Fourth Quarter 2024

Economic Insights

Volume 9, Issue 4

Nonworking Parents or Hungry Children

Missed Rent: Path to Eviction or Loan from Landlord?

Technology vs. the Middle Class

Questions and Answers | Research Update | Data in Focus

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Economic Insights

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Economic Insights features nontechnical articles on monetary policy, banking, and national, regional, and international economics, all written for a wide audience.

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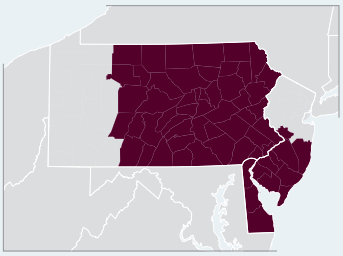

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Q&A...

with Igor Livshits, an economic advisor and economist here at the Philadelphia Fed.

Igor Livshits

After getting an applied math degree in his native Belarus, Economic Advisor and Economist Igor Livshits came to study economics in the United States and never looked back. After earning his master's degree from the University of Illinois and his doctorate from the University of Minnesota, he taught at Western University in Canada. He's been an economist with the Federal Reserve Bank of Philadelphia since 2017. His research interests include consumer debt and bankruptcy, political economy, and human capital.

Where did you grow up?
In Minsk, Belarus. My dad was a civil engineer and my mom's a pharmacist. I grew up in interesting times. I was 12 when the Perestroika reforms started and not yet 18 when the Soviet Union collapsed. Growing up Jewish in the Soviet Union, I always knew I was going to leave. I ended up leaving to study economics in the United States, which was a complete accident but a happy one.

How was it an accident?
I was a math nerd. I went to a math-heavy secondary school. Math is clean and beautiful and interesting, and it was free of communist propaganda. It was also the natural path. I was good at math. And it was competitive. I love competition. Other kids played sports. I played math. Who's going to be the fastest to solve this problem? That was my sport. I seemed destined for math grad school, but then I came across this newly opened office where people could learn about educational opportunities in the United States. I asked them, do you have any fellowships in mathematics? They said, no, but we have one in economics, and one of the subfields is mathematical economics. I submitted that application and was chosen to take part in the program. So, my first real encounter with economics was in the United States. I was coming from an applied math background, where we constantly do "math represents this phenomenon." In economics, math represents human behavior, incentives, and information. I found that fascinating from day one. Here is this very disciplined, strict, mathematical way of thinking about these interesting issues. I was hooked.

Because economics is about real-world issues.
It's about real-world issues and you get to solve math puzzles. And these puzzles are meant to represent something real. The coursework was heavy but enjoyable.

Where along this process did you become interested in personal and consumer bankruptcies?
I went to the University of Minnesota for my doctorate. At orientation, they said, look to your right, look to your left, these are the people you're going to learn from. And they were right. For the longest time, practically all my coauthors were my classmates from Minnesota. That's how I got into researching consumer bankruptcy. It was just after the 1998 Russian crisis, and I was trying to model why some countries default on foreign debt while others default on domestic debt. My classmate Jim McGee was talking with Michelle Tertilt, another classmate, who's German. Germany had just introduced personal bankruptcy. Jim and Michelle started discussing what economic tradeoffs (should) affect the design of bankruptcy rules. And Jim said, Igor is thinking about defaults—defaults of governments, not people, but mechanically the models are largely the same. Should we talk to him? Michelle said, yes. And the three of us have been writing on personal bankruptcy ever since. So, how did I get into personal bankruptcy? By chatting with my classmates in Minnesota.

Much of your published research has been theoretical, but the article you wrote for this issue of *Economic Insights* is empirical. Is that a one-off departure from what you normally do? Or are you changing your research methods more generally?
As I said, I'm a math nerd. My natural preference is to write down a model. I tell stories through models. But since moving to the Fed, I've had access to such good data. And not just the Fed. The profession at large has much more detailed data now. For more and more questions, you can just go look in the data. Sometimes the data are so rich and the question is so clear, you don't need to write down a model. But eventually you ask questions you can't answer that way. That's when you need to write down a model. Roughly speaking, whenever you want to do a counterfactual, you need a model. For example, in this article, two key questions are, how would landlords respond to changes in eviction laws, and what would that response mean for the availability of affordable rental housing? These are model questions. Also, surprisingly, when it comes to evictions—and especially rental nonpayments—we don't have good data. That's why I think I'll need to use models for my future articles about evictions.

Nonworking Parents or Hungry Children

How did the Child Tax Credit's COVID expansion affect child poverty and the parental work incentive?

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The views expressed in this article are not necessarily those of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

Caring for children presents a significant financial burden for many families. To help ease this burden, Congress in 1997 created the Child Tax Credit (CTC), a tax break for low- and middle-income families with children. Since then, Congress has modified the CTC several times, most recently as part of the Tax Credit and Jobs Act (TCJA) of 2017. The TCJA's version of the CTC expires at the end of 2025.

But when COVID hit and millions of families were struggling with lost income due to the pandemic, the CTC proved inadequate to the crisis. So when Congress passed the American Rescue Plan in 2021, it also dramatically increased the size of the credit and the number of low-income families that qualified for the credit. Although the expansion was only enacted for a single year, the TCJA's impending expiration has inspired many policymakers to revisit the CTC expansion.

In this article, we evaluate the effectiveness and trade-offs of the expanded CTC. First, we assess the policy's success in alleviating financial distress for families with children. Several researchers report that the expansion greatly reduced the child

poverty rate in 2021. We provide an in-depth review of this literature and offer a caveat for interpreting these well-publicized findings.

Second, we examine whether the 2021 CTC expansion inadvertently incentivized parents not to return to work. If the expansion reduced the incentives to work, it might have exacerbated the postpandemic worker shortage and thus contributed to the recent inflationary episode. We summarize empirical evidence that suggests that the temporary expansion did not disincentivize work. We discuss why this may be and conclude with a brief discussion of how these findings relate to proposals to renew or permanently expand the CTC.

Expanding the CTC in 2021

To understand how the temporary 2021 expansion changed the CTC and thus altered work incentives, we need to describe the rules under the preexpansion CTC, which were reinstated after the expansion expired (Table 1). First, to qualify for the CTC, a family must have a minimum annual earned income of $2,500. Policymakers included this rule to incentivize families with a marginal attachment to the labor market to keep at least one member in the labor force. In other words, this is a work requirement. Once a household surpasses this minimum earned income, the amount of the credit is phased in, increasing at a rate of 15 cents per dollar of earned income until it reaches a maximum of $2,000 annually per each child under 16 years old. Because Congress intended the credit to benefit low- and middle-income families, the size of the credit begins to decline when a family's income reaches $400,000 for married joint filers or $200,000 for single-parent filers.

When Congress temporarily expanded the CTC in 2021, it removed the phase-in and the minimum earned income threshold; it also increased the credit to $3,000 per child for children ages 6-17 and $3,600 for children under 5 (Figure 1).[1] Under the expanded CTC, the size of the credit did not depend on a household's income until it reached a relatively high level. Although the expanded credit phased out for families making more than $150,000 a year, the expansion turned the CTC into a lump-sum cash transfer program for those earning a lower income.

Theoretically, these changes disincentivized work through the income effect and the substitution effect. Under the income effect, families receiving more unearned transfer income should work less. Under the substitution effect, the opportunity cost of *not* working declines, further inducing families to work less. Specifically, the opportunity cost of not working corresponds to the income a family can earn by working. Under the CTC, the family receives an additional 15 cents per dollar of their labor income. But the 2021 expansion temporarily abolished this additional portion, lowering the price of not working. This could have increased the demand for not working or, more plainly, decreased the labor supply.

Two other changes made the CTC more accessible to low-income families. Under the TCJA, the credit was only *partially refundable*. "Refundability" means that benefits can be paid out as cash independent of the family's tax liability. In contrast, "nonrefundability" means the size of the benefit is limited by the family's tax liability. Because the CTC under the TCJA is refundable only up to a limit ($1,400), it is only partially refundable. For example, suppose a tax filer has a tax liability of $500 and is eligible to receive the CTC of $2,000. This filer cannot receive the full (net) benefits of $1,500 because the refund amount is capped at $1,400. The 2021 expansion made the credit *fully refundable*–that is, it made the size of the credit independent of a household's tax liability.

The expansion also introduced advance payments, whereby half of the total credit was paid in monthly installments from July to December 2021, prior to tax filing. Normally, the full credit is remitted to eligible recipients after they file their taxes. But under the expansion, eligible households with a history of tax-filing received their benefits prior to filing their 2021 taxes.[2]

TABLE 1

The COVID Pandemic Inspired Congress to Expand the Child Tax Credit

This expansion greatly increased the number of families eligible for the credit and the amount each family received.

