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The Reporter

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In This Issue

Program Report: Development of the American Economy

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The Development of the American Economy (DAE) program was one of the first research programs launched by Martin Feldstein in 1978 when he formalized the modern structure of the NBER.

The mission of the program is to research historical aspects of the American economy. Its members are economic historians whose specific interests span many subfields within economics, including macroeconomics, labor economics, finance, political economy, trade, and industrial organization. Broadly, economic history research comes in two flavors. First, economic historians study the evolution of economic trends that illuminate issues relevant to the modern economy, such as the entry of women in the labor force and the moderation of economic crises over time. Second, economic historians use the natural experiments offered by history to test economic theory and identify causal channels that may drive important economic change.

Recent work by Robert Margo demonstrates the continued integration of economic historians into mainstream economics.[1] Of articles published in the field's flagship journals such as *The Journal of Economic History and Explorations in Economic History*, 20 percent contained econometric language in 1970—words like "regression"—and now 70 percent do. Earlier cohorts of economic historians published 36 percent of their articles in economics journals (outside of economic history journals), whereas more recent cohorts publish 75 percent of their articles in these venues.

Given the wide span of interests and expertise of DAE program affiliates, research topics cover many areas, including health, the environment, banks, financial crises, corporate governance, education, migration and immigration, and intergenerational mobility. In recent years, affiliates have responded to global events by increasing their focus on historical pandemics, industrial policy, and trade. Text analysis, the use of large language models, and machine learning are among the new methodological areas of interest used in the group.

This report highlights research in four areas: innovation and manufacturing, economic mobility, banking and finance, and women in the economy.

Innovation and Manufacturing

The creation and diffusion of innovative modes of production are central to the process of modern economic growth. These technological changes often take decades to unfold. Economic historians are, therefore, especially well positioned to gather data on these processes and interpret the evidence. DAE affiliates have investigated and illuminated the connections between science, innovation, productivity, and policy.

One strand of this research studies important changes in American technology and productivity. A canonical example of technological change and diffusion entailed the replacement of waterpower by steam power in manufacturing establishments. By digitizing and analyzing federal Census of Manufactures manuscripts from 1850 to 1880, Hornbeck, Hsu, Humlum, and Rotemberg document that as the costs of steam power declined, areas without ready access to waterpower experienced relatively fast growth in manufacturing activity.[2] Moreover, using a dynamic model of firm entry and steam adoption, they show that the high fixed costs of switching to steam caused a socially inefficient lag in the technology's diffusion, as some firms remained locked into the older, lower fixed-cost waterpower technology.

The productivity gains associated with factory mechanization were unevenly shared. Atack, Margo, and Rhode show that the rise of mechanized factories with increased division of labor led to the de-skilling of manufacturing employment in the late nineteenth century; that is, skilled craftspeople were replaced by less-skilled operatives and laborers.[3] Decades later, this trend toward mechanization entailed the widespread adoption of

computerized machine tools. Boustan, Choi, and Clingingsmith find that industries highly exposed to computerization experienced relatively rapid productivity growth along with reduced employment of production workers.[4] Workers initially employed in these industries tended to shift into other less-impacted lines of manufacturing.

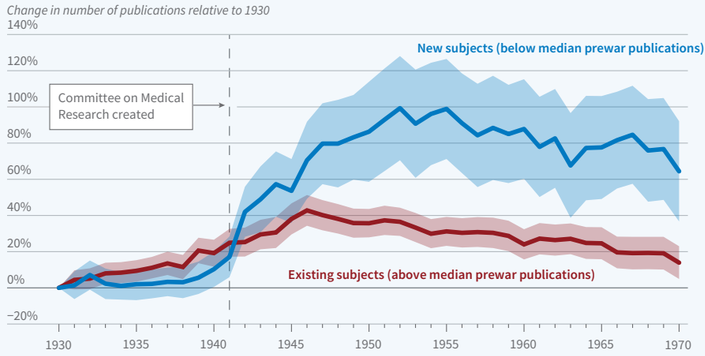
Federal policy plays a role in influencing the size and composition of the manufacturing sector, but tracing this influence requires detailed data and a long-term perspective. Klein and Meissner study tariffs and US manufacturing from 1870 to 1909 using highly disaggregated information.[5] They conclude that industries with higher tariffs had lower labor productivity, higher output prices, and higher employment, and that "tariffs are unlikely to have helped the US become a globally competitive manufacturer" in this era.

In the twentieth century, World War II and the Cold War ushered in an era of expansive federal funding for R&D and innovation. Gross and Sampat examine the long-term effects of the Committee on Medical Research established during World War II on postwar biomedical innovation, the pharmaceutical industry, and National Institutes of Health research funding.[6] In related work, Azoulay, Gross, and Sampat review the history of "indirect costs" in government-funded research at universities over the last 80 years.[7] Kantor and Whalley show how the Cold War's space race spurred R&D spending by NASA contractors, which increased manufacturing value added and employment in space-related sectors, albeit with modest effects on broad-based productivity.[8] Giorcelli shows how US managerial practices spread to Europe, in part through the US government's Technical Assistance and Productivity Program which allowed European managers to get training at US firms in the 1950s, and contributed to narrowing international productivity gaps.[9]

Beyond new ideas, sustained technological progress requires refinement, application, widespread adoption, and eventually adaptation to new settings. For most of human history, sustained positive rates of technological improvement were elusive. That changed during Britain's Industrial Revolution, beginning in the eighteenth century. Hanlon sheds light on "the rise of the engineer" during the Industrial Revolution, a new kind of professional who altered the way innovations were made.[10] He then incorporates this idea into a model that features a shift from "premodern" to "modern" economic growth. Rosenberger, Hanlon, and Hallmann also show how networks of innovation in Britain were important to the patterns and pace of its technological change and growth in the Industrial Revolution.[11]

Figure 1

World War II Medical Research Funding and Research Publications



Shaded areas represent 95% confidence intervals.
Source: "The Therapeutic Consequences of the War: World War II and the 20th-Century Expansion of Biomedicine," Gross DP, Sampat BN. NBER Working Paper 33457, March 2025.

Economic Mobility

A common view of American history holds that the US offered widespread opportunities for economic advancement, particularly in the nineteenth century when the frontier was still open to settlement and many immigrants arrived from Europe to find their fortunes, but that economic mobility has fallen since the mid-twentieth century. Economic mobility in the US has been the topic of careful empirical study in recent years, with this work summarized by Abramitzky, Boustan, and Matiashvili.[12] Measuring and evaluating trends in intergenerational mobility over time is now possible due to advances in the data digitization of the complete-count US census and in historical record linkage.[13]

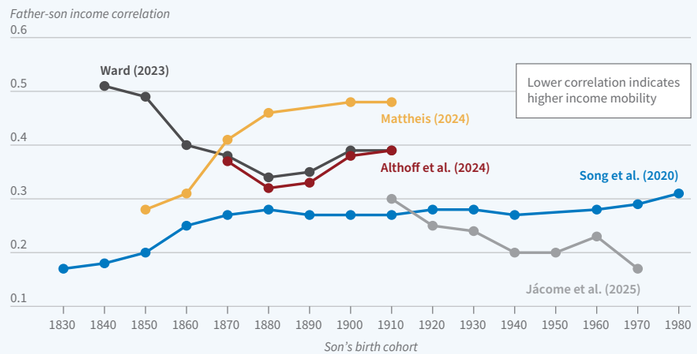
Recent research finds that intergenerational mobility was much lower in the nineteenth century than previously assumed, implying that, if anything, mobility was *rising*, not falling, over key decades of US history. Ward documents the importance of regional income adjustments and corrections for measurement error in obtaining accurate estimates of intergenerational mobility over time.[14] Moreover, findings based on samples of White men tend to overstate intergenerational mobility in the past. New work, such as Jácome, Kuziemko, and Naidu, Collins and Wanamaker, and Buckles, Price, Ward, and Hilber expands analysis samples to include Black men or Black and White women.[15]

A recurrent theme is the role of military service in promoting mobility and social change in the twentieth century. Ang and Chinoy study Black veterans after World War I and illustrate how the discriminatory treatment that Black soldiers experienced in the military encouraged them to join the NAACP and become community leaders to advocate for civil rights after the war.[16] A generation later, men who served in World War II enjoyed higher levels of educational attainment and enhanced income by 1950 according to Collins and Zimran, although these advantages may have dissipated by 1970.[17] Barrera, Ferrara, Fishback, and Heggeness, and Abramitzky, Kowalski, Pérez, and Price document that the GI Bill helped cohorts of men from low socioeconomic status backgrounds gain access to elite colleges at mid-century, but these gains dissipated by the 1980s.[18]

The World War II era reshaped economic mobility beyond the direct effect on men who served in the military. Garin and Rothbaum show that regions that received federal investment for manufacturing capacity during the

Figure 2

Intergenerational Income Mobility, White Men



This figure is abridged from the original.
Source: "Intergenerational Mobility over Two Centuries," Abramitzky R, Boustan LP, Matiashvili T. NBER Working Paper 33330, January 2025.

War experienced sustained economic growth and economic mobility in the subsequent decades.[19] Collins and Niemesh analyze the homeownership boom between 1940 and 1960 and document that it was fueled both by rising real income in the postwar economy and by Veterans Administration loans.[20]

Immigrants and their children move up the economic ladder at a different pace than native-born Americans. Abramitzky, Boustan, Jácome, and Pérez document that the children of immigrants experienced more rapid upward mobility than the children of the US-born raised at the same point in the income distribution, both in the past and today.[21] Residence in enclave neighborhoods is one important difference between immigrants and the US-born. Abramitzky, Boustan, and Connor and Abramitzky, Boustan, and Giuntella study Jewish and Polish Catholic immigrants respectively, finding that living in immigrant enclaves delayed economic assimilation while strengthening ethnic communities.[22] Gagliarducci and Tabellini document a similar pattern for Italian immigrants.[23]

Racial gaps remain high in the US on a variety of economic metrics, including income, wealth, and intergenerational mobility. Derenoncourt, Kim, Kuhn, and Schularick provide the first continuous series of White-to-Black per capita wealth ratios from 1860 to 2020.[24] This ratio is still six-to-one today, more than 150 years after Emancipation. Much of the convergence in this gap took place in the generation following the Civil War. The gap remains today in large part because of the vastly unequal initial conditions after slavery. After the Civil War, the government promised land and federal oversight of the southern labor market in the form of the Freedmen's Bureau. Few of these promises were kept. Collins, Holtkamp, and Wanamaker examine how more widespread land ownership would have improved intergenerational mobility among Black families in the late nineteenth century.[25] Chyn, Haggag, and Stuart show that southern counties that experienced more intensive federal efforts during Reconstruction experienced a backlash among White citizens measured through voting patterns and heightened racial violence.[26] As a result, Black Americans had few opportunities for upward mobility in the South. Baran, Chyn, and Stuart find that moving to northern cities provided new educational opportunities for the children of Black migrants.[27]

Banking and Finance

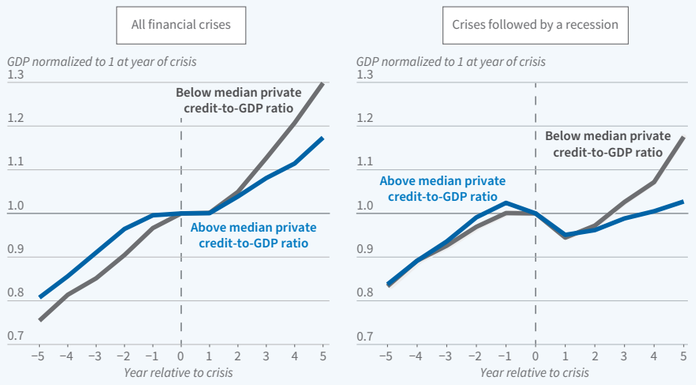
Recent research has continued to advance our understanding of bank failures and financial crises. Frydman and Xu review the last 20 years of research on banking crises, highlighting the value of long-term perspective, the importance of leverage in the financial system as a precursor to crises, the negative and often long-lasting impacts on the broader economy, and the important role that timely government responses can play in offsetting panics.[28]

A substantial body of research examines banking during the Great Depression, when waves of bank failures fueled the economy's downward spiral. Most places in the US lacked branch banking in the early twentieth century, a feature of the American economy that may have left it especially vulnerable to financial crises. Quincy shows that Bank of America's branching system in California, the largest in the country, improved local credit and economic outcomes during the Depression and beyond. Bank of America's geographic diversification and internal movement of capital insulated its branches from local shocks, in contrast to local unit banks and small branch networks.[29] Mitchener and Richardson assemble new datasets from bank balance sheets and show that banks that survived the early 1930s significantly contracted their lending, accounting for a large fraction of the total decline in bank lending.[30] Mitchener and Vossmeyer find that the closure of thousands of banks during the Depression did little to reduce risk in the financial system; that is, there was no "cleansing effect" from the closures.[31] Instead, acquisitions merely redistributed the risk to healthier banks.

