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Program Report

Development Economics Program

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Identifying what actually works to reduce poverty and improve population well-being is a key challenge in development economics. When something is thought to work, the next challenge is determining why it works and the conditions under which it works; that is, assessing the extent to which conclusions are generalizable. These are key research themes in the Development Economics Program.

One exciting source of new results on these questions arises from a multifaceted, focused initiative known as the "Graduation" Program. This program, developed by BRAC, a large NGO formerly known as the Bangladesh Rural Advancement Committee, was designed to provide the poorest people with a sustainable pathway out of extreme poverty. The program provides resources to address participants' immediate needs and longer-term investments, with the goal of building sustainable livelihoods. The Graduation Program has three central planks designed to provide a holistic set of resources and services to increase the productivity of the ultra-poor: a grant to acquire productive assets, access to a savings account, and two years of training and support, including life skills coaching.[1]

To investigate how well the program works, Abhijit Banerjee, Esther Duflo, Nathanael Goldberg, Dean Karlan, Robert Osei, William Parienté, Jeremy Shapiro, Bram Thuysbaert, and Christopher R. Udry conducted an ambitious set of coordinated randomized controlled trials (RCTs) in villages in Ethiopia, Ghana, Honduras, India, Pakistan, and Peru. They identified the poorest households in each study village and randomly offered about half of them the BRAC program, with the other households serving as controls. The program was a stunning success, as measured by a very large and broad set of markers of well-being.

At the end of the intervention, which lasted two years, relative

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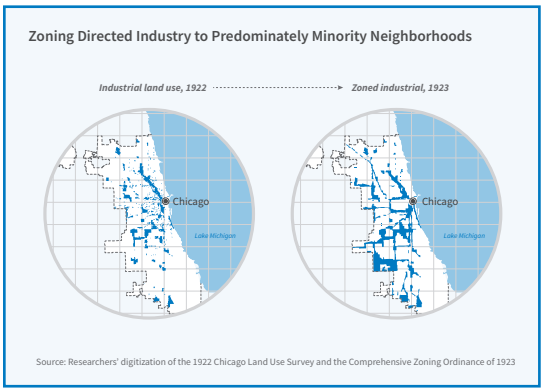

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to controls, Graduation Program households reported higher levels of per capita consumption, more income, greater savings, more assets and improved mental health. Effects were not only large and statistically significant, but also long-lived, persisting for at least a year after the intervention ended in all the study settings[2] and in India for at least another four years.[3]

Figure 1 illustrates estimates of the magnitude of some of the average standardized treatment effects two years after the start of the program in the six countries. Based on this evidence, many countries are currently experimenting with this type of multifaceted package as they endeavor to reduce persistent poverty.

New Thinking about Poverty Alleviation Strategies

The study clearly establishes that the Graduation Program has transformed the lives of the poorest not just in one small area but across vastly different settings over three continents. This is important because many of the most promising anti-poverty programs that have documented successful poverty reduction in some contexts have not been successful in other settings.

Microcredit is one example of an anti-poverty strategy that has been extensively analyzed. In 2006, the Nobel Peace Prize was awarded to Muhammad Yunus and Grameen Bank for leading the microcredit revolution that brought small loans first to the poor in Bangladesh, and then to the poor more broadly. Microloans, which are made mostly to women, involve some form of group liability and report excellent repayment rates. The number of people who have received the loans has grown rapidly and microfinance for a time was heralded as the magic bullet that would end poverty as we know it. However, results from rigorous studies investigating the impacts of microcredit have not been encouraging. Duflo, Banerjee, Rachel Glennerster, and Cynthia Kinnan conducted a randomized evaluation of the impact of a microfinance firm entering markets in Hyderabad, India, and found that, while loans were made and recipients invested in their new businesses, the effects were transitory, with no discernible improvements in consumption or well-being for any but a small fraction of recipients at the top of the income distribution.[4]

Non-experimental studies have drawn similar conclusions. This includes research that has taken a structural approach to modelling credit constraints, income uncertainty, and lumpy investments, exploiting quasi-experimental variation in microcredit programs in Southeast Asia. Overall, estimated impacts of microcredit have been mixed, at best, and the outcomes that are affected vary substantially across studies and contexts. Francisco Buera, Joseph Kaboski, and Yongseok Shin summarize the evidence on microcredit as indicating that, while it can help segments of the population increase both income and consumption, there is little reason to believe that it has had a transformative impact on the lives of the poorest.[5]

It is possible that microcredit loans are too small and too short-term to have a sustained impact on the lives of the recipients. This was investigated in a clever RCT conducted in rural Mali by Lori Beaman, Karlan, Thuysbaert, and Udry that provided capital to farmers at the beginning of the planting season to be repaid as a lump sum after the harvest.[6] About half the study villages were assigned to participate in a loan program. Women in those villages were able to form associations and apply for loans. After all loan decisions had been made, a random sub-sample of the women living in the same villages who did not borrow were given cash grants. In the other villages, randomly selected households were given a cash grant — the first plank of the Graduation Program. Those who received cash grants significantly increased investments and net revenue on their farms. In contrast, in the villages where loans were available, the farmers who borrowed increased their investments and revenue even more, whereas there were no significant increases among the cash grant recipients in these villages. The researchers conclude that when borrowers are self-selected, or selected by a loan officer, returns to credit are large, significant, and sustained, but when borrowers are not self-selected, average returns are effectively zero. A similar point is made

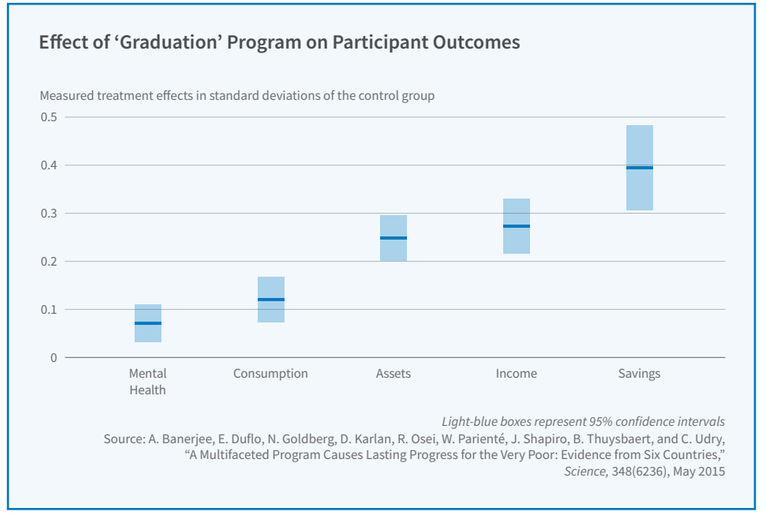

Figure 1

The Development Economics Program

The Development Economics Program, the youngest NBER program, was formed in 2012 to bring together scholars working on fundamental questions related to economic development and the behavior of individuals, families, firms, and institutions in developing countries. Program researchers undertake a wide array of studies to improve understanding of economic growth and productivity, poverty, inequality, and population well-being across the globe.

Of about 125 program members, nearly three-quarters also are affiliated with other NBER programs; Development Economics is the primary affiliation for about half the program members. This reflects both the breadth of development economics within the economics discipline and the fact that many of the central questions in development are also major questions in other areas of economics. One of the key benefits of the Development Economics Program is the unparalleled opportunity to integrate cutting-edge research across fields within economics and to develop productive cross-field collaborations that yield new insights into some of the most important issues of our day. The program has benefited from recent increases in the number of exceptionally talented young economists working in the field. About half of program affiliates received their PhD in the last 10 years.

Program initiatives are supported by an active advisory committee with a broad and changing membership. Current and past advisory committee members include Abhijit Banerjee, Esther Duflo, Andrew Foster, Penny Goldberg, Chiang-Tai Hsieh, Eliana La Ferrara, Dilip Mookherjee, Benjamin Olken, and Christopher Udry. The program has collaborated with the Bureau for Research and Economic Analysis of Development (BREAD), which was well-established when the program was launched. While NBER affiliates must have primary academic appointments in North America, BREAD includes researchers with academic and non-academic appointments globally. Joint meetings therefore provide a valuable breadth of perspectives. Every other year, the program and BREAD have held well-attended, productive joint meetings.

by Pushkar Maitra, Sandip Mitra, Dilip Mookherjee, Alberto Motta, and Sujata Visaria, who show that crop yields and income of potato farmers increased when trader-lender agents were given authority to select borrowers.[7]

An important point of this literature is that while credit is a powerful tool for poverty alleviation for a selected group of people, credit alone is not sufficient to combat widespread poverty at the population level.

Other work on microcredit highlights the importance of liquidity constraints after a shock. Emily Breza and Kinnan show that after the 2010 crackdown on microfinance in Andhra Pradesh, India, there were declines in wages and consumption.[8]

Elizabeth Frankenberg and I reported similar evidence during the Indonesian financial crisis, a large-scale, unanticipated shock, although they also note that families draw on all of their resources, including savings and even their own health and human capital, to mitigate deleterious impacts of the negative shock on the well-being of family members.[9]

Access to a savings account is the second important component of the Graduation Program. Research at the macro level has established the importance of the banking sector for growth and development, and many national and international agencies have invested substantial resources in an effort to shift people from informal savings structures into formal institutions. In a series of RCTs, Pascaline Dupas, Karlan, Jonathan Robinson, and Diego Ubfal find that expanding access to basic bank accounts to a population-representative sample of unbanked households in Uganda, Malawi, and Chile results in more deposits to accounts but has no impact on savings or incomes.[10] Similar results are reported by Simone Schaner in Kenya.[11] As Dupas and colleagues point out, other studies have found that access to basic savings accounts is associated with positive impacts on economic security, but they conclude that the majority of these results are based on analysis of samples that are selected on characteristics associated with a propensity to save, making it difficult to draw general conclusions about impacts at the population level.

This is not to say that access to reliable saving mechanisms is not important: There is abundant evidence that increasing access to formal saving institutions for those who are predisposed to use the services can have long-lasting benefits, as noted, for example, by Dupas, Anthony Keats, and Robinson,[12] as well as Karlan, Beniamino Savonitto, Thuysbaert, and Udry.[13]

The evidence on saving resembles that on the impact of providing capital to Malian farmers and credit to Indian farmers; the estimated effect of the programs depends critically on taking into account selectivity of recipients.

The third plank of the Graduation Program is training and skill development. There is a good deal of evidence that those who apply for and complete vocational training can realize positive, significant, and persistent improvements in labor market outcomes. In Colombia, Orazio Attanasio, Arlen Guarin, Carlos Medina, and Costas Meghir report long-lasting impacts for applicants randomized into vocational training. Ten years after the training program, those who received training earned 12 percent more than the controls.[14]

While effects were larger for young males relative to females in this Colombian program, other studies report the reverse. In a study in the Dominican Republic that included an intensive treatment of hard and soft skill training as well as an internship, Paloma Acevedo, Guillermo Cruces, Paul Gertler, and Sebastian Martinez found that the lives of females were transformed by the training. In contrast, for males the training raised expectations that were subsequently dashed, and there were no measurable long-term benefits.[15] In a recent study of on-the-job soft skill training of female garment workers in India, Achyuta Adhvaryu, Namrata Kala, and Anant Nyshadham report very large productivity increases among trainees — around 20 percent — with no concomitant rise in wages.[16] It is important, however, to underscore that, in all of these studies, trainees are self-selected in one way or another; evidence on the impact of non-targeted training programs is much more mixed.

The weight of the evidence, then, indicates that while each of the components of the Graduation Program can benefit specific sub-groups of the population, it is the program taken as a whole that is critical for achieving a transformative impact on the lives of the program beneficiaries. Banerjee, Karlan, Osei, Trachtman, and Udry explicitly test this hypothesis using data from Ghana designed to separately identify the impacts of the productive asset grant and the access to savings. They conclude that neither, alone, substantially improved the lives of the poorest. This is an extremely important insight that has had a major impact on thinking in the field.[17]

A different approach to reducing poverty is to provide income to households. Large-scale cash transfers, particularly conditional cash transfers, have improved population economic security and well-being. In recent work, for example, Susan Parker and Tom Vogl compare cohorts of adults who were and were not exposed to PROGRESA in Mexico during childhood. They find that the exposed cohorts are significantly better educated, more geographically mobile, perform better in the labor market, and live in more economically secure households. Economic benefits are especially large for females.[18]

Similar results are reported by Adriana Kugler and Ingrid Rojas for the same program using a different research design.[19] Universal basic income programs are being rolled out in several countries although it is too early to know what their longer-term impacts will be on the economic security and well-being of recipients. It is also unclear how such programs will impact society more broadly if they are implemented on a large scale in developing countries. Munenobu Ikegami, Michael Carter, Christopher Barrett, and Sarah Janzen develop a dynamic model of consumption and asset accumulation that includes random shocks; they conclude that state-of-the-world contingent transfers are likely to be more cost-effective than either conditional or unconditional cash transfers.[20]

Agriculture, Rural Markets, and Migration

Understanding the rural economy has been a central topic in development research, in part because many of the poorest eke out an existence working in agriculture. The vast majority of farms in developing countries are small, which, as shown in Figure 2, contrasts sharply with farms in developed countries. Andrew Foster and Mark Rosenzweig explain that, in developing countries, small farms tend to be more productive than medium-scale farms because they largely rely on family labor, eschewing purchased labor that carries high transaction costs. However, above a size threshold, there are economies of scale in capital that result in higher productivity but these economies are rarely realized in developing countries.[21] This research highlights the importance of modelling and better understanding frictions in rural markets, rather than assuming farmers behave as if rural markets are complete, an assumption that has been the mainstay of much of the literature but recently was rejected by Dan LaFave and Thomas.[22]

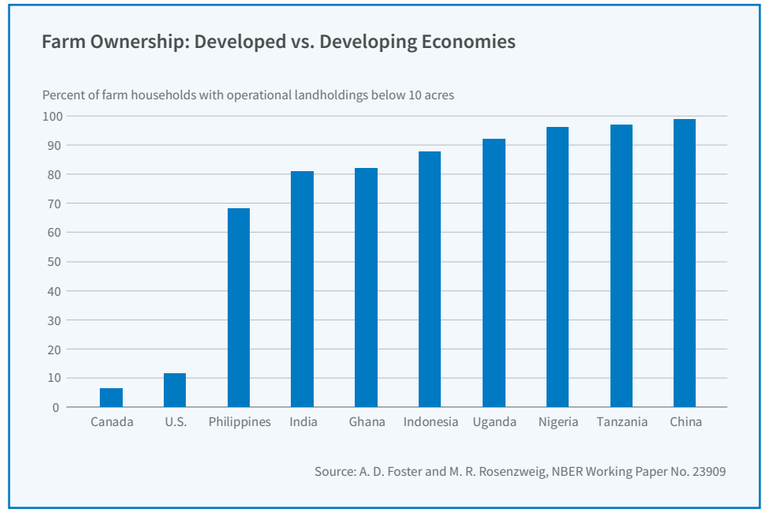

Figure 2

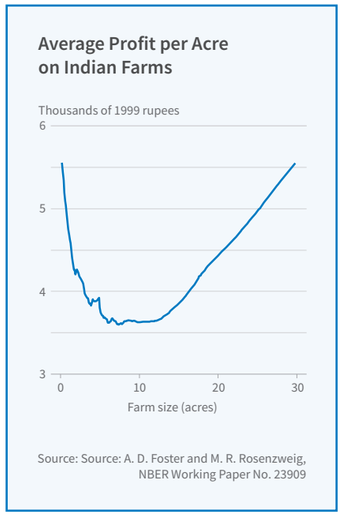

Figure 3

Indeed, studies underscore the point that several features of rural markets and some of the policies intended to help the poor in fact exacerbate poverty. For example, using data from 600 Indian districts over 50 years, Supreet Kaur establishes that nominal wages rise in response to higher than normal levels of rainfall but do not adjust downwards later, and nominal wages do not fall during droughts. She estimates that demand for the poorest rural dwellers, who are landless workers, is 9 percent lower than it would be if wages were flexible. The poor pay a heavy penalty for this wage rigidity, which apparently is sustained by beliefs on the parts of both workers and employers that nominal wage cuts are unfair and result in reduced effort.[23]

