostly low-MET leisure activities.

As a validation check, we find that these effects are concentrated among groups—particularly males who are low-educated or employed in physically demanding occupations—whose employment was most adversely affected by the recent economic collapse. The decrease in physical activity and exertion during an economic downturn may partly explain the positive association often found between unemployment and depression, and also lends some credibility to studies that uncover a procyclical relationship in mortality from cardiovascular causes.

## Diet and Food Intake

The flip side to energy expenditure and physical exertion is how a recession affects food intake, a question that I address in a study with Kelly.<sup>5</sup> We utilize individual-level data from the Behavioral Risk Factor

in subgroup-specific unemployment and employment rates, we find that individuals' food consumption choices systematically vary over the economic cycle, though in ways that defy simple characterization.

Specifically, we find consistent evidence that a higher unemployment rate is associated with reduced frequency of fruit and vegetable consumption, and weak evidence of an increased frequency of consuming snacks and foods relatively dense in calories and fat, such as hamburgers and fried chicken. Together with the ATUS data, the results indicate that reduced employment is associated with an increase in time spent eating and drinking. While this may not necessarily reflect calories consumed, it may reflect an increase in “secondary eating,” that is, snacking while watching television—both of which are activities our studies show tend to increase during a recession.

One issue with the BRFSS measures of consumption of foods such as hamburgers and fried chicken is that they conflate consumption of such foods prepared at home with those consumed in fast food restaurants and other establishments.

Using data from the National Longitudinal Survey of Youth (NLSY), Colman and I specifically assess effects on fast food consumption and find that unemployment reduces the number of fast food meals that respondents consume weekly.<sup>6</sup> There is considerable heterogeneity in these effects. As with the results for exercise and physical activity, the reductions are larger among males and lower-educated individuals—groups which tend to be

concentrated in boom-and-bust industries such as manufacturing and construction and thus relatively more vulnerable to the adverse employment effects of a recession.

## Mechanisms and Intra-Household Spillovers

In these studies, we assess both directly and indirectly the role of various mechanisms that may underlie the

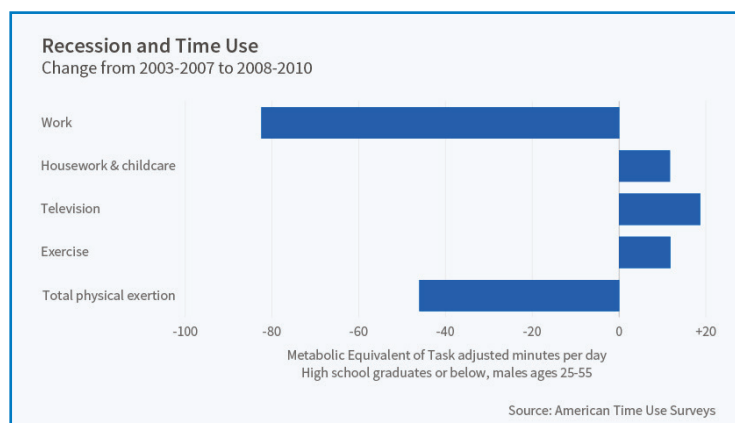


Figure 1

Surveillance System (BRFSS) spanning the 20 years of 1990–2009 and including the comparatively mild 1990–91 and 2001 recessions and the severe 2007–09 downturn. While self-reported measures of types of foods consumed and frequency of consumption in the BRFSS are subject to measurement error and less than ideal, the long time span and the large sample sizes allow us to provide some of the first evidence on this issue. Exploiting within-state variation



observed changes in behaviors. Own job-loss can affect exercise and diet by easing time endowment constraints as well as through a negative income shock. Further, it may lead to loss of health insurance and reduced access to care, which may also impact health behaviors. In prior work, Robert Kaestner and I find evidence of *ex ante* moral hazard whereby loss of coverage may actually lead individuals to behave more healthily, though there is also a counteracting effect from reduced contact with physicians due to loss of health care coverage, which can lead to an increase in unhealthy behaviors.<sup>7</sup> While these are direct “internal” effects from recession-induced job loss, an economic downturn may, in addition, have external spillovers on health behaviors, conditional on own labor supply. Inability to find work, risk of job loss, and expectations may affect mental health and perceived health status, which may affect behaviors.

We assess the role of some of these pathways in explaining the changes in observed food consumption choices. We find that, to varying degrees, shifts in household income, time constraints, and mental health status play important roles. With respect to reduced fast food consumption associated with unemployment, we find that this mostly reflects the greater availability of time for cooking rather than less income available to purchase fast food. This is supported by data from the ATUS, which show that the time spent on meal preparation is positively associated with the unemployment rate. For these behaviors, we do not find insurance coverage to be an important mediator, possibly due to the counteracting incentives noted above, and partly due to the increase in public coverage buffering the drop in private coverage. We also assess whether shifts in the relative prices of food over the business cycle can explain any substantial part of the link between unemployment and food consumption, and generally do not find this to be the case, with the caveat that measuring the relative prices of food is subject to multiple challenges.

One point generally overlooked in the literature is the possibility of external effects due to intra-household spill-

overs. For married or cohabiting couples, for instance, a spouse’s job-loss can affect a respondent’s behavior due to joint household production even if their own labor supply remains unchanged. Using the ATUS, Colman and I assess the importance of such spousal spillover effects.

Due to the segregation of genders across industries and sectors and to the much stronger adverse employment effects on male-dominated sectors during the recent recession, there is substantial within-state variation in each gender’s employment ratio independent from the other. Exploiting this variation, we find some evidence of spousal spillovers. Where the husband’s and wife’s time are substitute inputs—for instance, housework, child-care, and shopping—one spouse’s job loss reduces the other spouse’s time use in these activities. Thus, spousal job-loss allows the spouse to take over some of these activities, and frees up the other spouse’s time which then appears to be spent on personal care, socializing and relaxing, and sleeping. The presence of these and other external effects also underscores why it is not appropriate to use area-specific labor demand shocks as instrumental variables for own labor supply to identify effects on health behaviors and outcomes.

### Average Population Effect versus ‘Treatment-on-the-Treated’

An important issue that arises in this literature relates to the interpretation of effect sizes, and whether they are economically significant. In most of these studies, including some of our own, area-level measures of labor demand are linked to person-level data. What is being estimated is a reduced-form or average population effect (APE), which conflates those who are affected and those who are not affected by the recession. For instance, we find that a one percentage point decrease in the employment-to-population ratio increases time spent exercising by 0.27 minutes per day, an effect which is precisely estimated but appears to be very small. This APE is expected to be small, however, since most individuals are not affected and do not lose their jobs during a recession. This also poses

a challenge in this literature, as very large sample sizes are required to reliably detect it. If we assume that the effect is being realized only for individuals who lose their jobs during a recession, then this APE translates into a treatment-on-the-treated (TOT) effect of a 27-minute increase in time spent exercising, a meaningful effect size.

Consider the effect on total physical exertion for low-educated males, the group most affected by the recent economic downturn. We find that total physical activity declines by between 5.1 and 6.3 MET-adjusted minutes for every one percentage point decrease in the employment-to-population ratio. Again, if the effect is the result of changes in behavior only of those who become unemployed, this translates into a decline in total daily physical exertion of about 21 to 24 percent for the average laid-off individual. If there are external spillovers of the depressed labor demand on other individuals, then the TOT will be smaller. For instance, if we assume that the external effects are as large as the “internal” effects—so for instance, the recession affects as many other individuals as those who lose their jobs—then this implies a reduction in total physical exertion of 10 to 12 percent a day.

When studying individuals’ food consumption choices, we find indirect evidence of these external effects. That is, a higher rate of unemployment does not just affect food consumption among those who actually lose their jobs, but also among those “at risk” of becoming unemployed during a recession based on their socioeconomic characteristics. Specifically, we find a 3 to 6 percent reduction in the frequency of consuming fruits and vegetables among “at risk” individuals. These effect sizes are 6 to 10 times larger than what we find for the average person. With respect to the frequency of fast food consumption, using longitudinal data and a different identification strategy, described below, we estimate the effect of own unemployment, and thus a direct TOT effect for those laid off. Here, we find that own unemployment reduces the number of fast food meals respondents consume by about half a meal per week—a sizeable 29 percent decrease relative to the baseline mean.

## Longitudinal Evidence

Colman and I provide some of the first longitudinal evidence on these questions.<sup>8</sup> We specifically consider the effects of individuals' job loss on their health behaviors, using alternate measures — becoming unemployed during a recession, becoming unemployed because of being laid off, becoming unemployed due to plant or business closure — that are plausibly exogenous, based on data from the 1979 NLSY Cohort and the Panel Study of Income Dynamics (PSID). The use of longitudinal information allows us to address several lingering questions in the literature.

For instance, if recessions reduce smoking, cross-sectional data have a difficult time determining whether this reflects light smokers quitting or heavy smokers cutting back. Responses may also vary based on the duration of unemployment. Recent job losers will change their behavior little if they expect to be re-employed, whereas if they expect joblessness to last, they will adjust to a possibly prolonged decline in income and increase in non-work time. Longitudinal data also allow us to control for potential compositional selection arising from interstate migration that may be correlated with job prospects and health.

Consistent with our work with the ATUS, we find that becoming unemployed is associated with a small increase in recreational exercise but a substantial drop in total physical activity. These effects are more pronounced with longer unemployment duration. We also find some suggestive evidence for other health behaviors including a moderate decrease in smoking. Prior evidence on the effect of unemployment on smoking has been mixed, and our longitudinal evidence suggests that this may be due to heterogeneity across various margins. Among females, job loss is associated with an increase in the probability of being a current smoker, consistent with a decline in smoking cessation or relapse into smoking among for-

mer smokers due to stress. However, both males and females who were heavy smokers at baseline tend to somewhat reduce their cigarette consumption, consistent with an income effect. A longer unemployment duration is also associated with a greater likelihood of delaying a doctor visit, which may reflect individuals delaying or postponing utilization until they have a job and health care coverage.

Prior research on the effects of unemployment on the body mass index (BMI) has either found small effects on both sides or no effects. This may reflect that the true effect, if it exists, is simply too small to measure in a population-based sample. Thus, there is also some value in being able to measure energy expenditure (proxied by exercise and physical activity), energy intake (proxied by consumption of fast food, snacks, and other food), and the net effect (BMI) for the same individual over time. Our interpretation of the joint results of physical activity, fast food consumption, and BMI is that both energy expenditure and energy intake tend to decline after a job loss, leaving observed BMI unchanged or only slightly higher, mostly among previously obese individuals, even with prolonged unemployment.

## Conclusion

The research presented here shows that the effects of unemployment and risk of job loss on health behaviors are complex and multi-faceted, and cannot necessarily be reduced to broad generalizations along the form of recessions leading individuals to engage in more or less healthy lifestyles. Different behaviors vary in terms of their relative intensity of time- versus market-purchased inputs, and thus respond differently to shifts in resource constraints over the economic cycle. While our work yields some insights on these relationships, it only touches on a few behavioral outcomes and processes at play linking the broader macroeconomy to micro-level choices. In light of the far-reaching effects

of the recent economic downturn, interest in these questions has reemerged among economists and research along these lines will help inform efforts to determine the true economic costs of recessions and the appropriate policy responses.

