# A Young Person's Guide to Lawrence F. Katz*

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**Abstract**

This chapter reviews the intellectual contributions of Lawrence F. Katz, whose work has catalyzed two intellectual revolutions in economics. The first applies the lens of general equilibrium theory to illuminate the interaction between supply, demand and institutions in determining wage levels and wage inequality. The second designs, fields and orchestrates large-scale human subjects experiments to answer fundamental questions in social science. Katz's contributions to innovation are not bounded by authorship. Through his editorship of the *Quarterly Journal of Economics* and his mentorship of more than two hundred PhD students, Katz has shaped the agenda of the economics profession for over three decades.

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# 1 Introduction

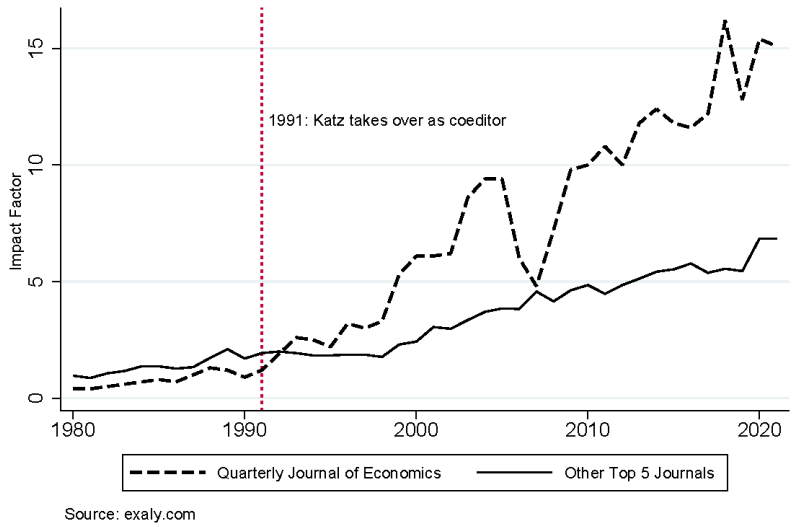
The French philosopher Émile Chartier famously said, "There are only two kinds of scholars; those who love ideas and those who hate them". Lawrence F. Katz is the living embodiment of the first breed: a scholar who recognizes the power of inchoate ideas and who invests to give them shape and structure. This signature trait is manifested in the three domains across which Katz has made profound contributions. The first domain is of course original scholarship. Since earning his PhD at MIT in 1985, Katz has pioneered two intellectual revolutions in economics. One applies the lens of general equilibrium theory to empirical labor economics to illuminate the interaction between supply, demand and institutions in determining wage levels and wage inequality. A second designs, fields and orchestrates large-scale human subjects experiments – some spanning multiple decades – to answer fundamental questions in social science that are out of reach of observational data. These contributions are intellectually disparate, but they are unified by a scholarly ambition that identifies the most pressing social welfare questions of the era and adopts and develops the tools needed to tackle them. This ambition has made Katz one of the most prolific and impactful economists of his generation. As of this writing, his articles and books have received over 100,000 scholarly citations in Google Scholar. According to the IDEAS bibliographic database (sourced from the RePEc economic repository), Katz ranks 67 in the all-time most cited economics scholars. This puts him in the top 0.1% of researchers, which is somewhat ironic, given Katz's decades-long concern with rising inequality.[1]

Katz's embrace of innovative ideas is seen in the diversity of his topics and methods, but it extends far beyond his own research. His second major contribution has been to shape the agenda of the economics profession through his editorial leadership of what is now its most impactful journal, the *Quarterly Journal of Economics (QJE)*. Figure 1 presents a time series of impact factors for the *QJE* compared to the average of the other top five journals in economics from 1980 to 2021. When Katz took over as co-editor of the *QJE* in 1991, it ranked slightly below the average of the other top five journals. It began a meteoric rise in the mid-1990s and now has an impact factor almost three times as high as its competitors.

Like Katz himself, the *QJE* has consistently sought out innovative questions and methods. While there is no single topic, method or ideological bent that Katz obviously favored as an editor, the papers he has edited are cohesive in their sensibility: they tackle questions that matter for social science and human welfare, they frequently extend the boundaries of economics beyond where it had previously ventured, and they reach these objectives with

[1]The top 5% of scholars numbered 3,328 as of May 2023 (https://ideas.repec.org/top/top.person.nbcites.html, accessed 6/10/2023). A ranking of 67 out of 66,560 (20 x 3,328) is the 99.9th percentile.

**Figure 1:** Impact factor of the *Quarterly Journal of Economics* versus other top 5 economics journals, 1980-2021




*Note:* The other top five journals are the *American Economic Review*, the *Journal of Political Economy*, *Econometrica* and the *Review of Economic Studies*. Impact factor data come from the open source bibliometric website exaly.com

maximal clarity and a bare minimum of complexity and obscurity. This latter characteristic is emblematic of Katz's approach to science. He is unimpressed by novelty for novelty's sake, and even less so by methodology for methodology's sake. Katz's goal as a scholar has always been to illuminate and extend the frontier of social science. Cloaking that frontier in mystery would only interfere with that objective.

Katz's third profound contribution is his prodigious and monumentally energetic mentoring of young scholars, who are variously drawn from Harvard's many tributaries of social science (economics, sociology, education and public policy) as well as other universities worldwide. Between 1986 and the present (2023), Katz has chaired or served on 238 dissertation committees, averaging more than six per year. The range of prominent scholars he has advised includes multiple Clark Medal winners (Steven Levitt, PhD 1994; Raj Chetty, PhD 2003), multiple MacArthur "genius" award winners (Sendhil Mullainathan, PhD 1998; Heidi Williams, PhD 2010), *dozens* of scholars who are now tenured faculty members at top five universities in the United States and worldwide and numerous social scientists who hold leadership roles in government, NGOs and industry. Like the papers Katz has published at *QJE*, these scholars are also disparate in their research topics, methods and ideological leanings. There is no *prototypical* Katz protégé. But the vast majority of his intellectual progeny have imprinted on his research values: relevance, creativity and clarity.

It is frequently said that Lawrence F. Katz is the "most thanked" scholar in economics

– implying that his name is most likely to appear in the acknowledgments section of others' scholarship. While we are unable to rigorously verify this belief, the fact that it is widely held testifies to the reality that Katz is an outsized contributor to the intellectual life of the profession. It is no overstatement to say that economics would be a less intellectually and culturally diverse, less generative, less friendly and ultimately less relevant profession were it not for Katz's singular contributions. As an incubator of talent, a cultivator of ideas and a sherpa to peripatetic scholars seeking the social science frontier, he is without peer. We count ourselves among his progeny.