Child Tax Credit Policy: 2020 and 2021

	The 2020 Tax Cuts and Jobs Act (TCJA)	The 2021 American Rescue Plan (ARP)
Credit	Maximum $2,000 credit per child aged 6–16	Maximum $3,600 credit for children aged 0–5 Maximum $3,000 credit for children aged 6–17
Refundability	Partially refundable, up to $1,400 per child	Fully refundable
Advance Payment	No advance—paid upon tax filing	Advance payment of up to 50 percent of total credit value, paid in monthly installments from July to December 2021, unconditional on tax filing; second half paid upon tax filing
Phase-In	Credit amount equal to 15 percent of earned income above minimum eligibility threshold, up to maximum credit amount	No phase-in
Minimum Eligibility	Must have at least $2,500/year in earned income	No minimum earned income
Phase-Out	Begins to phase out at a rate of $50 for every $1,000 in additional income over income threshold	Decreases at a rate of 5 percent as income exceeds thresholds until credit amount equals TCJA maximum of $2,000 per child, then follows TCJA phase-out
Phase-Out Income Thresholds	$200,000 for single/head-of-household filers, $400,000 for married-joint filers	$75,000 for single filers, $112,500 for head-of-household filers, and $150,000 for married-joint filers

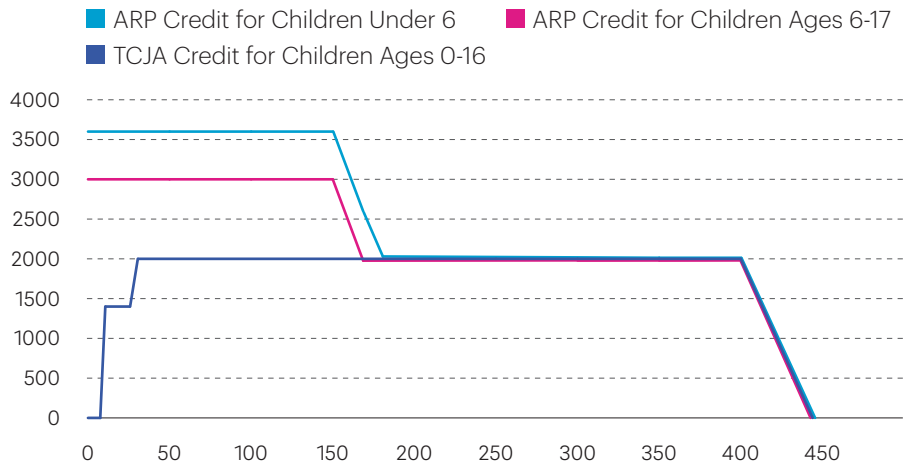
Data Source: Crandall-Hollick (2021)

FIGURE 1

Under the Expanded CTC, the Size of the Credit Did Not Depend on the Income Level Until It Reached a Relatively High Level

For those with a lower income, the expansion turned the CTC into a lump-sum cash transfer.

The CTC schedule under the TCJA and under the 2021 expansion for a married couple with one child; X axis is total household income (in thousands), Y axis is credit amount



Data Source: Urban–Brookings Tax Policy Center calculations (Urban–Brookings Tax Policy Center, 2024)

Note: This figure assumes that all income comes from earnings; other means-tested benefits are not considered. The figure shows the total credit for one child; families with more children would be eligible for larger credits. Phase-out thresholds apply to married couples filing jointly.

Importantly, many U.S. households are not required to file taxes. For example, single filers under 65 are not required to file taxes if their annual income is less than $13,850. Of course, that doesn't mean they don't file taxes. But in their 2023 working paper, University of Michigan associate professors of public policy Katherine Michelmore and Natasha V. Pilkauskas report that more than 25 percent of households whose monthly income is less than $1,000 ($12,000 per year) are nonfilers. Thus, even though changes in the expanded CTC, such as the removal of the work requirement and the introduction of full refundability, increased the availability of the CTC to previously ineligible families, newly eligible families without a history of filing taxes would have missed out on the advance payments.

To address this issue, the federal government set up an online sign-up tool, allowing these families to register to receive the advance payments.[3] Despite this tool, many eligible families still failed to receive their credit, as discussed below.

How the Expansion Affected Poverty Rates

As indicated above, the removal of the minimum earned income threshold greatly increased the number of CTC-eligible families. Using data from the Annual Social and Economic Supplement (ASEC) to the Current Population Survey (CPS), Kalee Burns and Liana Fox of the U.S. Census Bureau found that 97.1 percent of all children living in a family unit were eligible to receive the 2021 expanded CTC, relative to 38.2 percent of children before the expansion.[4] They estimate that the expanded CTC lifted 5.3 million people (including 2.9 million children) out of poverty.[5] Both the increased coverage and increased credit amount contributed to this decline in poverty.

The decline of children living under the poverty line corresponds to a decline in the poverty rate from 9.8 percent to 5.3 percent for children under the age of 6 and from 8.9 percent to 5.2 percent for children 6-17. Burns and Fox calculated these figures by comparing the number of people and children who fell on either side of the poverty income threshold, with and without the CTC. Thus, these percentages represent the total effect of the CTC in 2021. To isolate the expansion's effect, Burns and Fox also considered a counterfactual case in which the CTC eligibility and credit amounts hadn't changed in 2021. According to this calculation, the 2021 CTC expansion lifted 2.1 million children out of poverty.[6] That's about 72 percent (2.1 million out of 2.9 million) of the total effect (Figure 2).

Burns and Fox also found that the 2021 CTC expansion was most significant for Black children and Latino children, with the poverty rate for each group shrinking by 6.3 percentage points. This represents approximately 716,000 Black children and 1.2 million Latino children lifted out of poverty. These researchers also looked at family structure and found that the largest effect was felt among children in households headed by a single mother.

But these differences in the impact of the expansion are not just demographic. They are also geographic. In their 2023 Brookings report, Georgetown University professor of public policy Bradley Hardy, Columbia University research director Sophie Collyer, and Columbia University senior research scientist Christopher Wimer examined how the CTC expansion affected different geographic areas. They divided states into four categories based on whether each state's average cost of housing was above or below the averages' cross-state median, and whether each state's poverty rate was above or below the rates' cross-state median. They found that, although the CTC reduced poverty across all states, reductions were highest in states with a low cost-of-living yet high baseline poverty rate.[7] Moreover, states with an above-median share of Black children or above-median share of children with an unmarried mother had *both* a higher baseline poverty rate *and* a greater reduction in the child poverty rate. These results suggest that the 2021 CTC expansion helped reduce the inequality in child poverty rates between states.

Not All Eligible Families Received the Credit

The above calculations are based on the expanded *eligibility*—they assume universal uptake and do not account for incomplete participation.

TABLE 2

Our Difference-in-Differences Estimation of the Effect of the 2021 CTC Expansion Suggests That It Did Not Reduce the Work Incentive

Labor force participation rates among parents and nonparents before and after the policy change

	Parent (Treatment Group)	Nonparent (Control Group)	Difference
Jan-Jun 2021	80.41	76.24	+4.17
Jul-Dec 2021	81.35	77.10	+4.25
Difference	+0.94	+0.86	+0.08

Data Source: Authors' calculations using the Current Population Survey's public-use microdata

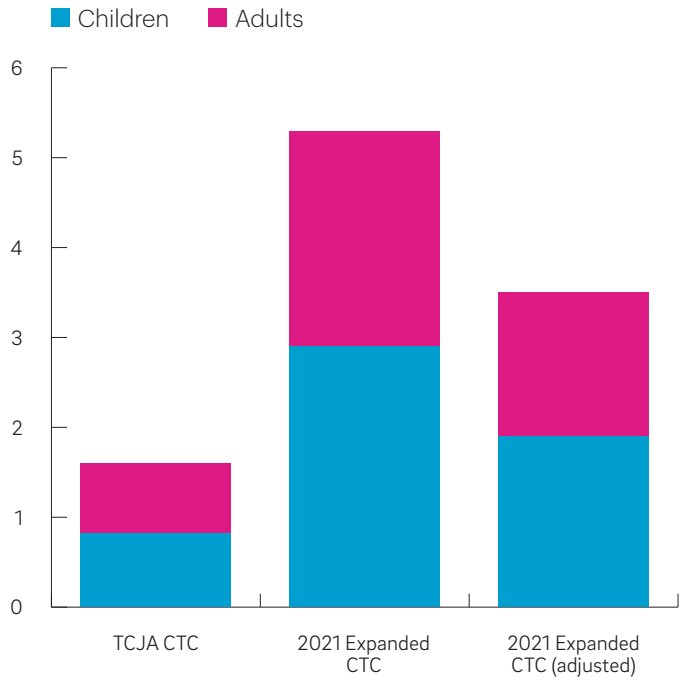
Note: Sample includes only individuals between 18 and 54 years old.