Uncertainty plays a central role in agricultural decision-making, with weather at the heart of much of that uncertainty. Uninsured weather risks are a major source of welfare loss although, as pointed out by Jing Cai, Alain de Janvry, and Elisabeth Sadoulet, weather insurance products typically face low take-up rates by farmers.[24] What are the impacts of these products? Studies have shown that when farmers buy weather-based insurance, agricultural output and labor demand are more sensitive to weather because farmers switch to riskier, higher-yield production methods. This point is made by Ahmed Mobarak and Rosenzweig, who examine the general equilibrium implications on labor market outcomes of offering insurance to both farmers and to landless laborers. When agricultural laborers are offered insurance, their labor supply responses result in wages being smoothed across weather states. When farmers who own land are offered insurance, their incomes benefit, but that insurance exacerbates the impact of weather shocks on the wages of landless laborers — the poorest of the poor — and makes them worse off than they would be in a world without insurance.[25]

In a similar vein, Rosenzweig and Udry focus on the quality of rainfall forecasts in rural India and show that weather forecasts affect farmer investment decisions, particularly in areas where forecasts are more reliable, which results both in higher profits and in more-variable profits.[26] Moreover, a forecast of good weather lowers out-migration from the farming area, which reduces wages and improves labor allocations, other things being equal. However, if the forecast turns out to be wrong, equilibrium wages are further reduced, resulting in greater volatility than would have been the case in the absence of weather forecasts.[27] The researchers conclude that improvements

in weather forecasting will benefit both farmers and landless laborers.

More generally, while migration has played an important role in mitigating spatial misallocation of factors in developing economies, large productivity gaps across sectors persist. For example, Gharad Bryan and Melanie Morten estimate that labor productivity would increase by 22 percent in Indonesia if barriers to migration were removed.[28] A long literature in development has shown that migration provides insurance. Morten estimates a structural model using panel data from India to investigate the links between migration and insurance, distinguishing informal, collective risk-sharing and self-insurance. She concludes that improving access to risk-sharing reduces temporary migration by 20 percentage points while reducing the cost of migration reduces collective risk-sharing by 8 percentage points.[29]

An innovative experimental study conducted by Mobarak established that a modest, one-time subsidy randomly assigned to some households in rural Bangladesh substantially raised outmigration rates during periods of low labor demand. These effects persist for several years, indicating important financial and non-financial barriers to migration. His work with David Lagakos and Michael Waugh investigates the welfare effects of the subsidy in a dynamic model of migration with incomplete markets. This research shows that non-financial factors play a major role in migration decisions, and that — since it is the poorest who are most likely to move when offered the subsidy — welfare gains are greatest for the poorest households.[30]

Entrepreneurship, Firms, and the Self-Employed

Turning to the non-agricultural sector, a long-standing puzzle is the "missing middle" of mid-sized firms in developing countries. Many studies have sought to understand why so many small firms in these countries do not grow. As Chang-Tai Hsieh and Benjamin Olken point out, however, it is not just mid-sized firms but also large firms that are missing. They document that, as is the case for farms in the rural sector, a very large fraction of firms in developing countries are small. However, in contrast to agriculture, small firms have low levels of productivity relative to larger firms and so the researchers conclude that it is larger firms that face binding capital or labor constraints.[31] This is consistent with some of the evidence on the limits to expansion of microenterprises. For example, Karlan, Ryan Knight, and Udry conduct an experiment in Ghana that provides financial capital (a cash grant) and managerial capital (consulting services) to microenterprises. While entrepreneurs invest the cash and take the advice, their profits decline and they revert to their prior practices.[32]

A contrasting study of Ghanaian microenterprises by Marcel Fafchamps, David McKenzie, Simon Quinn, and Christopher Woodruff finds that, in the case of females, in-kind services raise profits but cash grants have no impact, while among males both cash grants and in-kind services positively impact profits.[33] Microenterprises tend to be operated by households and, as Arielle Bernhardt, Erica Field, Rohini Pande, and Natalia Rigol point out, the failure to carefully separate the activities of husbands and wives leads to incorrect inferences about the productivity of female entrepreneurs. They conducted a randomized trial with female micro-entrepreneurs in India in which microfinance repayment constraints were relaxed by providing a grace period to the treatment group. They find that profits of household enterprises, taken together, rose substantially for the group that received the grace period. When there were multiple enterprises in the household, resources were allocated to the most profitable enterprise, which was often managed by the husband. Moreover, when the only enterprise in the household belonged to the wife, the profits of her enterprise rose. They find similar patterns in the Ghanaian data used by Fafchamps and colleagues as well as in data from an earlier Sri Lankan study and conclude that when capital is provided to a household member, household-level income gains are equivalent regardless of the recipient of the grant or loan.[34]

What are the key limiting factors that constrain the growth of small firms in developing countries? McKenzie and Woodruff conducted surveys of managerial practices in small firms in Bangladesh, Chile, Ghana, Kenya, Mexico, Nigeria, and Sri Lanka. They conclude that firm profits and productivity are higher in firms with better business practices, and that the better-educated and the children of entrepreneurs are more likely to employ these practices.[35]

Political Economy of Institutions

It is difficult to overstate the importance of institutions in development. As Duflo points out, drawing insights from economics to improve both the design and development of institutions will likely contribute to the field of implementation science and yield high returns for society.[36] Frederico Finan, Olken, and Pande emphasize this point, noting that public sector employees tend to earn more than they would in the private sector, particularly in contexts where concerns about governance quality are most severe. They point to the importance of taking into account the roles of selection, incentive structures, and monitoring of public sector workers in the design of programs and policies[37] as well as the time of recruitment and election.[38] As Duflo, Greenstone, Pande, and Nicholas Ryan document, the costs of corruption can be huge. They show that changing the incentives of third-party environmental auditors in India to reduce corruption results in plant emissions not only being reported correctly but also in substantial reductions in poisonous emissions.[39]

Leakage from public programs to local public officials is an enduring concern, particularly in very large and expensive programs. One approach to mitigating such capture is increasing transparency in program implementation. This idea has been rigorously tested and shown to be extremely effective in some very large-scale field experiments.

Indonesia's "Rice for the Poor" (Raskin) is a targeted transfer program that provides subsidized rice to over 17 million people. Collaborating with the Indonesian government, Banerjee, Hanna, Kyle, Olken, and Sudarno Sumarto provided information to eligible households in almost 400 villages about the benefits they should receive and compared the amounts they actually received with households in about 200 control villages. Beneficiaries received larger subsidies following the information campaign, with beneficiary households who were informed of the official price receiving the largest additional subsidies.[40] Moreover, they show that by opening up distribution to competition, the performance of the subsidized-rice distribution system was improved.[41]

India's National Rural Employment Guarantee Scheme (NREGS), the world's largest workfare program, is mandated to provide employment at a specified wage to all who apply to work on improving local infrastructure. Leakage of funds has been thought to be a serious problem as funds are diverted by local officials out of the program by paying ghost beneficiaries and by under-paying beneficiaries for their work. A large-scale randomized field experiment in Bihar designed and implemented by Banerjee, Rema Hanna, Jordan Kyle, Olken, and Sumarto increased transparency and accountability by shifting to electronic fund transfers and building in checks and balances. The reforms resulted in significantly lower leakage and thus lower program costs, while employment and wages of program beneficiaries did not change.[42] For the same program, Karthik Muralidharan, Paul Niehaus, and Sandip Sukhtankar showed that shifting to Smartcards, a biometrically authenticated payment system, resulted in faster and more predictable payments to beneficiaries, as well as less corruption.[43] Similarly, in India and Indonesia, Sean Lewis-Faupel, Yusuf Neggers, Olken, and Pande show that shifting public procurement procedures to an electronic platform results in improved quality of public works in both countries.[44]

These and other studies suggest that new technologies, if carefully implemented, have the potential to cut corruption and improve the performance of public programs. This is important because these programs are often designed to reduce poverty.

Conclusions

This brief summary describes some major themes in ambitious and innovative development studies that have recently been completed or are currently underway.

That this is an exciting time for development as a field is an understatement. In part, this is because of the many shared interests with other fields in economics and other disciplines. It is also because important substantive questions are being investigated both to advance science and to make a difference to global well-being. Studies creatively draw on theory in combination with a diverse array of empirical methods in a push to answer very hard questions. This has propelled investments in developing and testing ambitious research designs along with innovation in measurement and data collection. These ongoing investments augur well for continued important contributions to scientific understanding of the development process.

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The Origins of Urban Segregation in the United States

Allison Shertzer and Randall P. Walsh

Segregation by race is a central and persistent characteristic of American cities, and there is a broad consensus among economists that this spatial separation of racial groups is a key driver of socioeconomic outcomes for urban Americans. Researchers have documented that segregation contributes to poverty, adverse educational outcomes, and reduced intergenerational mobility.[1]

These findings naturally give rise to a focus on the origins of segregation. Attention has concentrated on three potential mechanisms: uncoordinated individual behavior, collective group action, and government policy, all of which have the potential to overlap and mutually reinforce one another. In this research report, we describe our work on the rise of segregation in pre-World War II American cities. We focus on the early 20th century period during which black ghettos were established or consolidated in most northern urban areas. The decades from 1900 to 1930 saw the largest increases in measured segregation of the century, as black migration from the South accelerated due to a combination of factors such as the boll weevil's devastation of Southern cotton crops and the slowdown of European immigration after World War I.

Despite the importance of this era for understanding how American cities came to be segregated, it has been the focus of very little empirical work in economics. This lack of attention stems from the absence of finely detailed spatial demographic data on cities for time periods prior to 1940. We have recently constructed such a dataset. It covers 10 major cities and was built by digitizing maps of census enumeration districts and matching them to the full-count census data from 1900, 1910, 1920, and 1930.[2] The resulting dataset gives us new opportunities to study urban population dynamics in prewar America.

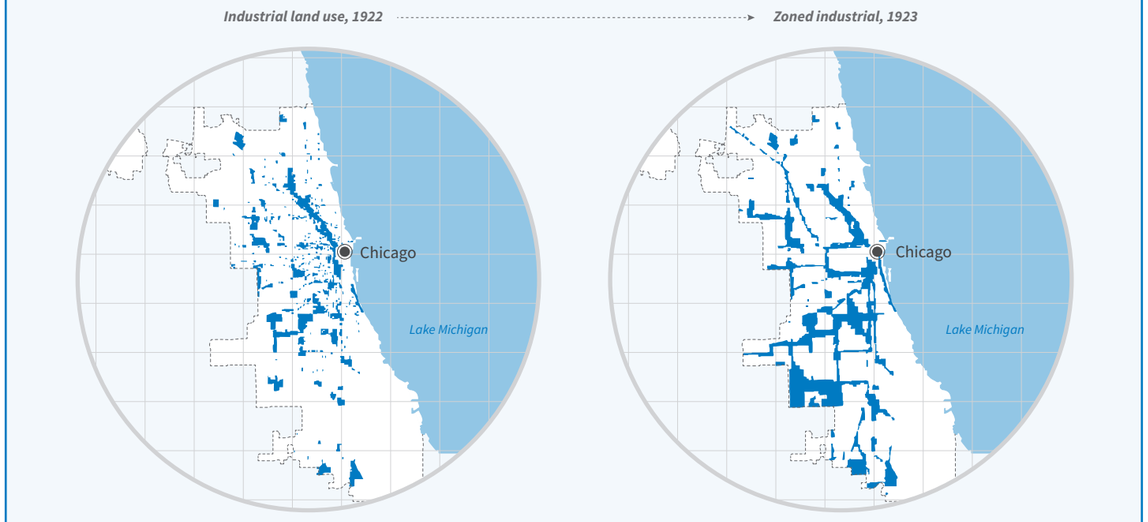
The Role of White Flight

Recent scholarship in law and history argues that the federal government played a key role in segregating American cities, for instance by "redlining" potentially integrated neighborhoods when issuing mortgage insurance policies beginning in the mid-1930s.[3] While these government actions may have been important for maintaining the color line in the postwar era, there exists little empirical support for the notion that government intervention was crucial for the initial establishment of segregated neighborhoods. Given that contemporary urban economics literature highlights how uncoordinated, intra-city household sorting across urban areas can increase segregation by race,[4] it is natural to ask: is it possible that segregation could have arisen even in the absence of discriminatory federal policies?

To answer this question, we use our new neighborhood-level dataset to quantify the extent of "white flight" from neighborhoods receiving black in-migrants.[5] Using methods from the labor economics literature to obtain exogenous variation in where black migrants settled,[6] we argue that white households departed neighborhoods in reaction to black arrivals at an accelerating rate over the 1900–30 period. Using a simple counterfactual model to assign blacks to locations that reflect differing levels of institutional barriers to settling in new neighborhoods, we argue that white flight can explain as much as 50 percent of the observed increase in segregation that occurred over the 1920s, the key prewar decade for the consolidation of the ghettos.

Our finding that sorting by whites out of neighborhoods with growing black populations was a quantitatively important phenomenon prior to the postwar opening of the suburbs is novel and calls into question the notion that the federal government was uniquely responsible for segregating America. Our results suggest that, even in the absence of effective barriers to black settlement in white neighborhoods, segregation would likely have arisen as a direct consequence of the widespread and decentralized relocation decisions of white households within an urban area. These results imply that policies that reduce barriers faced by blacks in the housing market — such as those contained in the Fair Housing Act of 1968 — may thus not prevent or reverse segregation as long as white households desire to avoid black neighbors or have concerns about the quality of public goods and amenities in neighborhoods experiencing racial turnover.

The above-cited work should not be construed as an argument that government actions have had no effect on the spatial distribution of various racial groups in American cities. For instance, recent work finds that Home Ownership Loan Corporation lending risk maps have had a long-term impact on home ownership rates and credit scores of individuals who live in neighborhoods that were unfavorably rated.[7] Urban governments also have great scope to shape where individuals of different races and incomes live. The impact of city-level policies has received comparatively less attention in the extant economics literature. To this point, we have undertaken several projects with various coauthors to assess the impacts of zoning and public transit infrastructure on the development of segregated cities.