## 2 Basics

Lawrence F. Katz was born in 1959 in Ann Arbor, Michigan, and grew up in Encino, California. He received a BA in Economics with Greatest Distinction from UC Berkeley in 1981 and delivered the commencement speech for his department. This address, "Housing and the Political Economy of Social Schizophrenia", which drew on his joint undergraduate research with PhD student Stuart Gabriel and assistant professor Jennifer Wolch, Katz dispassionately explains – while simultaneously passionately lamenting – that land use regulations had driven the San Francisco Bay Area's housing costs to the highest level in the nation (then 50% above the national median). If you are wondering what Katz meant by social schizophrenia, he anticipated your question:

> I am actually attempting to describe the situation that prevails when people's perceptions of general social goals or needed policies directly contradict their individual behavior and/or their perceptions of their own individual goals . . . [T]he schizophrenic result, albeit a rational seeming one from a self-interest perspective, is that people believe there should be more growth and housing development in the region but they don't want it in their own neighborhoods. (Katz (1981): 3, 6).

While the term social schizophrenia failed to go viral, Katz's argument was decades ahead of its time. The term we use today for social schizophrenia is "nimbyism".

A mere four years later, Katz earned the Economics PhD from MIT, where he was supervised by (then) associate professor Hank Farber. He then returned to Berkeley as an assistant professor at the School of Business Administration at UC Berkeley (now the Haas School). After one academic year, Katz joined the Harvard faculty as an assistant professor in 1986 and was promoted to full professor with tenure in 1991. In that same year, he became editor at the *QJE*. He has held both roles, Harvard professor and *QJE* editor, continually

since that time, except for an 18-month stint where he served as chief economist at the US Department of Labor in 1993 through 1994 during the Clinton administration. Katz was named the Elisabeth Allison Professor of Economics, his current title, in 2002.

# 3 Early Work

Katz's first top journal publication was also the second chapter of his dissertation. "Cyclical Unemployment: Sectoral Shifts or Aggregate Disturbances?". Co-authored with then MIT assistant professor Katherine Abraham, this paper appeared in the *Journal of Political Economy (JPE)* a year after Katz's PhD, and its publication was likely a catalyst in his move to Harvard that same year. Abraham and Katz (1986) took on a high-profile macroeconomic debate of its era. Taking note of the positive time series correlation between the unemployment rate and the variance of employment growth rates across sectors in the US, a highly-cited 1982 *JPE* paper by David Lilien posited a novel (partial) theory for the origins of aggregate unemployment. Rather than emanating primarily from aggregate macroeconomic business cycle shocks, as was conventionally understood, Lilien argued that aggregate unemployment arose substantially from shifts in labor demand across sectors. Specifically, a temporary rise in the dispersion of sectoral growth rates, even with no change in aggregate labor demand (i.e., a mean-preserving spread), would spur a temporary surge in aggregate unemployment as workers frictionally reallocate from contracting to expanding sectors.

Katz and Abraham took on Lilien's thesis in two steps. They first showed that the positive correlation between the dispersion of sectoral growth rates and unemployment does not resolve the causal question. Although Lilien's mechanism draws the causal arrow from sectoral growth dispersion to aggregate unemployment, a simple Okun's-law mechanism can generate the same relationship with the causal arrow reversed. Specifically, if sectors have different cyclical sensitivities, and fast-growing sectors (e.g, services) are less cyclically sensitive than slow-growing sectors (e.g., manufacturing), then an adverse business cycle shock that raises unemployment will simultaneously increase the dispersion of sectoral growth rates. How to tell these cases apart? Katz and Abraham proposed a simple test. Under the Lilien model, where unemployment stems from a reallocation across sectors, vacancies should rise with unemployment. Conversely, under the Okun-style model, where a rise in unemployment reflects a negative turn in the cycle, vacancies should fall with unemployment. Stated this way, it is virtually self-evident that rising unemployment rarely coincides with robust hiring, a regularity that the authors rigorously confirmed using US and UK data.

Alongside definitively rejecting Lilien's thesis, Abraham and Katz (1986) presaged two defining features of Katz's work. A first is a career-long engagement with questions at the

intersection between the labor market and the macroeconomy. A second is an exceptional capacity to marry the structure of applied theory with meticulous empirical work to produce powerful insights. In the present era of hyperabundant data and inexhaustible computing power, it is easy to overlook just how rare Katz's skillset was at that time. When he was writing his dissertation in the mid-1980s, public-use datasets came on 9-track tapes the size of deep-dish pizzas, and computer time was rented by the processor-minute. Indeed, the acknowledgements section of Katz's dissertation thanks two scholars for assistance with software and the School of Business Administration at UC Berkeley for funding Katz's computer work.

This virtuous marriage of frontier data analysis with "just the right amount of theory" is applied with equal virtuosity in the other half of Katz's PhD thesis. At the time that Katz was writing, it was commonplace for manufacturing firms to temporarily lay-off production workers during seasonal and cyclical downturns. Supported by unemployment insurance for up to six months, these laid-off workers would wait out the downturn, hoping to be recalled to their previous job – though of course, a recall might never come. Despite its prevalence, this arrangement had entirely escaped the standard theoretical and empirical treatment of job search by the unemployed, which – perhaps for the sake of simplicity, perhaps due to cluelessness – simply assumed that laid-off workers searched single-mindedly for a new job from the moment of separation.

Katz wasn't having it. The first contribution of his dissertation was to extend the theory of optimal job search to incorporate the competing risks that workers face in obtaining a new job and being recalled to the old one. Critical to this analysis was the recognition that unemployed workers possess and act upon *private* knowledge about their own recall prospects. An implication is that this knowledge would substantially affect their re-employment trajectories. "Everyone knew" at the time that Katz was writing that typical unemployment spells featured declining exit hazards: the longer the unemployment spell had lasted to date, the less likely it was to end in the next time interval. Katz formally demonstrated that the opposite should be true for workers who hoped to be recalled following lay-off. While awaiting a recall, these workers should have an initially low hazard of transitioning to a *new* job. If that recall does not materialise within a few months, however, they will eventually switch to plan B, and their exit hazard to new employment will rise. This *positive* duration dependence of the re-employment hazard is precisely the opposite of the conventional case, and it is what Katz set out to look for.

To apply these insights, Katz needed data sources where recall hires could be distinguished from new hires, and where recall expectations could be directly observed at the outset of unemployment. He found data to meet these requirements using two distinct

sources: the Panel Study of Income Dynamics (PSID), which was only in its teen years in the early 1980s, allowed Katz to distinguish unemployment spells that ended in recall versus new employment. A separate survey of unemployment insurance (UI) recipients in two US states developed by Walter Corson and Walter Nicholson directly queried workers about their expectations of recall.