In the absence of deposit insurance, banking panics in the early years of the Great Depression were common. President Roosevelt declared a "bank holiday" in March 1933 to assess banks' health and then allowed individual banks to re-open over time. Jaremski, Richardson, and Vossmeyer show that this sequential re-opening conveyed noisy information about banks' health and resulted in financial resources shifting across banks and communities.[32] The stigma of banks re-opening late lasted for a decade, but this was not detrimental to local commercial or industrial activity.

Figure 3

GDP Growth Around Financial Crises



Source: "Banking Crises in Historical Perspective," Frydman C, Xu C. NBER Working Paper 31092, June 2023, and Annual Review of Economics *15(1), July 2023, pp. 265–290.*

The US Postal Savings System did insure deposits. This was a haven for depositors, but it may have exacerbated liquidity risk for local banks. Jaremski and Schuster show that banks operating near post offices that accepted deposits were more likely to close in the early years of the Depression, a reflection of depositor withdrawals.[33]

Recent research has also drawn on historical experience to better understand financial markets. For instance, Bernstein, Frydman, and Hilt study the introduction of Moody's ratings for corporate securities in 1909.[34] Even though the ratings had no regulatory implications, lower-than-expected ratings caused a rise in market bond yields and bonds that were rated by Moody had reduced bid-ask spreads, consistent with improved liquidity and information transmission. Cortes, Vossmeyer, and Weidenmier investigate the "war volatility puzzle" (i.e., the relatively low level of US stock volatility during wartime, even during World War II).[35] They hypothesize that government-guaranteed contracts reduce the uncertainty of firms' earnings, which is consistent with new, hand-collected military spending data spanning more than 100 years, as well as with micro-level analyses. In another paper connected to the economic ramifications of war, Brunet, Hilt, and Jaremski find that Liberty Bond drives during World War I had lasting effects on households' financial behavior, as evidenced in mid-twentieth-century data on stock and bond ownership.[36]

Women in the Economy

The 2023 Nobel Memorial Prize in Economic Sciences was awarded to Claudia Goldin, who served as director of the DAE program for nearly three decades, for her research on the evolution of women's labor force participation over the past two centuries. Goldin's work shows that, in the early twentieth century, women often left the labor force upon marriage. By the 1960s, women instead began planning for careers, delaying marriage and childbearing to invest in higher education. Goldin considers the roles of changing social norms and legislation to formally protect women's economic rights.[37] Ngai, Olivetti, and Petrongolo construct a data series of hours spent on market work for men and women over 150 years.[38] Unlike men, whose work hours have steadily declined since 1880, women's hours first declined and then rose with the transition from agriculture and manufacturing to services and the marketization of household tasks.

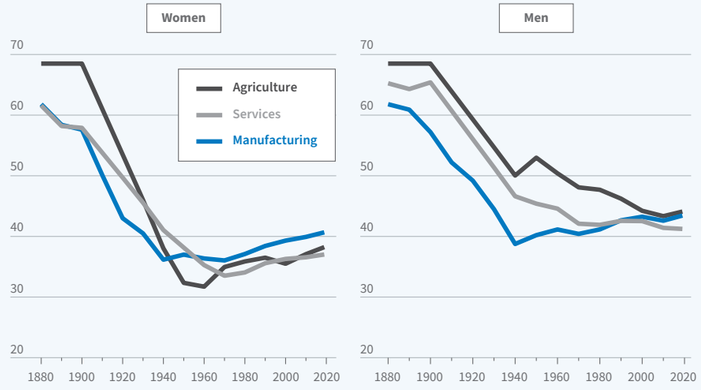
In addition to long-run economic trends, women's fertility and work decisions have been influenced by historical events and specific policy changes. Dettling and Kearney argue that the establishment of modern fixed-rate mortgages during the Great Depression and the diffusion of these loans through the Federal Housing Administration and the Veterans Administration contributed to rising fertility during the postwar years and the baby boom.[39] Goldin adds that the baby boom was an anomaly during a century otherwise marked by fertility decline as the opportunity cost of childbearing rose alongside women's economic opportunities.[40] Rising housing prices, as documented by Lyons, Shertzer, Gray, and Agorastos, may also play a role in recent fertility declines.[41] Bailey, Helgerman, and Stuart document that two pieces of landmark legislation—the Equal Pay Act of 1963 and Title VII of the Civil Rights Act of 1964—contributed to the falling gender pay gap, particularly in industries more exposed to these new legal requirements, even if compliance with the law was slow.[42]

The reorganization of economic activity during wartime also affected women's labor force participation. Aneja, Farina, and Xu demonstrate that the hiring of women for civil service positions during World War I had long-run effects on shaping gender norms.[43] Men who worked in offices with new female coworkers raised daughters who themselves were more likely to work. Ferrie, Goldin, and Olivetti study the first government-funded childcare centers designed to allow mothers to enter the workforce during World War II.[44] They find that due to limited scope and program delays, childcare did not contribute much to labor force entry.

Women have participated in entrepreneurial activities and ownership throughout US history. Wishart and Logan document that White women were actively involved in the market for enslaved persons.[45] In the New Orleans market, for example, women were listed as the owner of record for 30 percent of transactions. Gozen, Hornbeck, Humlum, and Rotemberg study female-owned manufacturing establishments in the mid-nineteenth century.[46] These firms were smaller than male-owned firms, employed more women, and

Figure 4

Paid Average Weekly Hours per Employee, 1880–2019



Source: "Gendered Change: 150 Years of Transformation in US Hours," Ngai LR, Olivetti C, Petrongolo B. NBER Working Paper 32475, May 2024.

were concentrated in subindustries like women's clothing and millinery. Later, in the mid-twentieth century, female-owned employment agencies advertised more skilled occupations for women and helped place women workers into higher paying jobs, according to Hunt and Moehling.[47]

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Collusion in Public Procurement

Sylvain Chassang and Kei Kawai

In both developed and developing countries, annual spending on public procurement averages about 12 percent of national GDP. The efficiency of public procurement can have a long-run impact on the growth and productivity of countries. A major challenge in achieving efficiency, however, is the possibility of collusion among suppliers. Collusive agreements increase prices, leading to wasted tax dollars or, in the case of developing countries, wasted foreign aid. These agreements often shield inefficient firms from competition, diverting resource allocation to low-performing sectors of the economy. Furthermore, the transparency requirements inherent to public procurement, such as public databases of past tenders and associated bids, can facilitate the coordination and enforcement of collusive practices.

This summary reviews our recent work on detecting and tackling collusive behavior in procurement auctions.

Detecting Collusion

Historically, antitrust agencies have taken a reactive approach to cartels, initiating investigations only after receiving complaints from clients or competitors or evidence from informed parties. Over the last two decades, some antitrust authorities have begun to take a more proactive approach by using data-driven screens to identify sectors and firms that are more likely to collude. However, such data-driven screens are often suggestive rather than conclusive because the bidding patterns they flag can be rationalized under competition. As a result, as Chassang and Juan Ortner point out, such screens often fail to meet the burden of proof required to launch investigations.[1] In a series of studies with collaborators, we develop three families of robust tests that identify bidding patterns used by cartels that are unlikely to be rationalized by any model of competition.

Designated Winners and Designated Losers

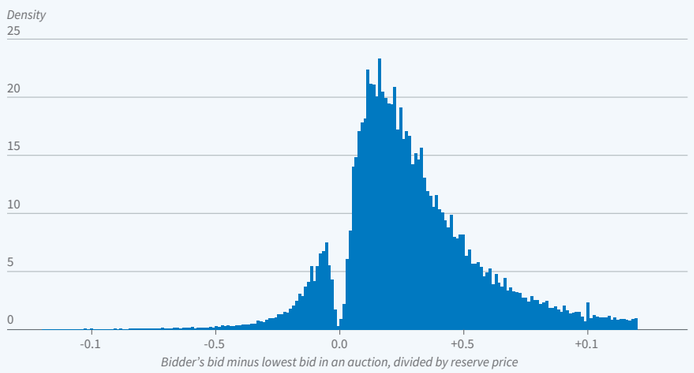
Cartels typically designate winners and losers before the auction. The designated winner submits the lowest bid, and the designated losers submit higher cover bids knowing that they will not win. Kawai and Jun Nakabayashi propose a screen for collusion based on this feature.[2] They analyze procurement auctions in Japan with secret reserve prices in which rebidding occurs when all (initial) bids fail to meet the secret reserve price. Because designated winners and losers are unlikely to change during the initial auction or the rebid (indeed, the designated winner may have already made arrangements in anticipation of winning), the identity of the lowest bidder will often be persistent under collusion. This should be the case even when the initial bids are very close. Under competition, by contrast, if the initial bids are close, the marginal loser should have close to a 50 percent chance of outbidding the initial low bidder.

Japanese procurement data from 2003 to 2005 show that the initial lowest bidder remains the lowest bidder in the rebid more than 95 percent of the time. More importantly, this probability remains above 95 percent even as the initial auction becomes closer, in the sense that the two lowest bids in the initial auction are almost tied. However, there is a 50 percent probability of the second and third lowest bidders changing regardless of how close the bidders are in the initial auction.

These patterns are consistent with the lowest initial bidder being the designated winner, while the second and third bidders participate in the auction only to create the appearance of competition. The patterns cannot be explained by competitive bidding with heterogeneous bidder costs.

Figure 1

Margins of Wins or Losses in Procurement Auctions



Source: "Robust Screens for Noncompetitive Bidding in Procurement Auctions," Chassang S, Kawai K, Nakabayashi J, Ortner J. Econometrica *90(1), January 2022, pp. 315–346.*

Isolated Winners

A second detection strategy, developed in our work with Nakabayashi and Ortner, seeks to draw inferences from the sample residual demand faced by bidders.[3] This demand describes the sample likelihood of winning if the bidder decreases or increases their bid by various amounts. One notable pattern is that winners tend to be isolated: Losing bids close to winning bids are surprisingly rare. As a result, bidders can profitably increase bids without reducing their chances of winning contracts.

Figure 1 illustrates this point graphically for a subset of procurement auctions. It plots $\Delta_{(i,t)}$ for bidder i and auction t; $\Delta_{i,t}$ denotes this bidder's margin of defeat or victory. It is negative if bidder i wins auction t and positive otherwise. There are few bids around $\Delta \approx 0$, which suggests the absence of close losing bids.

The paper systematizes this insight and identifies robust optimality constraints; for example, bidders should not systematically benefit from raising or lowering their bids.[4] These constraints should hold under competition even if costs and information follow arbitrary nonstationary processes. The paper then exploits these optimality constraints to compute the share of auctions that need to be noncompetitive in order to rationalize observed bidding patterns.

Incumbency and Rotation Patterns

In related work with Nakabayashi and Ortner, we further study the inferences that can be drawn from bidding patterns when they are associated with other covariates of interest, such as previous auction participation and outcomes.[5] Indeed, common allocation schemes used by bidding rings are contingent on past allocation outcomes. Under bid rotation, designated winners rotate, so that a past winner is less likely to be the current winner. Under incumbency-based allocation, incumbent winners are designated winners. Both are forms of market division: bid rotation divides the market across time, while incumbent-based allocation divides the market across contract types or geographic locations.