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<sup>1</sup> See for instance C. Ruhm, "Health Effects of Economic Crises," NBER Working Paper No. 21604, October 2015. [Return to text](#)

<sup>2</sup> H. Saffer, D. Dave, M. Grossman, and L. Leung, "Racial, Ethnic, and Gender Differences in Physical Activity," *Journal of Human Capital*, 7(4), 2013, pp. 378–410. [Return to text](#)

<sup>3</sup> G. Colman and D. Dave, "Exercise, Physical Activity, and Exertion over the Business Cycle," *Social Science & Medicine*, 93(c), 2013, pp. 11–20. [Return to text](#)

<sup>4</sup> One MET represents the energy it takes to sit quietly, which for the average adult represents about one calorie per every 2.2 pounds of body weight per hour; walking, for instance, has a MET value of 2. [Return to text](#)

<sup>5</sup> D. Dave and I. Kelly, "How Does the Business Cycle Affect Eating Habits?" *Social Science & Medicine*, 74(2), 2012, pp. 254–62. [Return to text](#)

<sup>6</sup> G. Colman and D. Dave, "Unemployment and Health Behaviors over the Business Cycle: A Longitudinal View," NBER Working Paper No. 20748, December 2014. [Return to text](#)

<sup>7</sup> D. Dave and R. Kaestner, "Health Insurance and Ex Ante Moral Hazard: Evidence from Medicare," *International Journal of Health Care Finance and Economics*, 9(4), 2009, pp. 367–90. [Return to text](#)

<sup>8</sup> G. Colman and D. Dave, "Unemployment and Health Behaviors over the Business Cycle: A Longitudinal View," NBER Working Paper No. 20748, December 2014. [Return to text](#)

# China's Trade Policies

John Whalley

Recent developments in China's trade policy include discussions of the possibility of joining the Trans-Pacific Partnership, exploration of mega trade deals with a number of trade partners, and enactment of a China-Korea free trade agreement. My research program applies numerical simulation methods to various economic models of China and its trading partners to analyze the potential impacts of such changes. The work draws on the output of two research efforts by young Chinese scholars that intensively examined a broad range of Chinese economic topics.<sup>1</sup>

## China and the TPP

The Trans-Pacific Partnership (TPP) is a proposed regional arrangement among 13 countries; China is not a participant. Chunding Li and I assess the potential effects of the TPP on China and other countries.<sup>2</sup> We use a numerical five-country global general equilibrium model which incorporates trade costs and a monetary structure that incorporates inside money and thereby allows for impacts

We also find that total world production and welfare will increase under a TPP regional free trade initiative and TPP will benefit member countries significantly. Smaller TPP countries gain proportionally more than the U.S. because of their substantial intra-Pacific trade. These results appear to be reasonably robust to changes in key model parameters, such as price elasticities of demand.

We use our model to simulate the effects of Japan joining the TPP and find that this would be a beneficial step for Japan and all other TPP countries, but that this action would have negative effects on China and the rest of the world. We evaluate the effect of China joining the TPP, and find that China and other TPP countries would all gain, while non-TPP countries would be hurt. In our model, the effects of TPP are different from those of global free trade. Global free trade benefits all countries, but TPP benefits only member countries. Moreover, the positive effects of global free trade are considerably higher than those of TPP.

## China and Mega Trade Deals

Li, Jing Wang, and I explore potential impacts on China and other major countries of mega trade deals beyond TPP.<sup>3</sup> These include the Regional Comprehensive Economic Partnership (RCEP), China-Japan-South Korea Free Trade Agreement, China-TPP, and possible China-U.S. and China-India free trade agreements. We also use numerical general equilibrium simulation methods, but introduce two important novelties. First, we divide trade costs into tariff and non-tariff barriers and again calculate trade costs between countries empirically using gravity-model methodology. This allows exploration of free-trade agreement effects from both tariff and non-tariff reduction. Secondly, we use an inside money structure to form an endogenous trade imbalance model that captures important realities in China's large trade imbalances. Using a 13-country Armington-type global general equilibrium model, we endogenously determine trade imbalance effects from the trade initiative and calibrate our model to a base case captur-



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Whalley's major research interests include computable general equilibrium, international trade, public finance, development economics and transition economies, globalization, and climate change economics.

He holds a B.A. in economics from Essex University (1968), and an M.A. (1970), M.Phil. (1971) and a Ph.D. (1973) from Yale University. He won the Hellmuth Prize for Achievement in Research in 2009, and was also a 2012 Killam Prize Winner.

Welfare Effects of the Trans-Pacific Partnership  
Assuming TPP eliminates all trade costs between members

	Percentage change
China	-0.06
United States	0.22
Japan	-0.02
Non-U.S. TPP countries	1.43
Rest of world	-0.02
World	0.01

Source: C. Li and J. Whalley, NBER Working Paper No. 18090

Figure 1

on trade imbalances. Trade costs are calculated using a method based on gravity equations. Our simulation results show small negative effects of the TPP on China and other non-TPP countries.



ing China's large trade surplus. We calibrate the model to 2011 data and use counterfactual simulations to explore the effects.

Our simulation results show that almost all mega deal member countries will gain and nearly all mega deal non-member countries will lose. The more non-tariff barriers are eliminated, the more significant the impacts the mega deal will have on all countries. All mega deals will benefit China in terms of welfare, trade, exports, and imports. Comparatively, the RCEP and China in the TPP generate the highest welfare outcomes in the model. The next highest is a China-Japan-Korea free trade agreement (FTA), and then a China-U.S. agreement. For the U.S., China in the TPP generates the highest welfare gain. The next highest is a China-U.S. FTA. For the European Union, all China-involved mega deals except a China-U.S. FTA generate negative welfare outcomes. For Japan, RCEP generates the highest welfare gain; the next highest is China in the TPP. For Korea, RCEP generates the highest welfare gain, followed by a China-Japan-Korea FTA. For India, RCEP generates the highest welfare gain, followed by a China-India FTA.

## China and Trade Policy Bargaining

Timing is an issue in China's trade bargaining, since the country is growing faster than its OECD partners. Li and I use a multi-country, single-period numerical general equilibrium model which describes the economies of China and its major trading partners to examine the outcomes of trade policy bargaining solutions — bargaining over tariffs and financial transfers — over time.<sup>4</sup> We compute gains relative to non-cooperative Nash equilibria (NE) for a range of model parameterizations.

This yields a measure of both absolute and relative gain to China from global trade policy bargaining. We calibrate the model to base case data for 2008 and use a model formulation in which there are heterogeneous goods across countries. The gains from trade bargaining accrue more heavily to countries other than China when we focus on the economic circumstances in 2008 than when we use data from a later year. We consider the impact of differing prospective national growth estimates, which sharply increase China's size relative to its trading partners. Our objective is to assess how China's gains from

trade bargaining change over time, and in particular whether they grow at a faster rate than GDP. Our simulation results show that China's welfare gains from bargaining with the OECD increase over time if all countries keep their present GDP growth rates. Using the Nash Equilibrium solution concept, China's share of global bargaining gains in the simulation is 41 percent in 2010, 67.7 percent in 2050, and 88.7 percent in 2100. [See Figure 2.] This shows growth in bargaining gains at roughly the rate of increase in relative GDP. China's annual average growth rate in its trade bargaining welfare gain is about 11 percent, just a little higher than its GDP growth rate. The comparable statistic for the OECD is about 6 percent, higher than its GDP growth rate. When we use an alternative Kalai-Smorodinsky (KS) solution concept, things are different. China's share of global gains is initially smaller — only 10.6 percent in 2010 — but grows much more rapidly to 70.9 percent in 2050 and to 99.1 percent in 2100. We get these results under the assumption that China maintains its growth rate at 10.47 percent, its average in 2001-10, and the OECD stays at a rate of 1.66 percent, its average in the same period.

These findings imply important differences when using Nash and KS bargaining solution concepts for numerical policy-based work. With asymmetric shifts in the utility possibility frontier due to growth, the Nash bargaining approach uses tangencies between an implicit Cobb-Douglas preference function and the utility possibility frontier, while the KS uses a utopia point proportional to intersections with axes. The two equilibrium concepts behave differently. Additionally, if China joins with India and Brazil to bargain jointly with the OECD, China's welfare gain from bargaining increases by 40 percent compared to the Nash bargaining China-OECD case. We also find that if we take account of the relative size of China's economy by making a purchasing power parity correction to our initial calibration, China's welfare gain would be even larger.

## China's Service Trade

Services are an increasingly important part of China's trade. Chen and I discuss the country's service trade performance from 1980 to 2010, focusing on service subsectors in both the Chinese and the world economies.<sup>5</sup> We summarize and present data on the size of China's service trade, its growth rate,

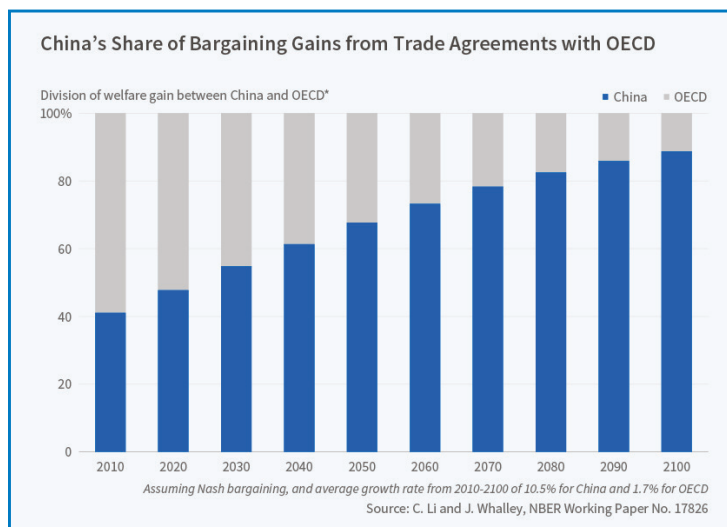


Figure 2

bargaining change over time, and in particular whether they grow at a faster rate than GDP.

Our simulation results show that China's welfare gains from bargaining with the OECD increase over time if all countries keep their present GDP growth rates. Using the Nash Equilibrium solution concept, China's share of global bargaining gains in the simulation is 41 percent in 2010, 67.7 percent in 2050, and 88.7 percent in 2100. [See Figure 2.] This shows growth in bargaining gains at roughly the rate of increase in relative GDP. China's annual average growth rate in its trade bargaining welfare gain is about 11 percent, just a little higher than its GDP growth rate. The compa-

sectoral decomposition, comparative advantage, and degree of openness. The data suggest that despite China's high growth rate, development of service trade lags behind merchandise trade. The openness index for China's service trade differs across subsectors, and the international competitiveness of major service subsectors remains low.

We examine China's service trade in light of prospective development strategies and assess potential effects on the Chinese and global economies. China has adjusted its long-term policy bias in favor of merchandise manufacturing and heavy industries to encourage high-tech manufacturing and services in its far-reaching 12th Five-Year Plan. A series of facilitating policies on taxation, finance, land use, and other elements has been launched to boost the service trade, which already has had large impacts on the country's economic growth, employment, and technology diffusion. The potential global impacts of China's service trade development include changes in China's competitiveness in offshore service outsourcing, shifts in global FDI patterns and flows, and international migration of educated labor.

## The Shanghai Pilot Free Trade Zone

China still maintains relatively rigorous capital controls for both state security and policy independence reasons. The adoption of the China (Shanghai) Pilot Free Trade Zone in September 2013 was part of an ambitious new round of reform, designed to liberalize the capital account and facilitate trade in the small area of Shanghai to which the zone's special policies apply. Daqing Yao and I discuss the reasons for and objectives of China's adoption of such a zone and review its first year of operation.<sup>6</sup> We find that the main impacts of the zone has not been its trade volume

or foreign investment, but the institutional innovation it has generated. The most significant changes include implementation of a "negative list" model for foreign investment management, more efficient operation of new trade supervisory institutions for trade execution, the launch of financial reform experiments on capital account convertibility and in financial services, and the cutting of red tape in administration.

The Shanghai zone is a trial introduction of both floating exchange rates and capital account liberalization into China's macro policy mix. We examine three measures to evaluate its effects: the price spread between the Chinese yuan in Hong Kong and mainland China, the yield gaps between Renminbi accounts in onshore and offshore markets, and the extent to which changes in China's money supply lead to changes in foreign interest rates. We find that the yield gap between three-month notes onshore and offshore declined after the founding of the Shanghai zone. Our results more generally suggest that China's capital controls have weakened since initiation of the zone.