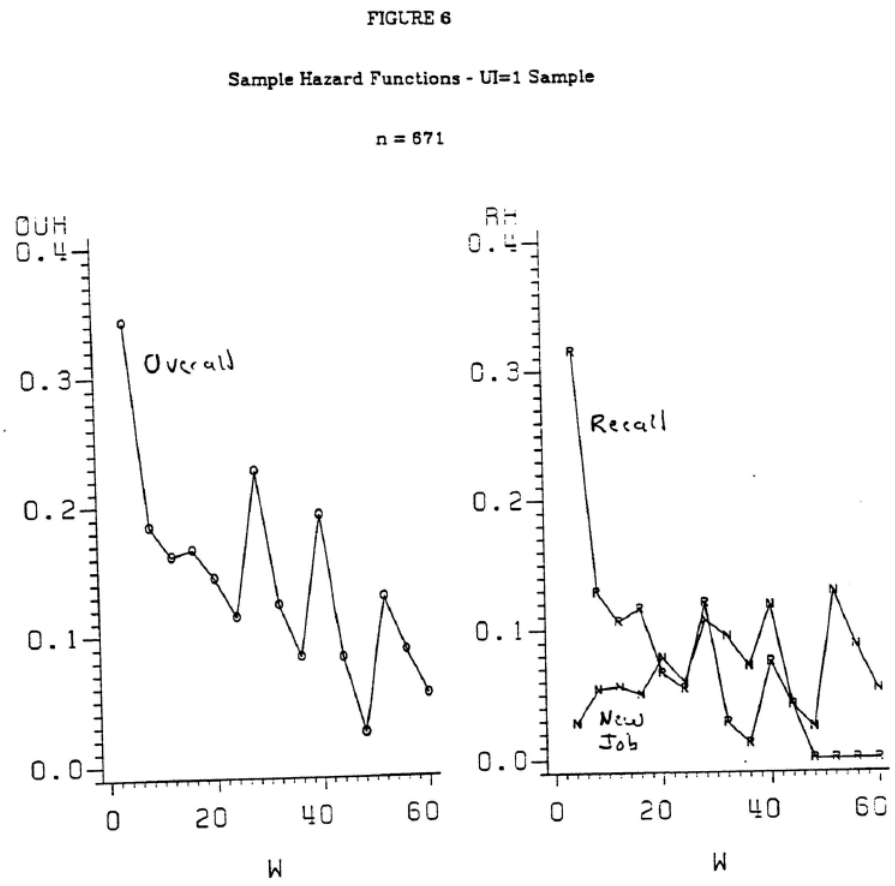
Fitting state-of-the-art competing-risk empirical hazard models to the data proved empirically powerful. It is easy to see why. Figure 2 below, which is clipped directly from Chapter 3 of Katz's dissertation, shows that the *average* re-employment hazard of displaced workers is *roughly* declining with weeks unemployed across the full sample. But this average decline is a mixture of two distributions: a *recall* hazard that is strongly declining with weeks unemployed (save for a spike at the termination of UI benefits), and a new job hazard that is *increasing* with weeks unemployed, precisely as Katz predicted. These descriptive statistics seal Abraham and Katz's case without any econometric modelling, and we read the relevant chapters from Katz's dissertation as an early awakening of the so-called credibility revolution in which he would play a field marshal's role.

Having developed these ideas in his dissertation, Katz joined forces with Bruce Meyer to publish two classic papers on unemployment and recall expectations. Both were published in 1990, one in the *Quarterly Journal of Economics* and the other in the *Journal of Public Economics* (Katz and Meyer (1990a,b)).

In an article published just one year later, Katz explored a second implication of the insight that parties to a lay-off possess private information. In broad terms, a worker might be laid-off for two distinct reasons: the employer ran into economic headwinds, necessitating a reduction in force (a true lay-off); or the worker performed poorly on the job, necessitating involuntary termination (a lemon). This distinction clearly matters to potential future employers, but how could an employer tell true lay-offs and lemons apart? In their 1991 paper "Layoffs and Lemons" – the title of which harks back to Akerlof's Nobel-winning 1970 "Market for Lemons" – Katz and co-author Robert Gibbons reason that while employers *cannot* individually tell lemons from truly laid-off workers, they can be sure that workers dismissed as a result of plant closure had not been fired for cause. Assuming that employers draw this inference, the implication is that workers dismissed due to mass lay-offs should fare better on the secondary market, measured both by unemployment durations and re-employment wages, than workers dismissed under other circumstances. Analyzing data from the Displaced Worker Survey in which workers self-report their reason for displacement, Gibbons and Katz find precisely this pattern.

The paper was impactful not simply because it was clever – though it was that – but because it provided a relatively early "win" for the asymmetric information models that had

**Figure 2:** The competing hazards of recall employment and new job accessions in PSID data




*Source:* Katz (1985, 78)

been gaining currency since Akerlof (1970) and Spence (1973). Brilliant though these papers were, they had eluded empirical evaluation as they required the econometrician to test for the causal effect of something that was by definition hidden. Gibbons and Katz showed that this could be done, and many subsequent papers followed suit. Indeed, a 1998 *QJE* paper by Acemoglu and Pischke leverages an analogous empirical strategy to identify adverse selection in the German apprenticeship system. The authors contrast the experience of job seekers entering the labor market after completing their compulsory military service – a non-selected group – with workers that are changing apprenticeships for unknown reasons, a potentially adversely-selected group.

In these same years, Katz delved into three other facets of employment, unemployment and labor market equilibrium. With MIT macroeconomist Olivier Blanchard, Katz co-authored the beautifully crafted and highly influential 1992 *Brookings* paper "Regional Evolutions". This study, which is among the top handful of Katz's most cited works, seeks to understand how local labor markets (in this case, states) within the US re-equilibrate

following adverse shocks. Do wages fall? Does unemployment remain persistently high? Do jobs recover numerically? Or does migration arbitrage these shocks away? The answer, Blanchard and Katz argue, incorporates elements of each of these forces. Adverse local shocks spur a short-term spike in unemployment and a fall in wages. Responding to these unfavorable conditions, workers depart for greener pastures. Over the ensuing half-decade, wages and employment-to-population rates reset to their prior levels. But the shock leaves its mark: population counts and hence total employment levels are permanently lowered as a consequence of outmigration – at least until a positive shock reverses this process.[2]

During the 1970s and 1980s, so-called efficiency wages were frequently invoked as a potential cause of persistently high involuntary unemployment. In a remarkably widely-cited literature review in the *NBER Macroeconomics Annual* in 1986, Katz considered the evidence for the explanatory potential of this hypothesis. The simple idea behind efficiency wage theory is that employers intentionally pay *above-market* wages to induce effort at the intensive margin: workers who receive rents on the job resist the natural inclination to "shirk" (slack off) lest they be fired and lose those rents. But if wages are deliberately set so that the marginal worker strictly prefers employment to unemployment, the net result is involuntary unemployment. Employed workers earn rents, while unemployed job seekers are unable to compete them away.