This has led many antitrust authorities and regulators, including the US Department of Justice and Canada's Competition Bureau, to flag bid rotation and incumbency advantage as indicators of collusion. It is possible, however, for bid rotation and incumbency patterns to arise under competition as well. Bid rotation will naturally arise under competition if large amounts of recently awarded work increase marginal costs. Incumbency advantage can arise under competition if some firms specialize in certain types of projects or if geographic proximity to customers lowers costs. Incumbency advantage can also arise with learning by doing. Hence, it is not obvious that bid rotation and incumbency patterns can be used as markers of collusion. Developing tests that can help distinguish between collusive and competitive explanations for rotation or incumbency patterns has been a long-standing challenge.

We propose a test of noncompetitive behavior targeting rotation and incumbency patterns using an approach related to regression discontinuity.[6] The key idea is to compare the characteristics of winners and losers conditional on the lowest and second-lowest bids being close. Indeed, we establish that under competition, conditional on being a close winner or loser, a bidder should win or lose with equal probability. As a result, close winners and close losers should be statistically similar.

Consider two firms regularly bidding on different auctions whose roles as incumbents or entrants may vary depending on the auction. If the auction is competitive, incumbents have a lower cost of procurement: Incumbents tend to win and, conversely, winners tend to be incumbents. However, the likelihood of being an incumbent is continuous in the bid difference. Conversely, if the likelihood of being an incumbent is not continuous in the bid difference at 0, as in Figure 1, then bidding is inconsistent with competitive behavior.

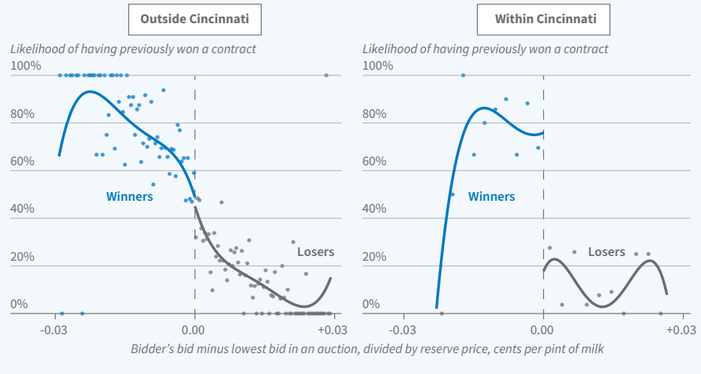
Applications Across Countries

Ohio School Milk Auctions

Our first application of the screen is to school milk auctions in Ohio studied by Robert Porter and J. Douglas Zona.[7] Before the start of every school year, school districts hold auctions to determine the provider of school milk for the following year. During most of the 1980s, dairies around Cincinnati, Ohio, colluded on auctions conducted by nearby school districts. Specifically, the colluding bidders agreed to designate the incumbent as the winner so that each bidder could keep serving the same school districts year after year. The incumbent placed the lowest bid and the nonincumbents placed higher bids in order to make sure that the incumbent won the auction as intended.

Figure 2

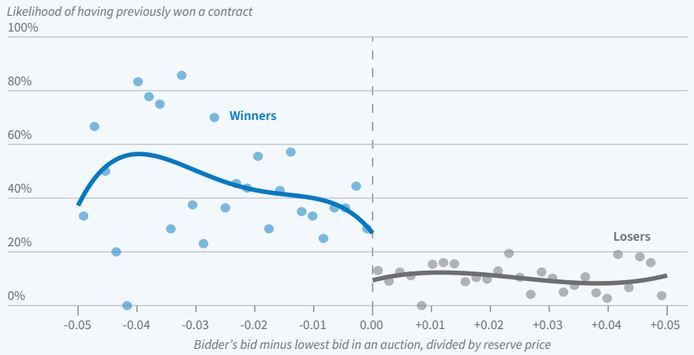
Ohio School Milk Auctions



Source: "Using Bid Rotation and Incumbency to Detect Collusion: A Regression Discontinuity Approach," Kawai K, Nakabayashi J, Ortner JM, Chassang S. NBER Working Paper 29625, January 2022, and The Review of Economic Studies *90(1), January 2023, pp. 376–403.*

Figure 3

Japanese Municipal Auctions



Source: "Using Bid Rotation and Incumbency to Detect Collusion: A Regression Discontinuity Approach," Kawai K, Nakabayashi J, Ortner JM, Chassang S. NBER Working Paper 29625, January 2022, and The Review of Economic Studies *90(1), January 2023, pp. 376–403.*

other auctions suggests that the test is useful for detecting collusion.

Japanese Procurement Auctions for Public Works

We have also applied our test to Japanese procurement auctions for public works contracts. In this setting, it is not always straightforward to identify an incumbent since many public works projects are unique. Hence, we first focus on the set of recurring auctions, which are typically auctions for repair and maintenance contracts.

Figure 3 plots the bid difference $\Delta_{i,t}$ and incumbency for recurring auctions. We find that a much higher proportion of marginal winners tend to be incumbents than marginal losers, which suggests that there is collusion in these auctions.

The set of recurring auctions is less than 5 percent of our sample. When incumbency is difficult to define clearly, bidding rings are likely to resort to other allocation rules, such as rotation.

To detect cartels among a broader set of public works auctions, we consider a test that screens for bid rotation. A defining feature of bid rotation is that the winner has less recently awarded work than the losers because bidders take turns winning auctions. We consider a measure of recently awarded work, $B^{90}_{i,t}$, which is the number of projects firm i has won in the 90 days preceding auction t. We plot backlog $B_{i,t}$ for all firms i and all auctions t in Figure 4. Because the sample contains very large auctions and relatively small auctions, we scale $\Delta_{i,t}$ by the reserve price so that $\Delta_{i,t}$ is in units of percentages of the reserve price. Similarly, we normalize the backlog measures by the firm-specific mean and the standard error. If firm i has a larger backlog at auction t relative to its historical average, the backlog measures will be positive, and vice versa.

This test considers how incumbency or backlog can be used as outcome variables in a regression discontinuity framework to detect collusion. Depending on the nature of the cartel's allocation rule, other outcome variables can be used to detect collusion. For example, in offshore oil and gas tract auctions, some believe that bidders give priority to those who already own a neighboring tract. In this instance, one could screen for collusion by making the outcome variable a neighbor. In other contexts, bidders may allocate auctions depending on how close they are to the construction site, so this distance could be the outcome variable.

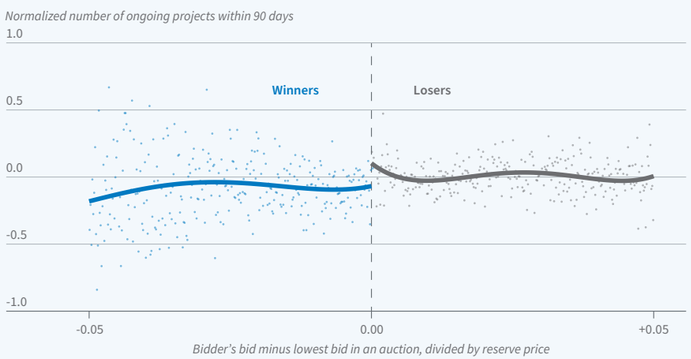
Tackling Collusion

What are the next steps after likely collusion is detected? While data-driven screens can sometimes be used to justify further investigation through official legal channels, suspect bidding behavior on its own often does not provide grounds for legal action. The recent evolution in US case law, in particular *Bell Atlantic v. Twombly*, has changed the burden of proof needed to initiate discovery.[8] Moreover, the law penalizes conspiracies to fix prices rather than tacit collusion. As a result, the US Department of Justice offers leniency to parties that come forward; this is the leading source of legally actionable information on cartels.[9]

There are alternative paths available to auctioneers who have become aware that bidders have organized. Auctioneers can alter the auction design to introduce frictions known to make cooperation between cartel members more difficult.

Figure 4

Construction Firms' Project Backlog and Japanese Public Works Auctions



Source: "Using Bid Rotation and Incumbency to Detect Collusion: A Regression Discontinuity Approach," Kawai K, Nakabayashi J, Ortner JM, Chassang S. NBER Working Paper 29625, January 2022, and The Review of Economic Studies *90(1), January 2023, pp. 376–403.*

Making Punishment Difficult

Cartels must maintain discipline. Cartel members and potential entrants tempted to undercut a designated winner are prevented from doing so by threat of retaliation via price wars. Some of our work investigates the impact on winning bids of minimum price guarantees, which limit the extent of competition, and the scope for punishment via price wars.[10] In municipal procurement data from Japan, the introduction of minimum price guarantees leads to lower bids and greater entry in auctions that are likely cartelized. This is consistent with the interpretation that minimum price guarantees weaken the cartel's ability to maintain discipline. In this setting, a prudent choice for minimum prices is a lower quantile of the range of winning bids observed. The guarantee should be low enough that it does not mechanically increase prices, yet high enough that it effectively constrains the cartel.

Injecting Imperfect Monitoring

Transparency requirements associated with good governance principles likely facilitate collusion in public procurement auctions. Maintaining collusion becomes difficult when losing bids are hidden.[11] One of our recent studies analyzes the introduction of scores in the tendering process used by the Japanese Ministry of Land, Infrastructure, Transport and Tourism.[12] We argue that in competitive environments, switching from first-price auctions to scoring auctions should increase prices. However, in the setting we study, the introduction of scoring led to a reduction in prices. Upon further investigation of the data, we find that scoring weakened overall cartel discipline and was particularly effective because it created an imperfect monitoring problem across cartel members. Because scores are noisy subjective evaluations of proposals, it is difficult for bidders to reliably ensure that an intended winner will in fact win.

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How Microeconomic Disruptions Affect the Macroeconomy

David Baqaee

Aggregation is a central problem for macroeconomics—how to reason about aggregate economic statistics that are composed of many heterogeneous and interacting parts. For example, how do energy shocks, like disruptions to the supply of Russian gas or Middle Eastern oil, affect real output and consumption in Europe and the United States? How do changes in consumer spending behavior during the COVID-19 pandemic affect employment and inflation? How do tariffs on Chinese goods affect real wages in the United States? How does churn in the supply chains of firms—additions and separations of suppliers—affect real output? The common element in these questions is their granularity: The economic shock is not aggregate in nature and affects different parts of the economy differently. The economist's job is to sum up all the disparate effects, take into account relevant interactions, and produce an estimate of the overall effect on output or consumption. These are not new questions, and in recent decades there has been an explosion of research attempting to answer granular questions like them. In this summary, I describe some key takeaways from this research that tackle a range of applied questions.

The Fundamental Theorem of Aggregation

To begin, consider an idealized perfectly competitive economy. Perfect competition means all producers make decisions taking current prices as given—that is, producers do not alter their behavior to change market prices. Other than this idealization, the economy is arbitrarily complicated. This means the economy may have many different households, each with their own preferences, incomes, and spending patterns. It can also have many producers with complex and interconnected supply chains that span industries and international borders.

How does a small change to one part of this economy affect aggregate output? At first glance, one may imagine that the answer to this question is almost impossibly complex and should depend on all sorts of details. For example, we must know how easy it is to find substitutes for the good being shocked. How complex are the supply chains leading to and the demand chains emanating from this good? How quickly and easily can labor and capital markets reallocate labor and capital? How big are adjustment costs? And on and on.

Surprisingly, the answer turns out to be deceptively simple: the percentage change in output is equal to the sales of the part of the economy that was shocked multiplied by the percentage change in its microeconomic efficiency. So, for example, if oil producers become 1 percent less efficient—that is, they produce 1 percent less output holding their inputs constant—then aggregate output falls by 1 percent times the sales of oil producers relative to total production.