The zone incorporates many policy innovations such as free trade accounts and a negative list for foreign investment, as well as new trade facilities. These reforms enable funds to flow in and out of China more freely, and integrate the Chinese financial market more into the international market.

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<sup>1</sup> One was a "Young China Scholars Network on China's Policy Options in a Post Crisis World" sponsored by Western University, the Centre for International Governance Innovation (CIGI, Waterloo), and the International Development Research Centre (IDRC, Ottawa) between 2010 and 2013. Another was a six-year (October 1, 2009, to September 31, 2015) project titled "The Western-CIGI-China (BRIC)-Ontario Project"

which was supported by Western University, Ontario Research Fund (ORF), CIGI, and a number of Chinese universities and research institutions.

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<sup>2</sup> C. Li and J. Whalley, "China and the TPP: A Numerical Simulation Assessment of the Effects Involved," NBER Working Paper No. 18090, May 2012, and published as "China and the Trans-Pacific Partnership: A Numerical Simulation Assessment of the Effects Involved," *The World Economy*, 37(2), 2014, pp. 169–92.

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<sup>3</sup> C. Li, J. Wang, and J. Whalley, "Numerical General Equilibrium Analysis of China's Impacts from Possible Mega Trade Deals," NBER Working Paper No. 20425, August 2014, and published as "Impact of Mega Trade Deals on China: A Computational General Equilibrium Analysis," *Economic Modelling*, 57, 2016, pp. 13–25.

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<sup>4</sup> C. Li and J. Whalley, "China's Potential Future Growth and Gains from Trade Policy Bargaining," NBER Working Paper No. 17826, February 2012, and published as "China's Potential Future Growth and Gains from Trade Policy Bargaining: Some Numerical Simulation Results," *Economic Modelling*, 37(C), 2014, pp. 65–78.

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<sup>5</sup> J. Whalley and H. Chen, "China's Service Trade," *Journal of Economic Surveys*, 28(4), 2014, pp. 746–74.

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In 2010–12, Alfaro served as Minister of National Planning and Economic Policy in her native Costa Rica during a leave of absence from Harvard.

Alfaro's main research interests are in international economics, in particular international capital flows, sovereign debt, foreign direct investment, and multinational activity. Her recent research focuses on multinational activity, value chains, and vertical integration.

Alfaro earned her Ph.D. in economics in 1999 from the University of California, Los Angeles, from which she received a dissertation fellowship award. She received a Licenciatura from the Pontificia Universidad Católica de Chile in 1994, from which she graduated with highest honors, and a B.A. in economics with honors from the Universidad de Costa Rica in 1992.

She lives in Brookline, Massachusetts, with her husband and daughter. They spend a lot of time in Costa Rica and in Brazil, where her husband was born.

## Multinational Firms, Value Chains, and Vertical Integration

**Laura Alfaro**

In recent decades there has been a very rapid increase in flows of goods and capital between countries and between firms, driven by technological progress and falling cross-border restrictions. The rising ability to retain or outsource various production stages within firms and across country boundaries has fueled fragmentation of production and the emergence of global value chains. Cross-border production, investment, and trade in final and intermediate goods by multinational corporations (MNCs) are key drivers of this phenomenon.

In a series of papers combining new firm-level datasets and novel insights from trade and organizational economics, my colleagues and I have examined the characteristics and determinants of MNCs, value chains, and vertical production. We have found new patterns of foreign direct investment (FDI), and investigated the relationships among market conditions, vertical integration, and the effects of foreign capital.

We document the emergence of new MNC industrial clusters and their distinct agglomeration patterns. The organizational choices that firms make in structuring their value chains suggest that complex production and process decisions involving multiple stages explain intra-firm activity. Our work enhances understanding of the sources of productivity gains and resilience to external shocks afforded to host countries by MNC activity and cross-border vertical relations.

### Global Patterns of MNC Activity

#### *Agglomeration*

One strand of my research has examined the geographic concentration of the plants operated by MNCs,

and compared that concentration with the analogous pattern for domestic firms. Maggie Chen and I find evidence of MNC clusters, which we label agglomeration.<sup>1</sup> MNCs' offshore subsidiaries' higher productivity, vertically integrated production, and higher knowledge- and capital-intensities all suggest that their motives for agglomeration are different from those of domestic firms. We quantify patterns of spatial location by constructing an index of agglomeration that compares establishments at both the industry and plant levels.<sup>2</sup> The index quantifies the extent to which MNC establishments are more or less likely to agglomerate than their domestic counterparts. Dun and Bradstreet's WorldBase data enables us to compute this index based on plant-level observations. The dataset includes primary and secondary industries, ownership information, and plant-level physical location, which can be used to calculate the distance between pairs of establishments.

Our comparative analysis generates a rich array of new findings. MNC headquarters are, on average, the most agglomerative, meaning that they are most concentrated geographically. Headquarters facilities are followed by MNC foreign subsidiaries and domestic plants in their degree of concentration. The differences in the degree of agglomeration of these three different types of facilities suggest that MNC offshore clusters are not simply a reflection of domestic industrial ones.

Figure 1, on the following page, plots the distributions of pairwise industries' agglomeration densities, computed using a distance of 50 km to define "close" establishments for MNC foreign subsidiaries and domestic plants, respectively. MNC foreign sub-



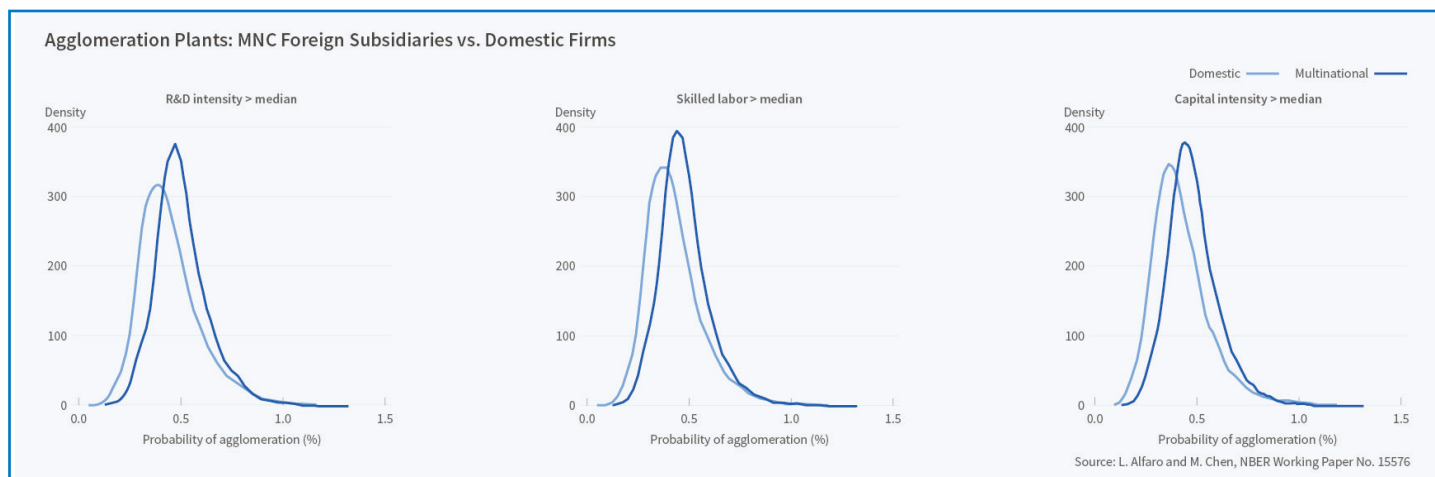


Figure 1

subsidiaries are more agglomerative than domestic plants in capital-, skilled labor-, and R&D-intensive industries. In industries with greater than median levels of capital intensity, the distribution of agglomeration indices is rightward-shifted for MNC foreign subsidiaries compared to domestic plants. This pattern is similarly observed for industries with greater than median levels of skilled labor and R&D intensities. We also evaluate how agglomeration economies, particularly input-output linkages, labor and capital goods market externalities, and technology diffusion, affect MNCs relative to domestic firms. We find that MNCs' choice of location is significantly influenced by technology diffusion and capital-good market externalities.

These findings are largely consistent with the MNCs' vertically integrated organizational form and substantial investment in technology and capital goods, as well as with the increasing segmentation of activities within firm boundaries and increasingly complex sourcing strategies.

### ***Intra-Industry FDI***

Andrew Charlton and I show that large FDI flows across rich countries associated with these more complex strategies do not fit the tra-

ditional classification of horizontal FDI.<sup>3</sup> Although patterns of foreign investment are recognized as complex, the literature has traditionally, for analytical simplicity, distinguished between two forms of, and motivations for, locating activities abroad: horizontal — replicating a subset of activities or processes in another country, and vertical — fragmenting production by function. In general, market access models are favored empirically over comparative advantage models. Our results suggest that data limitations have led the prior studies to underestimate vertical FDI systematically.

We use a combination of four-digit, sector-level information from the WorldBase data together with input-output tables to distinguish between horizontal and vertical FDI. We classify a horizontal subsidiary as a plant in the same sector as its foreign parent owner, and a vertical subsidiary as a plant in sectors that are inputs to the foreign parent's product. As we do not observe interplant trade, this approach infers vertical relations from information about the goods produced in each establishment and their input-output relationships. While we acknowledge its limitations, this method yields a large amount of data for many countries and industries and avoids con-

cerns about transfer pricing affecting values.

We find that the bulk of MNC activity occurs between rich nations, but some of our plant-level findings provide a new perspective that goes beyond this traditional wisdom. Many vertical subsidiaries, which we find are larger than commonly thought, are located in sectors related to higher skill input in high-skill countries. These subsidiaries have been assumed to be market seeking.<sup>4</sup> We term such subsidiaries *intra*-industry vertical FDI and show them to be qualitatively different from vertical subsidiaries that cross two-digit industry codes, that is, *inter*-industry vertical FDI. Although both are vertical, intra-industry vertical FDI is more difficult to explain via standard theories that emphasize factor cost differences as the primary motivation for fragmentation. We argue that the patterns of vertical FDI and the motivation for sourcing an input within firm boundaries also involve the subsidiary's intended position in the production chain. We define a variable that captures the proximity of two four-digit sectors in a vertical production chain as the proportion of the intermediate product used directly in the final good; for example, less-processed materials have low proximity variables. We find proximity to be significantly

higher, on average, between two vertically related plants than between two randomly selected ones.

## Firm Boundaries and Organizational Choices

### Value Chains

Pol Antràs, Davin Chor, Paola Conconi, and I examine firms' organizational choices along value chains and their key decisions regarding which segments of the production process to own and which to outsource.<sup>5</sup> We combine WorldBase data on firm activities across many countries and industries with information from standard input-output tables to study the differences between value chains for integrated and non-integrated inputs. We construct an industry-pair specific measure of the position of different industries along the value chain that summarizes the extent to which a firm's integrated inputs tend to be more upstream compared to its non-integrated inputs.

We develop a rich theoretical framework of firm behavior amenable to estimation using firm-level data.<sup>6</sup> In an incomplete-contracts setup in which the manufacture of final goods entails a large number of production stages performed in a predetermined order, suppliers engaged in different stages undertake relationship-specific investments. The division of surplus between the final-good producer and each supplier is governed by bargaining after inspection of the completed stage. We allow for heterogeneity in the importance of inputs for production as well as in suppliers' marginal cost of production at different points along the value chain.