FIGURE 2

The Removal of the Minimum Earned Income Threshold Greatly Increased the Number of Families Eligible for the CTC

But when we account for incomplete take-up, the total effect on poverty reduction is reduced to 3.5 million people.

Number of adults and children lifted out of poverty before and after the CTC expansion



Data Source: Authors' calculations using ASEC data and ASEC CTC Research Supplement

Note: The third bar is generated using the assumption that if a family indicated nonreceipt of the advance CTC payments, they likely also did not receive the second half of the payments. This assumption is made to create an upper bound on the proportion of eligible families that did not receive the 2021 CTC. Thus, our estimate of the downward-adjusted poverty lift effect of the 2021 CTC is a lower bound on the poverty alleviation of the policy.

But as previously noted, many (often low-income) families do not file a federal income tax return, which they must do to receive the CTC automatically. Some of these families became eligible for benefits only once Congress expanded the CTC. Did these families somehow overlook the expansion? To find out, we used the 2022 ASEC survey data. This survey asks whether the family received the advance CTC payments in 2021. According to the data, only 67 percent of eligible families answered "yes" to this question. This share is even lower for lower-income families: Among families with an annual income below $25,000, only 60 percent answered "yes."

This question pertains to the receipt of the *advance* payments. If a family did not receive the advance payments, it could still have received the full benefit by filing a tax return in 2022. (For eligible households that had previously filed a tax return, the advance CTC payments were sent automatically.) Such a family would have had to have filed a tax return for the first time in 2022 *and* been unaware that they could have received advance payments in 2021. This is unlikely. Thus, findings about the receipt of the advance payments likely apply to the receipt of the expanded CTC in general. When we account for the incomplete take-up of the credit, the number of people lifted out of poverty by the expanded CTC shrinks from 5.3 million to 3.5 million; for children, it shrinks from 2.9 million to 1.9 million (Figure 2).

Michelmore and Pilkauskas present evidence consistent with our estimate of incomplete receipt. They used a data set from a national monthly survey administered by Propel, a software company for low-income households. Propel's mobile app, Providers, allows users to track their Supplemental Nutrition Assistance (SNAP) balance and other government benefits. Michelmore and Pilkauskas collected the data from the app user surveys administered by Propel between August 2021 and January 2022. According to these surveys, only 67 percent of eligible families reported that they received the credit in that month. These surveys focused on low-income families, and the share is somewhat higher than the comparable share (that is, 60 percent) we found in the ASEC data. But the fact that these survey respondents are users of a benefit-tracking mobile app might mean that the sample is skewed toward the population (within low-income families) that is more likely to know about the advance payments. Thus, we conclude that the ASEC evidence is in line with the evidence from the mobile app users.

As outlined above, the federal government established an online tool to reach eligible households that had not previously filed their taxes. The evidence we present here, however, suggests that further outreach efforts are warranted. Researchers and policymakers should prioritize rigorous cost-benefit analyses of outreach initiatives and explore strategies designed to maximize the policy's intended effects while also minimizing its costs.

Impacts on Other Well-Being Measures

Several researchers have also found that the expansion (especially the advance payments) significantly reduced material hardship for low-income families.

For example, using high-frequency data from the U.S. Census' Household Pulse Survey, Columbia University senior research fellow Zachary Parolin and his coauthors—Collyer, Wimer, Barnard College professor of economics Elizbeth Ananat, and Columbia University Director of Policy Megan A. Curran—found that the advance payments of the CTC led to a 7.5 percentage point (25 percent) decline in food insufficiency among low-income households (that is, households whose income was less than $35,000) with children. Food insufficiency among childless households in the same income group remained stable over the same period, consistent with their nonreceipt of the CTC advance payments.

For their 2022 working paper, Pilkauskas and Michelmore, along with their coauthors, University of Wisconsin postdoctoral fellow Nicole Kovski and University of Michigan professor of public policy H. Luke Shaefer, examined overall material hardship beyond food consumption. Specifically, using the survey data collected by Propel (described above), these authors constructed a set of indexes of material hardship using groups of questions pertaining to homelessness, food insecurity, transportation insecurity, and an inability to pay bills. They found that the receipt of the average monthly amount of the CTC ($500, as part of the advance payments) reduced the total number of hardships a household experienced by approximately 17 percent. Food-related hardships were the most affected, decreasing by approximately 32 percent.[8]

A Disincentive to Work

The expansion of the CTC clearly helped many families, but it could also have reduced their work incentive. This concern was particularly pertinent in 2021-2022, because a labor shortage posed a significant challenge to firms, leading to higher labor costs and subsequently higher inflation.[9]

As discussed above, the substitution effect refers to the change in the relative prices of working and not working, and the income effect refers to the effective increase in total income. Standard economic theory suggests that the CTC expansion could have reduced the work incentive through both effects. To see how, we need to examine each of the expansion's three policy changes: the elimination of the phase-in structure, the increase in the credit amount, and the introduction of advance payments. The elimination of the phase-in presumably lowered the work incentive through the substitution and income effects. The increase in the credit amount, independent of the phase-in, did so through the income effect.[10] The advance payments only change the timing of the credit receipt but are particularly relevant for families with limited financial resources because they provide immediate relief from liquidity (or cash) constraints. The effect of relaxing this constraint can thus be thought of as an income effect.

The advance payments provide researchers with a unique opportunity to test the work incentive hypothesis. Households received these payments as monthly installments from July to December 2021. Thus, we can examine how labor force participation rates changed before and after the introduction of advance payments. This is an application of the difference-in-differences estimation of a policy effect (Table 2). For this analysis, we used the public-use microdata of the CPS to compute labor force participation rates among parents and nonparents before and after the policy change. In the first column of Table 2, we compare the participation rates among parents (those who we assume were eligible and received the benefits). These "treated" individuals *increased* their labor force participation rate between the two periods. However, changes in the general economy may have brought workers into the labor force independent of the advance payments. To control for this effect, the second column presents the participation rates among nonparents. Their participation rate *also* increased, and by a similar amount. The difference between the differences in participation rates is 0.08 percent. This finding does not support the work incentive hypothesis.

However, these calculations do not control for other aspects of the data. For example, our calculations assume that the underlying trend in the parents' labor force participation rate between the two halves of 2021 is the same as the trend for the childless. This is how we infer the "counterfactual" trend—the trend in the absence of the policy change. But this assumption may be wrong. Furthermore, if the work incentive effect is concentrated among low-income households, our calculations, which are based on the entire income spectrum, might mask the expansion's effect on these households.

Several researchers have used more sophisticated econometric techniques to address these issues. Although their papers differ in methodology, they all focus on the same period surrounding the start of the advance payments, and they all apply difference-in-differences estimations using the same data set we used for Table 2.

For their 2022 working paper, Ananat and her coauthors—Columbia University post-

TABLE 3

But When We Apply a Difference-in-Differences Estimation to Single Mothers, We See the Disincentive at Work

This matches what other researchers have found about this subgroup

Labor force participation rates among young unmarried females without a college degree, parents and nonparents, before and after the policy change

	Parent	Nonparent	Difference
Jan-Jun 2021	59.11	61.64	-2.53
Jul-Dec 2021	58.85	63.62	-4.77
Difference	-0.26	+1.98	-2.24

Data Source: Authors' calculations using the Current Population Survey's public-use microdata

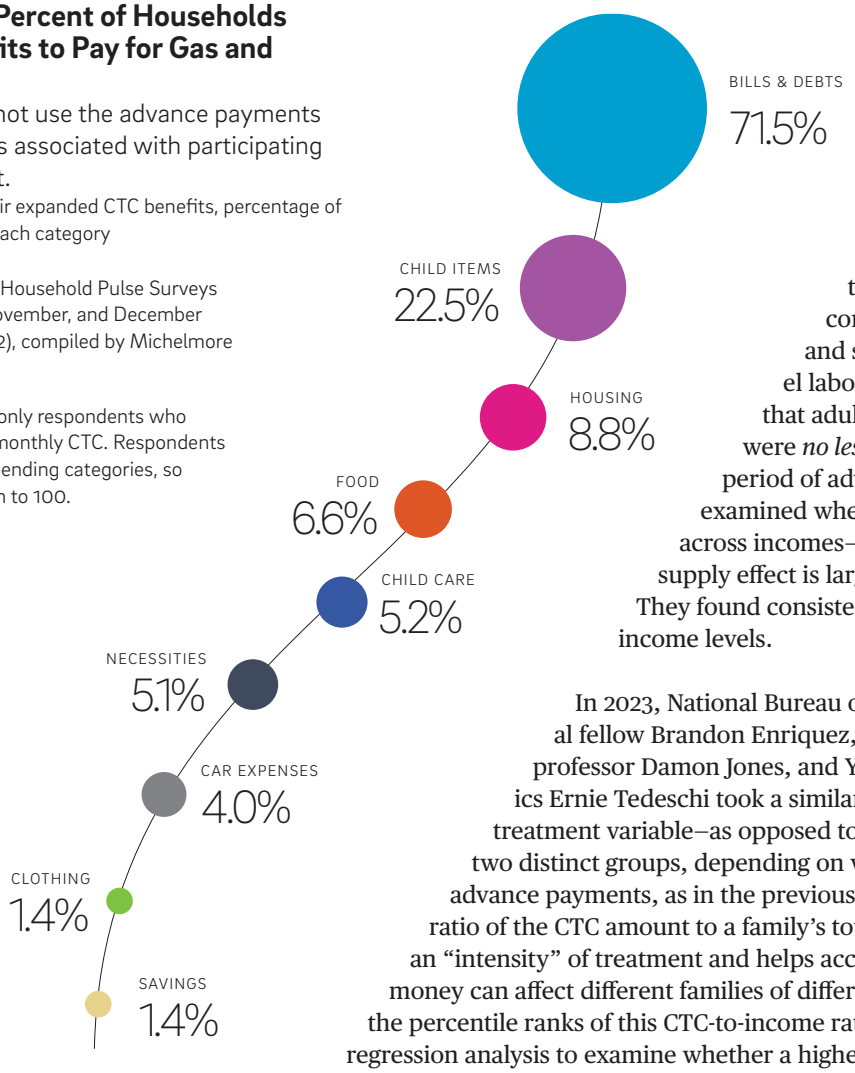
Note: Sample includes only unmarried females between 18 and 30 years old with some college or less.