Racial and Land Use Zoning Ordinances

The most direct way that urban governments have attempted to segregate their populations is through the adoption of explicitly racial zoning ordinances. Passed by cities between 1910 and 1917, these ordinances prohibited members of the majority racial group on a given city block from selling or renting property to members of another racial group. Walsh and coauthor Werner Troesken's work[8] suggests that prior to the adoption of these laws cities had created and sustained residential segregation through private norms and vigilante activity. Only when these private arrangements began to break down during the early 1900s did whites begin lobbying municipal governments for the passage of segregation ordinances. While these ordinances are salient indicators of racial attitudes in the early 1900s, continual court challenges reduced their direct impact on segregation. The potential efficacy of segregation ordinances was effectively ended in 1917 by the landmark Buchanan v. Warley decision, in which the United States Supreme Court struck down a racial zoning ordinance adopted by Louisville, Kentucky.

The outlawing of racial zoning ordinances meant that city governments could no longer legally enshrine the unequal treatment of neighborhoods by race. However, the potential misappropriation of purportedly race-blind "comprehensive" land use regulation is another way that zoning could have led to increased residential segregation. These ordinances, which set out allowable uses and building volumes for every block in the city, gained traction shortly after World War I. Today nearly every city in the United States has such an ordinance in force.

In joint work with Tate Twinam, we study the original zoning ordinance adopted by the city of Chicago in 1923, which was quite typical of land use regulation at the time.[9] The initial zoning ordinance was preceded in 1922 by a survey of land use at the city-block level. By digitizing this fine-scale geographic data on pre-existing land use we are able to

separate the effect of zoning from persistence in land use in our empirical work.

We find that, conditional on preexisting uses, black neighborhoods were targeted for both higher-density and industrial use zoning, compared with neighborhoods with white native-born residents. Discrimination in zoning thus survived in policies that were *de jure* race blind. In related work, we follow land use in Chicago over the 20th century and argue that zoning is far more influential than previously thought in determining the location of economic activity within cities.[10] Land use regulation could thus be a key mechanism through which local governments fostered and maintained segregation by race.

Transportation and Neighborhood Stability

Urban governments also may have facilitated separation between racial groups by investing in public transit infrastructure. The sharp increase in segregation broadly tracks the proliferation of streetcars and, later, the private automobile. As late as the 1920s, however, significant majorities of urban residents were commuting using public transit in major cities. In ongoing work, we are digitizing maps of public transit systems in major cities to investigate their impact on demographic sorting within urban areas.

We hypothesize that public transportation was critical for the acceleration of white flight because streetcars and subways significantly reduced the cost of living further away from employment centers. Household preferences for racial composition could have interacted with municipal infrastructure investments to increase residential segregation. Such a finding would further underscore the lesson that policies that were race-neutral on their face likely contributed to the development of segregated cities.

Our current work also explores the intersection of household preferences and collective action by whites to create neighborhoods populated almost entirely by African Americans, in particular the phenomenon of "blockbusting." This term was used to describe the process by which ghettos expanded in American cities. Real estate agents would select a promising area, usually adjacent to an existing black neighborhood, acquire a few properties, and rent them to African American families. The ensuing panic amongst the remaining white residents allowed realtors to buy the remaining properties at a discount and divide them into cramped apartments for additional black tenants.

To explore the housing market dynamics associated with blockbusting, we are constructing a unique panel dataset of addresses spanning the 1930s, a decade which saw significant expansions of ghettos in northern cities. Specifically, we are matching addresses from the population censuses of 1930 and 1940, the first national surveys to ask about housing prices. The resulting dataset will allow us to explore the housing price dynamics associated with racial turnover in urban neighborhoods, providing a fuller picture of the welfare implications of blockbusting and increased segregation.

Allison Shertzer is a faculty research fellow in the NBER's Development of the American Economy Program. An assistant professor of economics at the University of Pittsburgh, she received bachelor's degrees in industrial engineering and mathematics from Arizona State University in 2006 and a PhD in economics from the University of California, Los Angeles in 2011. She is a member of the boards of editors of *Explorations in Economic History* and *Historical Methods*.

Shertzer's main areas of research are cities and immigration in early 20th century America. Her work on the origins of residential segregation by race has been supported by the National Science Foundation. She has also studied how the arrival of European immigrants shaped the provision of public goods in prewar urban areas.

Shertzer traces her ancestry to mid-18th century German immigrants who settled in Pennsylvania, of which she is a ninth-generation resident. She lives in Pittsburgh with her husband and two young daughters.

Randall Walsh is a research associate in the NBER's Environment and Energy Economics Program and a professor of economics at the University of Pittsburgh. He received his bachelor's degree in economics from the University of New Hampshire in 1996 and his PhD from Duke University in 2002. He is a member of the editorial council of the *Journal of Environmental Economics and Management*.

Walsh's research focuses on issues arising at the various intersections of race, the environment, cities and politics. This work has been supported by both the National Institutes of Health and the National Science Foundation.

Walsh traces his southwestern Pennsylvania roots back to Richard "Big Dickey" Dotson, who prowled the region's woods while serving in the U.S. Army as an "Indian Spy" during the Revolutionary War. He lives in Pittsburgh with his wife and two teenage daughters.

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The Potential of Digital Currency and Blockchains

David Yermack

Digital currencies such as bitcoin and the underlying blockchain technology are among the most exciting recent innovations in finance. During 2017, surging interest in cryptocurrencies drove their total market value above $600 billion, an increase of more than 700 percent for the year, and major corporations and governments launched blockchain projects in diverse areas such as shipping and logistics, electric power distribution, and real estate title registration. Blockchain refers to a series of records, typically holding data such as financial transactions, protected by cryptographic tools and arranged sequentially, such that any attempt to change a prior entry throws off all entries after that point in the chain. This property makes blockchain ledgers resistant to tampering and provides much greater security than conventional double-entry bookkeeping.

In a series of papers, I have explored both the potential and the limitations of this emerging technology. Due to the libertarian free-market philosophy inherent in the stateless design of digital currencies, the topic evokes neoclassical ideas from the institutional economics of the 19th and 20th centuries, reviving ideas behind such movements as the Jacksonian era of Free Banking, in which private currencies played a much larger role in the economy than government fiat currencies, and the 1930s Chicago Plan for a narrow banking system with a 100 percent reserve requirement.

This article summarizes my digital currency work in three areas: the suitability of bitcoin as a currency, how blockchain technology may impact central banking, and the potential for blockchain technology to disrupt the equity markets and the dynamics of corporate governance. This work draws upon finance and banking as well as law and economics, cryptography, macroeconomics, and other fields.

Bitcoin as a Currency

Bitcoin is described by its anonymous creator as "a peer-to-peer electronic cash system," a stateless payment system that does not rely upon a trusted intermediary such as a central bank or a mint.[1] Its money supply is regulated by transparent, open source computer code, and transactions are validated by a system of double-key cryptography and are entered into a decentralized, widely distributed ledger through a periodic competition known as mining. Since the first use of bitcoin to pay for two pizzas in May 2011, a gradually increasing network of merchants has begun accepting bitcoin as payment for goods and services in the real economy.

While its design is indisputably novel and clever, a natural question to investigate is how well bitcoin fulfills the classical roles of money. I began to explore that question in late 2013, when the value of a bitcoin soared above $1,000 during an episode of feverish investor speculation[2] and concluded that bitcoin does not behave much like a currency, according to the criteria widely used by economists. Instead, bitcoin resembles a speculative investment similar to the internet stocks of the late 1990s.

David Yermack is a research associate of the NBER's Law and Economics Program, the Albert Fingerhut Professor of Finance and Business Transformation at New York University's Stern School of Business, and chair of the Stern School's finance department. He has been a member of the NYU faculty since 1994. He is also an adjunct professor of law and director of the law school's Pollack Center for Law and Business.

In 2014 Yermack began teaching the full semester course on Digital Currency and Blockchains at NYU with his law school colleague Geoffrey Miller. The course was the first in the world on this topic taught at a major research university, and it now enrolls more than 200 students annually.

In addition to his recent research on blockchains and digital currencies, Yermack has published some of the most cited papers in the fields of executive compensation and corporate governance. He has written papers on such diverse topics as options in baseball players' contracts, incentive compensation for clergymen, tobacco litigation, fraudulent charitable contributions, CEOs' mansions, and the fashion industry.

Yermack has been awarded five degrees from Harvard University: AB in 1995, MBA in 1991, JD in 1991, AM in 1993, and PhD in 1994. He has been a visiting professor at 12 international universities and a visiting scholar at the Federal Reserve Banks of New York and Philadelphia. He has given invited research seminars at more than 100 universities and institutes worldwide.

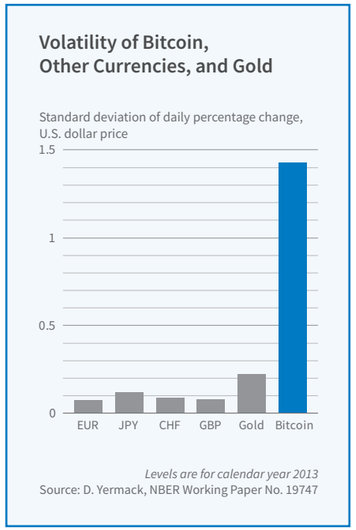

Figure 1

Money is typically defined by economists as having three attributes: It serves as a medium of exchange, a unit of account, and a store of value. Bitcoin somewhat meets the first of these criteria, because a growing number of merchants, especially in online markets, appear willing to accept it as a form of payment. However, the worldwide commercial use of bitcoin remains minuscule, indicating that few people use it widely as a medium of exchange, and those who do can be encumbered by security precautions and long delays needed to verify transactions.

Bitcoin also performs poorly as a unit of account, because merchants must quote the prices of common retail goods out to five or six decimal places with leading zeros, a practice rarely seen in consumer marketing and that is likely to confuse both sellers and buyers. In addition, bitcoin exhibits very high time series volatility, and it trades for different prices on different exchanges without the possibility of arbitrage. These characteristics undermine bitcoin's usefulness as a unit of account. Figure 1 shows the volatility of the daily bitcoin-U.S. dollar exchange rate in 2013, compared with that of other major currencies and gold. Bitcoin's volatility is an order of magnitude larger than that of other currencies and much higher than even the volatilities of risky growth stocks, which tend to top out in the range between 0.50 and 1.00. Many bitcoin enthusiasts have argued that its volatility should decline to more normal levels as the currency becomes more widely used, but Figure 2, which displays the volatility measured in a 120-day moving average over the six-year period 2012–17, shows that this has not occurred. Instead, bitcoin's volatility has gyrated; by late 2017, it had spiked to a level not seen since four years earlier.

As a store of value, bitcoin faces great challenges due to rampant hacking attacks, thefts, and other security-related problems. Bitcoin's daily exchange rate with the U.S. dollar exhibits virtually zero correlation with the dollar's exchange rates against other prominent currencies such as the euro, yen, Swiss franc, and British pound, and also against gold. Because bitcoin's value is almost completely untethered from that of other assets, it is not a useful tool for risk management.

Bitcoin also lacks additional characteristics usually associated with currencies. It cannot be deposited in a bank, and instead must be possessed through a system of "digital wallets" that have proved both costly to maintain and vulnerable to predators. No form of insurance has been developed for owners of bitcoin comparable to the deposit insurance relied on by bank customers in most economies. No lenders use bitcoin as the unit of account for standard consumer finance credit, auto loans, and mortgages, and to date no credit or debit cards have been denominated in bitcoin. Bitcoin cannot be sold short, and financial derivatives such as forward contracts and swaps that are routine for other currencies have not existed for bitcoin until very recently, when the major Chicago commodities exchanges began listing bitcoin futures in December 2017. A major price decline began very shortly after the inception of futures trading permitted speculators to bet for the first time against its further appreciation.

However, concluding that bitcoin does not meet standard criteria as a form of money implicitly raises the question of whether we have the right definition of money. An interesting alternative — "money is memory" — has been proposed in a provocative paper by Narayana R. Kocherlakota.[3] This work, which predates the launch of bitcoin by more than a decade, follows a logic quite similar to the blockchain distributed ledger that underlies bitcoin and other digital currencies.

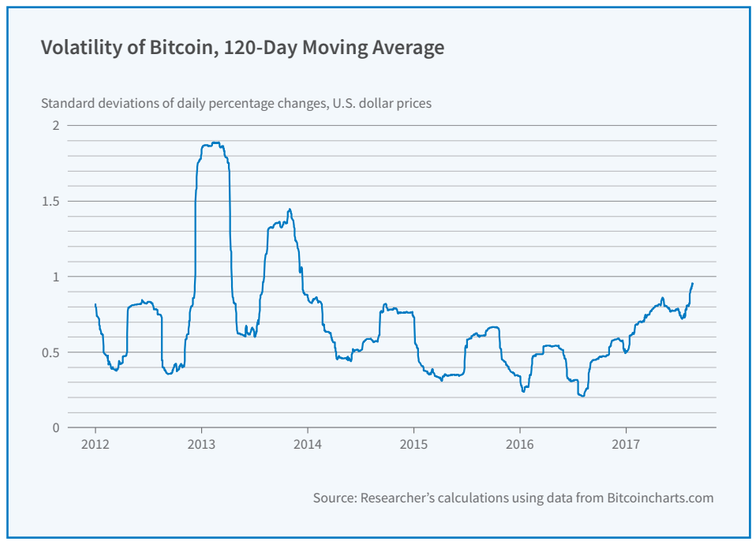

Figure 2

Central Bank Digital Currency

Although bitcoin and other digital currencies were created to bypass the control of central banks, the possibility of a central bank withdrawing its bills and notes from circulation and replacing them with its own blockchain-based digital currency has become an appealing topic of debate among monetary economists, and many central banks are openly investigating this possibility. Max Raskin and I review the most widely circulated proposals of this type and evaluate their potential costs and benefits.[4]

Most central bank digital currency proposals are a variant of the "Fedcoin" scheme advanced by a commentator in 2014.[5] The Fedcoin ideas have been taken up and discussed in policy papers by top officials of the Bank of England, among others. Under the Fedcoin proposal, citizens and businesses would be permitted to open accounts at the central bank itself, rather than depositing their funds in commercial banks as is done today. Central bank digital accounts could initially be funded by permitting depositors to convert existing currency, presumably at a one-to-one rate, and the new digital currency would reside on a blockchain operated by the central bank. When depositors wished to spend their digital currency, they would convey it over the central bank's blockchain to the account of another party.

By concentrating deposits in the central bank, Fedcoin schemes would implicitly end the practice of fractional reserve banking, "narrowing" the banking system so that depositors dealt directly with the central bank rather than with intermediary private banks. In many ways, Fedcoin represents a revival of the 1933 Chicago Plan, a widely discussed academic proposal to end fractional reserve banking in order to restore public confidence during the Great Depression.[6]

Monetary policy would become much easier for the central bank to implement under a digital currency system. The bank could commit to an algorithmic monetary policy and control it precisely. Negative interest rates could be paid to depositors, who would not have the option of holding physical cash to defeat such a policy. The concept of open market operations would be superseded by direct manipulation of customer balances, which could be targeted finely toward certain geographical regions or distinct demographic or economic clienteles of depositors.

The implications of these innovations could be vast. The central bank would not be vulnerable to runs, and governments could stop providing deposit insurance and occasional bailouts as the lender of last resort to inadequately funded commercial banks. Commercial banks would no longer have to engage in "maturity transformation," under which they raise funds from short-term demand deposits and lend them out in long-term mortgages and other loans, and they would presumably recapitalize themselves with long-term debt and equity securities. Risk-shifting and other moral hazard problems on the part of banks, which now receive free deposit insurance from the government, might be eliminated.