We find that a firm's propensity to integrate upstream inputs depends critically on the elasticity of demand for its final good and the elasticity of substitution across its production stages. When demand is elastic or inputs are not particularly substitutable, input investments are sequential complements; the greater the upstream supplier's investments, the greater that supplier's marginal incentive to undertake relationship-specific investments. In this case, it is optimal to contract at arm's length to incentivize upstream suppliers' investment efforts and integrate the stages furthest downstream to capture surplus. When demand is inelastic or inputs are sufficiently substitutable, input investments are instead sequential

tional arrangements to elicit the right incentives from suppliers positioned at early stages. We construct a measure of input contractibility for each industry and find that a greater degree of contractibility of upstream inputs increases the likelihood that a firm facing high elasticity of demand will integrate upstream inputs. These empirical patterns provide strong evidence that the position of inputs in the production process and contractual frictions critically shape a firm's integration choices.

### Prices and Vertical Integration

The impact of market conditions, in particular prices, on firms' organizational choices is a long-standing

question in organizational economics. In a recent paper, Conconi, Harald Fadinger, Andy Newman, and I find strong support for the view that output prices are a key determinant of vertical integration.<sup>7</sup> This result stems from managers not only having a stake in the organizational goal, but also standing to derive private, non-contractible benefits.<sup>8</sup> Suppose that integration increases productivity, but at a cost; improved coordination among suppliers, for example, could engender administrative costs independent of output and product price. A price-taking firm would choose to integrate only if the benefits of increased profitability outweigh the cost of integrating. At low prices, productivity gains from integration are seldom sufficiently valuable to justify the cost. As the market price rises, the tradeoff resolves in favor of more integration.

Testing whether product prices affect organizational design requires

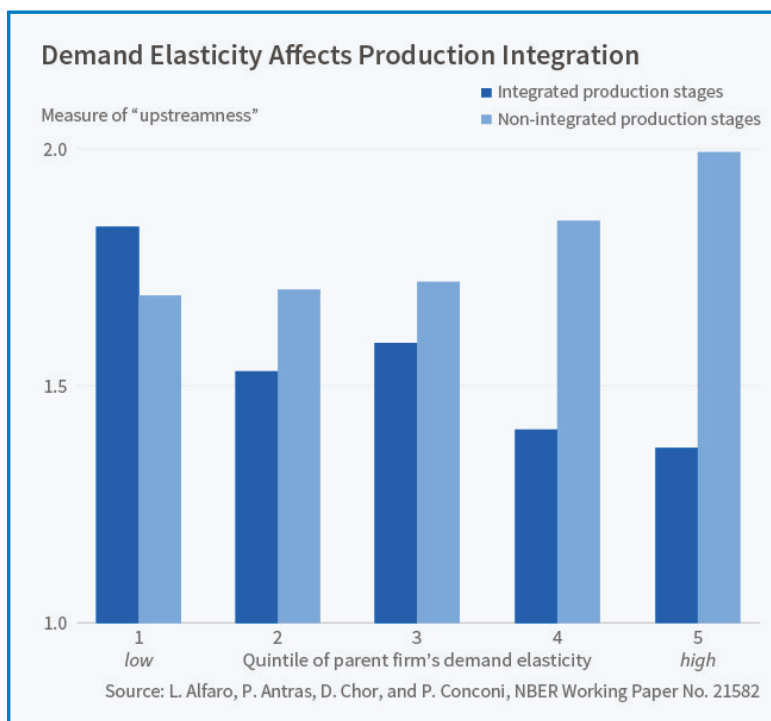


Figure 2

substitutes. In this case, firms choose to integrate relatively upstream stages and outsource downstream suppliers. Figure 2 illustrates these patterns for different quintiles of the parent firm's elasticity of demand.

In our model, greater upstream use of contract arrangements reduces a firm's need to rely on organiza-

an exogenous source of price variation. Trade policy provides one such source, since the degree of trade protection obviously affects equilibrium prices, but it is unlikely to be influenced by firms' vertical integration decisions. Under the most favored nation (MFN) principle set out in the General Agreement on Tariffs and Trade (GATT), member countries agree not to discriminate among trading partners, with some exceptions. Long-term multilateral trade negotiations render MFN tariffs less responsive to domestic political pressure. Reverse causality is also unlikely to be a concern in our analysis as the MFN tariffs that firms faced in 2004, the year we examine, were determined during the Uruguay Round of multilateral trade negotiations (1986–94). Combining information on firms' production activities drawn from WorldBase with input-output tables, we construct firm-level vertical integration indices that measure the fraction of inputs used in the production of a final good that can be produced in-house.

We find that the higher the tariff on imports of a given product, and thus the higher the domestic price, the more vertically integrated are the firms that produce the product in that country. The effect is larger precisely where organizational decisions ought to be more responsive to import tariffs—for firms that serve only the domestic market and in sectors in which tariffs have a greater impact on domestic prices. We rule out several alternative mechanisms that could generate a positive correlation between tariffs and vertical integration, such as competition and credit constraints. Our estimates imply that price changes can have large effects on firm boundaries. Contrary to the direction of causality suggested by foreclosure theories, whereby vertical integration raises prices as firms integrate with their suppliers to reduce competition, our analysis suggests that higher prices may induce more vertical integration.

## Effects of Multinational Firms Productivity, Selection, and Reallocation

The impact of MNCs on their host countries has been widely studied.<sup>9</sup> Positive gains from MNC activity are often attributed to within-firm productivity improvements resulting from productivity spillover from foreign MNCs to domestic firms, or from self-upgrading by domestic firms. But MNC production can also precipitate more intense competition in product and factor markets, as well as reallocation of resources from domestic to multinational firms and from less productive to more productive domestic firms. Although both channels imply aggregate productivity gains, they represent two distinct margins. Within-firm productivity improvement operates through an “intensive margin” where foreign production increases the productivity of domestic firms that persist, while between-firm selection and market reallocation operates at an “extensive margin” where foreign competition induces the exit of the least productive firms. The implications for domestic economies are also sharply different: growth or contraction of domestic industries.

My recent work with Chen disentangles the two channels in determining aggregate productivity gains from MNC production.<sup>10</sup> We investigate the ways market reallocation and knowledge spillovers influence potential gains from MNC competition, and their relative importance, using a general analytical framework based on a standard model of MNC production and heterogeneous firms, accounting for self-selection of MNCs. Our predictions of how variation in these channels influences the distribution of domestic firms along the dimensions of productivity, revenue, employment, and survival enable us to distinguish between the two channels. We empirically evaluate these predictions using Bureau van Dijk's Orbis, a large, cross-country-

panel compilation of financial, operating, and ownership information for companies.

We find within-firm productivity improvement and between-firm selection to be significant but distinctly different sources of gains from MNC production. We also explore the possibility of between-industry productivity spillover through vertical production linkages and find linkages to affect less and more productive firms differently. The data are consistent with both between-firm selection and market reallocation. Ignoring them could bias estimates of the origin and magnitude of productivity gains from MNC production.<sup>11</sup>

## Foreign Ownership, Vertical Linkages, and Resilience

Firms' integration choices across borders can also affect a host country's performance. MNCs' ability to shift production back home likely results in more volatile performance for horizontal subsidiaries while intra-firm demand may help absorb negative demand shocks in the host country, resulting in more resilient responses to crises.

Chen and I examine the differential performance of establishments, with particular emphasis on the role of foreign ownership during the 2008–09 global financial crisis. This crisis was notable for its speed, severity, and international span.<sup>12</sup> We provide micro-evidence on the role of production and financial linkages in influencing how foreign ownership affects an establishment's resilience to economic crisis. We construct a direct measure of production linkages by examining the input-output relationship between the primary products of subsidiaries and parent firms. We also consider how MNCs' internal capital markets lower subsidiaries' dependence on host country credit conditions, an advantage particularly important during credit crunches. In order to disentangle the effect of for-



foreign ownership from the effects of other observable and unobservable establishment and macroeconomic factors, we match MNC subsidiaries with local plants in the same country and industry on the basis of similarity in characteristics, using WorldBase's data. We infer the effect of foreign ownership from divergences in the performance paths of MNC subsidiaries and their local matches. We compare the effect of foreign ownership between the non-crisis years 2005–06 and the crisis period, 2007–08.

Our results shed light on why foreign ownership could lead to divergent performance. On average, foreign subsidiaries were more resilient than their domestic counterparts through the crisis. Establishments with stronger vertical production linkages exhibited more resilience, especially in host countries with greater negative demand shocks. Horizontally linked establishments, in contrast, performed no better than the control establishments. The role of vertical production linkages and the role of financial linkages, especially in host countries with worsening credit conditions, also were related to performance only during the crisis period.

<sup>1</sup> L. Alfaro and M. Chen, "The Global Agglomeration of Firms," NBER Working Paper No. 15576, December 2009, and *Journal of International Economics*, 94(2), 2014, pp. 263–76.

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<sup>2</sup> We extend the methodology of G. Duranton and H. Overman, "Testing for Localization Using Micro Geographic Data," *Review of Economic Studies*, 2(4), 2005, pp. 1077–106.

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<sup>3</sup> L. Alfaro and A. Charlton, "Intra-Industry Foreign Direct Investment," NBER Working Paper No. 13447, September 2007, and *American Economic Review*, 99(5), 2009, pp. 2096–119.

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<sup>4</sup> That firm-level trade data for the United States, for example, shows a high proportion of intra-firm trade between developed countries is further evidence of the importance of rich countries' MNC vertical activity. For further analysis of flows between rich and poor countries, see L. Alfaro, S. Kalemli-Ozcan, and V. Volosovych, "Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation," NBER Working Paper No. 11901, December 2005, and *The Review of Economics and Statistics*, 90(2), 2008, pp. 347–68; L. Alfaro, S. Kalemli-Ozcan, and V. Volosovych, "Capital Flows in a Globalized World: The Role of Policies and Institutions," NBER Working Paper No. 11696, October 2005, and in S. Edwards, ed., *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences*, Chicago, Illinois: University of Chicago Press, 2007, pp. 19–72; L. Alfaro, S. Kalemli-Ozcan, and V. Volosovych, "Sovereigns, Upstream Capital Flows and Global Imbalances," NBER Working Paper No. 17396, September 2011, and *Journal of the European Economic Association*, 12(5), 2014, pp. 1240–84.

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<sup>5</sup> L. Alfaro, P. Antràs, D. Chor, and P. Conconi, "Internalizing the Global Value Chains: A Firm-Level Analysis," NBER Working Paper No. 21582, September 2015.

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<sup>6</sup> P. Antràs and D. Chor, "Organizing the Global Value Chain," NBER Working Paper No. 18163, June 2012, and *Econometrica*, 81(6), 2013, pp. 2127–204.

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<sup>7</sup> L. Alfaro, P. Conconi, H. Fadinger, and A. F. Newman, "Do Prices Determine Vertical Integration?" NBER Working Paper No. 16118, June 2010, and *Review of Economic Studies*, 83(3), 2016, pp. 855–88.

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<sup>8</sup> For theoretical work, see P. Legros and A. Newman, "A Price Theory of Vertical and Lateral Integration," *Quarterly Journal of Economics*, 128(2), 2013, pp. 725–70.

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<sup>9</sup> The literature has identified important roles for the institutional environment and policy in terms of FDI and capital flowing into, in particular, poor countries, see L. Alfaro, S. Kalemli-Ozcan, and V. Volosovych, "Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation," *The Review of Economics and Statistics*, 90(2), 2008, pp. 347–68; and L. Alfaro, S. Kalemli-Ozcan, and V. Volosovych, "Capital Flows in a Globalized World: The Role of Policies and Institutions," in S. Edwards, ed., *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences*, Chicago, Illinois: University of Chicago Press, 2007, pp. 19–72. Evidence has shown positive effects of FDI conditional on local conditions, in particular local financial markets, see L. Alfaro, A. Chanda, S. Kalemli-Ozcan, and S. Sayek, "How Does Foreign Direct Investment Promote Economic Growth? Exploring the Effects of Financial Markets on Linkages," NBER Working Paper No. 12522, September 2006, and *Journal of Development Economics*, 91(2), 2010, pp. 242–56; and L. Alfaro, A. Chanda, S. Kalemli-Ozcan, and S. Sayek, "FDI and Economic Growth: The Role of Local Financial Markets," *Journal of International Economics*, 64(1), 2004, pp. 89–112.