FIGURE 3

Only About 10 Percent of Households Used the Benefits to Pay for Gas and Child Care

Most families did not use the advance payments to pay for the costs associated with participating in the labor market.

How families spent their expanded CTC benefits, percentage of families' spending for each category



Data Source: Providers Household Pulse Surveys (August, September, November, and December 2021, and January 2022), compiled by Michelmore and Pilkauskas (2023)

Note: Sample includes only respondents who reported receiving the monthly CTC. Respondents could select multiple spending categories, so percentages do not sum to 100.

doctoral research scientist Benjamin Glasner, University of Connecticut assistant professor of public policy Christal Hamilton, and Parolin—constructed an econometric model that controls for individual-level characteristics that influence employment outcomes (such as age, level of education, and sex) and that accounts for state-level labor market conditions. They found that adults in households with children were *no less likely* to be employed during the period of advance CTC payments. They also examined whether the treatment effect differs across incomes—that is, whether the negative labor supply effect is larger for lower-income households. They found consistently insignificant effects across all income levels.

In 2023, National Bureau of Economic Research postdoctoral fellow Brandon Enriquez, University of Chicago associate professor Damon Jones, and Yale Budget Lab director of economics Ernie Tedeschi took a similar approach but used a continuous treatment variable—as opposed to categorizing families into only two distinct groups, depending on whether they were eligible for the advance payments, as in the previous studies. They first calculated the ratio of the CTC amount to a family's total income. This ratio represents an "intensity" of treatment and helps account for how the same amount of money can affect different families of different income levels. They then used the percentile ranks of this CTC-to-income ratio in their difference-in-differences regression analysis to examine whether a higher rank is associated with a lower labor force participation rate. (Households that did not qualify for the CTC—for example, families without children—have a ratio of 0 and thus are at the lowest ranking.) They found that labor force participation rates steadily declined as ranking increased during the second half of 2021, but this pattern is statistically indistinguishable from the pattern in the first half of the year. Again, it seems that the CTC expansion (more specifically, the advance payments) did not reduce the work incentive.

In 2024, Northwestern University professor of education and social policy Diane Whitmore Schanzenbach and American Enterprise Institute economist Michael Strain conducted further robustness checks on previous research, including the research we have just discussed. They argue for splitting the sample based on key observable characteristics and estimating the impacts separately for each group. Using this approach, they can estimate the incentive effects in a more flexible manner than in the previous literature, albeit at the expense of statistical power due to a smaller sample size. They found a statistically significant negative effect of the CTC payments in the second half of 2021 among a specific subgroup: unmarried mothers with some college education or less and with children who are less than 6 years old. Specifically, this group was 4.5 percentage points less likely to be employed during the period when advance payments were made, compared with the comparable group without children. This is a substantial effect, given that the overall share of employed individuals prior to the advance payments was 64 percent.

We verified Schanzenbach and Strain's findings by applying our difference-in-differences estimation to a sample of unmarried females with some college education or less (Table 3). We restricted our sample to mothers between 18 and 30 years old, and our analysis did not distinguish by the age of their children.[11] Also, we considered the labor force participation rate instead of the share of the employed. We find that the treated parents dropped their participation rate by 0.26 percentage point between the first half and second half of 2021. While this raw difference is minimal, the control group *increased* its participation rate by 1.98 percentage points in the second half of the year. This implies that the overall effect is 2.24 percentage points, roughly in line with what Shanzenbach

and Strain found. When Shanzenbach and Strain considered other groups of people, however, they found no statistically significant effect.

The Missing Negative Effect on the Labor Supply

Why don't we observe a negative effect on the labor supply, despite what standard economic theory suggests? One possibility is that the negative incentive is offset by positive effects, resulting in no net effect. For example, if participating in the labor market is costly, the advance payments might have helped overcome this barrier. These costs include gas and child care. For this question, Michelmore and Pilkauskas presented useful survey results on how low-income families spent their CTC advance payments (Figure 3). According to this survey, only about 10 percent of households used the benefits for child care and gas or car expenses. This suggests that the majority of advance payments were not used to pay for the costs associated with participating in the labor market.

Another possibility is that most workers won't change their labor supply behavior (that is, by quitting a job or reducing their work hours) only because of the temporary availability of government transfer payments. For example, a worker is unlikely to quit a job they have had for a long time—even if their financial situation eases for a short period, as it did with the CTC payments—because their employer might not keep the position open until they want to return to work.[12] This example implies that the value of the employment relationship reflects not just today's earnings but also future earnings and how long the relationship is expected to last.

Moreover, the employment decision is not divisible: Individual workers generally have little flexibility to adjust their work schedule at will. The individual decision is likely to be either work or not work. One might have some flexibility in hours of work, but even then, a worker cannot adjust their workday by X hours in response to the availability of transfer payments. (If a firm operates three eight-hour shifts per day, its workers do not have the luxury of working, say, 0.8 shift a day.)

For these two reasons, individuals are unlikely to change their labor force participation unless the transfer is very large. And the findings in the literature suggest that even for low-income families, the CTC advance payments were not big enough to induce a transition from working to not working.

Conclusion

The 2021 CTC expansion significantly reduced child poverty, although this widely advertised reduction is probably overstated because the earlier results were based on the expansion of eligibility, not on the actual receipt of the credit. The government must improve its outreach to ensure that all eligible families receive the credits for which they are eligible.

Researchers generally find no evidence that the expansion (more specifically, the advance payments) reduced the work incentive. Does this mean that the 2021 CTC expansion should be reinstated and even made permanent? Our discussion in the previous section suggests that policymakers should exercise caution because a permanent enactment of such a policy might disincentivize work.

On the other hand, a recent paper by Ananat and Columbia University professor of contemporary urban problems Irwin Garfinkel makes a compelling case for also considering the long-term positive impact of the CTC on child development and children's future labor market outcomes. They appeal to the notion of "dynamic complementarity," whereby investments in children's development at each age have multiplicative effects—that is, greater human capital at each stage enhances returns on subsequent investments. This perspective warrants further in-depth research.

Notes

1 Figure 1 illustrates the CTC schedule under the TCJA and under the 2021 expansion for a married couple with one child. The phase-in and the minimum income requirement under the TCJA are represented by the upward-sloping portion of the dark blue line for those making less than $27,000.

2 See Table 1 for a comparison of the CTC before and during its expansion.

3 To receive the remaining portion of their credit, these families were required to file a 2021 tax return.

4 Burns and Fox (2022).

5 This estimate is based on an accounting exercise calculating the number of people (including both adults and children) lifted above the predetermined income poverty line by the expanded CTC who would have been below the poverty line without *any* CTC.

6 The poverty line is defined by the Supplementary Poverty Measure (SPM). SPM thresholds depend on family size, composition, tenure in area of residence, and geographic location. SPM thresholds also account for changes in the cost of living. According to the U.S. Bureau of Labor Statistics' 2021 release, SPM thresholds for household units with two adults and two children were $31,107 for owners with a mortgage, $26,279 for owners without a mortgage, and $31,453 for renters (Bureau of Labor Statistics, 2022).

7 The authors of this study determined that Pennsylvania and New Jersey have a high cost-of-living and low baseline poverty, whereas Delaware has a high cost-of-living and high baseline poverty. The group of states that contains Pennsylvania and New Jersey experienced a reduction in child poverty of 47 percent, whereas the group containing Delaware experienced a reduction of 41 percent. These reductions can be compared with a 51 percent decrease in child poverty in high-cost high-poverty states.