In macroeconomics, the main advantages to a central bank of having its own digital currency would come from giving the government more control and understanding of the financial system. Such control could facilitate policy intervention in response to the business cycle while also ensuring better individual compliance with tax collection and anti-money laundering statutes.

Blockchains and Corporate Finance

Blockchains appear to have great potential in corporate finance.[7] In addition to virtual currencies, blockchains can also hold debt securities and financial derivatives, which can be executed autonomously as "smart contracts" — computer code written to execute the reciprocal promises of two parties when agreed-upon contingencies are met. Companies could issue shares on a blockchain in several forms. A firm could operate and update its own private blockchain and sell shares directly to investors, who could then trade them on the same platform. A firm could also create a decentralized public blockchain similar to bitcoin's, in which shares were issued as rewards to miners for doing the work of updating the ledger. A third alternative would be to use an existing blockchain and attach shares of stock to coin transactions, using the so-called "colored coins" approach, which refers to bitcoin transactions that include a data field conveying information about other assets, such as the CUSIP number of a Treasury bond, that a seller wishes to transfer to a buyer. Finally, an existing stock exchange might improve its operations by adopting blockchain technology for post-trade clearing and settlement, as the Sydney-based ASX exchange is slated to do this year.

Using blockchains to record stock ownership could solve many long-standing problems related to companies' inability to keep accurate and timely records of who owns their shares. Perhaps most importantly, blockchains could provide unprecedented transparency to allow investors to identify the ownership positions of debt and equity investors, including the firm's managers, and overcome corruption on the part of regulators, exchanges, and listed companies. If a firm elected to keep its financial records on a blockchain, opportunities for earnings management and other accounting gimmicks could drop dramatically, and related party transactions would become more transparent.

The greater transparency of ownership associated with recording stock ownership on blockchains could provide firms with an early warning system when activists or raiders begin to buy shares. This would effectively make blockchains into a type of takeover defense, by undercutting the element of surprise and raising the cost for active investors to acquire shares.

On blockchains such as Ethereum that have more advanced capabilities than bitcoin's, self-executing smart contracts could replicate contingent claims such as stock options held by employees or warrants owned by outside investors.[8] These smart contracts could extend into areas such as the pre-contracted resolution of financial distress. Further applications appear promising in areas such as shareholder voting, where a number of national stock exchanges already have conducted successful pilot projects.

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Measuring the Motives for Charitable Giving

Jonathan Meer and Harvey S. Rosen

Charitable giving plays an important role in the U.S. economy. In 2016, individuals gave $282 billion to churches, museums, universities, and myriad other institutions.[1] A variety of issues pertaining to donative behavior have been covered in the economics literature. Two of the more important ones have arisen in discussions of the motivations for giving. The first is reciprocity: do people donate because they expect something in return? The second is affinity: what factors influence whether an individual develops a feeling of a community of interest with a charitable institution?

In a series of papers, we have examined these issues through the lens of alumni donations to universities. The determinants of alumni donations are of independent interest because of their importance in university budgets — donations were about $41 billion in 2016 and covered roughly 10 percent of institutions' expenses.[2] Endowments, another source of revenue, are composed in part of previous donations. Cuts in state aid to public universities in recent years and changes in tax incentives for donations embodied in the recent Tax Cuts and Jobs Act have brought questions about voluntary support of higher education to the fore. Further, universities have a unique structure and relationship with their alumni, a relationship that begins when individuals are students and which may extend decades beyond that time. Importantly, the relationships among alumni, solicitors, and the university itself are generally more clearly defined than for most charities. This makes higher education particularly useful for studying how an institution attempts to engender feelings of affinity among potential donors.

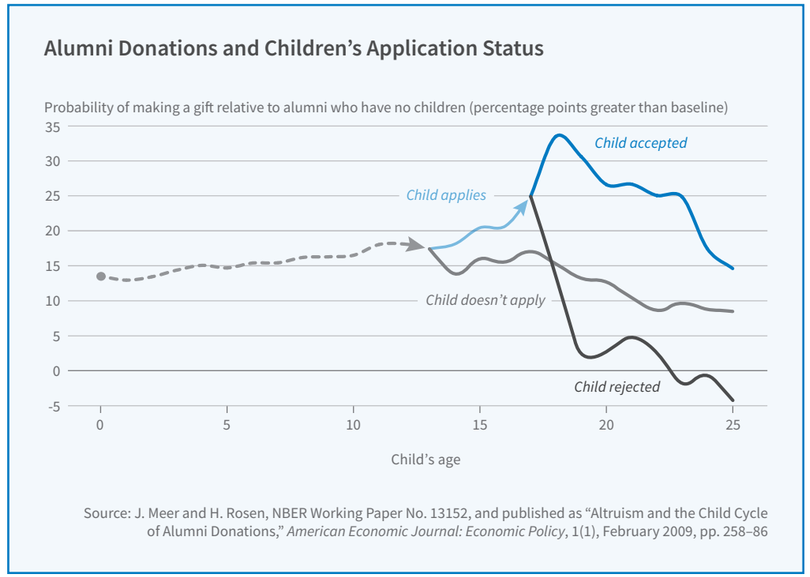
Most of the research described here is based on extensive proprietary information we received from a private, selective research university, which we call Anon U. These data included information on alumni such as age, ethnicity, gender, SAT scores, field of study, post-graduate degrees, and family members who also attended Anon U, as well as information on every gift they made to the university after graduation. In addition, the development staff at Anon U provided us with detailed explanations of their solicitation practices.

Reciprocity

Economists have long recognized that people are not entirely selfish; altruism is an important part of human behavior. That said, some charitable behavior is doubtless driven in part by self-interest. In particular, donors might expect something in return for their gift, such as prestige, tangible benefits like gifts or access to social events, and the ability to signal their virtue to others.

The Anon U data allowed us to make a rough estimate of the extent to which donations were due to a particular kind of reciprocity, namely, the hope that donations will help their children gain acceptance to the university. Although Anon U makes no promise whatsoever that donations will increase the likelihood of acceptance, this view that they could is widespread.

To assess the impact of this belief on donative behavior, we examined the relationship between an alumnus' or alumna's giving and the age and application status of his or her children.[3] If alumni believe that donations increase the probability of their children getting admitted, then giving will increase as their children near application age, and vary systematically with whether they apply and are accepted. We call this pattern "the child-cycle of alumni giving."



Source: J. Meer and H. Rosen, NBER Working Paper No. 13152, and published as "Altruism and the Child Cycle of Alumni Donations," *American Economic Journal: Economic Policy*, 1(1), February 2009, pp. 258–86

Figure 1

Figure 1 illustrates the child-cycle pattern generated by our Anon U data. The amount donated to the university is plotted as a function of the alumnus' or alumna's eldest child's age, relative to alumni who have no children. Those with a child donate more even when the child is very young, possibly because alumni with children have more interest in education in general. At age 14, we divide the sample between those whose children eventually apply to Anon U and those who do not. Giving increases sharply for the parents of future applicants, while it remains unchanged for the parents of non-applicants. At age 18, we divide the sample of applicants into those who were accepted and those who were rejected. Giving by parents of rejected applicants drops dramatically — back to the level of childless alumni. All of this is consistent with the notion that an expectation of reciprocity is driving at least some donations. This finding is supported by Kristin Butcher, Caitlin Kearns, and Patrick McEwan's study of data on giving at a women's college.[4] They also find that giving follows the child-cycle pattern and that alumnae with female children, who hence were feasible candidates for admission, gave more than those whose children were male, other things being the same.

To investigate further the notion that reciprocity influences donation decisions, we examined the proportion of alumni parents' giving that was directed toward specific purposes, such as athletic teams. We found a strong increase in such directed giving when their children were attending the university and a strong decrease after graduation, suggesting that parents were financing their child's own activities, and providing more evidence of self-interested motivations for giving. Related research using field experiments also shows that donors to universities are responsive to opportunities to direct their giving to specific causes.[5]

Our back-of-the-envelope calculations suggest that about half of giving by alumni whose children apply to Anon U is due to self-interest driven by hopes for reciprocity for their children. This is a lower bound for the overall role of self-interest, though, because our data do not allow us to discern other, non-child-related motivations.

A rather different type of reciprocity arises in the context of financial aid. Recipients of financial aid may feel gratitude toward their alma mater and therefore "give back" later in life. But they may also feel resentment, particularly if the aid comes in the form of student loans. The obligation to repay such loans, of course, can also reduce the capacity of alumni to donate.

We analyzed the relationship between giving and financial aid and found that the presence of a student loan per se decreases the probability of making a gift.[6] In addition, the amount donated falls with the size of the loan. We show that these effects are unlikely to be driven by lower income, but rather may reflect annoyance with loans that reduces affinity for the school. Scholarships, on the other hand, have no impact on the likelihood of giving. With respect to the amount given, we find that scholarship recipients give less conditionally on making a donation than their non-scholarship counterparts. At the same

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Meer received his bachelor's degree in economics from Princeton University in 2002 and his PhD in economics from Stanford University in 2009. He won the CASE H.S. Warwick Award for Outstanding Research in Alumni Relations for Educational Advancement in 2009 and 2012. He was cofounder of an online Principles of Microeconomics course at Texas A&M that reaches 3,000 students per year.

Meer's research interests include charitable giving, the economics of education, and the economics of low-skill labor markets. He lives in College Station with his wife and two children.

Harvey S. Rosen is the John L. Weinberg Professor of Economics and Business Policy at Princeton University. He was an undergraduate at the University of Michigan and received his PhD from Harvard University. He has been a member of Princeton's Department of Economics since 1974, serving as department chair from 1993 to 1996 and as codirector of the Center for Economic Policy Studies from 1993 to 2011. He was the inaugural master of Whitman College, Princeton's sixth undergraduate residential college.

Rosen has been involved in both the graduate and undergraduate teaching programs at Princeton. In recent years, he has taught courses in public finance, taxation, and introductory and intermediate microeconomics. From 1989 to 1991 he served in the U.S. Department of the Treasury as deputy assistant secretary for tax analysis. During a second stint in Washington, from 2003 to 2005, he served on the President's Council of Economic Advisers, first as a member and then as chair, providing advice to the White House on tax reform, Social Security, health care, energy, the federal budget, and financial market regulation.

Rosen's main field of research is public finance, a topic on which he has published several dozen articles in scholarly journals and an undergraduate textbook. He was elected a Fellow of the Econometric Society in 2006, and in 2007 received the National Tax Association's Daniel M. Holland Medal, for distinguished lifetime contributions to the study and practice of public finance.

time, though, the amount donated does increase with the size of the scholarship, suggesting that reciprocity plays a role.

Reciprocal behavior can be driven by social pressure as well.[7] This hypothesis is challenging to investigate, though, because social relationships are rarely random. A correlation in giving within a social network might be driven by common interests that lead to self-selection into that group. Thus, for example, observing that a person fundraises for a charity and his or her friends donate to that charity does not necessarily mean that their giving was driven by a desire to avoid social pressure. At Anon U, however, freshman-year roommates are assigned in a manner that is random with respect to any characteristics that could plausibly affect later-life giving.

Common experiences as roommates could create a spurious correlation between volunteering as a solicitor for the university by one roommate and giving by another. In that case, though, there would be a correlation between volunteering in any capacity for the university, including activities with no solicitation component, and giving by roommates. The processes that Anon U employs for organizing its volunteering and solicitation activities turn out to provide a useful framework for addressing this concern. Solicitations are generally impersonal, through letters and emails, until June, the last month of the fiscal year. At that point, alumni volunteers call classmates to raise funds for the university. High affinity for the school due to common experiences would lead to higher giving throughout the year; elevated giving only in June strongly suggests a response to social pressure.

As illustrated in Figure 2, this is precisely the pattern that emerges. Having a former freshman-year roommate who volunteers in a non-solicitation capacity for the university has no impact on giving, while having a solicitor roommate increases giving by about 10 percent. Importantly, this effect is limited to donations made during the time when personal solicitations are conducted. Furthermore, giving is elevated in the years in which one's former freshman-year roommate is a solicitor, compared to those in which he or she is not. In follow-on work, we also find that direct, personal solicitations can have an impact even after multiple impersonal solicitations, further demonstrating the impact of social pressure.[8]

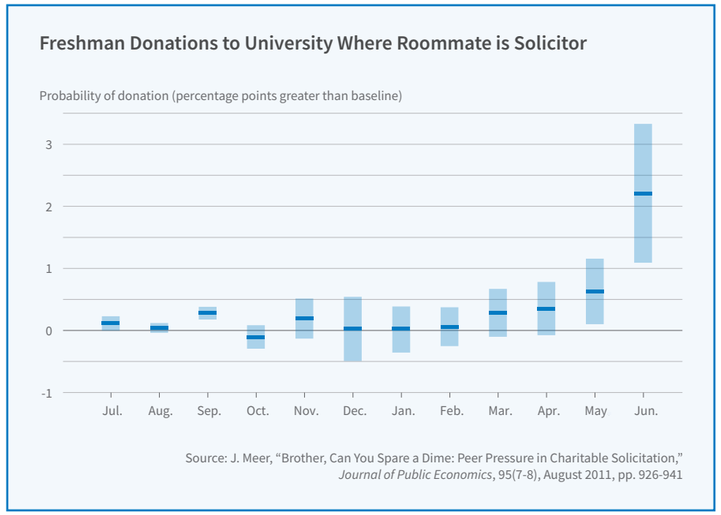

Figure 2

Finally, a field experiment at Texas A&M University conducted by one of us (Meer) with Catherine Eckel and David Herberich examines whether gifts to prospective donors from a charity — so-called donor premiums — increase donations by creating a desire or a sense of obligation to respond to a subsequent solicitation.[9] On the other hand, distaste for the costs associated with this solicitations strategy could reduce giving.[10]

We randomly assigned a group of alumni to a number of treatments. Some were sent unconditional gifts included in the solicitation — Texas A&M-branded luggage tags — while others were offered a gift conditional on their donation, with some having the option to opt out of the luggage tag. A control group was solicited with no gift offer. Responses were higher for those who were sent a gift on the front end than for those who were not, but not nearly enough to make up the cost. The promise of a gift had no impact on the size of donations. Few took the opportunity to decline the conditional offer when making a gift, suggesting that donors do place value on these gifts.

Our discussion so far has mentioned at several points the importance of affinity for a charity as a motivation for giving. We next turn to how universities form that affinity.

Creating Affinity for the Long Term

Universities can form stronger bonds with individuals earlier in life than most charities, a built-in advantage that enables long-term relationships. In several papers we have investigated the factors that engender affinities between a university and its alumni. At Anon U, participation in the majority social culture as an undergraduate, such as playing a varsity sport or belonging to social organizations such as sororities and fraternities, is strongly correlated with future giving.

The large role played by athletics at U.S. universities, often justified on the grounds that it leads to greater alumni engagement, led us to investigate this question in greater depth.[11] While previous work has focused on whether big-time sports like football and basketball impact giving,[12] we looked at the success of the team to which the alumnus or alumna actually belonged. For men, having won a conference championship as an undergraduate tended to increase future giving, primarily to the athletic fund, as opposed to the general fund, while there was little effect for women. After graduation, when an alumnus' former team won a conference championship, on average he increased giving to both the general and athletic funds, while for alumnae, there was no impact.