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<sup>10</sup> L. Alfaro and M. Chen, "Selection and Market Reallocation: Productivity Gains from Multinational Production," NBER Working Paper No. 18207, July 2012.

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<sup>11</sup> These results echo the growing literature that emphasizes effects of resource misallocation across establishments. See also L. Alfaro, A.

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<sup>12</sup> L. Alfaro and M. Chen, “Surviving the Global Financial Crisis: Foreign Ownership and Establishment Performance,” NBER Working Paper No. [17141](#), June 2011, and *American Economic Journal: Economic Policy*, 4(3), 2012, pp. 30–55.  
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**Erik Hurst** is a research associate in NBER's Economic Fluctuations and Growth, Public Economics, and Aging Programs. He is the V. Duane Rath Professor of Economics at the University of Chicago's Booth School of Business and is a co-editor of the *Journal of Political Economy*.

His research spans many fields, including empirical macroeconomics, labor markets, housing markets, and consumer behavior. He received his Ph.D. in economics from the University of Michigan in 1999 and a B.A. in economics from Clarkson University in 1993. In 2007, he received the TIAA-CREF Paul Samuelson Award for the best paper on life-long financial security for "Consumption vs. Expenditure" (with Mark Aguiar). In 2012, he was awarded the Ewing Marion Kauffman Prize Medal for Distinguished Research in Entrepreneurship.

Erik currently lives in Chicago with his wife and two children.

## Regional Evidence on Business Cycle Fluctuations and Countercyclical Policy

**Erik Hurst**

Studying cross-region variation in economic outcomes within a country is an increasingly common empirical research strategy in labor, public, and urban economics.<sup>1</sup> For example, local exposure to trade with China has been shown to reduce local employment rates and wages.<sup>2</sup>

Cross-state variation has been used to estimate the incidence of local taxes.<sup>3</sup> Large local public work programs have been used to document the existence of agglomeration economies in manufacturing.<sup>4</sup>

Cross-region variation provides macroeconomic researchers with richer information on economic fluctuations than aggregate time series data at the national level. For example, during the Great Recession in the United States, some metropolitan areas — Las Vegas, for example — experienced larger declines in employment than many others. Explaining this variation can shed light on potential causes of the aggregate recession.<sup>5</sup>

Drawing inferences about the aggregate economy from data on regional variation is complicated by two issues, however. First, the way a regional economy responds to a given economic shock could be substantively different from the way a national economy responds because of both factor mobility and general equilibrium forces.<sup>6</sup> Factors such as Federal

Reserve policy may respond to aggregate shocks but not to local shocks. Ignoring such general equilibrium factors can yield estimates of local employment elasticities to a given shock that are two to three times larger than the aggregate employment elasticity to the same shock.<sup>7</sup> Second, regional

comparisons cannot shed any light on shocks that affect the entire economy in the same way. Such shocks are "differenced away" when the different experiences of different regions are compared.

Much of my current research uses a

combination of local and aggregate data to learn about the drivers of aggregate business cycles and to explore the regional consequences of aggregate government policies. A combination of local and aggregate data, along with a structural economic model, often is needed to use local variation to address macro questions.

### Understanding the Causes of the Great Recession

Despite aggregate employment rates falling substantially during the Great Recession, aggregate real wage growth during the 2008-2010 period remained on its pre-recession trend. If employment fell because of a labor demand decline, the employment decline during the recession



**Figure 1**

Note: Estimated wages are for white men, aged 40-44 who attended some college, working 40 hours per week



should have been accompanied by a decline in real wages. Many people who believe that the Great Recession was primarily caused by a lack of demand appeal to wages being “sticky” as the reason a decline in real wages during the Great Recession did not accompany the sharp decline in employment.<sup>8</sup> [See Figure 1.]

In new work with Martin Beraja and Juan Ospina, I estimate the amount of wage stickiness using cross-state variation.<sup>9</sup> Using a variety of data sources, we show that states with the largest relative employment declines had the smallest relative wage increases. We construct state-level measures of real wages by combining state-level nominal wage data from the American Community Survey with state-level price indices constructed from scanner data. From this analysis, we estimate that wages are fairly flexible. While there is some stickiness to wages at the local level, real wages do respond to contemporaneous local labor demand shocks. [See Figure 2.]

To understand the broad causes of the Great Recession, we construct a model of local economies that can aggregate to the national economy. The model allows for the trade of goods across local economies, and for a national monetary authority that sets a common interest rate across local economies. We embed within the model four shocks: a shock to households’ intertemporal consumption decisions, a shock to firms’ marginal products of labor, a shock to households’ current choices between market consumption and leisure, and a monetary policy shock. All but the monetary policy shock have both aggregate and local components.

Using data on both aggregate and local employment rates, prices, and nominal wages, we estimate

the shocks that drove both aggregate and local business cycles during the Great Recession period. We estimate the amount of wage stickiness using local data throughout the analysis. Our main finding is that the shock to household intertemporal consumption decisions — something akin to a traditional Keynesian demand shock — explains at best only 40 percent of the employment decline during 2008–10 and essentially none of the persistently low employment

shock during the Great Recession? A rising degree of skill mismatch could generate empirical patterns like those from a labor supply shock. For example, manufacturing workers may not be able to fill jobs in the computer sector regardless of the wage being offered for the computer sector jobs.

In my work with Kerwin Charles and Matt Notowidigdo, we document the extent to which the secular decline in manufacturing employment during the 2000s contributed to the sharp decline in employment rates experienced in the U.S. economy between 2000 and 2015.<sup>10</sup> Employment rates for men and women between the ages of 21 and 54 with less than a four-year college degree fell by roughly 2 percentage points between 2000 and 2007 and then fell by an additional 7 percentage points between 2007 and 2010. In 2015, employment rates for this group were still roughly 7 percentage points below the 2000 level.

The U.S. economy lost roughly 3.5 million manufacturing jobs during the 2000–07 period and

another 2 million manufacturing jobs during the 2007–10 period. In 2015, U.S. manufacturing employment was still roughly 5.5 million jobs below the 2000 level. The decline in manufacturing employment in the U.S. during the 2000s was almost three times as large as the decline during the 1980s and 1990s.

A common question for structural explanations of the employment declines since early 2000 is why so much of the decline was concentrated during the 2007–10 period. It is often argued that structural forces result in more gradual changes while cyclical factors can result in more abrupt changes. If manufacturing employment declines are contributing to low employment rates in the U.S. econ-

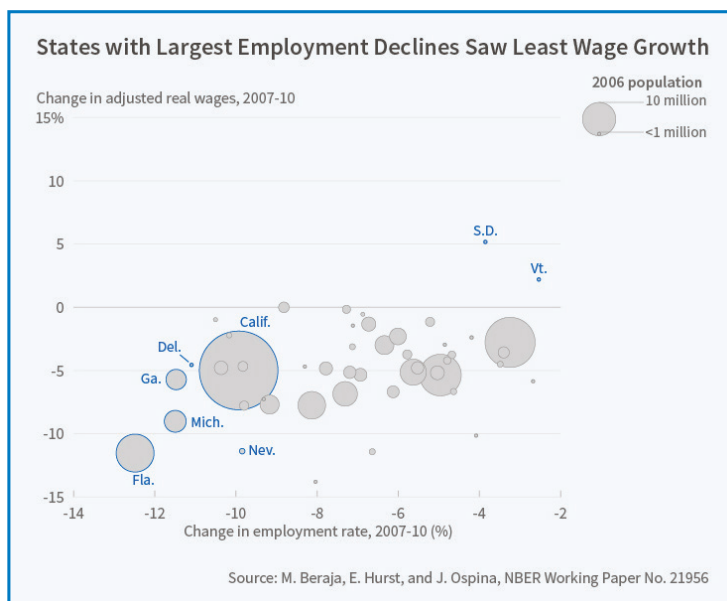


Figure 2

rate between 2010 and 2012. The degree of wage stickiness necessary for demand shocks to be the primary cause of aggregate employment decline during the Great Recession is inconsistent with the flexibility of wages that we estimate from cross-state variation. Explaining aggregate wage patterns requires an aggregate labor supply shock. In our analysis, regional data are essential for identifying a key parameter that helps distinguish between various shocks driving aggregate business cycles.

## Understanding the Decline in Employment Rates, 2000–15

What factors could have contributed to an aggregate labor supply

omy, why is it that the employment rate did not fall more during the early 2000s, when the manufacturing declines were larger?

Charles, Notowidigdo, and I document that the housing boom masked the labor market effects of the declining manufacturing sector. As manufacturing declined, lower skilled men and women were displaced, but the early 2000s housing boom actually increased demand for construction workers, mortgage brokers, real estate agents, and local services. This latter effect was due to a wealth or liquidity effect from rising house prices. As housing prices increased, households increased their spending on local goods.<sup>11</sup> Male workers with less than a four-year college degree moved sharply into construction during the early 2000s. Simultaneously, female workers with less than a four-year college degree moved sharply into real estate sales, mortgage brokerage, and local services.

Using aggregate data, we document that the decline in manufacturing employment for both men and women with less than a four-year college degree was almost completely offset by an increase in employment in sectors spurred on by the housing boom. In 2007, the housing market collapsed and employment spurred by the housing boom collapsed with it. Manufacturing employment continued to decline throughout the recession. Thus, a sharp downward trend in manufacturing employment coupled with a boom and bust in housing-related employment caused aggregate employment to remain relatively flat during the early 2000s and then to fall sharply at the start of the recession.

While the patterns are present in aggregate data, by exploiting regional variation the “masking hypothesis” can be illustrated clearly. Certain metropolitan areas—like Detroit—experienced large manufacturing declines and no housing boom. Other metropolitan areas—like Las Vegas—experienced little manufacturing decline and a large housing boom. Exploiting cross-

region variation, we show that employment rates in manufacturing areas plummeted well before the start of the Great Recession. Additionally, we show that employment rates were well above long-run trends in housing boom areas during the early 2000s. At the national level, these two effects roughly offset. Part of the masking we document occurred because local areas were exposed differentially to manufacturing declines and housing booms. However, we also document that masking occurred at the individual level. If an individual who was displaced from manufacturing in the early 2000s lived in an area experiencing a housing boom, that person was more likely to be re-employed than a displaced manufacturing worker in an area without a housing boom.

By exploiting cross-region variation, we find that the labor market was structurally weaker prior to the Great Recession than had previously been recognized, and that the housing boom temporarily propped up labor market statistics in aggregate data.

### **The Regional Effects of U.S. Monetary Policy**

In addition to my work using regional variation to learn about the drivers of the aggregate macroeconomy, I also have studied how aggregate U.S. macro policies differentially affect various regions of the country. In recent work with Beraja, Andreas Fuster, and Joe Vavra, we show that the Federal Reserve’s policy of quantitative easing (QE) beginning in November 2008 disproportionately helped regions of the country that were doing relatively well.<sup>12</sup> We document that right after QE began, mortgage rates fell sharply. As rates fell, a mini refinancing boom occurred. The increase in refinancing was associated with individuals tapping into their home equity. However, the increase in refinancing was concentrated in locations that had lower unemployment rates. The boom was much larger in Dallas than it was in Las Vegas. The reason is that most homeowners in Las

Vegas were underwater as of November 2008 while most homeowners in Dallas were not. Consumption increased much more after QE in Dallas than in Las Vegas. Local refinancing booms were correlated with local spending booms. Collectively, the results show that effects of monetary policy most helped regions that needed help least.

While the Federal Reserve may not be independently interested in the distributional aspects of monetary policy decisions, our paper highlights that the effectiveness of monetary policy in stimulating consumption through home equity borrowing can be time-varying. Monetary policy has a lower stimulus effect through this channel when the economy is experiencing a housing bust and many homeowners are underwater.