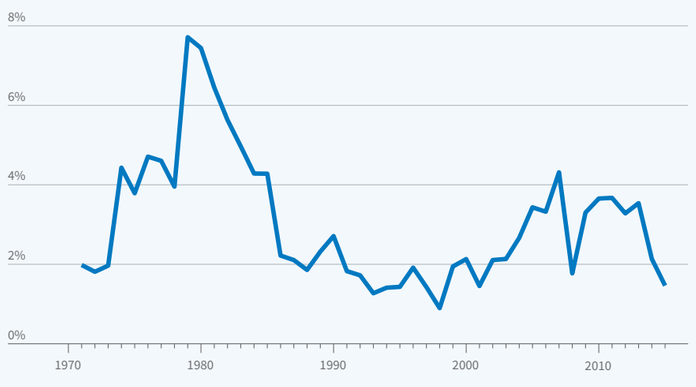
This result, oftentimes known as Hulten's theorem, is a consequence of perfect competition and underpins my approach to thinking about how granular shocks affect aggregate outcomes.[1] If details other than sales shares matter, then it must be the case that Hulten's theorem does not apply, and understanding why the theorem fails to apply is key to understanding why its naïve application may over- or understate the true effect. It also highlights what forces are important to measure if we are to arrive at more reliable answers. In each of the research applications below, I discuss the prediction from Hulten's theorem as well as its shortcomings.

The Effect of Large Disruptions on Output: The Case of Energy

The late Emmanuel Farhi and I extended Hulten's theorem beyond small shocks.[2] If the disturbance to the economy is large, then Hulten's theorem can cease to provide a good approximation. A good example is the energy industry. If the shock is small, then assuming perfect competition, the loss in aggregate efficiency is the reduction in the efficiency of oil producers times their sales as a share of GDP. In normal times, the sales share of energy is small, around 2 percent of GDP. However, a negative shock to oil supply causes oil's sales relative to GDP to rise.

Figure 1

Ratio of Global Oil Sales to Global GDP



Source: "The Macroeconomic Impact of Microeconomic Shocks: Beyond Hulten's Theorem," Baqaee DR, Farhi E. NBER Working Paper 23145, March 2019, and Econometrica *87(4), July 2019, pp. 1155–1203.*

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Figure 1, which plots oil sales relative to GDP, provides an illustration of this phenomenon. In the 1970s, the global economy was buffeted by a series of negative supply shocks to oil, including the Arab oil embargo, coordinated action by members of OPEC, and the Iranian revolution. Oil sales relative to GDP were 2 percent in 1972 and almost 8 percent in 1980. This means that the same-sized negative shock to the oil industry was four times more damaging to the world economy in 1980 than it would have been in 1972. It also means that, since the sales of oil relative to GDP increased dramatically, Hulten's approximation would have understated the importance of oil shocks by roughly a factor of three.

The key insight of approaching the problem through the lens of Hulten's theorem is that it points to an important sufficient statistic for understanding the aggregate consequences of large shocks: changes in sales shares relative to GDP. The forces that cause expenditures on oil to increase relative to GDP in response to negative supply shocks are the same ones we need to understand in order to quantify the effect of those supply shocks on aggregate output. Those forces include complementarities in production technologies between oil and other inputs, diminishing returns to scale that limit the economy's capacity to maintain energy production in the face of negative shocks, and the ubiquity of oil in supply chains that limits substitution possibilities in the production network.

The Effect of Distortions on Short- and Long-Run Consumption: The Case of Sanctions

In subsequent work, Farhi and I extend Hulten's theorem to relax the assumption about perfect competition.[3] The power of Hulten's theorem derives from the fact that in a perfectly competitive economy, every potential user and producer of a good has the same valuation for that good. This has two implications. First, since all users of a good have the same valuation for that good, the increase in aggregate output from an increase in the production of a good depends on the sales of that good. Second, reallocations of resources across competing uses are irrelevant; one consumer's gain is equal in value to another's loss and has no effect on aggregate output.

When competition is imperfect, due to, say, market power, financial frictions, or taxes, then neither of these statements hold. First, since the costs to producers are not equal to the price faced by consumers, the increase in output from an increase in the production of a good is not approximated by its sales. Second, since the value of a good is not equalized across all market participants, reallocations cannot be ignored, even if one is only interested in aggregate output. Our work develops extensions of Hulten's theorem to account for these effects in a closed economy without trade.[4] We also extend this methodology to account for international trade. Hannes Malmberg and I further extend this type of analysis to understand long-run outcomes in models with heterogeneous capital goods and capital accumulation.[5]

We show that, from a long-run perspective, there is a gap between the cost of maintaining the physical capital stock of a country (given by investment costs) and the revenues the capital stock generates (capital income). We show that this gap, which reflects compensation for risk and discounting, is equivalent to a markup on capital services from the perspective of long-run outcomes. For this reason, Hulten's theorem cannot be naïvely applied to studying long-run outcomes since investment costs are typically not equal to capital income. For example, in the United States, investment is around 20 percent of GDP, whereas capital income is around 35 percent.

In recent work with Malmberg, we apply this methodology to understand how sanctions on Russian energy and a US trade war affect long-run consumption and real wages.[6] We show that accounting for this gap and modeling capital adjustment is critical when analyzing the long-run effects of trade wars on real wages and consumption. This is because sanctions increase the relative price between investment goods and labor by taxing imported investment goods and their inputs. This price shift depresses capital demand, shrinks the long-run capital stock, and pushes down consumption and real wages compared to scenarios with fixed capital. The extent of the reduction in long-run consumption, in turn, depends on the gap between investment and capital income.

For example, in the case of a US trade war, we show that when adjustments in the capital stock are taken into account, long-run consumption and wage responses are both larger and more negative. With capital adjustment, US consumption can fall by 2.6 percent, compared to 0.6 percent when capital is held fixed.

The Effects of Lumpy Production for Aggregate Productivity: The Case of Supplier Turnover

An assumption implicit in Hulten's theorem is that production processes can be adjusted smoothly. However, certain production processes cannot just be smoothly scaled up or down. Instead, these changes occur in "lumps"—big jumps in capacity or cost when expanding or shrinking. This is especially true for the entry and exit of firms, which require a minimum size in order to be viable.

Ariel Burstein, Cédric Duprez, Farhi, and I generalize Hulten's approach to allow for jumps associated with the appearance or disappearance of firms.[7] Figure 2 shows, at the microeconomic level, the causal impact of the appearance or disappearance of a supplier for the per-unit costs of manufacturing firms in Belgium. The appearance of new suppliers tends to lower costs, and the disappearance of suppliers raises costs for downstream firms. The effect is symmetric and persistent: For each 1 percent of suppliers added or lost, per-unit costs fall or rise by around 0.3 percent as a share of total variable costs. In a perfectly competitive model, where Hulten's theorem holds, this effect should be zero. If

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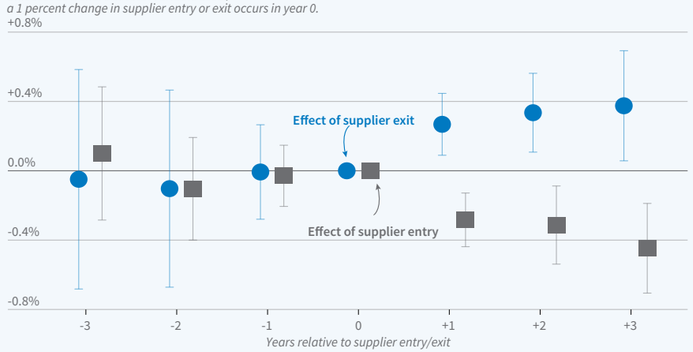
Figure 2

Manufacturing Costs Due to Supplier Entry and Exit

Unit cost as a share of total variable costs;
a 1 percent change in supplier entry or exit occurs in year 0.



Bars represent 95% confidence intervals.
Source: "Consumer Surplus from Suppliers: How Big Is It and Does It Matter for Growth?" Baqaee D, Burstein A, Duprez C, Farhi E. NBER Working Paper 31231, December 2024.

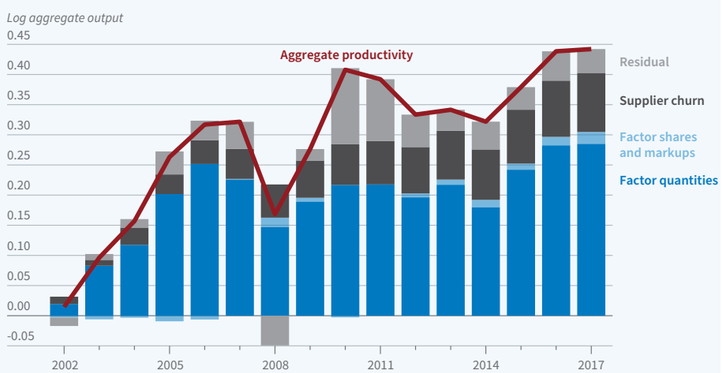
a supplier's disappearance raises or lowers unit costs for its customers, then it is not rational for that supplier to take prices as given.

Figure 2 hints at the macroeconomic importance of supplier churn. Dynamism in supply chains, where new suppliers enter into supply chains, pushes down production costs for other firms and boosts aggregate productivity. We quantify the importance of supplier churn for measuring aggregate growth by adding an extensive margin for supplier additions and separations to standard growth accounting formulas based on Hulten's theorem. Our formula accounts for the effects of supplier link formation and separation on the prices for downstream firms and the transmission of these price changes along existing supply chains from supplying firms to purchasing firms, all the way down to final consumers.

In Figure 3, we use the estimates in Figure 2 plus the Belgian firm-level production network, constructed from value-added tax returns, to conduct a growth accounting exercise for Belgium. We decompose aggregate output growth into several components: growth in the quantity of primary factors like labor and capital, reallocation effects captured by changes in markups and factor shares, a term capturing the importance of supplier churn, and a residual that captures all other factors. We find that around half of aggregate productivity growth—growth not due to factor quantities—between 2002 and 2018 can plausibly be accounted for by supplier churn. This is because each year more suppliers are added than are dropped, in expenditure share terms, and this dynamism in the supply chain can explain a large chunk of aggregate productivity.

Figure 3

Sources of Aggregate Productivity Growth



Source: "Consumer Surplus from Suppliers: How Big Is It and Does It Matter for Growth?" Baqaee D, Burstein A, Duprez C, Farhi E. NBER Working Paper 31231, December 2024.

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David Baqaee

David Baqaee is a professor of economics at UCLA, an NBER research associate affiliated with the Economic Fluctuations and Growth and International Trade and Investment programs, and an affiliate of the Centre for Economic Policy Research. His work explores how market power, nominal rigidities, and increasing returns to scale impact aggregate productivity through resource misallocation and production networks. His research has appeared in *Econometrica*, the *American Economic Review*, the *Journal of Political Economy*, *The Quarterly Journal of Economics*, and *The Review of Economic Studies*. Baqaee is an associate editor of *Econometrica* and *The Quarterly Journal of Economics*. He received his PhD in economics from Harvard University in 2015 and previously taught at the London School of Economics.

Housing, Climate Risk, and Insurance

Benjamin J. Keys

Homeowners are especially vulnerable to climate change. Their homes are commonly the largest investment in their portfolio, but houses are immovable assets. With the US housing market worth approximately $48 trillion, the choices homeowners, home builders, insurers, and mortgage lenders make around climate risk also affect the macroeconomy. In this article, I summarize the work that my coauthors and I have conducted on the topic of housing and climate risk.

How environmental risks associated with climate change are reflected in the market value of properties is known as "capitalization." House prices shifting due to climate risk signal where and how quickly adaptation must occur. When property values fail to promptly or accurately capture these risks, it creates a gap between perceived value and long-term vulnerability. The timing and extent of home price adjustment are critical for understanding whether assets are valued correctly and ultimately the true economic impact of climate risk.

My work explores changes in long-term risk perceptions and in direct financial costs of insurance. Perceptions of risk may operate on different timescales, which are subject to disagreement. Insurance prices, as a direct financial signal, are a primary pathway by which housing markets can adjust to climate risk. Premium changes today may cause homeowners to update their beliefs about today's risks as well as the future path of risks.