Football and basketball conference championships did little to increase giving, though we note that Anon U does not generally have a high profile in those sports. At schools with more visible football and basketball programs, the effects of success for those teams might be larger and more robust. Nevertheless, there is no reason to believe that former athletes at such institutions fail to develop an affinity for their own teams — our results on the importance of own-team championships could very well generalize. To the extent that this is true and universities care about turning their undergraduates into future donors, it would seem that universities should nurture broad varsity athletic programs.

Dovetailing with our work on the child-cycle of giving, we also examined whether families form bonds with universities that lead to greater overall donations, a frequent justification for legacy preferences in admissions.[13] We find that alumni whose children, nieces, or nephews attended Anon U donate substantially more than alumni who do not have a member of the younger generation attend. On the other hand, while alumni whose parents, aunts, or uncles attended Anon U donate more than their classmates whose relatives did not, the effect is smaller. And having a grandparent who attended Anon U does little to change giving.

Affinity for the university may induce donations for a few years after graduation, when memories are fresh. But universities want alumni to continue to donate even long after they have completed their studies, especially as they reach their peak earning years. This leads to the important question of whether giving when young has an independent effect on giving later in life: is charitable giving habit-forming? University fundraisers at many institutions certainly seem to believe that it is. They devote considerable resources to inducing young alumni to give even token sums, in the hope that they will continue to do so, and in greater amounts, later in life. In the Anon U data, there is a strong correlation between the probabilities of giving when young and later in life. But such a correlation by itself is not enough to demonstrate that habit formation is important in this context.

In order to identify the presence of a habit-formation effect, we require some variable that exerts a transitory effect on giving that is uncorrelated with the alumnus' or alumna's own general tendency to donate. The two considerations discussed above — having a former freshman-year roommate who is a solicitor, and athletic performance of an alumnus' former varsity sports team — fit the bill. Examining the giving patterns induced by these external inducements to donate allows us to isolate the impact of donative behavior when young on giving when older.[14] Estimates that fail to account for unobserved affinity suggest that the amount of giving when young drives giving when older. However, after correcting for spurious correlation, we find that the frequency of donating when young is the more important determinant of the size of gifts made in later years.

Another dataset, the survey of Giving and Volunteering in the United States, permits further exploration of habit formation. These data allow us to estimate the relationship between engaging in fundraising and volunteering at age 18 or younger and giving and volunteering as an adult.[15] Controlling for the volunteerism of parents helps reduce spurious correlation driven by family factors that could induce an individual to exhibit altruistic behavior when young and when older. Both fundraising and volunteering when young have a substantial positive impact on the likelihood of donating and the amount given as an adult. This relationship holds across all types of charities, including education-related ones. Once again, this provides suggestive evidence of habit formation in charitable giving.

Even in the presence of the interaction between the affinities developed early in life and habit formation, giving tends to drop off as alumni enter old age. Indeed, virtually all statistical analyses of charitable behavior suggest a negative relationship between old age and giving.[16] We examine late-life giving to Anon U to investigate the mechanisms behind this empirical regularity. To do so, we supplement our data with information extracted from obituaries published in the alumni magazine. Since we know when an alumnus or alumna passed away and, in many cases, the cause of death, we can separately determine the impact of age and of the approach of death. We replicate the negative relationship between age and donations found in the literature, but show that it is driven primarily by approaching mortality. We argue that our results are unlikely to reflect reduced resources at the end of life, but rather the diminished capacity or distractions of a final illness. Given the aging of the Baby Boom generation, *inter vivos* end-of-life donations and bequests will likely play a substantial role in the financing of charities over the next two decades.

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Consumption and Income Inequality since the 1960s

Bruce D. Meyer

Concerns about rising inequality inform important debates on some of our most significant issues, including income tax design, immigration, and globalization. The debate over inequality relies almost exclusively on income data that indicate that inequality has increased sharply in recent decades. Yet economists generally prefer using consumption rather than income to measure well-being.[1] For this reason, and because consumption is better reported than income for some segments of the population, I have reexamined inequality patterns using consumption data. In several papers, mostly with James Sullivan of the University of Notre Dame, I find that income data paint an incomplete and at times distorted view of how inequality in economic well-being has changed in the United States. Because public and private transfers, and in some cases the drawdown of prior saving, raise consumption relative to income for the lowest income groups, consumption patterns indicate a much more modest increase in inequality than the income data suggest.

Why Consumption?

Although income is the most commonly used measure of the economic well-being of U.S. households, there are a number of reasons why measuring how much people spend on food, shelter, transportation, and other goods and services provides a more accurate picture of their circumstances. Income typically fluctuates more than economic well-being, because people can save when income is temporarily high and borrow when it is temporarily low. Income also fails to reflect the flow of services received if one already owns a house or a car, and has no expenditures but significant consumption. A retired couple in their own home living off the savings accumulated over a lifetime may be living quite comfortably even if they have no income.

Consumption measures will reflect the loss of housing-services flows if homeownership falls, the loss in wealth if asset values fall, and the belt-tightening that a growing debt burden might require — all of which an income measure would miss. Furthermore, consumption is more likely than income to be affected by access to public insurance programs, and to capture the effects of changes in access to credit or the government safety net.

Consumption is better than income at reflecting deprivation. In a series of papers, Sullivan and I show that measures of material hardship or adverse family outcomes are more severe for those with low consumption than for those with low income.[2]

Several researchers have documented the patterns in consumption inequality. The evidence from this literature is mixed. Some studies show little change in consumption inequality over the past few decades and others show a proportional rise equal to or exceeding that of income.[3] These differences arise from the use of different data sources or definitions of consumption — for example, total consumption or nondurable consumption — and different methods of addressing measurement error.

Addressing Concerns about Data Quality

While consumption has a number of conceptual advantages relative to income as a measure of well-being,

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Meyer has been editor or associate editor of the *Journal of Business & Economic Statistics,* the *B.E. Journal of Economic Analysis and Policy,* the *Journal of Public Economics,* and the *Journal of Labor Economics.* He is a member of the Bureau of Labor Statistics Technical Advisory Committee, serves on the American Economic Association Committee on Government Relations, and was recently chair of the Business and Economic Statistics Section of the American Statistical Association. He has served on the Commission on Evidence-Based Policymaking, the National Academy Panel on Redesigning the BLS Consumer Expenditure Surveys, and the Advisory Panel on Research Uses of Administrative Data.

From 1987–2004, Meyer was a professor in the economics department of Northwestern University. He has been a visiting professor at Harvard University, University College London, and Princeton University.

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previous studies have raised concerns about the quality of both income and consumption data. There is considerable evidence that income is substantially underreported in national surveys, especially in categories of income important for those with few resources, and that the extent of underreporting has increased over time.[4] For example, only about half of all dollars transferred through the Temporary Assistance for Needy Families (TANF) program, food stamps (the Supplemental Nutrition Assistance Program, SNAP), and pensions have been captured in the principal income surveys in recent years.

At least some components of consumption are also underreported in surveys. However, recent research has shown that among the eight largest categories of expenditures, six are reported at a high rate in the Consumer Expenditure Interview Survey, the best source of data on household spending, and that rate has been roughly constant over time.[5] These comparisons also indicate that spending collected through a recall survey compares more favorably to national aggregates than does spending collected via a diary survey that appears too burdensome to complete accurately.

One way to address concerns about the quality of consumption data is to focus on components of consumption that are well-measured, including food at home, rent plus utilities, gasoline and motor oil, the rental value of owner-occupied housing, and the rental value of owned vehicles. In order to draw conclusions about changes in consumption inequality from evidence on the well-measured components, it is critical that these components be equally important for high- and low-consumption households. It is also important that price changes for well-measured consumption mirror the price changes for overall spending. Both of these conditions appear to hold: Well-measured consumption is roughly a constant share of overall consumption throughout the distribution, and the price of the bundle of well-measured goods has not changed noticeably relative to the prices for all goods.[6]

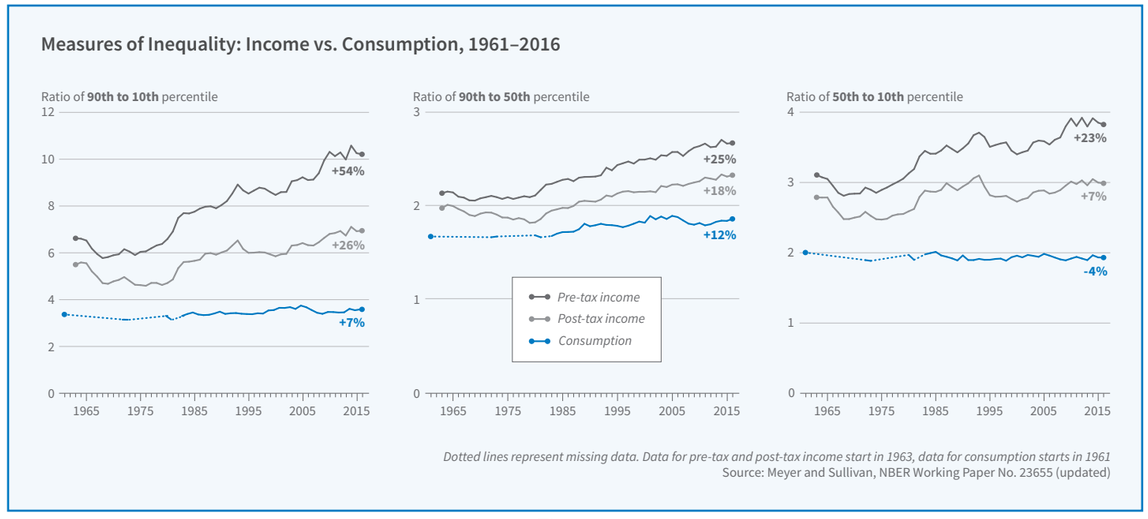

Figure 1

Trends in Income and Consumption Inequality

Official measures of income inequality suggest a steady rise in the U.S. since the early 1970s.[7] An important limitation of the official statistics is that they are based on pre-tax money income, which does not account for tax credits and in-kind transfers, such as housing benefits and food stamps, which have increased sharply over time. Income inequality still rises for measures of income that more closely reflect family resources available for consumption, but the rise is less noticeable.[8] Using our improved measure of consumption, however, a very different story emerges.

These differences are evident in Figure 1, where we report the ratio of the 90th percentile to the 10th percentile (the 90/10 ratio) for pre-tax money income, after-tax money income, and well-measured consumption.[9] Since the early 1960s, the rise in after-tax income inequality as measured by the 90/10 ratio (26 percent) has significantly exceeded the rise in consumption inequality (7 percent). Furthermore, this much smaller percentage increase in consumption inequality started from a considerably lower base. In some decades, such as the 1960s and 1990s, income and consumption inequality moved in parallel, but in other decades the differences were sharp. In the 1980s, inequality for both measures rose, but the increase was much greater for income (28 percent) than for consumption (5 percent). After 2005, these measures moved in opposite directions: income inequality rose sharply while consumption inequality fell.

The center and right panels of Figure 1 show that income inequality has risen for the top (90/50 ratios) and bottom (50/10 ratios) of the distribution, but increases in consumption inequality are only evident for the top. The finding that the patterns of consumption and income inequality at the top are fairly similar from the early 1960s through 2005 suggests that underreporting of consumption by the rich is not behind the differences in inequality over time.

Our evidence of only a modest rise in consumption inequality over the past five decades contrasts sharply with evidence from tax data that an increasing share of the nation's income is going to the very highest income families,[10] though several papers using broader and more consistent measures of income reported on income tax forms do not show large increases in the top 1 percent's income share.[11] Our analyses are distinct from these studies that focus on the highest income households. We do not include the extreme tails of the distribution because resources are likely to be poorly measured in survey data for these observations. Tax returns alone are also unsuitable for measuring incomes at the bottom, since they miss non-filers and important sources of income such as TANF, SSI, SNAP and housing benefits, which are not taxable.

What Explains the Sharp Differences in Inequality Patterns?

Many factors likely contribute to the differences between income and consumption inequality. As discussed above, there is considerable evidence that income sources that are particularly important for those at the bottom of the distribution are significantly underreported in surveys and that the extent of under-reporting has grown over time. A story of declining relative quality of income data at low percentiles is consistent with our results that show a much more noticeable rise in the 50/10 ratio for income than the 50/10 ratio for consumption over the past three decades. In addition, the divergence between income and consumption inequality measures is particularly evident for single-parent families, a group that receives a comparatively large share of transfer income.

For families with substantial holdings, changes in asset values could affect consumption even if income is unchanged. Thus, the sharp decline in asset prices after 2006, first in housing and then in financial assets, could explain why consumption inequality fell at the start of the Great Recession even though income inequality did not. This explanation is supported by evidence that between 2006 and 2010, a period of sharply falling asset prices, consumption spending rose for the lowest asset quintile, ranked by asset holdings, while it fell for the top four quintiles.

Implications

Most of the discussion around recent trends in inequality highlights growing dispersion. However, the evidence from consumption data indicates that changes in inequality in economic well-being are more nuanced than a simple story of rising income dispersion would suggest. In the bottom half of the distribution there is little evidence of rising consumption inequality, and in the top half of the distribution the rise in consumption inequality has been much more modest than the rise in income inequality, particularly since 2000.

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NBER News

Awards

Susan Athey was elected a vice president of the American Economic Association.

Jonathan Berk and the late Richard Green were awarded the Stephen Ross Prize, a biannual award from the Foundation for the Advancement of Research in Financial Economics for a paper in financial economics published in the last 15 years, for "Mutual Fund Flows and Performance in Rational Markets."

John Beshears, James Choi, David Laibson, and **Brigitte Madrian** received the TIAA Paul A. Samuelson Award for Outstanding Scholarly Writing on Lifelong Financial Security, for their paper, "Does Aggregated Returns Disclosure Increase Portfolio Risk-Taking?"

Francine D. Blau was awarded the 2017 Jacob Mincer Award by the Society of Labor Economists in recognition of lifetime contributions to the field of labor economics.

Anne C. Case was elected to the American Academy of Arts and Sciences, the American Philosophical Society, and the National Academy of Medicine. She and **Angus Deaton** received the Franklin Founder Award, recognizing excellence in a field germane to the interests of Benjamin Franklin.

Wesley Cohen received the Wiley Technology Innovation Management Distinguished Scholar Award, a lifetime achievement award conferred by the Technology Innovation Management Division of the Academy of Management.

Janet Currie received an honorary doctorate from the University of Zurich.

Stefano DellaVigna and **Brian Knight,** and their coauthors Ruben Durante and Eliana La Ferrara, received the *American Economic Journal: Applied Economics* Best Paper Prize for their paper, "Market-Based Lobbying: Evidence from Advertising Spending in Italy."

Dave Donaldson received the John Bates Clark Medal from the American Economic Association and was elected a Fellow of the Econometric Society.

Darrell Duffie and **Haoxiang Zhu** and their coauthor Piotr Dworczak won a 2017 Amundi Pioneer Prize from the American Finance Association, awarded annually for the top three papers in fields other than corporate finance, for their paper, "Benchmarks in Search Markets."

Mara Faccio was elected a director of the American Finance Association.

Pinelopi Goldberg was elected a vice president of the American Economic Association.

Claudia Goldin received an honorary doctorate from the European University Institute.

Gautam Gowrisankaran was awarded an honorary doctorate from the University of Oulu in Finland.