### **U.S. Mortgage Markets and Cross-Region Redistribution**

The extent to which households can borrow to self-insure against regional shocks depends crucially on how the interest rate varies with regional economic conditions. Most economic models assume that regions within a monetary union share a common risk-adjusted interest rate. For most households, mortgages are the primary instrument of borrowing. In a recent paper with Ben Keys, Amit Seru, and Vavra, I show that the assumption of constant risk-adjusted mortgage rates is well supported by data for mortgages securitized by Government Sponsored Enterprises (GSEs).<sup>13</sup> Using loan-level data, we document that there is no spatial variation at all in mortgage rates and fees across U.S. metropolitan areas for loans securitized by the GSEs despite there being large *ex ante* predictable differences in default risk across those regions. All of our results control for loan-level observables like FICO score and loan-to-value ratios. For example, GSE-secured loans originated in 2007 in Las Vegas, conditional on borrower and loan observables, faced the same mortgage rate as GSE-secured loans originated in 2007 in Dallas, despite the Las Vegas loans,

conditional on observables, having a much higher predicted default probability, given that housing prices were falling to a greater extent there.

The patterns found within a sample of GSE loans differ markedly from the patterns in a sample of otherwise similar mortgages not securitized by the GSEs. These loans were similar in all dimensions aside from size. Loans above a certain threshold are ineligible for securitization by the GSEs. Mortgage rates on these jumbo loans were higher in areas where predicted mortgage default rates were higher. We show evidence that the GSEs are bound by political constraints that prevent them from charging spatially different mortgage rates conditional on borrower and loan characteristics.

If mortgage rates do not respond to local economic shocks that increase *ex ante* default risk, then households in these regions face lower borrowing costs than they would if default risk were priced into interest rates. This reduction in borrowing costs may in turn offset some of the negative local economic shocks that increased default risk in the first place. Conversely, those in regions with low default risk will face higher borrowing costs than they would if this low default risk was priced into interest rates. Thus, the constant interest rate “policy” followed by the GSEs results in state-contingent regional transfers. We estimate that during the Great Recession about \$47 billion was transferred via the mortgage market from regions with smaller employment declines (above the median) to regions with larger employment declines (below the median).

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<sup>3</sup> M. Harding, E. Leibtag, and M. Lovenheim, “The Heterogeneous Geographic and Socioeconomic Incidence of Cigarette Taxes: Evidence from Nielsen Homescan Data,” *American Economic Journal: Economic Policy*, 2012, 4(4), 2012, pp. 169–98.  
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<sup>5</sup> A. Mian and A. Sufi, “What Explains the 2007–09 Drop in Employment?” *Econometrica*, 82(6), 2014, pp. 2197–223. An earlier version of this paper circulated as “What Explains High Unemployment? The Aggregate Demand Channel,” NBER Working Paper No. 17830, February 2012.  
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<sup>6</sup> E. Nakamura and J. Steinsson, “Fiscal Stimulus in a Monetary Union: Evidence from U.S. Regions,” NBER Working Paper No. 17391, September 2011, and *American Economic Review*, 104(3), 2014, pp. 753–92; M. Beraja, E. Hurst, and J. Ospina, “The Aggregate Implications of Regional Business Cycles,” NBER Working Paper No. 21956, February 2016.  
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<sup>7</sup> M. Beraja, E. Hurst, and J. Ospina, “The Aggregate Implications of Regional Business Cycles,” NBER Working Paper

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<sup>8</sup> See, for example, P. Krugman, “Yellen, Wages, and Intellectual Honesty,” blog post from August 25, 2014.

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<sup>9</sup> M. Beraja, E. Hurst, and J. Ospina, “The Aggregate Implications of Regional Business Cycles,” NBER Working Paper 21956, February 2016.

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<sup>10</sup> K. Charles, E. Hurst, and M. Notowidigdo, “The Masking of the Decline in Manufacturing Employment by the Housing Bubble,” *Journal of Economic Perspectives*, 30(2), 2016, pp. 179–200; K. Charles, E. Hurst, and M. Notowidigdo, “Housing Booms, Manufacturing Decline, and Labor Market Outcomes,” University of Chicago Working Paper, 2016, [http://faculty.wcas.northwestern.edu/noto/research/CHN\\_manuf\\_decline\\_housing\\_booms\\_mar2016.pdf](http://faculty.wcas.northwestern.edu/noto/research/CHN_manuf_decline_housing_booms_mar2016.pdf). The prior two papers are based on K. Charles, E. Hurst, and M. Notowidigdo, “Manufacturing Decline, Housing Booms and Non-Employment,” NBER Working Paper No. 18949, April 2013.  
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<sup>11</sup> A. Mian and A. Sufi, “House Price Gains and U.S. Household Spending from 2002 to 2006,” NBER Working Paper No. 20152, May 2014.

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<sup>12</sup> M. Beraja, A. Fuster, E. Hurst, and J. Vavra, “Regional Heterogeneity and Monetary Policy,” *Federal Reserve Bank of New York Staff Reports* No. 731, June 2015.

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<sup>13</sup> E. Hurst, B. Keys, A. Seru, and J. Vavra, “Regional Redistribution Through the U.S. Mortgage Market,” NBER Working Paper No. 21007, March 2015, and forthcoming in *American Economic Review*.

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### Lisa Jordan Elected to NBER Board of Directors



Jordan

At its September 2016 meeting, the NBER Board of Directors elected Dr. Lisa Jordan to a five-year membership term as an at-large director. Jordan is director of education and membership development for the United Steelworkers of America. She and her staff create and coordinate the union's education program throughout North America and in the United Kingdom.

Jordan is engaged in a range of applied economic research. Her primary areas of interest are labor eco-

nomics, industrial relations, and race and gender economics. She currently serves as an adviser to the AFL-CIO's Commission on Race and is a past board member of the Labor and Employment Relations Association.

Jordan graduated from the University of Notre Dame with a Ph.D. in labor economics. She served as a labor educator and assistant professor at the University of Illinois and at the University of Minnesota before becoming the director of the School of Business at Brevard College.

### 39th Annual NBER Summer Institute

The NBER hosted its 39th annual Summer Institute during a three-week period in July 2016. There were 2,763 registered participants, taking part in 54 distinct meetings led by 124 organizers. About one in five participants — 554 researchers — were attending their first Summer Institute. There were 169 graduate student participants. Two thirds of the participants were not NBER affiliates.

Caroline Hoxby, who is the Scott and Donya Bommer Professor of Economics at Stanford University and the director of the NBER's Education Program, delivered the 2016 Martin Feldstein Lecture on "The Dramatic Economics of the U.S. Market for Higher Education." Her talk described the heterogeneity in the cost of delivering undergraduate education at different institutions, the differences in student test scores across schools, and the correlation between educational resources and student scores. Her analysis suggested that for a broad range of selective colleges and universities, the marginal productivity of additional resources devoted to undergraduate education is sim-

ilar. An edited text of the lecture appears earlier in this issue of *The NBER Reporter*.

A panel discussion on the Brexit vote in the United Kingdom and its implications for global financial markets and economic growth drew a large turnout and provided participants with new insights on the consequences of this important change in international economic relations.

A group of five researchers — Al Roth of Stanford, Parag A. Pathak of MIT, Atila Abdulkadiroglu of Duke University, Nikhil Agarwal of MIT, and Itai Ashlagi of Stanford — presented the 2016 Methods Lectures on "The Theory and Practice of Market Design." They described the deferred acceptance algorithm that is widely used in designing rules for matching markets and explained how a number of such markets operate in practice.

All of the presentations — the Feldstein Lecture, the Brexit Panel, and the Methods Lectures — have been videotaped and can be accessed on the NBER website under the NBER Videos tab on the left side of [the homepage](#).

## Jonathan Skinner Is New Director of Economics of Aging Program



Skinner

Jonathan Skinner, the James O. Freedman Presidential Professor of Economics at Dartmouth College and a professor of family and community medicine at the Geisel School of Medicine, is the new director of the Economics of Aging Program. A member of the Institute of Medicine and an NBER research associate since 1989, Skinner is one of the most active and influential researchers in the fields of health economics and the economics of aging.

Skinner received his B.A. from the University of Rochester and his Ph.D. from UCLA. He was a faculty member at the University of Virginia for 14 years before joining the Dartmouth faculty in 1995.

Skinner's research spans the many different topics that come together in the Economics of Aging

Program: health status, saving behavior, the role of the public and private sectors in providing old age security, the operation of insurance markets, and intergenerational linkages that affect older households. Skinner chairs the American Economic Association's Committee on Government Relations, is on the steering committee of the Health and Retirement Study, and has been a member of the editorial boards of journals in both economics and medicine.

He is well known for his work on precautionary saving and social insurance, and for his contributions to the "Dartmouth Atlas" research program on the explanation of regional variations in health care costs in the United States.

## Catherine Wolfram Is New Director of Environment and Energy Economics Program



Wolfram

Catherine Wolfram, the Cora Jane Flood Professor of Business Administration at the University of California, Berkeley, Haas School of Business, is now director of the Environment and Energy Economics Program. A member of the Berkeley faculty since 2000, Wolfram received her A.B. from Harvard and her Ph.D. from MIT. She was an assistant professor at Harvard for several years before moving to Berkeley.

An NBER research associate since 2006, she has been a member of the Environment and Energy Economics Program steering committee

since its inception.

Wolfram's research interests span a range of energy and environment topics. She has studied electricity markets, climate policy, U.S. air pollution regulations, and energy demand in the developing world. A faculty director of Berkeley's Energy Institute at Haas, she is also the principal investigator on several large grants, including one from the Alfred P. Sloan Foundation to support research on energy efficiency and one from the U.K.'s Department for International Development to fund research on energy in the developing world.

## China Working Group Director Shang-Jin Wei Returns



Wei

After spending over two years based in Manila as chief economist of the Asian Development Bank, Shang-Jin Wei has returned to Columbia University and resumed his role as director of the NBER's China Working Group. While Wei was on leave, Hanming Fang of the University of Pennsylvania served as interim director and provided outstanding leadership.

Wei is the N.T. Wang Professor of Chinese Business and Economy and professor of finance and economics at the Columbia Graduate School of Business. He is a research associate in the NBER's Development Economics, International Finance and Macroeconomics, and International Trade and Investment programs.

## Liran Einav Is New Director of Industrial Organization Program



Einav

Liran Einav is a professor of economics at Stanford, where he has taught since 2002. He received his B.A. from Tel Aviv University and his Ph.D. from Harvard.

An NBER research associate since 2008, he has been a co-director of the Bureau's Working Group on Insurance Economics since 2012.

Einav has made important contributions to a range of topics in industrial organization and applied microeconomics more generally, including the role of competition and imperfect information in consumer

credit and health insurance markets. He has developed empirical models of both insurance demand and insurance pricing, and explored the implications of both adverse selection and moral hazard. He has also studied the economics of online markets, such as peer-to-peer internet markets, and the economic performance of the motion picture industry.

He is widely sought-after for his editorial expertise: In June 2017 he will complete a term as co-editor of *Econometrica*, and he will become a co-editor of the *American Economic Review* in 2018.

## Ben Handel and Motohiro Yogo Are New CoDirectors of Insurance Working Group



Handel

Benjamin Handel, an associate professor of economics at the University of California, Berkeley, and Motohiro Yogo, a professor of economics at Princeton, have become co-directors of the Insurance Working Group.

Handel, who has taught at Berkeley since 2010, received his A.B. from Princeton and his Ph.D. from Northwestern. He was named an NBER faculty research fellow in industrial organization in 2011 and became a research associate in 2016.