8 See Stuart (2023) for more on the longer-term trend in how the economic position of children compares with that of their parents.

9 For example, Shapiro (2023) shows that increased labor costs con-

tributed significantly to higher prices of nonhousing services during the pandemic years.

10 This effect disappears if households anticipate that the increased amount must be financed by tax increases on their future income. But this assumption is unlikely to hold, especially for low-income families.

11 Schanzenbach and Strain (2024) consider females between 20 and 50, but we focus on a younger group since it gives us a clearer pattern.

12 Reducing hours might be somewhat easier, but the same idea applies.

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Missed Rent: Path to Eviction or Loan from Landlord?

To get eviction policy right, we must understand why some people miss rent in the first place.

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Thanks to a dramatic increase in the cost of housing, shelter has been the single biggest contributor to the current inflation episode. The rapidly rising cost of housing strains many households, and when households cannot make their housing payments, they risk dramatic consequences: foreclosure for homeowners, eviction for renters. Both foreclosures and evictions negatively impact earnings, increase homelessness and residential mobility, and reduce credit access.[1] These negative consequences extend to the mental health of evicted tenants, particularly mothers, who subsequently experience higher levels of depression and parental stress.[2]

Because missed mortgage payments were at the heart of the Great Financial Crisis, there has been considerable research on mortgage performance and foreclosures. However, the same cannot be said for evictions. Nor is there much economic research on the determinants and consequences of rental nonpayment.[3]

But recently, several economists have begun to study evictions and missed rent payments.[4] One of these researchers,

Southern Methodist University assistant professor of economics Nathaniel Pattison, points out that missing a rent payment is akin to borrowing, as it permits a household to smooth nonhousing consumption in the event of an adverse financial shock such as a loss of income or an unexpected expense.[5] This raises two key questions.

First, a missed rent payment, like a loan, implies a future cost, but is this future cost simply the repayment of "the loan" or the risk of being evicted?

Second, is the consumption-smoothing benefit of being able to miss a rent payment diminished during a recession, when it is most valuable? Such cyclicality is almost certainly present for missed mortgage payments. Normally, most delinquent mortgages "self-cure," which means that mortgagors catch up on their payments,[6] but during the Great Recession, foreclosures skyrocketed, implying that homeowners' ability to smooth consumption by skipping their mortgage payments was limited at that time. Similarly, during economic expansions, most delinquent renters make up their missed rent and avoid eviction,[7] but is this true during recessions, too?

To answer these questions, we begin by explaining the key economic forces and trade-offs associated with evictions. Then we summarize what researchers know about rental delinquencies and evictions, and what answers their research suggests for the two questions posed above.

We also provide additional empirical evidence on the subject. We describe the (cross-sectional) empirical relationship between eviction filings and neighborhood characteristics, document empirical patterns of nonpayment and evictions over the business cycle, and explore what these facts suggest about the underlying economic mechanisms. We conclude by discussing the implications of this analysis for policy interventions.

The Key Economic Forces and Trade-offs

Before we set out to explore the empirical evidence, we need to identify the key economic forces and trade-offs associated with evictions and missed rent payments.[8] On the one hand, permitting tenants to miss rent payments when they are in financial distress (as when the head of household has lost their job) can serve as an *informal insurance mechanism*. On the other hand, landlords must be compensated upfront for the implied risk of nonpayment, so they charge higher rents, especially for the (lower income) tenants who are more likely to skip their rent.[9] We refer to this increase in rent as the *default premium*. Any policy designed to reduce evictions must balance the insurance benefit of the lax eviction regime against the higher rents (or lower availability of low-cost housing) arising from the lower "commitment" of tenants to pay their rent.[10]

To quantitatively evaluate this trade-off, we must understand the economic shock that led a household to miss their rent payment. If this shock is temporary, then the distressed tenant should quickly recover and pay their back rent, so a delinquency shouldn't lead to an eviction. However, if the underlying shock is persistent, then rental delinquencies are unlikely to self-cure, and the eviction regime becomes much more important in shaping the rental housing market.

What Researchers Know

To illustrate the presence of these mechanisms and inform the answers to the two questions posed above, we turn to empirical analysis. Although economists have only recently begun to study rental delinquencies and evictions, this recent research provides important insights.

*See **What the JCHS Found.***

Rental Prices and Delinquencies

Lower-income renters are at greater risk of being delinquent on their rent and thus pay a larger default premium. Two facts exacerbate this risk. First, although rents increase with income, the rent burden (that is, the ratio of rent to income) decreases with income: Higher-income renters pay more for rent, but middle- and lower-income renters spend a larger portion of their income on rent.[11] Thus, the financial strain from the cost of housing (and the risk of delinquency) is greater for low-income households.

Second, the rent-to-value ratio decreases with the level of rent.[12] In other words, the rent for an expensive apartment represents a smaller portion of its market value than does the rent for a cheaper apartment. This can be viewed as evidence of the default premium in rental prices. Because low-income households are more likely to rent cheaper apartments, and because they are more likely to miss their rent payments, their landlords demand greater compensation for that risk in the form of higher asking rent (and thus a higher rent-to-value ratio).[13] This means that low-income renters not only pay a larger share of their income toward rent, but they also get less for their money.[14]

This relationship between rent and the risk of delinquency creates a feedback loop: The higher risk of delinquency among low-income renters drives up rents for those renters, further increasing the risk of delinquency and making housing even more unaffordable.[15]

Direct evidence regarding rental delinquencies is sparse. One important observation comes from Pattison's recent study, which used the U.S. Census Bureau's Survey of Income and Program Participation (SIPP) to document that a job loss doubles the probability of a missed housing payment.[16] We used the same data source to calculate the aggregate time series of rental delinquency rates (partial due to data availability). We then plotted the delinquency rates against the eviction filing rates obtained from Eviction Lab, an organization housed at Princeton University that is dedicated to making nationwide eviction data publicly accessible to the broader research community (Figure 1).[17] Surprisingly, there isn't a strong correlation between the two time series. To better understand which renters are more likely to move from delinquency to eviction, we document some facts about evictions.

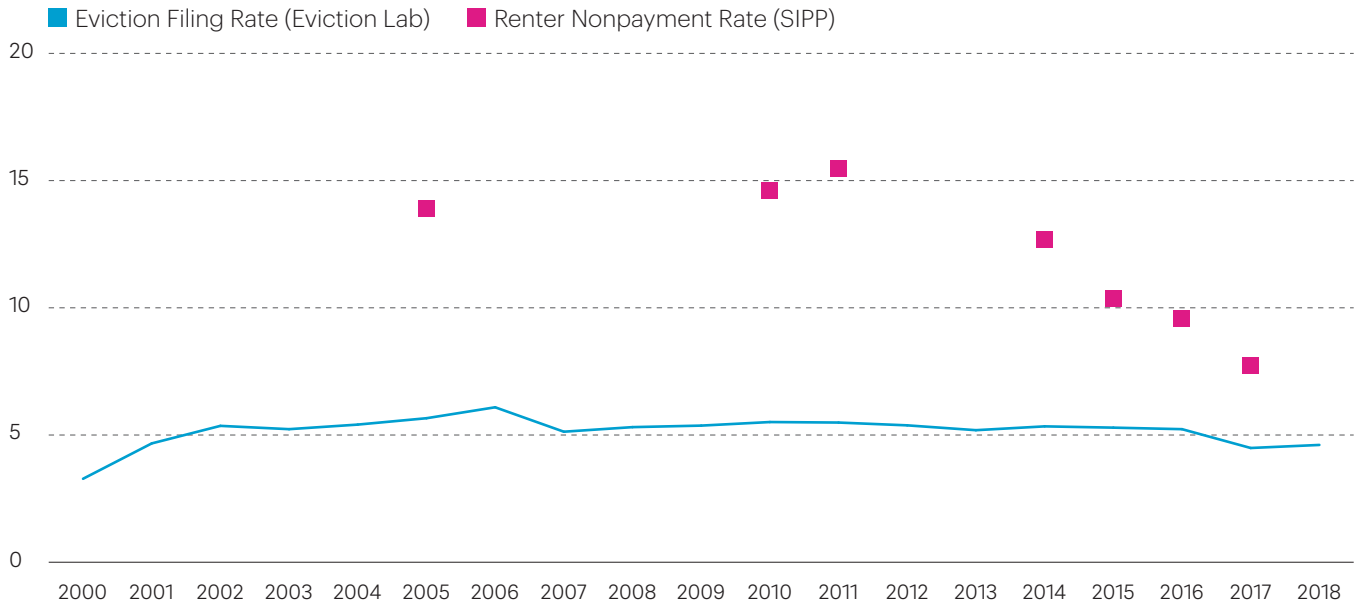
The Landscape of Evictions

There is little consensus on the annual number of evictions in the United States. One important data source is Eviction Lab, which provides measures of the three stages of the judicial eviction process: filing, threatened, and judgment (Figure 2). According to Eviction Lab, there are more than 2 million filings per year. About half of filings end up in eviction judgments, implying that about 1 million households are evicted every year.[18] How-