What does Katz conclude from this review? In our reading, the subtext of his article is that efficiency wage theory is intriguing but the evidence is inconclusive. Thirty-five years later, this less-than-thrilling assessment has stood the test of time. While it is clear that workers will slack when no one is looking, and that the presence of "rents" reduces that temptation, there is no conclusive evidence that this mechanism is a major cause of involuntary unemployment. The theory has neither been proved nor disproved.

In a 1989 *Brookings* paper with Lawrence Summers, Katz returned to the question of labor market rents. This article made an unequivocal case that rents are a pervasive feature of the US labor market: some industries pay rents and others do not. To a contemporary reader, this conclusion might hardly raise an eyebrow, but its implications were fairly radical in its day. The paper implicitly rejects the law of one price in the labor market and gives economic content to the notion of "good jobs" and "bad jobs" – terms that are thrown around frequently by sociologists but have no meaning in strict neoclassical competitive theory. In "Job Queues and Wages", Holzer et al. (1991) presented far more direct evidence on labor market rents, demonstrating that workers queue for minimum wage jobs – something that should not occur in a competitive setting where employers can offset mandated wage increases

[2]In an important coda to this work, Amior and Manning (2018) argue that these adverse shocks do not tend to mean revert but instead appear to accumulate in the same locations over multiple decades.

by increasing work demands or eroding benefits.

These findings, documenting the pervasive importance of rents in the labor market, arguably lay dormant until the "big data" revolution brought an entirely new level of power and specificity to these regularities. Following the work of Abowd et al. (1999), Card et al. (2013) and Manning (2013), labor market rents have taken center stage in a burgeoning literature on non-competitive determinants of wage setting.

# 4 Education, Technology, and Inequality

By the late 1970s, Richard Freeman's 1976 book *The Overeducated American* had amply familiarized scholars and laypersons with the fact that the college wage premium had been steeply falling in the US throughout the decade – so much so that, according to Freeman, the marginal social return to sending more US students to college had turned negative. Economists were thus startled to realize a decade later that the trajectory of the college premium had reversed course only three years after Freeman's book was published. Between 1979 and 1987, the weekly wage gap between young male college graduates and young males with twelve or fewer years of schooling rose by 30% (Katz and Murphy, 1992), more than fully offsetting its losses in the prior decade. As Katz later wrote, far from being limited to an increase in education differentials, the rise of inequality was "fractal" – no matter how finely one slices the data, additional dimensions of growing inequality emerge within that slice (Katz, 1994). Understanding the origins of rising inequality arguably became the animating cause of contemporary labor economics – and indeed, much of the economics profession and allied social sciences – for much of the next two decades. Katz was one of the first scholars to recognize the monumental importance of rising wage inequality. No scholar played a more generative or authoritative role in that quest than Lawrence Katz. The list below provides a glimpse of the depth and breadth of his contributions to this subject:

- Quantifying the fundamental contributions of movements in labor demand and labor supply in fomenting rising wage inequality (Katz and Murphy, 1992).
- Assessing the impacts of immigration and trade on the wage structure: Borjas et al. (1992, 1996, 1997).
- Examining the link between income and consumption inequality: Cutler and Katz (1992).
- Comparing changes in wage structures across countries to understand sources of rising inequality: Katz and Revenga (1989); Freeman and Katz (1994); Katz et al. (1995).

- Exploring historical and contemporary impacts of technological change on skill demands: Goldin and Katz (1998); Autor et al. (1998).
- Synthesizing the burgeoning literature on rising inequality in industrialized countries: Katz and Autor (1999).
- Documenting and interpreting labor market "polarization": Autor et al. (2006, 2008).
- Analyzing the falling share of labor in national income in the United States and Europe: Autor et al. (2017, 2020b).
- Integrating the history of public and private educational institutions, human capital investment, technology, skill demands and wage structure throughout the twentieth century: Goldin and Katz (1996, 2000, 2008); Autor et al. (2020a).
- Of course, this list does not capture the guiding intellectual hand that Katz provided to other scholars in his role as *QJE* editor, where he shaped much of the leading scholarship published on wage inequality over the last three decades.

Among these many distinguished contributions, Katz's 1992 *QJE* article with Kevin Murphy, "Changes in Relative Wages, 1963–1987: Supply and Demand Factors", set the agenda for much that followed. By establishing both a set of foundational facts about rising inequality and a conceptual apparatus for interpreting them, the work has guided inquiry for the ensuing three decades. Published early in the debate about the causes of unfolding inequality, it laid out the following mission statement that ultimately makes clear why the paper was so impactful:

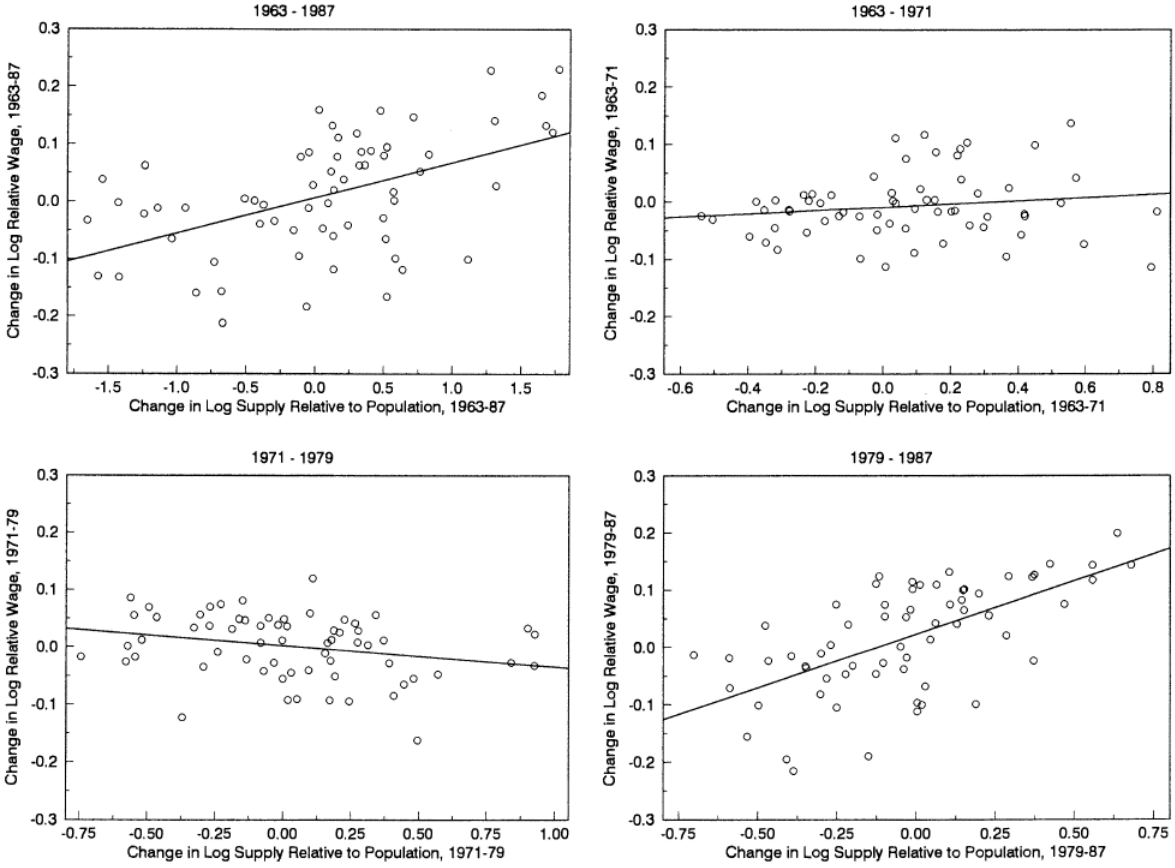
> In this paper we examine how far one can go toward explaining recent changes in relative wages in the United States using a simple supply and demand framework. Rather than focusing on changes in relative wages during the 1980s in isolation, we analyze relative wage movements over the longer 25-year time period from 1963 to 1987. By examining this longer time period, we are able to evaluate the ability of competing explanations to explain a wide range of wage observations (such as both falling college wage premiums in the 1970s and rising college wage premiums in the 1980s) as well as differences in timing of changes in wage differentials (Katz and Murphy (1992, 36)).

Rather than focus on single causes, such as minimum wages, trade unions, international trade or the computer revolution – all of which were the subject of other contemporary papers – Katz and Murphy took an explicitly general equilibrium approach, centering on the role of

fundamental market forces. While their approach did not exclude other complementary or contributory explanations, it provided the bedrock atop which these stories would ideally sit. In addition, rather than attempting to "explain" only the recent period of surging inequality, Katz and Murphy rolled the tape (literally, the 9-track tape!) back to 1963, which was as far as the March Current Population Survey's Annual Demographic File would allow. Their data accordingly included a period of stable wage inequality prior to 1970, a period of falling wage inequality from 1970 to 1979, and a period of rising wage inequality from 1979 forward. If those disparate trends could be reconciled with a unified explanation, this would be an important achievement.

The story of the paper can be told in two figures. Figure 3 lays out the basic supply-demand puzzle by plotting the relationship between changes in log hours supplied and log hourly wages earned for 64 exhaustive and mutually exclusive demographic groups over three time periods in the US: 1963–1971, 1971–1979 and 1979–1987 (as well as for the full period). In two of the three time periods (1963–1971 and 1979–1987), these quantity-price relationships were upward sloping, meaning that skill groups that were increasing in quantity in these years were simultaneously increasing in "price". But this was not true for 1971–1979, where prices and quantity negatively covaried. This figure motivates the conclusion that supply changes alone are highly unlikely to explain the evolution of wage structure during this time interval. Accordingly, the paper proceeds to "examine whether the observed wage changes can be made consistent with the observed pattern of relative quantity changes simply by allowing for smooth trend changes in relative demands' (ibid.: 52).

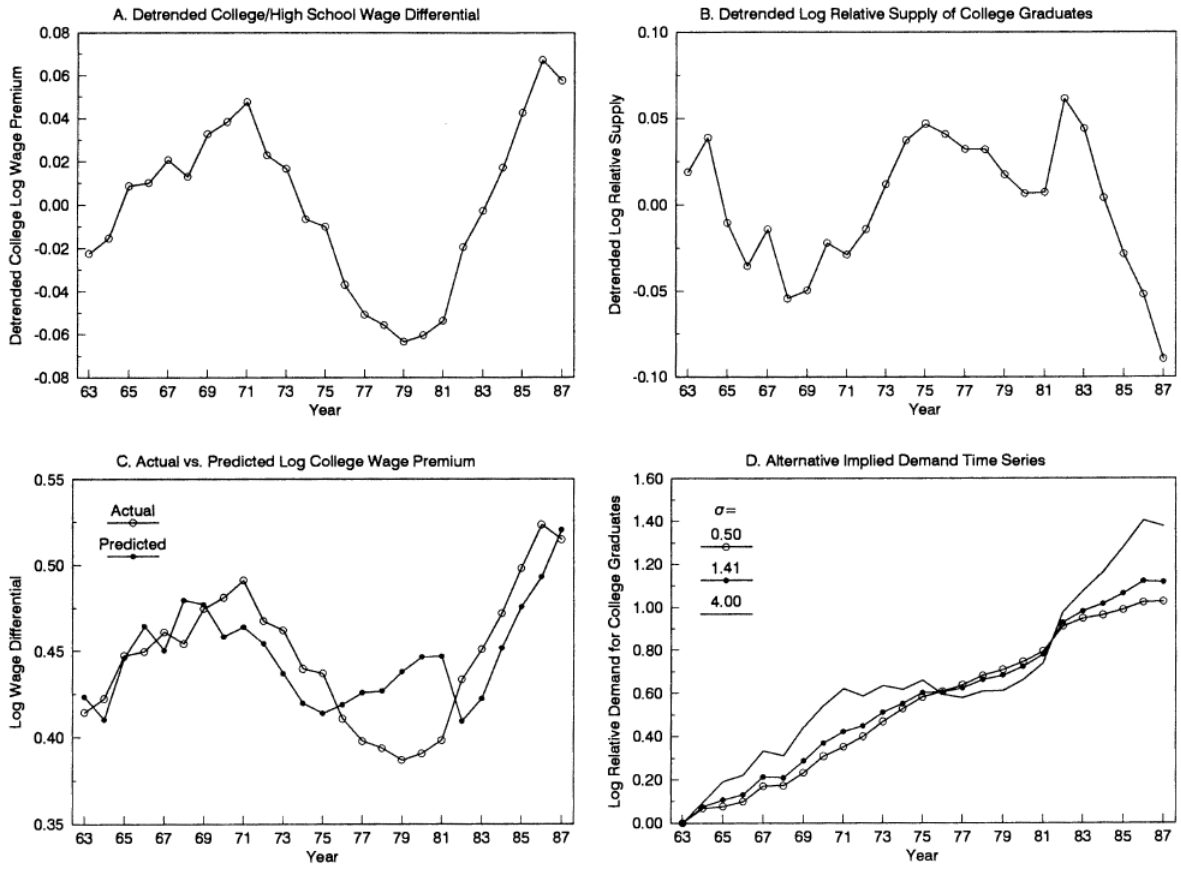
**Figure 3:** Supply changes and wages changes for 64 demographic groups defined by education (four groups), gender (two groups) and potential experience (eight groups) in the US, 1963–1987