Yogo

Yogo received his A.B. from Princeton in 2000 and his Ph.D. from Harvard in 2004. He became a junior faculty member at the Wharton School at the University of Pennsylvania and, after a period as a research economist at the Federal Reserve Bank of Minneapolis, joined the Princeton faculty in 2015. Yogo was an NBER faculty research fellow from 2006

until 2011 and has been a research associate since 2015.

Handel's work is primarily concerned with the economic analysis of health insurance markets. He has studied the role of adverse selection, the nature of competition between insurance providers, and the role of behavioral economics in explaining insurance plan choice. His 2015 *Econometrica* paper with Igal Hendel and Michael Whinston on "Equilibria in Health Exchanges" was awarded the Econometric Society's Frisch Medal. Handel is a recent recipient of an NSF CAREER Award.

Yogo's research focuses on insurance markets, financial economics, and econometrics. He has been particularly interested in how regulatory policy affects insurance companies and in the supply of and demand for insurance products.

## Stephen Redding Is New Director of International Trade and Investment Program



Redding

Stephen Redding is the Harold T. Shapiro '64 Professor of Economics in the department of economics and the Woodrow Wilson School of Public and International Affairs at Princeton University, where he has taught since 2010. He was a member of the faculty at the London School of Economics and at Yale University before moving to Princeton.

Redding received his undergraduate and graduate training at Oxford University and was a research economist at the Bank of England before beginning his aca-

demic career. He is an associate editor of *Econometrica*.

Redding has been an active member of the International Trade and Investment Program since his appointment as an NBER research associate in 2011. He has made important research contributions to a wide range of questions in international trade, economic geography, and growth and productivity analysis. His work spans traditional questions in international trade as well as emerging issues in spatial economics.



## Jeffrey Brown, Courtney Coile, and James Choi Lead Retirement Research Center



Brown



Choi



Coile



Liebman

Jeffrey Brown, the Josef and Margot Lakonishok Professor and dean of the business school at the University of Illinois, Urbana-Champaign, is the new director of the NBER Retirement Research Center. Brown's work has touched on many issues related to retirement security, saving, and the provision of lifetime income.

Assistant directors of the center are James Choi, professor of finance at Yale University's School of Management, and Courtney Coile, the professor of economics and director of the Knapp Social

Science Center at Wellesley College. Choi has done pioneering work on how defaults and other plan design features affect retirement saving. Coile has made important contributions to understanding the interplay between labor market conditions, Social Security, and retirement well-being. She is the editor of *The NBER Bulletin on Aging and Health*.

Jeffrey Liebman, the Malcolm Wiener Professor of Public Policy at the Harvard Kennedy School, is senior adviser to the Center. He previously served as associate director.

## David Autor and Nicole Maestas Lead Disability Research Center



Autor



Maestas

David Autor, the Ford Professor of Economics and associate economics department head at MIT, is the new director of the NBER Disability Research Center. Autor has written seminal papers on disability policy and previously served as the associate director of the Center. Nicole Maestas,

associate professor of health care policy at Harvard Medical School, is now associate director. She previously was a senior economist at the RAND Corporation, and has done important work on labor market effects of disability insurance. Jeffrey Liebman is senior adviser to the Center.

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## Conferences

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### Trans-Atlantic Public Economics Seminar on Social Insurance

The NBER's bi-annual Trans-Atlantic Public Economics Seminar met in Mannheim, Germany, on June 13–15. The meeting was organized by Research Associate Roger Gordon of the University of California, San Diego, Andreas Peichl of the University of Mannheim, and NBER President James Poterba of MIT. These researchers' papers were presented and discussed:

- **Anna Raute**, University of Mannheim, “Can Financial Incentives Reduce the Baby Gap? Evidence from a Reform in Maternity Leave Benefits”
- **Itzik Fadlon**, University of California, San Diego, and NBER, and **Torben Heien Nielsen**, University of Copenhagen, “Household Labor Supply Responses to Severe Health Shocks and the Gains from Social Insurance”
- **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”
- **Mathias Dolls**, **Philipp Doerrenberg**, **Andreas Peichl**, and **Holger Stichnoth**, ZEW (Mannheim), “Labor Market and Savings Responses to Pension Reforms — Quasi-Experimental Evidence from Germany”
- **Stuart Adam**, **David Phillips**, and **Barra Roantree**, Institute for Fiscal Studies (London), “35 Years of Reforms: A Panel Analysis of the Incidence of, and Employee and Employer Responses to, Social Security Contributions in the U.K.”
- **Bruce D. Meyer**, University of Chicago and NBER, and **Wallace K.C. Mok**, Chinese University of Hong Kong, “Disability, Earnings, Income, and Consumption” (NBER Working Paper No. [18869](#))
- **Liran Einav**, Stanford University and NBER; **Amy Finkelstein**, MIT and NBER; and **Paul Schrimpf**, University of British Columbia, “Bunching at the Kink: Implications for Spending Responses to Health Insurance Contracts” (NBER Working Paper No. [22369](#))
- **Jeffrey Clemens** and **Michael Wither**, University of California, San Diego, “Is Tinkering with Safety Net Programs Harmful to Beneficiaries? Evidence from the Medicaid Notch and the Minimum Wage”
- **Torben Fischer**, **Markus Frölich**, and **Andreas Landmann**, University of Mannheim, “Adverse Selection in Micro-Health Insurance Markets: Evidence from a Randomized Control Trial in Pakistan”
- **Andreas Lichter**, IZA Institute for the Study of Labor (Bonn), “Benefit Duration and Job Search Effort: Evidence from a Natural Experiment”
- **Thomas Le Barbanchon**, Bocconi University (Milan), “Optimal Partial Unemployment Insurance: Evidence from Bunching in the U.S.”
- **Ioana Marinescu**, University of Chicago and NBER, “The General Equilibrium Impacts of Unemployment Insurance: Evidence from a Large Online Job Board” (NBER Working Paper No. [22447](#))

Summaries of these papers are at: <http://www.nber.org/confer/2016/TAPES16/summary.html>

## East Asian Seminar on Economics

The NBER, the Australian National University, the Peking University China Center for Economic Research, the Chung-Hua Institution for Economic Research (Taipei), the Hong Kong University of Science and Technology, the Korea Development Institute, the National University of Singapore, the Tokyo Center for Economic Research, and Tsinghua University (Beijing) jointly sponsored the NBER's 27th Annual East Asian Seminar on Economics. It took place in Singapore on June 23–24. Research Associates Takatoshi Ito of Columbia University and Andrew K. Rose of the University of California, Berkeley, organized the conference. These researchers' papers were presented and discussed:

- **Benjamin J. Keys** and **Amit Seru**, University of Chicago and NBER; **Tomasz Piskorski**, Columbia University and NBER; and **Vincent Yao**, Georgia State University, “Mortgage Rates, Household Balance Sheets, and the Real Economy” (NBER Working Paper No. [20561](#))
- **Mathias Hoffmann**, University of Zurich, and **Iryna S. Stewen**, University of Mainz, “Holes in the Dike: The Global Savings Glut, U.S. House Prices and the Long Shadow of Banking Deregulation”
- **Sumit Agarwal**, Georgetown University, and **Cristian Badarinza** and **Wenlan Qian**, National University of Singapore, “The Effectiveness of Housing Collateral Tightening Policy”
- **Sumit Agarwal**; **Gene Amromin**, Federal Reserve Bank of Chicago; **Souphala Chomsisengphet**, Office of the Comptroller of the Currency; **Tomasz Piskorski**; **Amit Seru**; and **Vincent Yao**, “Mortgage Refinancing, Consumer Spending, and Competition: Evidence from the Home Affordable Refinancing Program” (NBER Working Paper No. [21512](#))
- **Sumit Agarwal**; **Changcheng Song**, National University of Singapore; and **Vincent Yao**, “Banking Competition and Shrouded Attributes: Evidence from the U.S. Mortgage Market”
- **Brent Ambrose** and **Jiro Yoshida**, Pennsylvania State University, and **N. Edward Coulson**, University of Nevada, Las Vegas, “Inflation Rates Are Very Different When Housing Rents Are Accurately Measured”
- **Hanming Fang**, University of Pennsylvania and NBER; **You Suk Kim**, Federal Reserve Board; and **Wenli Li**, Federal Reserve Bank of Philadelphia, “The Dynamics of Adjustable-Rate Subprime Mortgage Default: A Structural Estimation” (NBER Working Paper No. [21810](#))
- **Daisuke Miyakawa** and **Ichiro Uesugi**, Hitotsubashi University (Tokyo), and **Chihiro Shimizu**, National University of Singapore, “Geography and Realty Prices: Evidence from International Transaction-Level Data”
- **Peter Chinloy**, American University, and **Man Cho** and **Inho Song**, Korea Development Institute, “The Asset Price of a House”
- **Bo Zhao**, Peking University (Beijing), “Too Poor to Retire? Housing Prices and Retirement”
- **Wen-Chieh Wu**, National Chengchi University (Taipei), and **Yu-Chun Ma** and **Jiann-Chyuan Wang**, Chung-Hua Institution for Economic Research (Taipei), “Childhood Housing Environment and Young Adulthood Health Status”

Summaries of these papers are at: <http://www.nber.org/confer/2016/EASE16/summary.html>



# International Seminar on Macroeconomics

The NBER's 39th International Seminar on Macroeconomics took place in Sofia, Bulgaria on June 24–25. The seminar was organized by Research Associates Richard H. Clarida of Columbia University, Jeffrey Frankel of Harvard University, and Hélène Rey and Lucrezia Reichlin of London Business School. These researchers' papers were presented and discussed:

- **Enrique Alberola**, Bank for International Settlements, and **Gianluca Benigno**, London School of Economics, “Revisiting the Commodity Curse: A Financial Perspective”
- **Yusuf Soner Baskaya** and **Mehmet Fatih Ulu**, Central Bank of the Republic of Turkey; **Julian di Giovanni** and **José-Luis Peydró**, Pompeu Fabra University (Barcelona); and **Şebnem Kalemli-Özcam**, University of Maryland and NBER, “International Spillovers and Local Credit Cycles”
- **Luca Dedola** and **Livio Stracca**, European Central Bank, and **Giulia Rivolta**, University of Brescia, “If the Fed Sneezes, Who Catches a Cold?”
- **Vania Stavrakeva**, London Business School, “Optimal Capital Flows in a Model with Financial Frictions and Imperfectly Competitive Banking Sector”
- **Luis Céspedes**, Adolfo Ibáñez University (Chile); **Roberto Chang**, Rutgers University and NBER; and **Andrés Velasco**, Columbia University and NBER, “Financial Intermediation, Exchange Rates, and Unconventional Policy in an Open Economy” (NBER Working Paper No. [18431](#))
- **Kathryn Holston** and **Thomas Laubach**, Federal Reserve Board, and **John Williams**, Federal Reserve Bank of San Francisco, “Measuring the Natural Rate of Interest: International Trends and Determinants”
- **Andrés Fernández**, Inter-American Development Bank, and **Stephanie Schmitt-Grohé** and **Martín Uribe**, Columbia University and NBER, “World Shocks, World Prices, and Business Cycles: An Empirical Investigation”
- **Karen K. Lewis**, University of Pennsylvania and NBER, and **Edith Liu**, Federal Reserve Board, “Disaster Risk and Asset Returns: An International Perspective”

Summaries of these papers are at: <http://www.nber.org/confer/2016/ISOM16/summary.html>

# The Economics of Asset Accumulation and Poverty Traps

An NBER conference, “The Economics of Asset Accumulation and Poverty Traps,” took place in Washington, D.C., on June 28–29. The meeting was organized by Christopher B. Barrett of Cornell University, Research Associate Michael Carter of the University of California, Davis, and NBERR Board Member Jean-Paul Chavas of the University of Wisconsin-Madison. These researchers’ papers were presented and discussed:

- **Duncan Thomas** and **Elizabeth Frankenberg**, Duke University and NBER, “Shocks and Nutrition, Health, and Human Capital”
- **Emma Boswell Dean** and **Heather Schofield**, University of Pennsylvania, and **Frank Schilbach**, MIT and NBER, “Poverty and Cognitive Function”
- **Jonathan de Quidt**, Institute for International Economic Studies (Stockholm), and **Johannes Haushofer**, Princeton University, “Depression for Economists”

- **Travis Lybbert**, University of California, Davis, and **Bruce Wydick**, University of San Francisco, “Poverty, Aspirations, and the Economics of Hope: A Framework for Study with Preliminary Results from the Oaxaca Hope Project”
- **Francisco J. Buera**, Federal Reserve Bank of Chicago; **Joseph P. Kaboski**, University of Notre Dame and NBER; and **Yongseok Shin**, Washington University in St. Louis and NBER, “Taking Stock of the Evidence on Micro-Financial Interventions” (NBER Working Paper No. [22674](#))
- **Michael Carter**; **Munenobu Ikegami**, International Livestock Research Institute (Nairobi); and **Christopher B. Barrett**, “Poverty Traps and the Social Protection Paradox”
- **Paulo Santos**, Monash University (Melbourne), and **Christopher B. Barrett**, “Heterogeneous Wealth Dynamics: On the Roles of Risk and Ability” (NBER Working Paper No. [22626](#))
- **Jean-Paul Chavas**, “Agro-Ecosystem Productivity and the Dynamic Response to Shocks” (NBER Working Paper No. [22624](#))
- **Karen Macours**, Paris School of Economics, and **Renos Vakis**, The World Bank, “Medium-Term Impacts of a Productive Safety Net on Aspirations and Human Capital Investments”
- **Norbert Schady**, **Caridade Araujo**, and **Mariano Bosch**, Inter-American Development Bank, “Cash Transfers and Poverty Traps: A Tale of Two Generations”
- **Oriana Bandiera**, **Robin Burgess**, and **Munshi Sulaiman**, London School of Economics; **Narayan Das**, BRAC University (Bangladesh); **Selim Gulesci**, Bocconi University (Milan); and **Imran Rasul**, University College London, “Labor Markets and Poverty in Village Economies”

Summaries of these papers are at: <http://www.nber.org/confer/2016/PTs16/summary.html>

## Japan Project

The NBER held a meeting on the Japanese economy in Tokyo on August 1. The seminar was organized by Shiro Armstrong of the Australian National University, Research Associate Charles Horioka of the Asian Growth Research Institute (Kitakyushu), Research Associate Takeo Hoshi of Stanford University, Tsutomu Watanabe of the University of Tokyo, and Research Associate David Weinstein of Columbia University. These researchers’ papers were presented and discussed:

- **Robert Dekle**, University of Southern California; **Atsushi Kawakami**, Teikyo University (Tokyo); **Nobuhiro Kiyotaki**, Princeton University and NBER; and **Tsutomu Miyagawa**, Gakushuin University (Tokyo), “Product Dynamics and Aggregate Shocks: Evidence from Japanese Product and Firm Level Data”
- **David Cashin**, Federal Reserve Board, and **Takashi Unayama**, Hitotsubashi University (Tokyo), “The Impact of a Permanent Income Shock on Consumption: Evidence from Japan’s 2014 VAT Increase”
- **Jess Diamond**, Hitotsubashi University (Tokyo), and **Kota Watanabe** and **Tsutomu Watanabe**, University of Tokyo, “The Formation of Consumer Inflation Expectations: Evidence from Japan’s Deflation Experience”
- **Mark Koyama**, George Mason University; **Chiaki Moriguchi**, Hitotsubashi University (Tokyo); and **Tuan-Hwee Sng**, National University of Singapore, “Geopolitics and Asia’s Little Divergence: A Comparative Analysis of State Building in China and Japan After 1850”

- **Gauti Eggertsson**, Brown University and NBER; **Neil Mehrotra** and **Sanjay Singh**, Brown University; and **Lawrence Summers**, Harvard University and NBER, “A Contagious Malady? Open Economy Dimensions of Secular Stagnation” (NBER Working Paper No. [22299](#))
- **Hiroshi Fujiki**, Chuo University (Tokyo), and **Hajime Tomura**, Waseda University (Tokyo), “Fiscal Cost to Exit Quantitative Easing: The Case of Japan”

Summaries of these papers are at: <http://www.nber.org/confer/2016/JPMs16/summary.html>

## Economics of Commodity Markets

The NBER, supported by the Bank of Canada, held its annual Universities Research Conference, “The Economics of Commodity Markets,” in Cambridge on September 16–17. Jing Yang of the Bank of Canada and Research Associates Kenneth Singleton of Stanford University and Wei Xiong of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Farid Farrokhi**, Purdue University, “Global Sourcing in Oil Markets”
- **Frank Wolak**, Stanford University and NBER, “Assessing the Impact of the Diffusion of Shale Oil and Gas Technology on the Global Coal Market”
- **Martijn Boons** and **Melissa Porras Prado**, Nova School of Business and Economics (Lisbon), “Basis-Momentum in the Futures Curve and Volatility Risk”
- **Ignacia Mercadal**, University of Chicago, “Dynamic Competition and Arbitrage in Electricity Markets: The Role of Financial Players”
- **Reinhard Ellwanger**, Bank of Canada, “Driven by Fear? The Tail Risk Premium in the Crude Oil Futures Market”
- **Daniele Bianchi**, University of Warwick, and **Jacopo Piana**, Cass Business School (London), “Expected Spot Prices and the Dynamics of Commodity Risk Premia”
- **Steffen Hitzemann**, Ohio State University, “Macroeconomic Fluctuations, Oil Supply Shocks, and Equilibrium Oil Futures Prices”
- **Michael Brandt**, Duke University and NBER, and **Lin Gao**, University of Luxembourg, “Macro Fundamentals or Geopolitical Events? A Textual Analysis of News Events for Crude Oil”
- **Jorge Fornero** and **Markus Kirchner**, Central Bank of Chile, “Learning About Commodity Cycles and Saving-Investment Dynamics in a Commodity-Exporting Economy”
- **Niko Jaakkola**, Ifo Institute for Economic Research (Munich); **Daniel Spiro**, University of Oslo; and **Arthur van Benthem**, University of Pennsylvania and NBER, “Finders, Keepers?” (NBER Working Paper No. [22421](#))

Summaries of these papers are at: <http://www.nber.org/confer/2016/CEMf16/summary.html>



## Energy Policy Tradeoffs between Economic Efficiency and Distributional Equity

An NBER conference, “Energy Policy Tradeoffs between Economic Efficiency and Distributional Equity,” took place in Durham, North Carolina, on September 16–17. Faculty Research Fellow Tatyana Deryugina and Research Associate Don Fullerton, both of the University of Illinois at Urbana-Champaign, and Research Associate William A. Pizer of Duke University organized the meeting. These researchers’ papers were presented and discussed:

- **Chris Bruegge**, Stanford University; **Tatyana Deryugina**; and **Erica Myers**, University of Illinois at Urbana-Champaign, “The Distributional Effects of Building Codes”
- **Sébastien Houde**, University of Maryland, and **Joseph Aldy**, Harvard University and NBER, “Efficiency and Distributional Consequences of Heterogeneous Behavioral Responses to Energy Fiscal Policies”
- **Mar Reguant**, Northwestern University and NBER, “The Distributional Impacts of Large-Scale Renewable Policies”
- **Lucas Davis**, University of California, Berkeley, and NBER, and **Christopher Knittel**, MIT and NBER, “Are Fuel Economy Standards Regressive?”
- **Stephen Holland**, University of North Carolina at Greensboro and NBER; **Erin Mansur**, Dartmouth College and NBER; **Nicholas Muller**, Middlebury College and NBER; and **Andrew Yates**, University of North Carolina at Chapel Hill, “Distributional Effects of Air Pollution from Electric Vehicle Adoption”
- **Arik Levinson**, Georgetown University and NBER, “Are Energy Efficiency Standards Less Regressive Than Energy Taxes?”
- **Julie Anne Cronin**, U.S. Treasury Department; **Don Fullerton**; and **Steven Sexton**, Duke University, “Carbon Tax Rebates and Redistribution”
- **Carolyn Fischer**, Resources for the Future, and **William A. Pizer**, “Equity versus Efficiency in Energy Regulation”

Summaries of these papers are at: <http://www.nber.org/confer/2016/EPTf16/summary.html>

## Tax Policy and the Economy

An NBER conference, “Tax Policy and the Economy,” took place in Washington, D.C., on September 22. Research Associate Robert Moffitt of Johns Hopkins University organized the meeting. These researchers’ papers were presented and discussed:

- **Alan J. Auerbach**, University of California, Berkeley, and NBER; **Laurence J. Kotlikoff**, Boston University and NBER; **Darryl R. Koehler**, Economic Security Planning; and **Manni Yu**, Boston University, “Is Uncle Sam Inducing the Elderly to Retire?”
- **Gizem Kosar**, Federal Reserve Bank of New York, and **Robert Moffitt**, “Trends in Cumulative Marginal Tax Rates Facing Low-Income Families, 1997–2007”
- **Emmanuel Saez**, University of California, Berkeley, and NBER, “Taxing the Rich More: Preliminary Evidence from the 2013 Tax Increase”

- **Louis Kaplow**, Harvard University and NBER, “A Distribution-Neutral Perspective on Tax Expenditure Limitations”
- **Conor J. Clarke**, Yale University, and **Wojciech Kopczuk**, Columbia University and NBER, “Business Income and Business Taxation in the United States since the 1950s”

Summaries of these papers are at: <http://www.nber.org/confer/2016/TPE16/summary.html>

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## Program and Working Group Meetings

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### Economic Fluctuations and Growth

The NBER’s Program on Economic Fluctuations and Growth met in Cambridge on July 16. Research Associates Fernando Alvarez of the University of Chicago and Emi Nakamura of Columbia University organized the meeting. These researchers’ papers were presented and discussed:

- **Anmol Bhandari**, University of Minnesota; **David Evans**, University of Oregon; **Mikhail Golosov**, Princeton University and NBER; and **Thomas Sargent**, New York University and NBER, “Fiscal Policy and Debt Management with Incomplete Markets”
- **Gabriel Chodorow-Reich**, Harvard University and NBER, and **Loukas Karabarbounis**, Federal Reserve Bank of Minneapolis and NBER, “The Limited Macroeconomic Effects of Unemployment Benefit Extensions” (NBER Working Paper No. [22163](#))
- **Lorenz Kueng**, Northwestern University and NBER, “Explaining Consumption Excess Sensitivity with Near-Rationality: Evidence from Large Predetermined Payments” (NBER Working Paper No. [21772](#))
- **Greg Kaplan**, University of Chicago and NBER; **Kurt Mitman**, Institute for International Economic Studies (Stockholm); and **Giovanni Violante**, New York University and NBER, “Consumption and House Prices in the Great Recession”
- **Xavier Gabaix**, New York University and NBER, “Behavioral Macroeconomics via Sparse Dynamic Programming” (NBER Working Paper No. [21848](#))
- **Sydney Ludvigson**, New York University and NBER; **Sai Ma**, New York University; and **Serena Ng**, Columbia University and NBER, “Uncertainty and Business Cycles: Exogenous Impulse or Endogenous Response?” (NBER Working Paper No. [21803](#))

Summaries of these papers are at: <http://www.nber.org/confer/2016/EFGs16/summary.html>

### African Successes

**Volume I: Government and Institutions**

**Volume III: Modernization and Development**

Sebastian Edwards, Simon Johnson, and David N. Weil, editors  
The University of Chicago Press, 2016  
\$110.00 each (cloth)

Studies of African economic development frequently focus on the daunting challenges the continent faces. From recurrent crises to ethnic conflicts and long-standing corruption, a raft of deep-rooted problems has led many to regard the continent as facing many hurdles to raising living standards.

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