John Graham was awarded the American Taxation Association Outstanding Manuscript Award for "Tax Rates and Corporate Decision-Making," a joint paper with Michelle Hanlon and Terry Shevlin. He, **Campbell R. Harvey,** and their coauthors Ilia Dichev and Shiva Rajgopal also received a Graham and Dodd Scroll for their paper, "The Misrepresentation of Earnings."

Gene M. Grossman presented the Ohlin Lectures at the Stockholm School of Economics.

Rucker Johnson received an Andrew Carnegie fellowship.

Sebnem Kalemli-Ozcan was a Houblon Norman Fellow at the Bank of England and a Council of Foreign Relations International Economics Fellow.

Anil Kashyap was awarded the Order of the Rising Sun, Gold Rays with Neck Ribbon by the Emperor of Japan for his role in promoting and disseminating high-quality research on the Japanese financial system and Japan's economic policies.

Olivia S. Mitchell received an honorary doctorate from the Goethe University of Frankfurt.

Juhani Lillainmaa and coauthors Stephen Foerster, Brian Melzer, and Alessandro Previtero received a 2017 Amundi Pioneer Prize for Distinguished Paper from the American Finance Association for their paper, "Retail financial advice: Does one size fit all?"

Adriana Lleras-Muney was elected to the executive committee of the American Economic Association.

Matteo Maggiori was awarded a National Science Foundation CAREER grant. He also received an Excellence Award in Global Economic Affairs from the Kiel Institute for the World Economy, and a Young Researcher Award from the London Business School AQR Asset Management Institute.

Ariel Pakes was elected to the National Academy of Sciences and awarded the Institute of Industrial Economics' Jean-Jacques Laffont Prize, which recognizes an economist whose research is in the spirit of Jean-Jacques Laffont's, combining both theory and empirical work.

David C. Popp received the 2017 Association of Environmental and Resource Economists' Publication of Enduring Quality Award for his paper on "Induced Innovation and Energy Prices."

James Poterba was elected a corresponding fellow of the British Academy.

Valerie Ramey was elected to the American Academy of Arts and Sciences.

Assaf Razin was awarded the 2017 EMET Prize in Economics, an award for excellence in academic and professional achievements that is sponsored by the A.M.N. Foundation for the Advancement of Science, Art, and Culture in Israel, under the auspices of and in cooperation with the Prime Minister of Israel.

Stephen J. Redding won the

Best Paper Prize from the *Journal of International Economics* for his paper on "Goods Trade, Factor Mobility, and Welfare."

Mar Reguant was awarded the 16th Banco Sabadell Award for Economic Research, which is awarded every year to a promising Spanish economist under the age of 40.

Dani Rodrik received the John von Neumann Award from Corvinus University in Budapest and the John Fayerweather Eminent Scholar Award from the Academy of International Business. He also was elected president of the International Economic Association.

Mark Rosenzweig and coauthor Junsen Zhang received the Sun Yefang Economic Science Award for their paper, "Do Population Control Policies Induce More Human Capital Investment? Twins, Birth Weight, and China's 'One-Child' Policy."

Peter Rousseau and **Boyan Jovanovic** received the inaugural Robert E. Lucas, Jr. Prize from the *Journal of Political Economy* for their paper on "Extensive and Intensive Investment over the Business Cycle." The Lucas Prize is to be awarded biannually to a paper in the area of dynamic economics.

Dan Sichel was part of a team that won the Indigo Prize for the best essay on how to measure economic activity in the 21st century. He also received the Abramson Award from the National Association for Business Economics for his paper with David Byrne and Stepen Oliner on "Prices of High-Tech Products, Mismeasurement, and the Pace of Innovation."

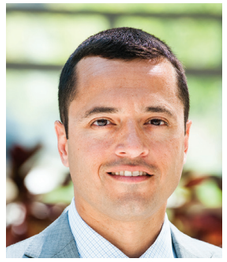
Betsey Stevenson was elected to the Executive Committee of the American Economic Association.

Joseph Vavra received a Sloan Foundation Fellowship.

Adrien Verdelhan and coauthors Wenxin Du, and Alexander Tepper received the AQR Insight Award for their paper on "The Deviations from Covered Interest Rate Parity."

Antoinette Schoar, Amir Sufi Codirecting Corporate Finance Program

Antoinette Schoar



Amir Sufi

Antoinette Schoar, the Michael M. Koerner (1949) Professor of Entrepreneurial Finance at the MIT Sloan School of Management, and Amir Sufi, the Bruce Lindsay Professor of Economics and Public Policy at the University of Chicago Booth School of Business, are the new codirectors of the NBER's Program on Corporate Finance.

Schoar's research interests span household finance and consumer behavior, the financing of start-ups and entrepreneurial firms, and the role of financial markets in emerging market economies. She is a recipient of the Kauffman Medal for Distinguished Research in Entrepreneurship. Between 2009 and the start of her new program director duties, she was the director of the NBER's Entrepreneurship Working Group.

Schoar was also an associate editor of *The Journal of Finance* and the *Journal of Economic Perspectives*, and a co-founder of ideas42, a non-profit organization that uses insights from behavioral economics and psychology to solve social problems. She received her PhD in economics from the University of Chicago and her undergraduate degree from the University of Cologne, in Germany. She has been an NBER affiliate since 2001.

Sufi's research focuses on finance and macroeconomics, with a particular emphasis on links between credit markets and the real economy. He was awarded the 2017 Fischer Black Prize, given biennially to the top financial economics scholar under the age of 40 by the American Finance Association. He has taught at Chicago Booth since 2005.

An undergraduate at Georgetown, Sufi earned his PhD in economics from MIT, where he was awarded the Robert M. Solow Endowment Prize for Graduate Student Excellence in Teaching and Research. He serves as an associate editor for the *American Economic Review*, *The Journal of Finance*, and the *Quarterly Journal of Economics*. Sufi became an NBER affiliate in 2009 and is also an affiliate of the Economic Fluctuations and Growth and Monetary Economics Programs.

David Robinson Becomes Director of Entrepreneurship Working Group

David Robinson

David Robinson, the new director of the Entrepreneurship Working Group, is the J. Rex Fuqua Distinguished Professor of International Management and a professor of finance at Duke University's Fuqua School of Business. His research focuses on entrepreneurial corporate finance and household finance, in particular the economics of the private equity industry and the role of financial literacy in household decision-making.

Robinson received his undergraduate degree from the University of North Carolina at Chapel Hill and his PhD from the University of Chicago. He has been an NBER member since 2010, with affiliations in both the Corporate Finance and Productivity, Innovation, and Entrepreneurship Programs.

Robinson has served as the coordinator of the Entrepreneurship Research Boot Camp, a component of the NBER Summer Institute that brings together promising graduate students interested in economic research on entrepreneurship. He is also a visiting professor at the Swedish House of Finance in Stockholm, and an associate editor of *The Journal of Finance*.

Conferences

Economics of Digitization

A conference on "Economics of Digitization" took place at Stanford University on March 1–2. Research Associates Shane Greenstein and Josh Lerner of Harvard University and Scott Stern of MIT organized the meeting, which was sponsored by the Alfred P. Sloan Foundation. These researchers' papers were presented and discussed:

- **Ananya Sen**, MIT, and **Catherine Tucker**, MIT and NBER, "Information Shocks and Internet Silos: Evidence from Creationist-Friendly Curriculum"
- **Elizabeth Lyons**, University of California, San Diego, and **Laurina Zhang**, Georgia Institute of Technology, "Research as Leisure: Experimental Evidence on Voluntary Contributions to Science"
- **Daniel Bjorkegren**, Brown University, and **Darrell Grissen**, "Behavior Revealed in Mobile Phone Usage Predicts Loan Repayment"
- **Neil Thompson**, MIT, and **Douglas Hanley**, University of Pittsburgh, "Science is Shaped by Wikipedia: Evidence from a Randomized Control Trial"
- **Christian W. Peukert**, Catholic University of Portugal, and **Imke C. Reimers**, Northeastern University, "Digital Disintermediation and the Market for Ideas"
- **Brett W. Hollenbeck**, University of California, Los Angeles; **Davide Proserpio**, University of Southern California; and **Sridhar Moorthy**, University of Toronto, "Advertising Strategy in the Presence of Reviews: An Empirical Analysis"
- **Chiara Farronato**, Harvard University and NBER, and **Georgios Zervas**, Boston University, "Consumer Reviews and Regulation: Evidence from NYC Restaurants"
- **Ariel Dora Stern**, Harvard University, and **Cirrus Foroughi**, NBER Research Assistant, "Digital Innovation in a Regulated Industry: Evidence from Software-Driven Medical Devices"
- **Megan MacGarvie**, Boston University and NBER; **Jeremy Watson**, Boston University; and **John McKeon**, Edgeworth Economics, "It was Fifty Years Ago Today: Recording Copyright Term and the Supply of Music"

Summaries of these papers are at: www.nber.org/confer/2018/EoDs18/summary.html

Economics of Infrastructure

A conference on "Economics of Infrastructure" took place in Cambridge on March 2. Research Associates James M. Poterba of MIT and Edward L. Glaeser of Harvard University organized the meeting, which was supported by the Smith Richardson Foundation. These researchers' papers were presented and discussed:

- **Treb Allen**, Dartmouth College and NBER, and **Costas Arkolakis**, Yale University and NBER, "The Welfare Effects of Transportation Infrastructure Improvements"
- **Marquise McGraw**, Consumer Financial Protection Bureau, "Airline Hub Airports and Local Economic Outcomes"

- **Stephan Heblich**, University of Bristol; **Stephen J. Redding**, Princeton University and NBER; and **Daniel Sturm**, London School of Economics, "The Making of the Modern Metropolis: Evidence from London"
- **David Albouy**, University of Illinois at Urbana-Champaign and NBER, and **Arash Farahani**, Independent Budget Office of the City of New York, "Valuing Public Goods More Generally: The Case of Infrastructure"
- **Joshua A. Lewis**, University of Montreal, and **Edson R. Severnini**, Carnegie Mellon University, "Short- and Long-Run Effects of Rural Electrification: Short- and Long-Run Effects of the Roll-out of the U.S. Power Grid"
- **Matthew Turner,** Brown University and NBER, and **Marcel Peruffo**, Brown University, "Health Effects of Piped Water on Child Mortality in Brazil"
- **Elaine Buckberg**, **Robert Mudge**, and **Hannah Sheffield**, Brattle Group, "Recent Developments in the U.S. Public Private Partnership Market"
- **Ryan D. Nunn**, Brookings Institution, "Economic Issues Raised by Recent U.S. Proposals for Infrastructure Investment"
- **Aleksandar Andonov**, Erasmus University Rotterdam; **Roman Kräussl**, University of Luxembourg; and **Joshua D. Rauh**, Stanford University and NBER, "Infrastructure as an Investable Asset: An Investor Perspective"

Summaries of these papers are at: www.nber.org/confer/2018/EIs18/summary.html

Economics of Energy Distribution

A conference on "Economics of Energy Distribution" took place in Cambridge on March 7–8. Research Associates James B. Bushnell of the University of California, Davis, Ryan Kellogg of the University of Chicago, and Erin T. Mansur of Dartmouth College organized the meeting, which was sponsored by the Alfred P. Sloan Foundation. These researchers' papers were presented and discussed:

- **Nicholas Ryan**, Yale University and NBER, and **Anant Sudarshan**, University of Chicago, "The Efficiency of Rationing: Agricultural Power Subsidies, Power Supply, and Groundwater Depletion in Rajasthan"
- **Frank A. Wolak**, Stanford University and NBER, "Distribution Network Pricing and Regulation with Significant Distributed Solar Photovoltaic Generation Capacity"
- **Justin Kirkpatrick** and **Steven E. Sexton**, Duke University; **Bobby Harris**; and **Nicholas Muller**, Carnegie Mellon University and NBER, "Siting Solar PV Capacity to Maximize Environmental Benefits"
- **Imelda Wang**, **Matthias Fripp**, and **Michael J. Roberts**, University of Hawaii, "Variable Pricing and the Social Cost of Renewable Energy"
- **Catherine Hausman**, University of Michigan and NBER, and **Lucija Muehlenbachs**, University of Calgary, "Price Regulation and Environmental Externalities: Evidence from Methane Leaks" (NBER Working Paper No. 22261)
- **Severin Borenstein**, University of California, Berkeley and NBER, and **James B. Bushnell**, "Are Residential Electricity Prices Too High or Too Low? Or Both?"

Summaries of these papers are at: www.nber.org/confer/2018/EEDs18/summary.html

The Challenges of Globalization in the Measurement of National Accounts

A meeting of the Conference on Research in Income and Wealth, on the topic of "The Challenges of Globalization in the Measurement of National Accounts," took place in Washington on March 9–10. Nadim Ahmad and Peter van de Ven of the OECD, Brent Moulton of the Bureau of Economic Analysis, and Research Associate J. David Richardson of Syracuse University organized the meeting. The program was divided into five parts. These researchers' papers were presented and discussed:

Challenges of Globalization in National Accounts

- **Moulton** and **van de Ven**, "Addressing the Challenges of Globalization in National Accounts"
- **Silke Stapel-Weber**, **Paul Konijn**, **John Verrinder**, and **Henk Nijmeijer**, Eurostat, "Meaningful Information for Domestic Economies in the Light of Globalization — Will Additional Macroeconomic Indicators and Different Presentations Shed Light?"
- **Maria Borga** and **Cecilia Caliandro**, OECD, "Eliminating the Pass-Through: Towards FDI Statistics that Better Capture the Financial and Economic Linkages between Countries"
- **Fariha Kamal**, Bureau of the Census, "A Portrait of U.S. Factoryless Goods Producers"

Accounting for Global Production Processes

- **James J. Fetzer**, **Tina Highfill**, **Kassu Hossiso**, **Thomas Howells**, **Erich Strassner**, and **Jeffrey Young**, Bureau of Economic Analysis, "Accounting for Firm Heterogeneity within U.S. Industries: Extended Supply-Use Tables and Trade in Value Added using Enterprise and Establishment Level Data"
- **Gabriela Saborio-Muñoz** and **Rigoberto Torres-Mora**, Central Bank of Costa Rica, "Costa Rica: Integrating Foreign Direct Investment Data and Extended Supply-and-Use Tables into the National Accounts"
- **Bart Los** and **Marcel Timmer**, University of Groningen, "Measuring Bilateral Exports of Value Added: A Unified Framework"
- **Bernhard Michel**, **Caroline Hambÿe**, and **Bart Hertveldt**, Belgian Federal Planning Bureau, "The Role of Exporters and Domestic Producers in GVCs: Evidence for Belgium Based on Extended National Supply-and-Use Tables Integrated into a Global Multiregional Input-Output Table"
- **Nadim Ahmad**, "Accounting for Globalization: Frameworks for Integrated International Economic Accounts"

Impact of Transfer Pricing and Tax Avoidance

- **Mark Vancauteren**, Hasselt University, and **Michael Polder** and **Marcel van den Berg**, Statistics Netherlands, "The Relationship Between Tax Payments and MNE's Patenting Activities and Implications for Real Economic Activity: Evidence from the Netherlands"
- **Derrick Jenniges, Raymond Mataloni Jr., Sarah Stutzman,** and **Yiran Xin,** Bureau of Economic Analysis, "Strategic Movement of Intellectual Property within Multinational Enterprises"
- **Jennifer Bruner** and **Dylan Rassier,** Bureau of Economic Analysis; and **Kim J. Ruhl,** Pennsylvania State University, "Multinational Profit Shifting and Measures throughout Economic Accounts"

Accounting for the Impact of Globalization in Europe

- **John D. FitzGerald**, Trinity College Dublin, "National Accounts for a Global Economy: The Case of Ireland"
- **Sebnem Kalemli-Ozcan,** University of Maryland and NBER; **Bent Sorensen,** University of Houston; **Carolina Villegas-Sanchez,** ESADE Business School; and **Vadym Volosovych,** Erasmus University Rotterdam, "Who Owns Europe's Firms? Foreign Investment in Europe and Implications for Risk Sharing"

Globalization and Innovation/Productivity

- **Mark de Haan** and **Joseph Haynes**, Statistics Netherlands, "R&D Capitalization: Where Did We Go Wrong?"
- **Fernando Galindo-Rueda** and **Daniel Ker**, OECD, and **Francisco Moris** and **John Jankowski**, National Science Foundation, "Capturing International R&D Trade and Financing Flows: What Do Available Sources Reveal about the Structure of Knowledge-Based Global Production?"