In the face of more frequent and severe climate events, many homeowners are uninsured or underinsured. Climate-induced disasters are a further destabilizing event for housing markets—post-disaster aid can help affected households. Insurance markets alone thus offer an incomplete picture, as capitalization is additionally influenced by households' ability to recover in the aftermath of a disaster. A holistic analysis of climate risk transfer programs, such as insurance and post-disaster aid, which may face different adverse selection and moral hazard challenges, represents a potential direction for future research.

Do House Prices Reflect Climate Risk?

As 42 percent of the US population resides in shoreline counties, whether housing markets incorporate information on the risk of sea level rise (SLR) is of critical importance. Philip Mulder and I study the relationship between exposure to SLR and changes in housing and mortgage markets over the 2001–19 period.[1] We focus on the coastal Florida market, where the Union of Concerned Scientists projects that more than 1 million properties are at risk of chronic inundation due to SLR by 2100.

To examine how climate risks are incorporated into housing markets, we link combined data on home transactions, sales listings, mortgage applications, and insurance premiums to climate forecasts at the census tract level. Our analysis focuses on similar housing markets within one mile of the Florida coast that are differentially exposed to SLR because of differences in elevation.

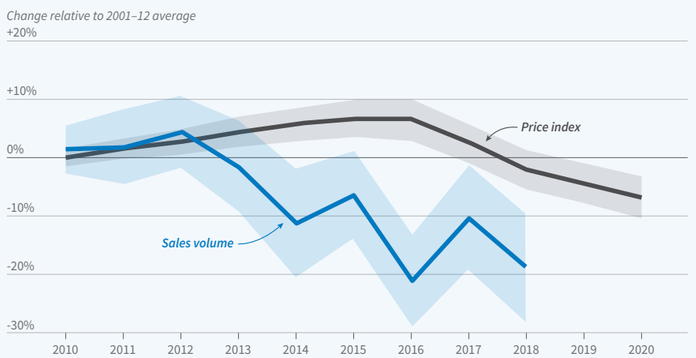
We document a demand-driven decline in transaction volumes and home prices over a period of increasing risk salience. As shown in Figure 1, transaction volumes began to diverge in 2013, with prices declining only gradually thereafter. Using listings data, we find that the transaction decline can be attributed to sellers continuing to list their homes at the same prices as their less exposed coastal neighbors. As a result, SLR-exposed homes spent more days on the market before selling and accumulated as unsold inventory. Only gradually did sellers lower their list prices to meet the falling demand of buyers.

Calibrating a housing market model of transaction volume and prices where sellers incorporate negative climate news into their list prices with a delay, we find that by 2019, buyers demanded a 6.7 percent price discount to accept SLR risks. Interpreted through the model, a discount of this magnitude implies that buyers expect at-risk coastal homes to be underwater 20 years earlier than suggested by home prices alone.

Our findings suggest that capitalization of new information about risks into house prices is neither instantaneous nor automatic. In addition, the results point to a potential area for further research in decomposing the influence of frictions that delay adjustment. Possible channels include sluggish updating of beliefs, the effects of subsidized flood insurance, and the choice of mortgage lenders to not price regional risk.[2]

Figure 1

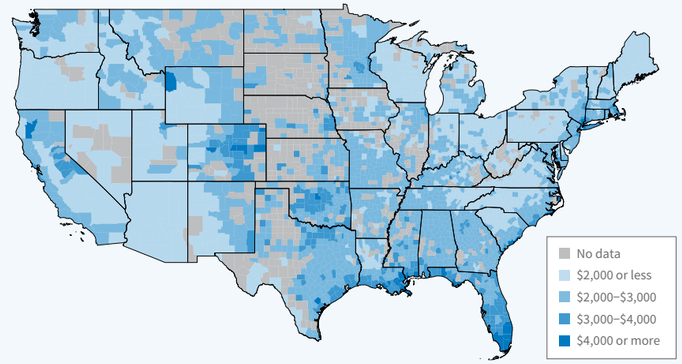
Sales Volume and Price Index for Homes Exposed to Rising Sea Level Risk



Shaded areas represent 95% confidence intervals.
Source: "Neglected No More: Housing Markets, Mortgage Lending, and Sea Level Rise," Keys BJ, Mulder P. NBER Working Paper 27930, October 2020.

Figure 2

Average Annual Insurance Premiums, 2023



Source: "Property Insurance and Disaster Risk: New Evidence from Mortgage Escrow Data," Keys BJ, Mulder P. NBER Working Paper 32579, June 2024.

What Is Driving the Increased Cost of Property Insurance?

Property insurance plays a critical role in housing markets. Few homeowners can afford to pay out of pocket when disaster strikes. Most home transactions are facilitated by mortgage credit, and mortgage lenders and guarantors like Fannie Mae and Freddie Mac require sufficient insurance coverage to protect their collateral.

However, how property insurance markets are adapting to rising climate risk is understudied due to a lack of granular data on how much households pay for coverage. Mulder and I develop a new approach to measuring homeowners' insurance premiums.[3] We decompose mortgage escrow payments into their primary components (principal + interest + taxes + insurance) to isolate homeowners' property insurance expenditure. Using a large database of mortgage escrow payments, we construct over 47 million observations from 2014 to 2023.

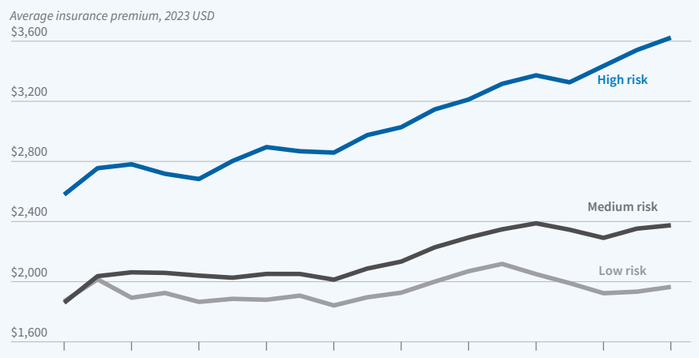
We find that average nominal premiums increased by 33 percent from 2020 to 2023, a 13 percent real increase. With the granularity of our data, we are able to produce county-level maps of the cost of insurance (shown in Figure 2) and analyze trends in premiums at the ZIP code level. We provide the first estimate of the relationship between disaster risk and premiums using within-state variation in expected disaster losses. While we find that the increase in construction costs can explain slightly over half of the rise in premiums, we also show that the largest increases were concentrated in ZIP codes with the greatest disaster risk (see Figure 3). Our estimates show that the relationship between disaster risk and premiums sharply increased, such that a 1 standard deviation increase in disaster risk is associated with a $425 increase in premiums, up from $250 in 2018. This tightening of the relationship between risk and premiums explains nearly 20 percent of the increase in premiums.

This increase in the risk-to-premium gradient coincides with a doubling of reinsurance prices between 2018 and 2023. Reinsurance draws from a global pool of capital to protect the insurance industry from insolvency and especially to insure it against concentrated catastrophe risk. We show that the dramatic shifts in reinsurance pricing associated with more frequent and severe climate-induced disasters, increased construction costs (materials and labor), and the effects of a changing interest rate environment are being passed through to homeowners' policies in dense high-risk areas. Among the most heavily exposed ZIP codes, we estimate that the reinsurance shock increased annual premiums by nearly $300 in 2023.

Finally, we examine the capitalization of the reinsurance shock into

Figure 3

Disaster Risk Exposure and Insurance Premiums



Source: "Property Insurance and Disaster Risk: New Evidence from Mortgage Escrow Data," Keys BJ, Mulder P. NBER Working Paper 32579, June 2024.

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house prices. House prices should reflect long-term expectations about the costs of insuring the home. If market participants expect this reinsurance shock to be a temporary blip, then we should expect to see little effect on home values. Instead, we find that the reinsurance shock reduced 2023 home values by an average of $8,400. The capitalization of premiums into home prices is even stronger in markets where climate risk is growing, suggesting that the reinsurance shock has shifted real estate market participants' expectations about future premium growth.

Our work provides new estimates of the relationship between expected disaster losses and insurance premiums in the midst of recent market turmoil, and the degree of pass-through from secondary reinsurance markets to primary homeowners insurance premiums to house prices. A key takeaway is that capital market disruptions affect what homeowners ultimately pay for climate risk, thereby shaping the price signal for other adaptation or resiliency investments. Households face not only changing climate risks but also changes in the price to insure those risks.

How Do Uninsured or Underinsured Households Manage Disaster Losses?

In the aftermath of disasters, many households who are uninsured or underinsured experience large shocks to their balance sheets. In coauthored work with Benjamin L. Collier, Daniel A. Hartley, and Jing Xian Ng, I examine the effects of credit supplied by the US federal disaster loan program, which provides loans to households with uninsured damages from a federally declared natural disaster.[4]

The federal disaster loan program is one of the primary sources of disaster assistance to households, lending over $60 billion since its inception. Our data include 315,000 households who applied for assistance across 614 distinct federally declared disasters between 2005 and 2013. These households experienced large shocks to their balance sheets, with average uninsured damages of $80,000, or more than 110 percent of average annual income.

Using the program's administrative data linked to credit records, we exploit a discontinuity in loan approval around a debt-service-to-income (DTI) threshold of 40 percent, which is codified in the program's loan underwriting handbook. Applicants with a DTI just below this threshold are 20 percentage points more likely to be approved than those applicants just above it. We find that receiving a federal disaster loan persistently reduces financial distress, with approved applicants around the discontinuity 61 percent less likely to file for bankruptcy in the three years following the disaster compared to denied applicants with similar economic need and creditworthiness (see Figure 4). In addition, these loans act as complements to other private borrowing. For example, approved applicants are persistently more likely to take out a new auto loan in the years after the disaster.

How does the program target benefits? We examine the mechanisms behind the effects of emergency credit and financial distress. The program has a number of unique features, such as a borrowing amount above which the loan must be collateralized by a lien on the house[5] and two different interest rate regimes depending on household creditworthiness. Examining variation around the interest rate regime cutoff (a FICO score of 700), we find that the loan's benefits arise from the provision of emergency liquidity rather than through the subsidization of a lower interest rate.

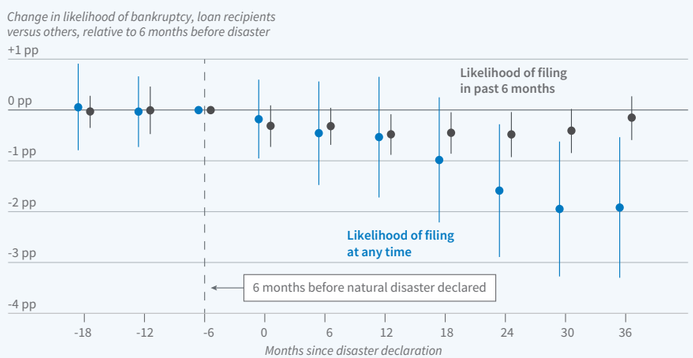
By matching detailed disaster loan applications with consumer credit reports for the first time, we show the benefits of liquidity provision precisely when it is most needed, a situation that is increasingly relevant as natural disasters become more frequent and severe.

A Continuing Research Agenda on Housing and Climate Risk

In a world of growing climate-induced disasters, the challenges for property markets will only intensify. Rising insurance costs are creating dilemmas both for households managing their pocketbooks and policymakers who wish to guarantee the availability of some form of insurance. Without insurance, homebuyers would be unable to qualify for a mortgage. Thus, research on how housing, mortgage, and insurance markets are being reshaped by climate risk has the potential to inform policy. Price signals from insurance premiums are the most direct information most households have on their risk, and these signals should induce responses in the form of resilience investments or exit. Further research is needed to understand the competitive forces at play in the insurance and reinsurance markets, the role of information provision in influencing home building and home buying decisions, and the trade-offs faced by regulators around the availability and affordability of protection against growing physical risk.

Figure 4

Disaster Loan Approval and Bankruptcy Filing



The US federal disaster loan program provides loans to households that have uninsured damages from a federally declared natural disaster. Thin bars represent 95% confidence intervals.
Source: "Credit When You Need It," Collier BL, Hartley DA, Keys BJ, Ng JX. NBER Working Paper 32845, August 2024.