FIGURE 1

The Eviction Rate Does Not Vary Much Over Time, Even When the Nonpayment Rate Does

The renter nonpayment rate and the eviction filing rate, percentages, 2000–2020



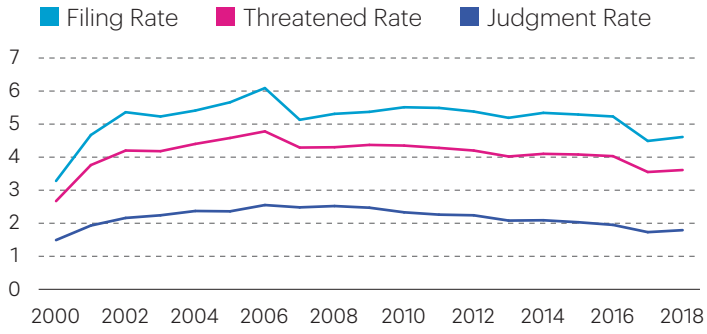
Data Sources: U.S. Census Bureau's Survey of Income and Program Participation (SIPP) and Eviction Lab

FIGURE 2

Surprisingly, There Was No Spike in Evictions During the Great Recession

All measured rates have remained remarkably stable since the early 2000s.

Time series of eviction rates (filing, threatened, and judgment), percentages, 2000–2018



Data Source: Eviction Lab

Note: Uses Eviction Lab's national "proprietary" data.

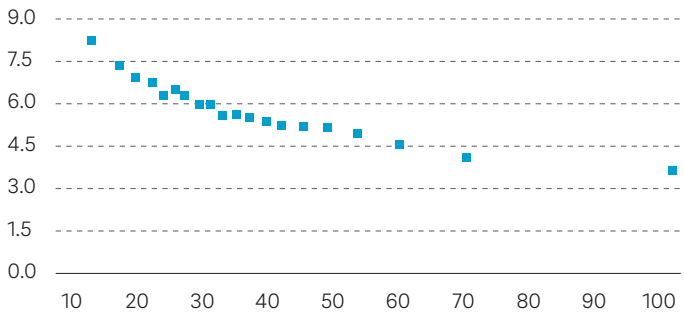
ever, this is a lower-bound estimate because Eviction Lab's data do not cover the entire country. If we extrapolate from the U.S. Census Bureau's American Housing Survey, the number of filings rises to roughly 3.2 million per year.[19] Finally, a recent Princeton University study estimates that landlords filed more than 3.6 million eviction cases per year from 2000 to 2018, equating to almost 7 percent of renter households.[20] Interestingly, all three of Eviction Lab's metrics remain rather stable over time. Even when foreclosures skyrocketed during the Great Recession, these rates did not increase considerably.

The richness of the Eviction Lab data enables us to analyze how the demographic and economic characteristics of individual neighborhoods (specifically, individual census tracts) correlate with the eviction rates. Combining the data from Eviction Lab with data from the U.S. Census Bureau's American Community Survey, we find strong (and perhaps unsurprising) relationships: Evictions are higher in neighborhoods with lower incomes (Fig-

FIGURE 3

Eviction Rates Are Higher in Lower-Income Neighborhoods

The relationship between the eviction filing rate as a percentage (Y axis) and the median income of a neighborhood's renter households in ,000s (X axis), 2010–2018

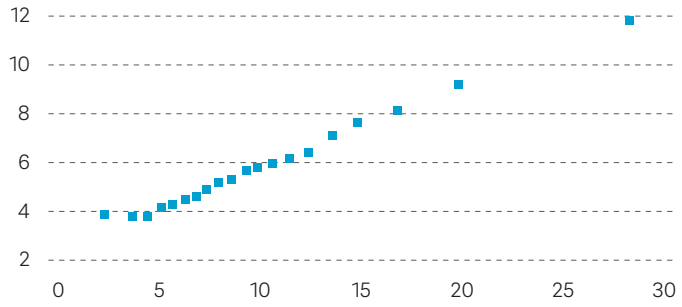


Data Sources: Eviction Lab and U.S. Census Bureau's American Community Survey

FIGURE 4

Eviction Rates Are Higher in Neighborhoods with a Higher Unemployment Rate

The relationship between the eviction filing rate as a percentage (Y axis) and a neighborhood's unemployment rate as a percentage (X axis), 2014

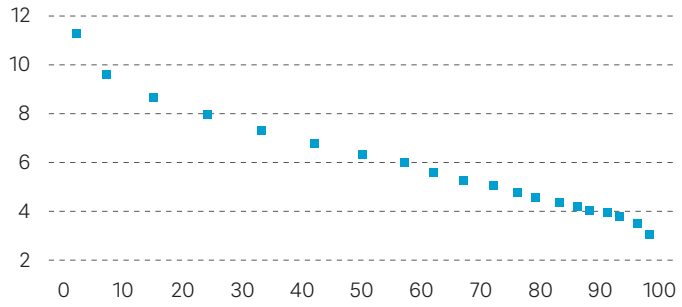


Data Sources: Eviction Lab and American Community Survey

FIGURE 5

Eviction Rates Are Higher in Neighborhoods Where a Larger Share of Residents Belong to a Racial Minority

The relationship between the eviction filing rate as a percentage (Y axis) and the share of a neighborhood's residents who are White (X axis), 2010–2018



Data Sources: Eviction Lab and American Community Survey

ure 3), higher unemployment (Figure 4), and a greater share of minority residents (Figure 5).

These findings are consistent with what other researchers have found. Lower-income renters face a higher probability of an eviction judgment, as do those who have recently experienced a job loss.[21] Unfortunately, the data on rental nonpayment (which may eventually lead to evictions) is not rich enough to replicate this analysis, but as noted above, Pattison finds that a job loss doubles the probability of a tenant missing a rent payment.[22]

Additionally, we used the New York Fed Consumer Credit Panel / Equifax (CCP) to construct measures of credit access and credit distress at the neighborhood level. We then correlated those measures with the eviction filing rates from Eviction Lab.

Our first observation is as pronounced as it is unsurprising: Evictions and financial distress are strongly correlated spatially. Specifically, we find that neighborhoods with a high eviction rate also have a high rate of credit card delinquencies (Figure 8).[23]

But when it comes to the relationship between credit access and evictions, the evidence is mixed. On the one hand, eviction filing rates are negatively correlated with credit card penetration. In other words, neighborhoods with a low share of credit card holders have a higher eviction filing rate (Figure 9). On the other hand, we find no clear relationship between evictions and another measure of credit access: the share of "credit invisibles"—that is, adults without a credit record.[24] This is somewhat surprising as it seems to conflict with the previous observation and with the findings of one of this article's authors, who found that credit invisibility is negatively correlated with a neighborhood's median income and positively correlated with its poverty rate.[25]

Nonpayment and Evictions Over the Business Cycle

We now turn to the second question we posed earlier: How do rental nonpayments and evictions behave over the business cycle? Specifically, does the consumption-smoothing function of delinquency diminish during recessions?

Although there is a clear relationship between the unemployment and eviction rates in the cross-section, this relationship is surprisingly absent in the time series. As can be seen in Figure 2, eviction filings resulting from rental delinquencies did not rise during the Great Financial Crisis or the Great Recession it triggered. This is puzzling because many people suffered a negative income shock during these years. (The unemployment rate peaked at 10 percent near the end of 2009 and didn't drop below 5 percent until 2016.) It is particularly surprising when we recall that both mortgage delinquencies and foreclosures spiked during these years (Figure 6).

There are two components to this puzzling observation. First, the available (though limited) SIPP data indicate that the rate of rental nonpayment did not increase nearly as much as the rate of mortgage delinquencies (Figure 1). Second, and even more significantly, the rate of transitions from delinquency to enforcement action was radically different for renters and homeowners (Figure 7).