*Source:* Katz and Murphy (1992, 53)

Figure 4 reveals the success of that approach. The first panel documents the phenomenon to be explained: the rising then falling then rising college wage premium in the US, here purged of a time trend. The second panel (top right) plots the key candidate explanatory variable, which is the log relative supply of college graduates, also purged of a time trend. A comparison of these two panels reveals that these plots are close to mirror images. When the college relative supply slows relative to trend, the college premium rises relative to trend, and vice versa when the college relative supply accelerates. The third and fourth panels put these pieces together, documenting that one can go a remarkably long way in explaining the evolution of the college premium by positing a steady underlying positive trend in relative demand that, absent a commensurate increase in supply, pushes that premium upward. Conversely, when supply outpaces this trend, as occurred in the 1970s, the premium declines and when supply decelerates, as it did during the 1980s, the premium spikes.

**Figure 4:** Trends in relative wages, relative supply and (implied) relative demand for college versus non-college workers in the US, 1963–1987




*Source:* Katz and Murphy (1992, 71)

Notice the critical work done here by the *trend*, which captures the movement of the relative demand curve. The fact that it is positive implies that there is a powerful undercurrent of "skill-biased technological change" (SBTC) that is essential to understanding the evolution of the wage structure. How strong is this undercurrent? The fourth panel of the figure (bottom right) provides the answer. Conditional on the $R^2$ maximizing value of the elasticity of substitution ($\sigma = 1.41$), the time trend appears remarkably linear (see the series marked with solid black dots). The implication: the sudden rise of educational earnings inequality in the US after 1979 was due *not* to an acceleration in the demand for college-educated workers, but rather to a deceleration in their relative supply.

This is a remarkably clear and powerful conclusion. Moreover, it is arguably not what most scholars were expecting.[3] Prior to Katz and Murphy, the literature was substantially

[3]Though we note that by 1989, Katz had already published an article estimating the contribution of decelerating college supply to the rising college wage premium (Katz and Revenga, 1989). In fact, an early version of the Katz-Murphy model is estimated in that paper, leading us to speculate that it might reasonably have been christened the Katz-Revenga model – or simply the Katz model.

focused on demand-side factors, including technology and trade, and institutional factors, such as labor unions and minimum wages. (Which is not to say that those things were unimportant: all have been convincingly shown to contribute to the evolution of wage inequality.) These explanations neglected the other blade of the Marshallian scissors – secular shifts in the supply of new college graduates – but it was this blade that was effectively doing the cutting. It was the general equilibrium lens that Katz and Murphy brought to bear on the problem – attending to both blades of the scissors – that brought the solution into focus.

In reviewing the history of this remarkable conclusion, it is hard to resist remarking on two ironies. First, despite (we suspect) being the most cited labor economics paper published in the 1990s, its key finding is often lost on its academic readership. In our experience, many scholars understand Katz-Murphy to provide the crucial evidence that rising wage inequality in the 1980s was driven by SBTC. This is not entirely wrong – relative demand for educated labor was rising – but it misses the point. Relative demand for college labor was also rising in the 1950s, 1960s and 1970s (Goldin and Margo, 1992). What *changed* in the 1980s was a sharp deceleration in relative supply, not an acceleration in relative demand.

The second irony concerns which evidence from the extraordinarily ambitious Katz-Murphy paper ultimately proved most enduring. At the time of its publication, it was arguably the most data-intensive empirical labor economics paper ever written. It pooled 25 years of person-level Current Population Survey data to form a sample of well over a million observations – far beyond the storage and processing capacity of most research computers of the time. Given the prohibitive cost of running these huge statistical analysis system jobs on rented mainframe time on the University of Chicago computers, the authors executed the primary analyses of the paper only twice, once each for two different sample restrictions. Yet, despite the paper's extraordinary empirical heft, its most iconic contribution is a time series regression of 25 non-independent college wage premium data points on a constant, a linear time trend and a relative supply term (Figure 3, lower left-hand panel).[4] Fit to three decades of inequality data, this regression established the explanatory power of the simple supply-demand model. While one should not infer from this example that less data yields greater impact, it is a reminder that what makes research great is not brute force but potent insight.

Katz and Murphy (1992) was the opening overture in a concerto of scholarship that Katz orchestrated over the next three decades, frequently in collaboration with his research (and life) partner, Claudia Goldin. Two products from that collaboration stand in for the entire encyclical. The first is "The Origins of Technology-Skill Complementarity" (Goldin

[4]This irony was not lost on Katz. This paragraph recapitulates a conversation between Katz and Autor that took place when the latter was still a graduate student.

and Katz, 1998). A key finding from both Katz and Murphy (1992) and Goldin and Margo (1992) was that the economy-wide demand for educated labor in the US had been rising for decades – at least since the 1940s, and perhaps much longer. Yet, at the time that Goldin and Katz were writing, it was widely understood that the rise of mass production in the eighteenth century had been the *opposite* of skill-biased, displacing skilled artisanal labor and substituting it with machinery, managers and lots of unskilled labor. How did the Dickensian reality of the early industrial era give rise to subsequent decades of ever rising demand for educated labor?

In "Origins", Goldin and Katz offered a hypothesis and a wealth of original historical evidence to explain this phase shift in the demand for skilled labor. While mass production was initially expertise-displacing, Goldin and Katz revealed that as manufacturing processes and products became more complex in the early twentieth century, high-technology industries of that era – e.g. rubber, plate glass, gasoline, canned condensed milk and factory-made butter – increasingly demanded high-school educated workers who could master this complexity. Indeed, the estimates in "Origins" implied that the demand for skilled labor in the US increased as rapidly between 1909 and 1929 as it did during the 1980s and 1990s. Yet, inequality *fell* during those earlier decades but jumped in the later ones. What explains the difference? The paper concludes with a tantalizing hypothesis: "[A]s the high school movement continued to spread across America in the 1920s, the wage gap between the high school educated employee and the less-educated worker may have been kept in check in an era of skill-biased technical change' (Goldin and Katz (1998, 726-727)).