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Benjamin Keys

Benjamin Keys is the Rowan Family Foundation Professor of Real Estate and Finance at the Wharton School, University of Pennsylvania, and an NBER research associate affiliated with the Public Economics program. His interests center on household finance, real estate, and mortgage markets, with recent work on climate risk, foreign investment, and financial distress. His research has been published in *The Quarterly Journal of Economics*, the *American Economic Review*, and the *Journal of Financial Economics*. Keys received his PhD from the University of Michigan, previously taught at the University of Chicago, and worked at the Federal Reserve Board.

The Economics of Counterfeiting

Yi Qian

Intellectual property (IP) rights and counterfeiting have permeated everyday lives as globalization, technological advancement, and AI flourish. Interbrand estimates that the brand value of Louis Vuitton was $26.3 billion in 2023, as an example of the IP value of brands. The values brands possess generate incentives for counterfeiting and imitation. Counterfeiting cuts across countries and industries. Notably, counterfeit footwear has topped the seizure list of the US customs service for four years, accounting for nearly 40 percent of total seizures.[1] The origins, impacts, and remedies of counterfeits and the protection of IP are pertinent topics to address.

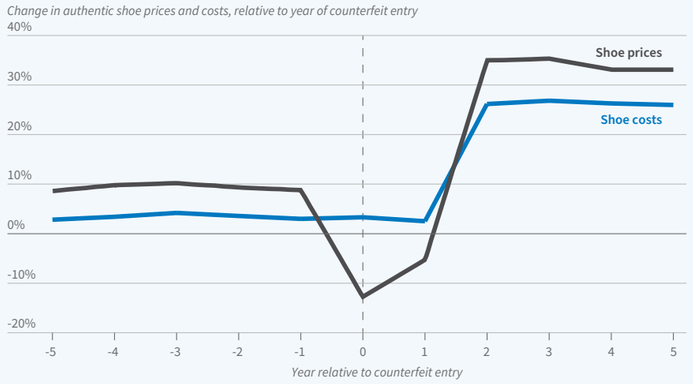
My research agenda is centered on the economics of innovation, IP, and brand management against counterfeiting. At a broad level, my interests in branding and IP motivate the analysis of the strategic roles of IP development and protection, the impact of counterfeiting and imitation, and brand management in emerging markets.[2] The goal of my research is to understand a) the origins, impacts, and remedies of counterfeiting and imitation, b) how IP laws and policies shape incentives for innovation and the marketing of innovation, and c) the relationship between intangible IP and economic performance. I explore these questions to better understand how marketers can more effectively respond to IP policies and devise IP strategies. In addition, my research offers insights into ways to increase consumer surplus and improve social welfare.

My primary research involves understanding the impact counterfeiters can exert on the market. For companies, brands are valuable IP and strategic assets, a source of competitive advantage. For consumers, brands ideally serve as a guarantee of authenticity and quality. For policymakers, branding investments affect social welfare and, in the long run, the rate of economic growth. My research sheds light on the ways in which brand infringement and protection interact with the broader economy and subsequently generate important implications for government and managers alike. It does so in three ways: a) by investigating the role of trademarks—the form of IP that protects brand exclusivity—and presenting evidence that informs trademark policy choices and branded firms' self-enforcement strategies; b) by exploring how brand management activities against counterfeits affect market competition and innovation, thus relating branding to broader company strategies and industrial organization; and c) by drawing analogies between the concepts of brand and collective reputation to understand how false victim signals free ride on the authentic victim "brand," tarnish its reputation, and harm social welfare.

I identify heterogeneous sales impacts of counterfeiting on different quality tiers and brands. I evaluate how firms can better manage their IP and branding strategies in a market with counterfeits or imitations, including adjustment of the extent, nature, and direction of innovation, pricing, investment in self-enforcement, and vertical integration of downstream retail channels. The set of strategies are complements rather than substitutes. I further explore how income inequality and status signaling can drive the demand for counterfeits and how personality affects individual attitudes toward counterfeits and counterfeiters as well as incentives to counterfeit.

Figure 1

Shoe Counterfeiters and Authentic Manufacturers' Prices



Source: "Impacts of Entry by Counterfeiters," Qian Y. The Quarterly Journal of Economics *123(4), November 2008, pp. 1577–1609.*

The General Marketing Impact of Counterfeiting

One strand of my research involves an econometric attempt to study the general marketing impact of entry by counterfeiters under weak IP protection.[3] I collected new panel data from Chinese shoe companies from 1993 to 2004. By exploiting the discontinuity of government enforcement efforts in the footwear sector in 1995 and the differences in authentic companies' relationships with the government, I identify and measure the effects of counterfeit entry on authentic prices, quality, and other market outcomes. My analysis shows that counterfeit entry stimulates the original producer to offer a higher-quality product at a higher price. In addition, company-level self-enforcement activities and downstream vertical integration of licensed company stores are effective in deterring counterfeit entry or reducing counterfeit sales. For companies conducting business in developing countries, relationships with local governments play important roles in brand management.

The aforementioned strategies that branded firms adopt to combat counterfeits can be considered manifestations of endogenous sunk costs (ESC) that can sustain market dominance.[4] My work provides a theoretical framework for understanding counterfeiting.[5] I build upon a vertical differentiation model with endogenous quality and other ESC. I model two layers of asymmetric information that counterfeiting frequently generates: First, there is asymmetric information between a counterfeiter and buyers. Second, some buyers may show off the counterfeits to signal their fake status. I find evidence that legitimate firms react by establishing essentially a separating equilibrium that signals their goods' origin by investing in quality, developing retail stores, fostering self-enforcement, and raising prices. In contrast, the conventional wisdom in developing countries is that weak enforcement forces legitimate firms to accept lower prices and quality in what amounts to a pooling equilibrium. I find the former outcome in a common consumer good: footwear. Brands did not innovate prior to entry by counterfeiters, even though there was substantial competition among the horizontally differentiated brands. My model conceptualizes and resolves this puzzle: Due to the knock-off nature of counterfeits, they enter the vertical quality line of the infringed brand. Such competition exerts unique pressure on the brand to move up the quality ladder in a market where the brand otherwise enjoys monopolistic power in its own niche. This suggests that a substantial portion of the rents from innovation accrue not from technological novelty but from embedding innovation in brands and distribution systems insulated from fringe competition.

My findings suggest that public-private partnerships in enforcement could be effective, leveraging both the private firm's insider knowledge and the government's sanction power. Inviting collaboration with the brands that have vested interests and incentives to combat illegal activities such as counterfeiting could lead to more efficiency.

The Nature and Direction of Innovation Responses to Counterfeiting

The theoretical model described above provides the microfoundations of consumer deception by a counterfeiter and an authentic firm's tactics (distribution choices and self-enforcement) to mitigate it. My research with Qiang Gong and Yuxin Chen provides a deeper theoretical examination of the nature and extent of innovation by disentangling the attributes of quality. We focus on the differential impact on two dimensions of quality.[6] The fact that counterfeiters usually mimic an authentic product's design but offer inferior functional quality has important implications for authentic producers' incentives to innovate and the nature of innovation. This theoretical framework helps unravel these complexities with intuitive closed-form solutions. While prior literature primarily defines a prestige effect as a function of the total sales of the brand (and its counterfeits) and one-dimensional quality, we decompose quality to a finer level. In addition, we endogenize quality choices and analyze the model under producers' flexible cost structures. The findings provide practical guidance on brand-protection strategies under different market conditions where counterfeits may vary by production cost and pervasiveness.

This research contributes to the literature on counterfeits and product quality differentiation. Our model extends Philip Nelson's constructs on searchable and experiential goods to quality dimensions within a good.[7] For many products, including authentic brands subjected to counterfeit imitation, some quality traits are observable (e.g., stitching, appearance) and others unobservable (e.g., durability) at the time of purchase. Counterfeits, by definition, share some searchable (observable) quality traits with the authentic brand, whereas the deception revolves around the experiential (unobserved). Our model incorporates two dimensions of endogenous vertical quality as well as endogenous price under asymmetric information and yields closed-form solutions as testable predictions of counterfeit competition. In related work, we generalize the model framework to capture continuous quality dimensions.[8] Untangling these two quality dimensions yields insights into the unique impact counterfeits can have on branded products compared with a generic entry.

The topic is relevant to emerging markets and the results shed light on an interesting feature of these markets. Emerging markets are characterized by relatively low enforcement of anti-counterfeit regulation. Chinese counterfeit shoe manufacturing, which is weakly regulated, is the setting for the theory's empirical test. Therefore, this research can provide insights into marketing in emerging markets. A key result is that at low levels of counterfeiting, the brand tolerates some counterfeiting by allowing the counterfeiter to pool on the searchable dimension. However, if counterfeiting grows too much, the brand separates by making the quality on the observable dimension sufficiently high that the counterfeiter cannot reproduce the same high level of quality on this dimension. We formalize this notion as the "self-correcting property" of emerging markets—if it anticipates too much counterfeiting, the brand preempts it. We also provide supportive anecdotal and empirical evidence. Based on detailed shoe characteristics data, we find that branded companies improved their searchable quality dimensions after infringement by counterfeiters, but not their experiential dimensions.

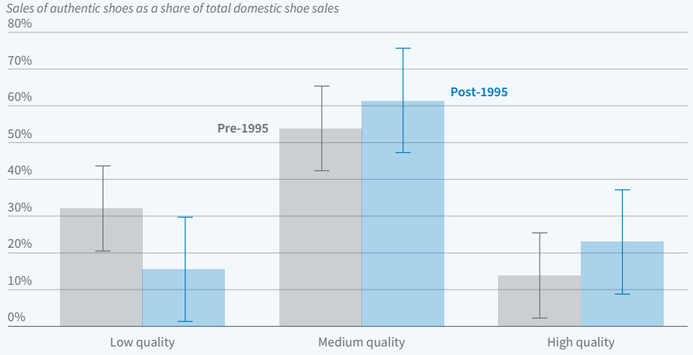
While branded firms were shown to innovate in the face of counterfeiting, are such incentives sustainable? In order to effectively guide priorities for and directions of innovation and enforcement strategies, it is crucial to understand the sales impacts of counterfeits on authentic products of different types and quality tiers and on brands of different natures and life stages. However, the extant literature has left this topic largely unexplored, due in part to insufficient data. My research fills this void by investigating the specific sales impacts of counterfeits through field and experimental methods, including

Figure 2

Counterfeit Entry and Authentic Shoe Sales, by Quality Tiers

In 1995, the Chinese government reallocated enforcement resources away from footwear manufacturing.

Sales of authentic shoes as a share of total domestic shoe sales



Bars represent 95% confidence intervals.
Source: "Counterfeiters: Foes or Friends? How Do Counterfeits Affect Different Product Quality Tiers?" Qian Y. NBER Working Paper 16785, September 2013.

examining how product quality, product type, brand age, and brand reputation mediate these effects.[9] Such sales-related findings go well beyond the general marketing impacts of counterfeiting and shed much-needed light on potential *incentives and directions* for innovation and enforcement as well as academic, managerial, and policy-related implications.