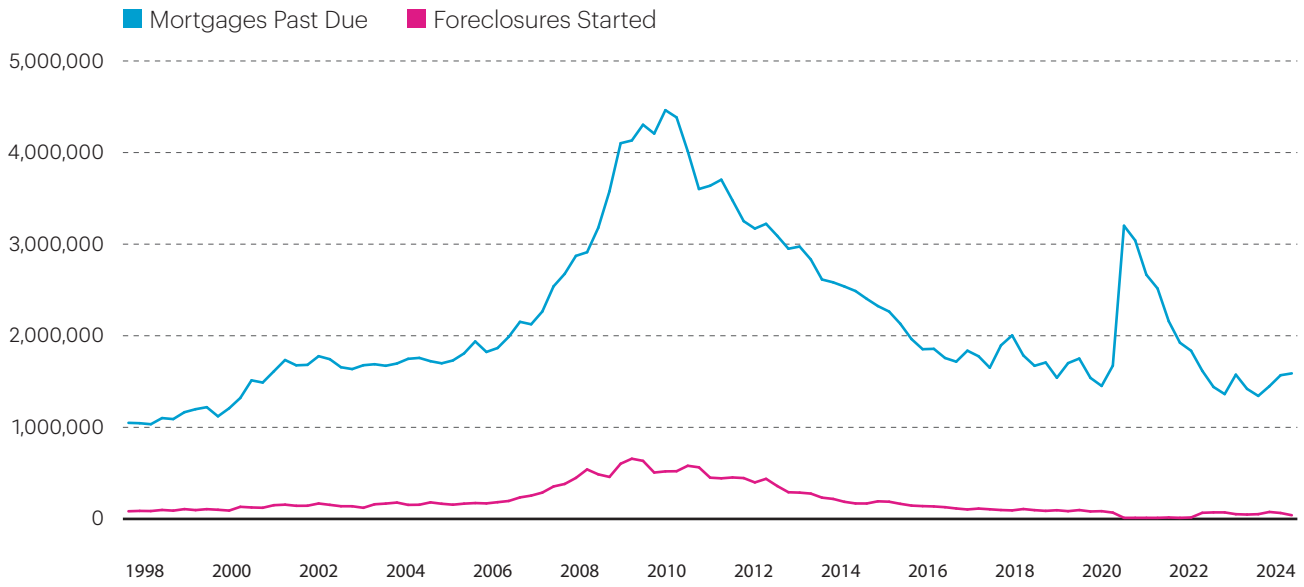
Whereas the vast majority of mortgage delinquencies self-cure in "normal times"[26]—that is, delinquent homeowners become current again without intervention from lenders—the situation was dramatically different during the Great Recession. Indeed, it was so different, the government stepped in with mortgage modification programs (including outright foreclosure moratoria) designed to prevent foreclosures. Despite these interventions, the foreclosure rate skyrocketed, not only as a share of all mortgages but even as a share of *delinquent* mortgages (Figure 7). This makes the lack of an increase in the eviction rate during the Great Recession even more surprising.

The aggregate numbers indicate that landlords did not become less tolerant of delinquencies during the Great Recession, which suggests that renters retained the consumption-smoothing value of rental nonpayment during the economic downturn. However, that makes it even more surprising that the share of renters taking advantage of this option did not increase at that time.

FIGURE 6

Both Mortgage Delinquencies and Foreclosures Spiked During the Great Recession

Mortgage delinquencies and foreclosures, 2000–2024

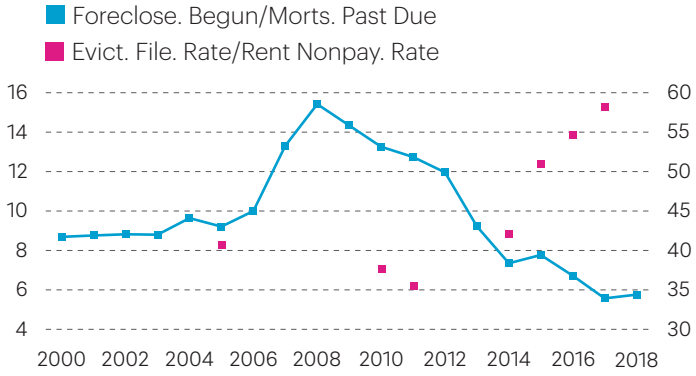


Data Source: Mortgage Bankers Association

FIGURE 7

The Rate of Transitions from Delinquency to Enforcement Action Was Radically Different for Renters and Owners

The share of mortgages past due that led to the start of foreclosure proceedings; the share of rental nonpayments that led to eviction filings, 2000–2020



Data Source: Mortgage Bankers Association, Eviction Lab, SIPP

What We Have Learned About the Underlying Economic Mechanisms

Turning back to the questions we posed at the beginning of this article, we can say with a high degree of certainty that some renters deal with financial distress by delaying their rent payments temporarily or indefinitely, and landlords require compensation for the risk of these missed payments. This implies that policies restricting evictions can drive up rents and make it harder for low-income households to find affordable rentals.

What is less clear but critical to the evaluation of an eviction policy is the nature of the underlying "shocks" that lead to rental nonpayment. If the shocks are transitory and most delinquent tenants become current again quickly,[27] then it's easy to make the case against evictions. However, if the underlying shocks are persistent,[28] then policies that delay evictions do more harm than good because they result in higher asking rents, making housing less affordable for the most vulnerable households.

When we turn our attention to the landlord-as-lender "safety net," our analysis suggests that, unlike the case with missed mortgage payments, this informal insurance mechanism does not vanish during recessions. Landlords, unlike mortgage lenders, do not appear to toughen their stance toward late payments during downturns. Having said that, we are puzzled that rental delinquencies didn't surge during the Great Recession despite the fact that more households experienced financial difficulties.

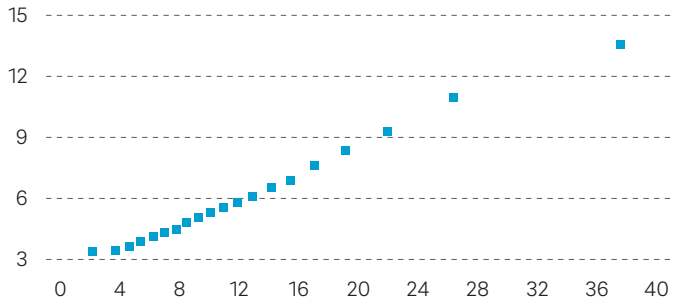
Policy Interventions

An eviction can devastate a household, so it is unsurprising that many people advocate for policies that make it harder to evict tenants. One such policy is the right to counsel (RTC), whereby low-income tenants who have had an eviction case filed against them receive subsidized or free legal assistance in court. Theoretically, RTC programs should deter evictions by extending the filing process and saddling landlords with higher legal fees,[29] with the added benefit that tenants will enjoy increased legal protections. In San Diego, an RTC program extended the average length of the eviction process by 31 percent and lowered the average share of outstanding debt that evicted tenants paid by 15 percentage points.[30] Investigations of other RTC programs find that tenants benefit from legal representation provided while

FIGURE 8

Neighborhoods with a High Eviction Rate Also Had a High Rate of Credit Card Delinquencies

The relationship between the eviction filing rate as a percentage (Y axis) and the credit card delinquency rate as a percentage (X axis), 2010–2018



Data Sources: Eviction Lab and New York Fed Consumer Credit Panel / Equifax

in court because of delayed court processes and fewer eviction judgments.[31] In a preliminary analysis of New York City's Universal Access to Counsel policy, zip codes that adopted this RTC program earlier were found to have experienced a decline in the share of filings that resulted in an eviction.[32]

Despite these potential benefits, some studies find that RTC policies are ineffective in preventing evictions and may actually undermine tenant welfare. This is due, in large part, to landlords hiking rents to compensate for the anticipated increase in the likelihood of default, for the associated legal costs of pursuing an eviction, and for the increased time it takes to evict under RTC. (This increased time is a problem for landlords because the longer a delinquent tenant stays in their unit, the longer the landlord goes without receiving rent.) These rent increases make housing even more unaffordable.[33] Furthermore, if the adverse shock that compels a tenant to miss a rent payment is persistent—meaning the tenant is not able to bounce back and make up the rent—then RTC policies only delay the inevitable eviction.[34] If it is true, as one recent study argues, that most tenants at risk of eviction (that is, tenants who are delinquent) have experienced a persistent shock, then RTC policies would likely be ineffective.[35]

A different solution shows promise: offering rental assistance to tenants experiencing job loss or a negative income shock. One recent study found that paying partial rental support directly to a landlord once their tenant becomes unemployed has a positive impact on tenant welfare without meaningful spillovers for rent prices, rental supply, or unit quality.[36] Another study found that a $400 rental subsidy for low-income households would substantially reduce housing insecurity and homelessness while improving aggregate welfare.[37] Rental assistance differs meaningfully from RTC policies because, rather than making it more difficult to evict the tenant after they default, rental assistance lowers the likelihood that a renter will default in the first place.[38] Moreover, given the resulting reduction in homelessness expenses, government spending on net could fall.[39] Rental assistance also outperforms RTC policies in terms of costs and distributional effects,[40] and there is consensus that rental assistance is more effective for preventing rental nonpayment and evictions than policies explicitly designed to restrict evictions.