This insight arguably set the stage for Goldin and Katz's seminal book, *The Race Between Education and Technology*, published a decade later. Its title invokes the observation by Nobel laureate Jan Tinbergen that the path of income inequality "depends on the "race" between third-level [college-educated] manpower due to technological development and supply of it due to increased schooling" (Tinbergen (1974, 224)). Goldin and Katz used this metaphor to provide a coherent and compelling account of how human capital has been the defining factor for the American century – mostly for America, but also for much of the industrialized world.

A central thesis of the book is that the steady accumulation of human capital was the main equalizer of the US labor market over the course of the twentieth century. This accumulation was not, however, an inevitable consequence of market forces. Rather, it flowed from a set of uniquely American civic virtues and institutions that spurred the US to invest amply and productively in its citizens. Goldin and Katz write:

> By the early twentieth century America educated its youth to a far greater extent than did most, if not every, European country. Secondary schools in America were

> free and generally accessible, whereas they were costly and often inaccessible in most of Europe. Even by the 1930s America was virtually alone in providing universally free and accessible secondary schools (Goldin and Katz (2008, 12)).

Conversely, the surging inequality of the era in which their book was written was not, as many imagined, the ineluctable consequence of rapid technological change. Rather, it reflected a shortfall of human capital investment and, more broadly, a decline of the virtues that enabled such investments a century earlier. The lesson was not that America had failed but rather that an opportunity remained within reach.

# 5 Moving to Opportunity

Katz was a principal architect of one of the most important social policy experiments in US history – the Moving to Opportunity (MTO) demonstration. In the early 1990s, the problem of concentrated poverty appeared intractable and urgent. Crack cocaine was sweeping through America's big cities and drug-related gang violence led to a spike in Black youth homicides around the country (Shroder and Orr, 2012). Because drugs and violence were especially concentrated in public housing, policy makers began to think about ways to improve the lives of people living in the poorest neighborhoods. Broadly, there were two types of solutions. First, place-based policies like Empowerment Zones sought to improve existing neighborhoods by attracting businesses through tax credits. Second, housing vouchers aimed to help low-income residents of poor neighborhoods "move to opportunity".

Congress passed an appropriations bill for the department of Housing and Urban Development in 1992, and some of the money from the bill went to support MTO. The development of the experiment itself required input from a number of other Federal agencies, including the Department of Labor, where Katz was serving in the Clinton administration as chief economist.

The MTO demonstration program began in 1994 and ran in five cities – Boston, Baltimore, Chicago, New York and Los Angeles. The experiment included 4,604 families living in public housing in the poorest census tracts in the country. MTO randomly assigned participants into three groups – a control group who stayed in their regular public housing, a treatment group who received a housing voucher to move to a neighborhoods of their choice and a third "low-poverty" treatment group who received a housing voucher that was only valid in low-poverty neighborhoods (this group also received housing search assistance).

The original theory of action for MTO was based on the work of John Kain, William Julius Wilson and others who argued that there was a "spatial mismatch" between public

housing residents' physical location and the kinds of good jobs that lead to economic opportunity (Kain, 1968; Wilson, 2012). The idea was that adult participants of MTO – who were predominantly Black single mothers – would move into neighborhoods with better job prospects.

That was not what happened. In 2001, Katz and his co-authors published an interim analysis of the MTO experiment in the *QJE* (Katz et al., 2001). They found no impact of receiving a voucher on employment or earnings, and no change in welfare receipt or other social assistance. This held for both voucher groups, even the ones who were required to move to a low-poverty neighborhood. However, they found that voucher recipients felt safer, healthier and happier, and reported fewer sightings of crime and violence near their houses. In an important preview of later results, they also found fewer behavior problems among the male children of voucher recipients, and that all children in the treatment group were less likely to be victimized by crime or to visit the hospital for injury or ill health. MTO voucher recipients moved not to opportunity, but to *tranquillity*.

In the "final" experimental analysis, published in 2007, Katz and his co-authors found that the interim results published in 2001 held up well (Kling et al., 2007). Four to seven years after random assignment, voucher recipients still lived in safer, lower-poverty neighborhoods than the control group. However, there was no impact of MTO on any measure of economic self-sufficiency. Partly this was because the spatial mismatch hypothesis did not seem to hold empirically – the lower-poverty neighborhoods where MTO recipients resided did not have more jobs available, and less than 10% of recipients reported finding a job through a neighborhood contact (ibid.). Despite the lack of economic impact, MTO recipients reported large and long-lasting gains in mental health and well-being, with larger impacts for recipients who moved to lower-poverty neighborhoods.

In follow-up work 10-15 years after random assignment, Katz and his many co-authors obtained physical health data from MTO participants and reported reductions in the prevalence of extreme obesity and diabetes among voucher recipients (Ludwig et al., 2011). Another follow-up study used survey responses of MTO participants to construct a measure of subjective well-being and found that reducing neighborhood poverty by 10 percentage points increased subjective well-being as much as a $10,000 increase in annual income (Ludwig et al., 2012).

Despite these extraordinary gains in physical and mental health, the view of MTO among social scientists was decidedly mixed. Some sociologists argued that incomplete voucher take-up and the choice of many recipients to move to places that were not dramatically different in terms of poverty and segregation made MTO a "weak treatment" that did not truly measure the importance of neighborhoods (Clampet-Lundquist and Massey, 2008). One of

the authors (Deming) was a graduate student at Harvard during this time and can testify to the intensity of debates about the interpretation of MTO.

Everyone wanted – and expected – MTO to improve economic outcomes for recipients. As an economist and a scholar committed to understanding and alleviating poverty, Katz had every incentive to torture the data until it confessed. Yet his commitment to empiricism during this period was noble and steadfast. In a reply to Clampet-Lundquist and Massey (2008), Katz and his co-authors essentially argued that the MTO results, although surprising, were real tests of neighborhood effects, and that we should try to understand them rather than dismissing them (Ludwig et al., 2008).

Remarkably, nearly two decades after the study's inception, the experiment yielded a fresh set of results that validated Katz's unswerving commitment to experimental rigour and simultaneously caused sceptics to reconsider their criticisms. In 2016, Katz published (along with Raj Chetty and Nathan Hendren) a landmark study that changed our understanding of the importance of neighborhood effects (Chetty et al., 2016). The authors linked data from the original MTO study to federal income tax records through 2012, 16 years after random assignment. Like earlier studies, they found no impact of MTO on economic outcomes for adult voucher recipients. However, they found a striking pattern of impacts on the *children* of voucher recipients. Children who were age 13 or older at the time of random assignment did not benefit from moving to a lower-poverty neighborhood – the estimates on employment and earnings, while imprecise, were negative in sign. However, children below the age of 13 who moved because of MTO had 30% higher earnings as young adults. They were also more likely to attend college, and the colleges they attended were more selective. Also, they lived in lower-poverty neighborhoods as adults and were less likely to be single parents.