Analyses using economic theory, empirical modeling, and randomized lab experiments arrive at convergent results. I identify some of the benefits (advertising) and costs (substitution) to legitimate brands from counterfeit imitation. The advertising effect outweighs the substitution effect for high-end products and the business-stealing effects dominate for low-end products where counterfeits are closer substitutes. I further identify moderators of the advertising effects of counterfeiting and find that the advertising effects are larger for brands that are younger and less famous at the time of infringement and for products that are more fashionable and tailored to younger customers. Such heterogeneous sales impacts could steer innovations along the respective dimensions. The consistency of results from the Chinese field panel data and US-based lab experiments demonstrates that the panel-based findings have implications beyond China, and the generalizable principles are theorized with a vertical differentiation model of multi-product firms.[10] I have identified similar positive spillover effects of an entrant (e.g., outlet store) in other contexts in marketing, such as line extensions.[11]

Varying Effects of Counterfeiting by Time, Sector, and Region

In addition to estimating the overall average treatment effects of entry by counterfeiters, I estimate the dynamic and heterogeneous impacts and the factors underlying any heterogeneity in brand management responses. I have tracked the long-term sales impact of counterfeiting for three quality tiers of brands. I show that the positive advertising effects on the high-end product sales and negative substitution effects on the low-end product sales lingered for years. Gilles Grolleau, Juliette Evon, and I find that the heterogeneous effects of counterfeiting are corroborated in the wine industry.[12] Alex Cuntz and I find an overall negative counterfeiting effect on R&D and net sales as well as unusual positive effects for the broad sector of tools, materials, and vehicles.[13] Infringements by piracy of differing quality levels cause heterogeneous effects for different brands, whether they are plaintiffs or defendants in trademark litigation.[14] The same is true for movie producers and theaters with regard to box-office revenues before and after launch.[15]

Understanding the heterogeneous effects of counterfeits on product and brand types helps to paint a more complete picture of counterfeits' impact as well as provide more specific guidance. In even the wealthiest nations, resources are constrained and prioritizing enforcement efforts based on the heterogeneous impacts of counterfeiting is crucial.[16] This stream of research therefore contributes to the broader literature on how firm responses to their legal environment could have important moderating effects on the impact of IP protection.

Demand for Counterfeiting

In order to propose effective IP and brand-management strategies, it will also be helpful to understand what drives the demand for counterfeits and what affects purchasing behavior. Hui Xie and I employ new nonparametric data fusion methods to develop comprehensive databases that overcome data constraints when studying consumer counterfeit purchase behavior.[17] We examine the branded company's internal records and consumer survey datasets simultaneously and find that such data fusion helps us to develop databases that enable studying the relationships between counterfeit purchases and various marketing elements, such as consumer purchase motivations, behaviors and attitudes toward the authentic product, and the brand's marketing channels, promotions, and advertisements.

The analysis reveals systematic differences in the characteristics of consumers with different counterfeit-purchase outcomes. In particular, consumers who did not purchase counterfeits in the past year have more positive attitudes toward the prices of authentic products and tend to use the products for work and in social interactions. Furthermore, they place more emphasis on the health, safety, and social interaction benefits of branded products. Therefore, one potentially useful strategy would be to use advertisements to stress these authentic-product benefits compared with those of counterfeit products. This also indicates the importance of educating consumers about the potential hazards of purchasing counterfeits, which some authentic firms have already been doing. The analyses additionally reveal the important role of the internet in counterfeit purchases.

Besides the substantive contributions, we show methodologically how combining complementary datasets through data fusion can help extract new information about counterfeit purchase behaviors and suggest potential measures for fighting counterfeits, which would not be feasible if these datasets were analyzed separately. This study also opens the door to developing data fusion methods to balance data disclosure and privacy protection, which will only gain importance in this AI age.[18] We also propose new IV-free causal inference methods as summarized in a recent NBER paper, which could enable analyses beyond correlation in the era of syndicated and unstructured data.[19]

The Counterfeit Personality

While the previous section highlights my work on probing into the origins of counterfeiting on the demand side, my recent research turns from counterfeit products to the counterfeit personality. Building on the victimhood and moral identity literature, Ekin Ok, Brendan Strejcek, Karl Aquino, and I explore the personality traits associated with counterfeiting, both in terms of attitudes toward counterfeits and counterfeiters as well as the propensity for counterfeiting and fraudulent behavior.[20] We show that the virtuous victim signal, as a manifestation of Dark Triad personality traits, predicts a person's willingness to engage in and endorse ethically questionable behaviors, such as purchasing counterfeit products.

Mingyuan Ban, Qiang Gong, Aquino, and I further study the impact of false victim signaling in the charity market, applying and extending the collective reputation theoretical framework. We directly model three types of individuals with different personalities and incentives who signal their victim status.[21] Our analyses of social welfare under the honest, dishonest, and mixed equilibria shed light on key parameters that could potentially serve as policy instruments for improving social welfare. We also reveal that the mechanisms analogous to bank runs and lemons markets could arise in the victims' market as much as in other markets. In particular, when charity resources are scarce, more strategic signalers could rush to emit false victim signals and drive the market to the dishonest equilibrium and lower social welfare. The need for screening signalers could drive up the psychological costs to authentic victims to the extent that they voluntarily drop out of the market and suffer alone, resulting in misplaced charity funds and severe deadweight losses. When there is psychological utility associated with cheating for the hedonic signalers, the social welfare consequences are even worse.

Looking ahead, there are ever increasing opportunities in this information age to generate timely insights in a world with increasingly pervasive counterfeits and imitations, to help people discern authenticity, and to aid policymakers in executing justice gracefully and effectively.

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Yi Qian

Yi Qian is a professor of marketing and behavioral sciences at the Sauder School of Business at the University of British Columbia (UBC). Qian's research focus is on the economics of innovation, intellectual property, blockchain, and brand management against counterfeiting. Her work develops applied econometric methods to draw causal inferences, account for missing data, and correct for sampling biases. She is an NBER research associate in the Productivity, Innovation, and Entrepreneurship program. She received her BA in economics, MA in statistics, and PhD in economics from Harvard University. Before joining UBC, she served at Northwestern University as a faculty member at the Kellogg School of Management and as a research fellow at the Searle Center on Law, Business, and Economic Growth and the Institute for Policy Research.

NBER News

American Economic Association Names New Distinguished Fellows

The American Economic Association (AEA) has named four new Distinguished Fellows, three of whom, **Susan M. Collins**, **Barbara M. Fraumeni**, and **Joseph P. Newhouse**, are current or past NBER researchers.

Collins, president and CEO of the Federal Reserve Bank of Boston, is an expert on macroeconomics and international finance. Prior to taking up her role with the Federal Reserve, she was a research associate in the International Finance and Macroeconomics program as well as a member of the NBER Board of Directors.

Fraumeni of the University of Southern Maine is a key contributor to economic measurement and productivity analysis. She is a research associate in the Productivity, Innovation, and Entrepreneurship (PRIE) program.

Newhouse of Harvard University, whose research has shaped and advanced the field of health economics, is a research associate in three programs: Economics of Health, Children and Families, and PRIE.

The fourth new Distinguished Fellow is Timothy Taylor of Macalester College.

The AEA issued a **press release** covering these and other award announcements.

Stefanie Stantcheva Wins John Bates Clark Medal

Stefanie Stantcheva of Harvard University, a research associate in the Public Economics, Political Economy, and Economic Fluctuations and Growth programs, has won the 2025 John Bates Clark Medal, awarded annually by the American Economic Association to an American economist under the age of 40 who has made a significant contribution to economic thought and knowledge.

Stantcheva has made wide-ranging contributions in public finance, studying the effects of taxation on innovation, immigration, and investments in education. She has also developed novel survey and experimental methods to quantify perceptions of economic policy and the factors that determine them.

The **prize citation** notes that her "masterful application of innovative tools ... has revisited classic questions in public finance and produced new insights into optimal tax policy and the general effects of taxes on economic behavior."

Darrick Hamilton and Barry Melancon Elected to NBER Board of Directors

At its meeting on April 28, the NBER Board of Directors elected two new members: Darrick Hamilton and Barry Melancon. Hamilton will represent the American Federation of Labor and Congress of Industrial Organizations (AFL-CIO). He is the Henry Cohen Professor of Economics and Urban Policy and the founding director of the Institute on Race, Power and Political Economy at The New School, as well as the chief economist of the AFL-CIO. His research focuses on the economics of stratification and on labor market and wealth inequality, with particular attention to racial disparities and policies that could reduce them. He has served as president of the National Economic Association and as codirector of the American Economic Association Summer Training Program. Hamilton received his undergraduate degree from Oberlin College and his PhD from the University of North Carolina, Chapel Hill, both in economics.

Melancon, who was also elected NBER Treasurer, will represent the American Institute of Certified Public Accountants. From 1995 until 2024, he served as that organization's CEO and spearheaded several important initiatives, including audit quality centers, private company reporting standards, the computerized CPA exam, and consumer financial literacy education programs. He is the global chairman of the board of the International Integrated Reporting Council and a founding and current board member of the Center for Audit Quality. He has served on the US Department of the Treasury Advisory Committee on the Auditing Profession. Melancon holds an undergraduate degree in accounting and an MBA from Nicholls State University, which also awarded him its Honorary Doctorate of Commerce.

The Board also elected board members Jessica Einhorn and Robert Mednick to emeritus status.

NBER Appoints 63 New Affiliates

Following a call for nominations in January, the NBER has appointed 63 new affiliates: 19 Research Associates and 44 Faculty Research Fellows. In addition, six Faculty Research Fellows have been promoted to Research Associates.

The directors of the NBER's 19 research programs recommend appointments after consulting with steering committees made up of leading scholars. Research Associate appointments must be approved by the NBER Board of Directors, while Faculty Research Fellows are appointed by the NBER President. All new affiliates must hold primary academic appointments in North America; Research Associates must have tenure.

The newly appointed researchers serve on the faculties of 39 different colleges and universities. They received their graduate training at 29 different institutions. The new appointments bring the total number of Research Associates to 1,532 and the number of Faculty Research Fellows to 319.

The names and university affiliations of the newly appointed NBER affiliates are listed below.

Research Associates

Name	University Affiliation	Program
Abhay Aneja	UC Berkeley	Law and Economics
Silvia Barcellos*	University of Wisconsin	Economics of Aging, Economics of Health
Valentina Bruno	American University	International Finance and Macroeconomics
Ryan Chahrour	Cornell University	Monetary Economics
Xi Chen	Yale University	Economics of Aging
Maureen Cropper*	University of Maryland	Environment and Energy Economics
Sebastian Di Tella*	Stanford University	Economic Fluctuations and Growth
Douglas Gollin	Tufts University	Development Economics
Deepak Hegde	New York University	Productivity, Innovation, and Entrepreneurship
Kyle Herkenhoff*	University of Minnesota	Economic Fluctuations and Growth
Joshua Hyman	Amherst College	Economics of Education
Simon Jäger*	Princeton University	Labor Studies
Ethan Kaplan	University of Maryland	Political Economy
Michael Keane	Johns Hopkins University	Economics of Aging, Economics of Health
David Keiser	University of Massachusetts, Amherst	Environment and Energy Economics
Gaurav Khanna	UC San Diego	Development Economics
Bhashkar Mazumder	UC Irvine	Children and Families, Economics of Health
Paul Novosad	Dartmouth College	Development Economics
Paige Ouimet	University of North Carolina	Corporate Finance
Richard Patterson	Brigham Young University	Economics of Education
Yongseok Shin*	Washington University in St. Louis	Economic Fluctuations and Growth
Joseph Steinberg	University of Toronto	International Finance and Macroeconomics

Research Associates (continued)

Name	University Affiliation	Program
Olga Stoddard	Brigham Young University	Labor Studies
Lucian Taylor	University of Pennsylvania	Corporate Finance
Yulya Truskinovsky	Syracuse University	Economics of Aging

*Promotion from Faculty Research Fellow.