Summaries of these papers are at: www.nber.org/confer/2018/CRIWs18/summary.html

Firms, Networks, and Trade

A conference on "Firms, Networks, and Trade" took place in Cambridge on March 15. Research Associates Laura Alfaro and Pol Antràs, both of Harvard University, and International Trade and Investment Program Director Stephen J. Redding of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **Alonso Alfaro-Urena**, Central Bank of Costa Rica, and **Isabela Manelici** and **Jose P. Vasquez**, University of California, Berkeley, "The Productivity Effects of Joining Multinational Supply Chains: Evidence from Firm-to-Firm Linkages"
- **Johannes Boehm**, Sciences Po, Paris, and **Ezra Oberfield**, Princeton University and NBER, "Misallocation in the Market for Inputs: Enforcement and the Organization of Production"
- **Yimei Zou**, Universitat Pompeu Fabra, Barcelona, "Endogenous Production Networks and Gains from Trade"
- **Ernest Liu**, Princeton University, "Industrial Policies in Production Networks"
- **Ayumu Ken Kikkawa**, University of Chicago; **Glenn Magerman**, Université Libre de Bruxelles; and **Emmanuel Dhyne**, National Bank of Belgium, "Imperfect Competition and the Transmission of Shocks: The Network Matters"
- **Jonathan Eaton**, Pennsylvania State University and NBER; **Samuel S. Kortum**, Yale University and NBER; and **Francis Kramarz**, CREST-INSEE, Paris, "Firm-to-Firm Trade: Imports, Exports, and the Labor Market"

Summaries of these papers are at: www.nber.org/confer/2018/FNs18/summary.html

Program and Working Group Meetings

Industrial Organization

Members of the NBER's Industrial Organization Program met at the Stanford Institute for Economic Policy Research on February 9–10. Faculty Research Fellow Myrto Kalouptsidi of Harvard University and Research Associate Jesse M. Shapiro of Brown University organized the meeting. These researchers' papers were presented and discussed:

- **John Asker**, University of California, Los Angeles and NBER; **Allan Collard-Wexler**, Duke University and NBER; and **Jan De Loecker**, Princeton University and NBER, "Market Power, Production (Mis)Allocation, and OPEC," (NBER Working Paper No. 23801)
- **Jan De Loecker** and **Jan Eeckhout**, University College London, "The Rise of Market Power and the Macroeconomic Implications" (NBER Working Paper No. 23687)
- **Stefano DellaVigna**, University of California, Berkeley and NBER, and **Matthew Gentzkow**, Stanford University and NBER, "Uniform Pricing in U.S. Retail Chains" (NBER Working Paper No. 23996)
- **Germán Gutiérrez**, New York University, and **Thomas Philippon**, New York University and NBER, "Declining Competition and Investment in the U.S." (NBER Working Paper No. 23583)
- **Xiang Hui**, MIT; **Maryam Saeedi**, Carnegie Mellon University; **Steven Tadelis**, University of California, Berkeley and NBER; and **Giancarlo Spagnolo**, SITE-Stockholm School of Economics, "Certification, Reputation, and Entry: An Empirical Analysis"
- **Mitsuru Igami**, Yale University, and **Takuo Sugaya**, Stanford University, "Measuring the Incentive to Collude: The Vitamin Cartels, 1990–99"
- **John C. Haltiwanger**, University of Maryland and NBER; **Robert Kulick**, NERA Economic Consulting; and **Chad Syverson**, University of Chicago and NBER, "Misallocation Measures: The Distortion That Ate the Residual" (NBER Working Paper No. 24199)
- **Selin Akca**, University of Zurich, and **Anita Rao**, University of Chicago, "Value of Search Aggregators"
- **Ying Li**, Cornerstone Research; **Joe Mazur**, Purdue University; **Yongjoon Park**, University of Maryland; **James W. Roberts**, Duke University and NBER; **Andrew Sweeting**, University of Maryland and NBER; and **Jun Zhang**, University of Maryland, "Endogenous and Selective Service Choices After Airline Mergers" (NBER Working Paper No. 24214)

Summaries of these papers are at: www.nber.org/confer/2018/IOs18/summary.html

Labor Studies

Members of the NBER's Labor Studies Program met at the Federal Reserve Bank of San Francisco on February 15–16. Program Codirectors David Autor of MIT and Alexandre Mas of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **Richard Hornbeck**, University of Chicago and NBER, and **Enrico Moretti**, University of California, Berkeley and NBER, "Who Benefits from Productivity Growth? The Direct and Indirect Effects of Local TFP Shocks"

- **Simon Jäger**, MIT and NBER; **Benjamin Schoefer**, University of California, Berkeley; and **Josef Zweimüller**, University of Zurich, "Marginal Jobs and Job Surplus: Evidence from Separations and Unemployment Insurance"
- **Cody Cook** and **Jonathan Hall**, Uber Technologies; **Rebecca Diamond**, Stanford University and NBER; **John A. List**, University of Chicago and NBER; and **Paul Oyer**, Stanford University and NBER, "The Gender Earnings Gap in the Gig Economy: Evidence from over a Million Rideshare Drivers"
- **José Azar**, Charles River Associates; **Ioana Marinescu**, University of Pennsylvania and NBER; and **Marshall I. Steinbaum**, "Labor Market Concentration" (NBER Working Paper No. 24147)
- **David Card**, University of California, Berkeley and NBER; **Lowell Taylor**, Carnegie Mellon University and NBER; and **Ciprian Domnisoru**, Carnegie Mellon University, "The Intergenerational Transmission of Human Capital: Evidence from the Golden Era of Upward Mobility"
- **Johannes F. Schmieder**, Boston University and NBER; **Till M. von Wachter**, University of California, Los Angeles and NBER; and **Jörg Heining**, Institut für Arbeitsmarkt- und Berufsforschung, "The Costs of Job Displacement over the Business Cycle and Its Sources: Evidence from Germany"
- **Amanda Agan**, Rutgers University, and **Michael D. Makowsky**, Clemson University, "The Minimum Wage, EITC, and Criminal Recidivism"

Summaries of these papers are at: www.nber.org/confer/2018/LSs18/summary.html

Law and Economics

Members of the NBER's Law and Economics Program met in Cambridge on February 16. Program Director Christine Jolls of Yale University organized the meeting. These researchers' papers were presented and discussed:

- **Michael D. Frakes**, Duke University and NBER, and **Jonathan Gruber**, MIT and NBER, "Defensive Medicine: Evidence from Military Immunity"
- **John Matsusaka**, **Oguzhan Ozbas**, and **Irene Yi**, University of Southern California, "Can Shareholder Proposals Hurt Shareholders? Evidence from SEC No-Action Letter Decisions"
- **Lauren Cohen**, Harvard University and NBER, and **Umit Gurun**, University of Texas at Dallas, "Buying the Verdict"
- **Roberta Romano**, Yale University and NBER, "Does Agency Structure Affect Agency Decision Making? Implications of the CFPB's Design for Administrative Governance"
- **Steven Shavell**, Harvard University and NBER, "The Rationale for Motions in the Design of Adjudication"
- **Edward H. Stiglitz**, Cornell Law School, "Folk Theories and Constitutional Values"
- **Cäzilia Loibl**, The Ohio State University; **Lucia Reisch**, Copenhagen Business School; **Julius Rauber**, Zeppelin University; and **Cass R. Sunstein**, Harvard University, "Which Europeans Like Nudges? Approval and Controversy in Four European Countries"

Summaries of these papers are at: www.nber.org/confer/2018/LEs18/summary.html

Economic Fluctuations and Growth

Members of the NBER's Economic Fluctuations and Growth Program met in San Francisco on February 23. Research Associates Andrew Atkeson of the University of California, Los Angeles and Monika Piazzesi of Stanford University organized the meeting. These researchers' papers were presented and discussed:

- **Matteo Maggiori**, Harvard University and NBER; **Brent Neiman**, University of Chicago and NBER; and **Jesse Schreger**, Columbia University and NBER, "International Currencies and Capital Allocation"
- **John Kennan**, University of Wisconsin-Madison and NBER, "Spatial Variation in Higher Education Financing and the Supply of College Graduates" (NBER Working Paper No. 21065)
- **Katarína Borovičková**, New York University, and **Robert Shimer**, University of Chicago and NBER, "High Wage Workers Work for High Wage Firms" (NBER Working Paper No. 24074)
- **Marcus Hagedorn**, University of Oslo; **Iourii Manovskii**, University of Pennsylvania and NBER; and **Kurt Mitman**, Institute for International Economic Studies, "The Fiscal Multiplier"
- **Fatih Guvenen**, University of Minnesota and NBER; **Gueorgui Kambourov** and **Burhanettin Kuruscu**, University of Toronto; **Sergio Ocampo-Diaz**, University of Minnesota; and **Daphne Chen**, Florida State University, "Use It Or Lose It: Efficiency Gains from Wealth Taxation"
- **Carlos Garriga**, Federal Reserve Bank of St. Louis, and **Aaron Hedlund**, University of Missouri, "Housing Finance, Boom-Bust Episodes, and Macroeconomic Fragility"

Summaries of these papers are at: www.nber.org/confer/2018/EFGw18/summary.html

Monetary Economics

Members of the NBER's Monetary Economics Program met at the Federal Reserve Bank of New York on March 1-2. Faculty Research Fellows Amir Kermani of the University of California, Berkeley and Jennifer La'O of Columbia University organized the meeting. These researchers' papers were presented and discussed:

- **Itamar Drechsler**, **Alexi Savov**, and **Philipp Schnabl**, New York University and NBER, "Banking on Deposits: Maturity Transformation without Interest Rate Risk"
- **Julian Kozlowski**, New York University, and **Laura Veldkamp** and **Venky Venkateswaran**, New York University and NBER, "The Tail that Keeps the Riskless Rate Low" (NBER Working Paper No. 24362)
- **Chen Lian**, MIT, and **Yueran Ma**, Harvard University, "Anatomy of Corporate Borrowing Constraints"
- **Francisco J. Buera**, Washington University in St. Louis, and **Sudipto Karmakar**, Banco de Portugal, "Real Effects of Financial Distress: The Role of Heterogeneity"
- **Anmol P. Bhandari**, University of Minnesota; **David Evans**, University of Oregon; **Mikhail Golosov**, University of Chicago and NBER; and **Thomas J. Sargent**, New York University and NBER, "Inequality, Business Cycles, and Monetary-Fiscal Policy"
- **Emmanuel Farhi**, Harvard University and NBER, and **David Baqaee**, London School of Economics, "Productivity and Misallocation in General Equilibrium" (NBER Working Paper No. 24007)

Summaries of these papers are at: www.nber.org/confer/2018/MEs18/summary.html

Chinese Economy

The NBER's Working Group on the Chinese Economy met in Cambridge on March 2–3. Faculty Research Fellow Nancy Qian of Northwestern University, working group Director Shang-Jin Wei of Columbia University, and Research Associate Daniel Xu of Duke University organized the meeting. These researchers' papers were presented and discussed:

- **Harald Hau,** University of Geneva; **Yi Huang,** The Graduate Institute, Geneva; and **Hongzhe Shan,** Swiss Finance Institute, "TechFin at Ant Financial: Credit Market Completion and its Growth Effect"
- **Panle Jia Barwick,** Cornell University and NBER; **Dave Donaldson,** MIT and NBER; **Shanjun Li,** Cornell University and NBER; and **Yatang Lin,** Hong Kong University of Science and Technology, "The Welfare Effects of Passenger Transportation Infrastructure: Evidence from China"
- **Yuyu Chen,** Peking University, and **David Yufan Yang**, Stanford University, "The Impact of Media Censorship: Evidence from a Field Experiment in China"
- **Hanwei Huang,** London School of Economics, "Germs, Roads, and Trade: Theory and Evidence on the Value of Diversification in Global Sourcing"
- **Hui He**, International Monetary Fund, and **Lei Ning** and **Dongming Zhu,** Shanghai University of Finance and Economics, "The Impact of Rapid Aging and Pension Reform on Savings and the Labor Supply: The Case of China"
- **Koichiro Ito**, University of Chicago and NBER, and **Shuang Zhang**, University of Colorado Boulder, "Do Consumers Distinguish Marginal Cost from Fixed Cost? Evidence from Heating Price Reform in China"
- **Shang-Jin Wei** and **Jianhuan Xu** and **Jungho Lee**, Singapore Management University, "Trade Imbalance as a Source of Comparative Disadvantage: Why Does China Import So Much Waste?"
- **Guojun He**, Hong Kong University of Science and Technology; **Shaoda Wang**, University of California, Berkeley; and **Bing Zhang**, Nanjing University, "Environmental Regulation and Firm Productivity in China: Estimates from a Regression Discontinuity Design"
- **Hanming Fang**, University of Pennsylvania and NBER; **Zhe Li** and **Nianhang Xu**, Renmin University of China; and **Hongjun Yan**, DePaul University, "In the Shadows of Government: Political Turnovers and Firm Perk Expenses"
- **Pierre-André Chiappori**, Columbia University; **David Ong**, Peking University; **Yu Yang**, University of Wisconsin-Madison; and **Junsen Zhang**, Chinese University of Hong Kong, "Marrying Up: Trading Off Spousal Income and Spousal Height"
- **Loren Brandt** and **Gueorgui Kambourov**, University of Toronto, and **Kjetil Storesletten**, University of Oslo, "Barriers to Entry and Regional Economic Growth in China"

Summaries of these papers are at: www.nber.org/confer/2018/CEs18/summary.html

Environment and Energy Economics

Members of the NBER's Environment and Energy Economics Program met in Cambridge on March 8–9. Faculty Research Fellow Tatyana Deryugina of the University of Illinois at Urbana-Champaign and Research Associate Matthew Kotchen of Yale University organized the meeting. These researchers' papers were presented and discussed:

- **Panle Jia Barwick** and **Shanjun Li,** Cornell University and NBER, and **Deyu Rao** and **Nahim B. Zahur,** Cornell University, "Air Pollution, Health Spending, and Willingness to Pay for Clean Air in China"
- **Robin Burgess,** London School of Economics; **Jonathan M. Colmer,** University of Virginia; and **Michael Greenstone**, University of Chicago and NBER, "The Economics of Marine Conservation"
- **Mark J. Borgschulte,** University of Illinois at Urbana-Champaign; **David Molitor,** University of Illinois at Urbana-Champaign and NBER; and **Eric Zou,** Illinois University, "Smoked Out: The Effect of Wildfire Smoke on Labor Market Outcomes"
- **Nicholas Muller,** Carnegie Mellon University and NBER, "Individual Discount Rates during the Great Depression: Evidence from Firewood Prices in Portland, Oregon"
- **Jeffrey G. Shrader, Jr.,** New York University, "Expectations and Adaptation to Environmental Risks"
- **Tatyana Deryugina** and **David Molitor,** "Long-Run Health Dynamics in the Wake of Disaster: Evidence from Hurricane Katrina"
- **Leslie A. Martin** and **Samuel J. Thornton,** University of Melbourne, "To Drive or Not to Drive? A Field Experiment in Road Pricing"
- **Paramita Sinha,** Research Triangle Institute; **Martha L. Caulkins,** University of Maryland; and **Maureen L. Cropper,** University of Maryland and NBER, "Do Discrete Choice Approaches to Valuing Urban Amenities Yield Different Results than Hedonic Models?" (NBER Working Paper No. 24290)
- **Erich Muehlegger,** University of California, Davis and NBER, and **Richard Sweeney,** Boston College, "Pass-through of Input Cost Shocks under Imperfect Competition: Evidence from the U.S. Fracking Boom" (NBER Working Paper No. 24025)
- **Bryan Bollinger,** Duke University; **Jesse Burkhardt,** Colorado State University; and **Kenneth Gillingham,** Yale University and NBER, "Peer Effects in Water Conservation: Evidence from Consumer Migration"

Summaries of these papers are at: www.nber.org/confer/2018/EEEs18/summary.html

Aging

Members of the NBER's Aging Program met in Cambridge on March 8–9. Program Director Jonathan S. Skinner of Dartmouth College and Research Associate Kathleen M. McGarry of the University of California, Los Angeles organized the meeting. These researchers' papers were presented and discussed:

- **Timothy Layton** and **Nicole Maestas**, Harvard University and NBER; **Daniel Prinz**, Harvard University; and **Boris Vabson**, Stanford University, "The Consequences of (Partial) Privatization of Social Insurance for Individuals with Disabilities: Evidence from Medicaid"
- **Kevin S. Milligan**, University of British Columbia and NBER, and **Tammy Schirle**, Wilfrid Laurier University, "Earnings, Mortality, and the Distribution of Longevity"
- **Liran Einav**, Stanford University and NBER; **Amy Finkelstein**, MIT and NBER; **Sendhil Mullainathan**, Harvard University and NBER; and **Ziad Obermeyer**, Partners Healthcare, "Does High Healthcare Spending at End of Life Imply Waste? Predictive Modeling Suggests Not Necessarily"
- **Silvia H. Barcellos** and **Leandro Carvalho**, University of Southern California, and **Patrick Turley**, Harvard University, "Distributional Effects of Education on Health"
- **John Beshears, David Laibson,** and **Brigitte C. Madrian,** Harvard University and NBER; **James J. Choi**, Yale University and NBER; and **Bill Skimmyhorn**, United States Military Academy, "Borrowing to Save? The Impact of Automatic Enrollment on Debt"
- **David Cutler**, Harvard University and NBER, "Is Aging a Luxury Good?"

Summaries of these papers are at: www.nber.org/confer/2018/AGs18/summary.html

International Finance and Macroeconomics

Members of the NBER's International Finance and Macroeconomics Program met in Cambridge on March 8–9. Research Associates Emmanuel Farhi of Harvard University and Brent Neiman of the University of Chicago organized the meeting. These researchers' papers were presented and discussed:

- **Liliana Varela**, University of Houston, and **Juliana Salomao**, University of Minnesota, "Exchange Rate Exposure and Firm Dynamics"
- **Dmitriy Sergeyev** and **Luigi Iovino**, Bocconi University, "Central Bank Balance Sheet Policies without Rational Expectations"
- **Anil Ari**, International Monetary Fund, "Sovereign Risk and Bank Risk-Taking"
- **Andrei A. Levchenko**, University of Michigan and NBER, and **Nitya Pandalai-Nayar**, University of Texas at Austin, "Technology and Non-Technology Shocks: Measurement and Implications for International Comovement"
- **Ryan Chahrour** and **Rosen Valchev**, Boston College, "International Medium of Exchange: Privilege and Duty"
- **Emine Boz**, International Monetary Fund; **Gita Gopinath**, Harvard University and NBER; and **Mikkel Plagborg-Møller**, Princeton University, "Global Trade and the Dollar" (NBER Working Paper No. 23988)

Summaries of these papers are at: www.nber.org/confer/2018/IFMs18/summary.html

International Trade and Investment

Members of the NBER's International Trade and Investment Program met in Cambridge on March 16–17. The meeting focused on "Trade and Geography." International Trade and Investment Program Director Stephen J. Redding and Research Associate Esteban Rossi-Hansberg, both of Princeton University, organized the meeting. These researchers' papers were presented and discussed:

- **Enrico Berkes**, Northwestern University, and **Ruben Gaetani**, University of Toronto, "Income Segregation and Rise of the Knowledge Economy"
- **Fabian Eckert**, Yale University, and **Michael Peters**, Yale University and NBER, "Spatial Structural Change"
- **Matthew J. Delventhal**, Universitat Autonoma de Barcelona and Barcelona GSE, "The Globe as a Network: Geography and the Origins of the World Income Distribution"
- **Bernt Bratsberg** and **Oddbjorn Raaum**, Frisch Centre, Oslo, and **Andreas Moxnes** and **Karen Helene Ulltveit-Moe**, University of Oslo, "Opening the Floodgates: Immigration and Structural Change"
- **Peter Egger** and **Nicole Loumeau**, ETH Zurich, "The Economic Geography of Innovation"
- **Jeffrey C. Brinkman** and **Jeffrey Lin**, Federal Reserve Bank of Philadelphia, "Freeway Revolts!"
- **Nelson Lind**, Emory University, and **Natalia Ramondo**, University of California, San Diego and NBER, "Trade with Correlation" (NBER Working Paper No. 24380)
- **Richard K. Mansfield**, University of Colorado at Boulder and NBER, "How Local Are U.S. Labor Markets? Using an Assignment Model to Forecast the Geographic Incidence of Local Labor Demand Shocks"
- **Shushanik Hakobyan**, International Monetary Fund, and **John McLaren**, University of Virginia and NBER, "Local-Labor-Market Effects of NAFTA: The Other Shoe Drops"

Summaries of these papers are at: www.nber.org/confer/2018/TGs18/summary.html

Productivity, Innovation, and Entrepreneurship

Members of the NBER's Productivity, Innovation, and Entrepreneurship Program met in Cambridge on March 23. Program Codirectors Nicholas Bloom of Stanford University and Josh Lerner of Harvard University, Faculty Research Fellow Sabrina T. Howell of New York University, and Research Associate Serguey Braguinsky of the University of Maryland organized the meeting. These researchers' papers were presented and discussed:

- **Eunhee Sohn**, Georgia Institute of Technology, and **Robert Seamans** and **Daniel Sands**, New York University, "Technological Opportunity and the Locus of Innovation: Airmail, Aircraft, and Local Capabilities"
- **Ernest Liu**, Princeton University, **Atif R. Mian**, Princeton University and NBER, and **Amir Sufi**, University of Chicago and NBER, "Low Interest Rate and Productivity Growth"
- **Stefano DellaVigna**, University of California, Berkeley and NBER, and **Matthew Gentzkow**, Stanford University and NBER, "Uniform Pricing in U.S. Retail Chains" (NBER Working Paper No. 23996)
- **Patrick M. Kline**, University of California, Berkeley and NBER; **Neviana Petkova**, U.S. Department of the Treasury; **Heidi L. Williams**, MIT and NBER; and **Owen M. Zidar**, University of Chicago and NBER, "Who Profits from Patents? Rent-Sharing at Innovative Firms"
- **Barton Hamilton**, Washington University in St. Louis; **Andres Hincapie**, University of North Carolina at Chapel Hill; **Robert Miller**, Carnegie Mellon University; and **Nicholas W. Papageorge**, Johns Hopkins University, "Innovation and Diffusion of Medical Treatment"
- **Sarada**, University of Wisconsin-Madison, and **Oana Tocoian**, Claremont McKenna College, "Entrepreneurship and the American Dream: How Far Does the Upward Mobility Ladder Reach?"
- **Jeffrey L. Furman**, Boston University and NBER, and **Markus Nagler** and **Martin Watzinger**, University of Munich, "Disclosure and Subsequent Innovation: Evidence from the Patent Depository Library Program"

Summaries of these papers are at: www.nber.org/confer/2018/PRs18/summary.html

Development of the American Economy

Members of the NBER's Development of the American Economy Program met in Cambridge on March 24. Program Codirectors Leah Platt Boustan of Princeton University and William J. Collins of Vanderbilt University organized the meeting. These researchers' papers were presented and discussed:

- **Samuel Bazzi** and **Mesay Melese Gebresilasse**, Boston University, and **Martin Fiszbein**, Boston University and NBER, "Frontier Culture: The Roots and Persistence of 'Rugged Individualism' in the United States"
- **Karen Clay**, Carnegie Mellon University and NBER; **Ethan J. Schmick**, Washington & Jefferson College; and **Werner Troesken**, University of Pittsburgh and NBER, "The Rise and Fall of Pellagra in the American South" (NBER Working Paper No. 23730)
- **Vellore Arthi**, University of Essex; **Brian Beach**, College of William and Mary and NBER; and **Walker Hanlon**, New York University and NBER, "Estimating the Recession-Mortality Relationship when Migration Matters" (NBER Working Paper No. 23507)
- **Taylor Jaworski**, University of Colorado at Boulder and NBER, and **Carl Kitchens**, Florida State University and NBER, "The Interstate Highway System and the Development of the American Economy"
- **Gregori Galofré-Vilà**, University of Oxford; **Christopher M. Meissner**, University of California, Davis and NBER; **Martin McKee**, London School of Hygiene; and **David Stuckler**, Bocconi University, "Austerity and the Rise of the Nazi Party" (NBER Working Paper No. 24106)
- **Robert A. Margo**, Boston University and NBER, "The Integration of Economic History into Economics" (NBER Working Paper No. 23538)
- **Farley Grubb**, University of Delaware and NBER, and **Cory S. Cutsail**, IMA Consulting, "Colonial North Carolina's Paper Money Regime, 1712–74: Value Decomposition and Performance"

Summaries of these papers are at: www.nber.org/confer/2018/DAEs18/summary.html

NBER Books

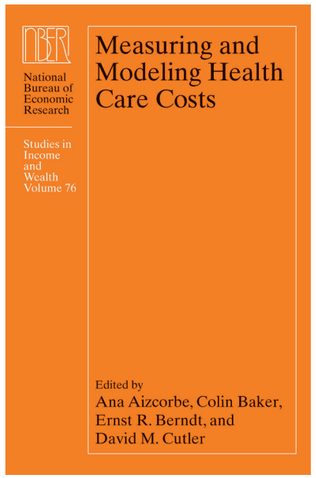
Measuring and Modeling Health Care Costs

Edited by Ana Aizcorbe, Colin Baker, Ernst R. Berndt, and David M. Cutler
512 pages, 62 line drawings, 113 tables
$130 (cloth)

Health care costs represent nearly 18 percent of U.S. gross domestic product and 20 percent of government spending. While there is detailed information on where these health care dollars are spent, there is much less evidence on how this spending affects health.

The research in *Measuring and Modeling Health Care Costs* seeks to connect our knowledge of expenditures with what we are able to measure of results, probing questions of methodology, changes in the pharmaceutical industry, and the shifting landscape of physician practice. Some examples: research in this volume investigates obesity's effect on health care spending, the effect of generic pharmaceutical releases on the market, and the disparity between disease-based and population-based spending measures. This vast and varied volume applies a range of economic tools to the analysis of health care and health outcomes.

Practical and descriptive, this new volume in the Studies in Income and Wealth series is full of insights relevant to health policy students and specialists alike.

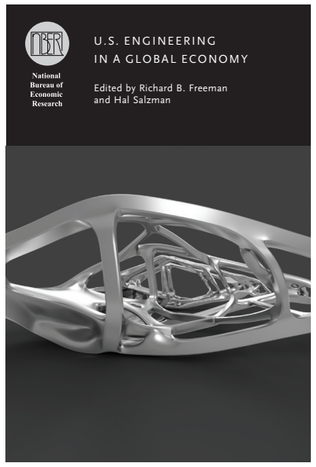


U.S. Engineering in a Global Economy

Edited by Richard B. Freeman and Hal Salzman
320 pages, 39 line drawings, 61 tables
$130 (cloth)

Since the late 1950s, the engineering job market in the United States has been fraught with fears of a shortage of engineering skill and talent. *U.S. Engineering in a Global Economy* brings clarity to issues of supply and demand in this important market. Following a general overview of engineering-labor market trends, the volume examines the educational pathways of undergraduate engineers and their entry into the labor market, the impact on productivity and innovation of engineers working in firms, and various dimensions of the changing engineering labor market, from licensing to changes in demand and guest worker programs.

The volume provides insights on engineering education, practice, and careers that can inform educational institutions, funding agencies, and policy makers about the challenges facing the United States in developing its engineering workforce in the global economy.



Women Working Longer: Increased Employment at Older Ages

Edited by Claudia Goldin and Lawrence F. Katz
304 pages, 77 line drawings, 70 tables
$130 (cloth)

Today, more American women than ever before stay in the workforce into their sixties and seventies. This trend emerged in the 1980s and has persisted for decades, despite substantial changes in macroeconomic conditions. Today's older American women work full-time jobs at greater rates than women in other developed countries. Why is this so?

In *Women Working Longer,* editors Claudia Goldin and Lawrence F. Katz assemble new research that presents fresh insights on the phenomenon. Their findings suggest that education and work experience earlier in life are connected to women's later-in-life work. Other contributors to the volume investigate additional factors that may play a role in late-life labor supply, such as marital disruption, household finances, and access to retirement benefits. A pioneering study of recent trends in older women's labor force participation, this collection offers insights valuable to a wide array of social scientists, employers, and policy makers.

Innovation Policy and the Economy, Volume 18

Edited by Josh Lerner and Scott Stern
160 pages
$60 (cloth)

The 18th annual volume of the NBER's *Innovation Policy and the Economy* series focuses on research exploring the interplay between new technologies and organizational structures, such as networks and corporations. Glenn Ellison and Sara Fisher Ellison explore how consumer search in a technology-mediated marketplace can affect the incentives for firms to engage in price obfuscation. Aaron Chatterji focuses on the role of innovation in American primary and secondary education (K–12), emphasizing recent evidence on the efficacy of classroom technologies. Economic sociologist Olav Sorenson considers how information, influence, and resources flow through innovation networks. The last two chapters focus on how corporate organizational structures influence innovation and dynamism. Andreas Nilsson and David Robinson develop a synthetic framework for understanding the emergence and choices of social entrepreneurs and socially responsible firms. Steven Kaplan argues that there is little empirical evidence to support the common claim that investor pressure for short-term financial results leads U.S. companies to underinvest systematically in long-term capital expenditures and R&D.

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