The authors argued that their results could be explained by a very simple process. Better neighborhoods have positive "exposure" effects that are roughly linear in time, but the act of moving imposes a one-time disruption cost on children. The exposure effects outweighed the disruption for younger children, but not for older children. This was subsequently validated in follow-up work by Chetty and Hendren (2018), who studied childhood mobility patterns in more than seven million families across the US. The MTO narrative was rewritten again. Neighborhoods really do matter, and the MTO participants really did move to opportunity, just on behalf of their children rather than themselves.

Katz – along with a team of co-authors – is working to implement the lessons of MTO for the next generation of low-income families. Working with policy makers in Seattle and King County, they have implemented a randomized controlled trial that offers housing vouchers and intensive search assistance to families seeking to move to better neighborhoods (Bergman et al., 2019). They find that providing information about economic opportunities in other

neighborhoods along with customized search assistance increases movement of voucher recipients to lower-poverty neighborhoods by more than threefold, and that families who make the move are staying and are reporting high levels of neighborhood satisfaction.

It is hard to overstate the importance of the MTO experiment for social science research. It was one of the largest and most influential studies of housing and neighborhood effects ever conducted, spawning dozens of follow-up studies and encouraging a generation of researchers to invest in large-scale, but risky, field experiments. MTO showed the power of research that is ambitious, long-term, ruthlessly empirical, deeply relevant and intensely focused on the neediest members of society. It was the quintessential Katz project.

# 6 For-Profit Colleges

A central theme in Katz's work on education is how broader market forces shape the economic returns to education. As Goldin and Katz showed in *The Race Between Education and Technology*, the value of a college degree depends not only on how much it is valued by employers but also its scarcity. They show that a key reason why the college wage premium has risen in the last several decades is that the United States is not producing enough college graduates to keep pace with demand.

*The Race Between Education and Technology* was published in 2007 and incorporated data through 2005. At that time, the primary concern was sluggish growth in educational attainment. From 1980 to 2005, the share of people age 25 to 29 completing a bachelor's degree grew very little, from 22.5% to 28.8% (National Center for Education Statistics, 2023). Yet from 2005 to 2015, the college completion rate grew by 6.8 percentage points to 35.6%, growing faster in a decade than it had in the previous 25 years.

This might seem like a happy story for a champion of American education like Katz. But in a series of papers, he and his co-authors showed that a disproportionate share of the rise in college enrollment in the early 2000s occurred in low-quality, often predatory, for-profit colleges. From 2001 to 2010, total enrollment in for-profit colleges increased fourfold, from 500,000 to over two million, comprising more than half of the total growth in postsecondary enrollment over that decade (ibid.).

The expansion of for-profit colleges was buoyed by the confluence of two factors. First, advances in digital technology and the lifting of regulatory scrutiny of "correspondence" colleges (mostly college-by-mail at the time the regulations were created) led to a rapid expansion in online postsecondary degree offerings (Deming et al., 2012). Second, federal government spending on student financial aid increased dramatically over this period. Adjusted to 2021 dollars, the US Department of Education spent $3.7 billion on need-based

financial aid in 1980, $5.9 billion in 1990, $9 billion in 2000 and nearly $25 billion in 2010. This spending occurred primarily in the form of Pell Grants, which are vouchers provided to low-income students to attend the college of their choice, and Stafford Loans which subsidize the interest on loans taken out by low-income students.

For-profit colleges serve primarily low-income students and charge high prices, which are designed to capture the full value of Federal aid. In 2010, they accounted for less than 10% of students but about 25% of Pell Grant and Stafford Loan dollars and nearly half of all loan defaults Deming et al. (2012, 2013).

On the other hand, for-profit colleges were also quicker than public institutions to offer degree programs in growing labor markets and in-demand fields such as healthcare and information technology. Strikingly, the number of public institutions actually declined between 2005 and 2015 despite an increase in federal aid, and many existing public colleges faced funding shortages and capacity constraints. Thus, for-profit colleges were the only realistic option for many low-income students, and the question of whether they were better than the alternative was very much unsettled.

Katz and his co-authors aimed to answer this question with a resume audit study. They randomly assigned the sector and selectivity of postsecondary degrees to fictitious resumes and sent more than 10,000 job applications to entry-level business and healthcare job postings in five major US cities (Deming et al., 2016). They found that resumes with a bachelor's degree from a for-profit college were 22% less likely to receive a callback from an employer than otherwise identical resumes with a degree from a non-selective public institution. Another finding was that when applying to jobs that did not require a degree, bachelor's degrees from for-profit colleges were no more likely to receive a callback than resumes with no degree at all (ibid.). For-profit college degrees were not highly valued by employers. This cast serious doubt on their value, since they charge very high prices and often leave students with substantial student loan debt and default risk.

Katz's work on for-profit colleges contributed importantly to increased regulation of the for-profit sector by the Obama administration, including the Gainful Employment regulations passed in 2011.

# 7 Conclusion

Lawrence Katz has made profound contributions to our understanding of labor markets and inequality through original scholarship. His work illuminates how labor supply, labor demand and economic institutions interact to determine wage levels, returns to education, inequality and the wage structure of an economy. He was also a principal contributor to one

of the most important social science field experiments in history, and his work has changed our understanding of the importance of place and neighborhoods in determining economic opportunity. Connecting the many threads of Katz's scholarship is his continuous engagement with the critical social policy questions of his time, and his indefatigable capability to deploy or develop the frontier tools necessary to answer them.

Judging by his scholarly work alone, Katz is a prime mover in the economics profession. Yet his influence extends far beyond his own research. Katz has edited the *QJE* for more than 30 years, and in that time, it has become by far the most cited and most influential journal in economics. He has also advised and mentored hundreds of junior scholars. In this way, Katz's intellectual influence has spread vastly farther than even his prodigious scholarly record suggests.

Katz is both a major scholar of our era and an exceptionally generous, principled and constructive public citizen. His research, advising, and mentorship have profoundly influenced generations of economists, including the authors of this article, both of whom were Katz advisees. If one were to take the average of the formative influence that Katz has had on the two of us and multiply that number by the 236 other students to whom he has served as a PhD adviser, one begins to appreciate the depth of his impact, and to glimpse the source of the widely-held hunch that Lawrence Katz is the most thanked scholar in the economics profession.

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