Faculty Research Fellows

Name	University Affiliation	Program
Carolina Arteaga	University of Toronto	Economics of Health
Jacob Bastian	Rutgers University	Children and Families
Ceren Baysan	University of Toronto	Political Economy, Development Economics
Gideon Bornstein	University of Pennsylvania	Economic Fluctuations and Growth
Greg Buchak	Stanford University	Corporate Finance
Juanma Castro-Vincenzi*	University of Chicago	International Trade and Investment
Brandyn Churchill	American University	Economics of Health
Gemma Dipoppa	Columbia University	Political Economy
Valentina Duque	American University	Children and Families
Joel Flynn	Yale University	Monetary Economics, Economic Fluctuations and Growth
Masao Fukui	Boston University	Monetary Economics
Chloe Gibbs	University of Notre Dame	Children and Families, Economics of Education
Matthew Gudgeon	Tufts University	Labor Studies
Allan Hsiao	Stanford University	Environment and Energy Economics, Development Economics, Industrial Organization
Anders Humlum	University of Chicago	Labor Studies
Pawel Janas	Caltech	Development of the American Economy
Erin Kelley	University of Chicago	Development Economics
Raymond Kluender	Harvard University	Economics of Health
Ambar La Forgia	UC Berkeley	Economics of Health
Lorenzo Lagos	Brown University	Labor Studies
Riley League	University of Illinois Urbana-Champaign	Economics of Health

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Faculty Research Fellows (continued)

Name	University Affiliation	Program
Wenhao Li	University of Southern California	Asset Pricing
Yiming Ma	Columbia University	Asset Pricing
Brian McGarry	University of Rochester	Economics of Aging
Emily Nix	University of Southern California	Law and Economics, Labor Studies
Sebastián Otero	Columbia University	Economics of Education
Bruno Pellegrino	Columbia University	International Finance and Macroeconomics
Mayra Pineda-Torres	Georgia Tech	Economics of Health
Michael Rubens	UCLA	Industrial Organization
Martin Saavedra	Rutgers University	Development of the American Economy
Andreas Schaab	UC Berkeley	Economic Fluctuations and Growth
David Schönholzer	UC Santa Cruz	Public Economics
Bernardo Silveira	UCLA	Law and Economics
Evan Soltas*	Princeton University	Public Economics
Jorge Tamayo	Harvard University	Productivity, Innovation, and Entrepreneurship
Charles Taylor	Harvard University	Environment and Energy Economics
Patrick Testa	Tulane University	Development of the American Economy
Nick Tsivanidis	UC Berkeley	International Trade and Investment, Development Economics
Benjamin Vatter	MIT	Industrial Organization, Economics of Health
Damián Vergara	University of Michigan	Public Economics
Milena Wittwer	Boston College	Industrial Organization
Woan Foong Wong	University of Oregon	International Trade and Investment
Ting Xu	University of Toronto	Productivity, Innovation, and Entrepreneurship
Yao Zeng	University of Pennsylvania	Asset Pricing

*Appointment will take effect on July 1, 2025.

Six 2025 Robert Summers Fellowships Awarded

The NBER has awarded six Robert Summers fellowships to enable economic statisticians from government agencies and international organizations to attend the **Conference on Research in Income and Wealth (CRIW) meeting** on July 14–15, 2025, in Cambridge, MA. The fellows will participate in the meeting and have an opportunity to interact with leading scholars and practitioners in the field of economic measurement. Founded in 1936 by Simon Kuznets, the CRIW provides a forum for academics, government representatives, and business economists to present and discuss the latest research in this area.

The fellowship program honors Robert Summers, a distinguished CRIW member and professor at the University of Pennsylvania, who made substantial contributions to the study of international price and output comparisons. Summers, together with Alan Heston and Irving Kravis, developed the Penn World Table (PWT), a comprehensive dataset that provides consistent national income and economic data across a wide range of countries and years. Today, the PWT includes information from 190 countries and serves as a critical resource for cross-country economic analysis.

The 2025 fellowship recipients are: Thomas Anderson from the US Bureau of Economic Analysis, Carmelita Esclanda from the Bangko Sentral ng Pilipinas, Kelsey O'Flaherty from the Federal Reserve Board, Dominic Smith from the US Bureau of Labor Statistics, Dean Villanueva from the Asian Development Bank, and Romalahy Mande Isaora Zefania from the Madagascar Institut National de la Statistique. The fellows work on a range of issues concerning economic statistics, including international comparisons and price measurement.

Three NBER Affiliates Join CEA

NBER research associates **George Borjas**, **Kim Ruhl**, and **Pierre Yared** have taken leave from their academic positions to serve at the Council of Economic Advisers. Borjas serves as a senior economist, Ruhl as a member, and Yared as vice chair and a member. Borjas, who is affiliated with the Labor Studies and Economics of Aging programs, is the Robert W. Scrivner Research Professor of Economics and Social Policy at the Harvard Kennedy School. Ruhl, an affiliate of the International Finance and Macroeconomics and International Trade and Investment programs, is the Curt and Sue Culver Professor of Economics at the University of Wisconsin. Yared, affiliated with the Economic Fluctuations and Growth and Political Economy programs, is the MUTB Professor of International Business at Columbia Business School.

All of these researchers will be on leave from the NBER for the duration of their public service.

Kristin Forbes Joins Business Cycle Dating Committee

Kristin Forbes, a research associate in the International Finance and Macroeconomics and Monetary Economics programs and the Jerome and Dorothy Lemelson Professor of Management and Global Economics at MIT's Sloan School of Management, has joined the Business Cycle Dating Committee (BCDC). Forbes is an expert on monetary policy, exchange rates, capital flows, and financial regulation who has also served in a number of important public policy roles, including as a member of the Monetary Policy Committee at the Bank of England, a member of the Council of Economic Advisers, and as a deputy assistant secretary at the US Department of the Treasury. Members of the BCDC are appointed by the NBER President with the approval of the BCDC chair and the chair of the NBER Board of Directors.

Robert Hall, who chaired the BCDC from 1978, when it was launched in its current form, until 2024, has resigned from the committee.

Jay Bhattacharya Tapped to Lead National Institutes of Health

In early April, following his Senate confirmation, **Jay Bhattacharya**, a professor of medicine at the Stanford School of Medicine, became the 18th director of the National Institutes of Health (NIH). With a budget of $47 billion in 2024, the NIH is the largest federal funder of medical research on the causes of and treatments and cures for diseases. Bhattacharya holds both a PhD in economics and an MD from Stanford University, and he has studied a range of issues in health economics, demography, and the economics of innovation. He was appointed as a faculty research fellow in the NBER Health Care (now the **Economics of Health**) program in 2002 and promoted to research associate in 2009. He resigned his NBER appointment when he was nominated to lead the NIH.

Conferences and Meetings

Detailed programs for NBER conferences are available at nber.org/conferences

Title of Conference/Meeting	Organizers	Dates
Chinese Economy Working Group Meeting	Nancy Qian, Shang-Jin Wei, and Daniel Xu	March 20–21, 2025
Energy Markets, Decarbonization, and Trade	Natalia Ramondo and Joseph S. Shapiro	March 20–21, 2025
Linking Historical Data Sources for Small Populations	Achyuta Adhvaryu, Randall Akee, and Emilia Simeonova	March 21, 2025
Environment and Energy Economics Program Meeting	Steve Cicala, Christopher R. Knittel, and Paulina Oliva	March 27–28, 2025
East Asian Seminar on Economics	Benjamin Faber, Takeo Hoshi, Renée Fry-McKibbin, and Warwick McKibbin	March 27–28, 2025
International Finance and Macroeconomics Program Meeting	Anusha Chari and Diego J. Perez	March 28, 2025
Financial Market Frictions and Systemic Risks	Wenxin Du, Alp Simsek, Chester S. Spatt, and Mao Ye	March 28, 2025
Development of the American Economy Program Meeting	Leah Platt Boustan and William J. Collins	March 29, 2025
Children and Families Program Meeting	Anna Aizer and Janet Currie	April 3–4, 2025
Labor Studies Program Meeting	David Autor and Alexandre Mas	April 4, 2025
Race and Stratification Working Group	Vicki Bogan, Ellora Derenoncourt, Dania V. Francis, and Trevon D. Logan	April 4, 2025
International Trade and Investment Program Meeting	Stephen J. Redding	April 4–5, 2025
Organizational Economics Working Group	Raffaella Sadun and Andrea Prat	April 10–11, 2025
40th Annual Conference on Macroeconomics	John V. Leahy and Valerie A. Ramey	April 10–11, 2025
Economic Analysis of Business Taxation	James M. Poterba and Juan Carlos Suárez Serrato	April 17–18, 2025
Public Economics Program Meeting	Katarzyna A. Bilicka and Wojciech Kopczuk	April 17–18, 2025
Corporate Finance Program Meeting	Emanuele Colonnelli and Dirk Jenter	April 18, 2025
Asset Pricing Program Meeting	Tyler Muir and Nikolai Roussanov	April 18, 2025
Behavioral Finance Working Group Meeting	Nicholas C. Barberis	April 19, 2025
New Developments in Long-Term Asset Management	Luis M. Viceira and Annette Vissing-Jorgensen	April 19, 2025
Investments in Early Career Scientists	Donna K. Ginther, Joshua L. Rosenbloom, and Bruce A. Weinberg	April 25, 2025
Productivity, Innovation, and Entrepreneurship Program Meeting	Nicholas Bloom, Serguey Braguinsky, Sabrina T. Howell, and Josh Lerner	April 25, 2025
TRIO Conference (NBER-TCER-CEPR)	Shin-ichi Fukuda, Joshua K. Hausman, and Kenichi Ueda	April 26–27, 2025
Entrepreneurship and Innovation Policy and the Economy	Benjamin Jones and Josh Lerner	April 29, 2025
Economic Analysis of Regulation	Craig Garthwaite and Steve Cicala	May 1, 2025
Economics of Education Program Meeting	Caroline M. Hoxby	May 1–2, 2025

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Conferences and Meetings (continued)

Title of Conference/Meeting	Organizers	Dates
Political Economy Program Meeting	Francesco Trebbi and Ebonya L. Washington	May 2, 2025
Economics of Transportation in the 21st Century	Edward L. Glaeser, James M. Poterba, and Stephen J. Redding	May 2, 2025
Economics of Culture and Institutions	Alberto Bisin and Paola Giuliano	May 3, 2025
Monetary Policy in Emerging Markets	Mark A. Aguiar, Şebnem Kalemli-Özcan, and Linda Tesar	May 6–8, 2025
Insurance Working Group Meeting	Benjamin R. Handel and Motohiro Yogo	May 9, 2025
Trends and Patterns in Health Disparities	Jevay Grooms and Hannes Schwandt	May 16, 2025
Environmental and Energy Policy and the Economy	Tatyana Deryugina, Matthew Kotchen, and Catherine Wolfram	May 22, 2025
Fertility and Declining Population Growth in High-Income Countries	Melissa Schettini Kearney and Phillip B. Levine	May 22–23, 2025

Books

The Economic History of American Inequality: New Evidence and Perspectives

Martha J. Bailey, Leah Platt Boustan, and William J. Collins, editors

This volume refines and extends the economic history literature on economic inequality in the United States. Economic inequality manifests itself on various dimensions, including access to resources and to economic security, as well as access to education and opportunities for migration, marriage, and other important life decisions.

Measuring inequality and studying its variation over time and in response to economic shocks such as recessions and wars deepen our understanding of how the economy operates and can inform the design of public policies.

The studies in this compendium present comprehensive evidence on income distribution during the nineteenth and early twentieth centuries, drawing on new data on wages and prices. They also consider disparities in economic well-being that are reflected in outcomes other than wage and salary income, such as homeownership and marriage.

The volume also presents new evidence on the effects of income inequality on social outcomes. It concludes with an intellectual history of "human capital," a core concept in the economic analysis of the underpinnings of labor market inequality.

Long-Term Care around the World

Jonathan Gruber and Kathleen McGarry, editors

The developed world is in the midst of a demographic transition caused by increasing life expectancy and falling fertility. It will bring new challenges associated with caring for a rapidly aging population.

Long-Term Care around the World documents and compares long-term care programs in 10 developed countries of varying sizes and with different healthcare structures.

Drawing on original analyses of survey data and government statistics, the researchers show that the costs of long-term care are beyond the financial means of a large fraction of the elderly population in most countries, particularly the oldest and most disabled. As a result, public systems bear most of the cost of formal long-term care, such as care in an institution or paid home care.

Most countries spend more on nursing homes than on home care, but the relationship between the two varies widely—as does the mix of care needs and resources that are used to define eligibility for public funding. At the same, most care is provided informally, through family or unpaid caregivers.

Estimates of the cost of informal care, which include the foregone earnings of caregivers, suggest that it accounts for at least one-third of all long-term care spending—and averages 50 percent of spending—in every country. Given its importance, any estimate of the social costs of long-term care must account for the implicit costs of informal care.

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