Another policy proposal is a rent guarantee insurance (RGI) program. Renters who opt into RGI can have their rent paid off for a fixed number of months after experiencing an adverse income shock.[41] When the tenant is unable to pay their rent, the insurer pays it on their behalf. Like a rental assistance program, an RGI program reduces the tenant's housing insecurity and risk of homelessness following a job loss. Also, because the landlord continues to receive direct payments that cover 100 percent of the rent, the landlord does not have to increase the rent for new and existing tenants to account for the greater likelihood of default. As a result, an RGI program lacks the negative spillovers that may arise from an RTC program. However, because RGI benefits expire after a fixed number of months, it isn't ideal when an income shock is persistent.

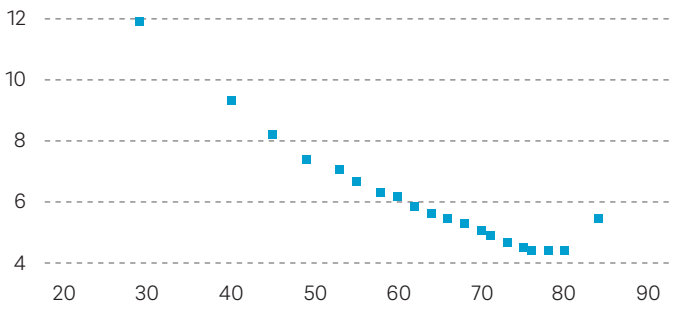
There's also an important distinction between private and public RGI. A private insurer would target higher-income households that have a lower risk of default but are better able to pay the insurance premium. Such a private provider would often find it unprofitable to offer this coverage to lower-income households who are at greater risk of rental nonpayment and who would find insurance premia less affordable. A public insurer, on the other hand, would target lower-income households and possibly use the substantial savings on homelessness expenses to finance the RGI program. As a result, a public RGI program would do more to address housing insecurity.[42]

Still another policy proposal is arbitration. A new policy implemented in Philadelphia in recent years has gained national attention and provides a good case study for our discussion. The Eviction Diversion Program (EDP), introduced in September 2020, aims to minimize the number of eviction orders by creating an avenue through which tenants and landlords can resolve disputes outside of court. In its current form, landlords are required to participate in the EDP prior to filing an eviction case against their tenant. Once an EDP request has been filed, a 30-day window begins during which the tenant and landlord—often with the assistance of a city official or a representative from

FIGURE 9

Neighborhoods with Greater Credit Access Had a Lower Eviction Rate

The relationship between the eviction filing rate as a percentage (Y axis) and the share of a neighborhood's households with a credit card (X axis), 2010–2018



Data Sources: Eviction Lab and New York Fed Consumer Credit Panel / Equifax

a nonprofit organization that has partnered with the city–work to accomplish one of the following: create a plan for the tenant to pay back the missed rent and show they can pay rent moving forward; help the tenant move out of their unit smoothly without having an eviction order placed on their public record, which would make it harder to find housing in the future; or receive Targeted Financial Assistance (TFA) should the case meet TFA eligibility requirements. If no agreement is reached by the end of the 30-day period, the landlord may proceed with the eviction filing process.

The EDP has shown promise since it was rolled out. A recent *Wall Street Journal* article reports that court filings to remove tenants in Philadelphia were down 41 percent in the period from June 2023 to June 2024 when compared with the annual average between 2016 and 2019.[43] The program benefits tenants by helping them continue making payments on time and by keeping an eviction off their record should they have to move. It benefits landlords by reducing the court costs associated with filing an eviction order and ensuring they continue receiving rental payments in full.

However, some argue that the EDP isn't effective on a large scale, nor does it meaningfully address the root causes associated with eviction filings. The program seems to favor tenants who, as discussed earlier, face a temporary income shock. If these tenants expect their income to bounce back, they can show their landlord that they will be able to continue making regular payments again soon. However, in cases in which the shock persists, the EDP only delays eviction. In fact, over half of the cases that go through the EDP end up in court, implying that the EDP often postpones an eviction rather than avoiding it altogether.[44]

In sum, though the EDP keeps some delinquent renters out of court and removed from the formal eviction process in the short term, its long-term viability is tied to its ability to offer rental assistance to tenants behind on payments.

Each of these policy interventions aims to make evictions less frequent, by either making evictions more difficult or helping tenants pay their rent on time. Each has its advantages, but a system that covers rent costs and lowers the default cost for landlords shows greater promise for effectively protecting tenants and improving the welfare of (prospective) renters without making housing less affordable.

What the JCHS Found

According to Harvard University's Joint Center for Housing Studies (JCHS), rents increased during and after the COVID-19 pandemic. Although rent growth has slowed since last summer, it remains elevated and exceeds the growth in wages. As of 2022, a record-high 22.4 million renter households spent more than 30 percent of their income on rent and utilities. Since 2019, cost-burden shares have risen the most for middle-income renters earning between $30,000 and $74,999 annually.[45] At the same time, rental units are not getting any cheaper. The JCHS notes that the supply of low-rent housing units has dwindled in the last decade, a trend made worse by the spike in rents during the pandemic. Simply put, rents continue to rise at a rapid rate, making rentals even more unaffordable for the average renter.

Notes

1 See Collinson et al. (2024b).

2 See Desmond and Kimbro (2015) and Collinson et al. (2024b).

3 Important earlier research in sociology is best exemplified by Desmond (2016).

4 For recent research into evictions, see Abramson (2024), Collinson et al. (2024b), Corbae et al. (2023), and Imrohoroglu and Zhao (2022). For research on missed rent payments, see Pattison (2024).

5 See Pattison (2024).

6 See Adelino et al. (2009).

7 See Pattison (2024).

8 An economic force is a direct effect of an event (like a job loss) on an economic outcome (like delinquency). One example of such a force is the effect of rental nonpayment on the profitability of rental units. A trade-off results from two economic forces working in opposite directions, as when some harm results from something otherwise beneficial. In this case, "trade-off" refers to the fact that providing partial insurance by permitting some missed payments results in higher rents and a smaller supply of affordable housing.

9 The equilibrium effect of rental prices is central to the analysis in Abramson (2024), Corbae et al. (2023), and Imrohoroglu and Zhao (2022).

10 This trade-off between partial insurance and commitment is similar to the one pointed out by Zame (1993) for credit markets. For personal bankruptcies, the trade-off was quantitatively assessed by Chatterjee et al. (2007) and Livshits et al. (2007).

11 See Abramson (2024) and Corbae et al. (2023).

12 As documented by Corbae et al. (2023) using the U.S. Census Bureau's Rental Housing Finance Survey, and by Diamond and Diamond (2024) using the American Housing Survey.

13 See Corbae et al. (2023).

14 Of course, that only goes for those low-income renters who do make their rent payments, as those who miss their rent payments end up being partially cross-subsidized (and thus increase the cost to their peers).

15 This logic also implies that marketwide increases in the cost of housing disproportionately affect poor renters, because any such macro increase is amplified by this feedback mechanism.

16 See Pattison (2024) for additional facts about missed housing payments and their correlation with job loss.

17 Gromis et al. (2022b)

18 Eviction Lab (2018).

19 See Collinson et al. (2024b).

20 See Gromis et al. (2022a).

21 See Abramson (2024) and Desmond and Gershenson (2017).

22 See Pattison (2024).

23 This observation could be driven in part by variation in the cost of housing. In his 2023 paper, "Are Rising Rents Raising Consumer Debt and Delinquency," Neil Bhutta, a special advisor in the Philadelphia Fed's Consumer Finance Institute, found that rent increases are associated with credit card delinquency.

24 We measure the share of credit invisibles by comparing the adult population of a census tract from the American Community Survey with the number of people with credit "trades" extrapolated from the CCP, which is a 5 percent sample of all individuals in the country with a credit record and a Social Security number.

25 See Livshits (2022).

26 See Adelino et al. (2009). In a similar vein for rental markets, Pattison (2024) finds that most delinquent renters become current again, and Humphries et al. (2024) find that landlords forbear most nonpayment (to avoid the costs associated with an eviction filing).

27 As suggested by Pattison (2024).

28 As suggested by Abramson (2024).

29 See Humphries et al. (2024).

30 See Abramson (2024).

31 See Collinson et al. (2024a).

32 See Ellen et al. (2021). Their study looked at the short-term impact of the UAC policy. Because evictions can take considerable time to occur after nonpayment, these estimates could be an underestimate if more evictions are prevented, or an overestimate if evictions rise after the program is implemented. This is the same program Collinson et al. (2024a) studied.

33 See Humphries et al. (2024) and Collinson et al. (2024a).

34 This is the central argument in Abramson (2024).

35 See Abramson (2024), who makes this case and thus takes a pessimistic view of RTC programs.

36 See Corbae et al. (2023).

37 See Abramson (2024).

38 Abramson (2024) makes this argument.

39 Abramson (2024) estimates an overall decline of roughly $6.9 million in spending in San Diego.

40 See Abramson (2024).

41 See Abramson and Van Nieuwerburgh (2024) for an evaluation of RGI programs.

42 See Abramson and Van Nieuwerburgh (2024) for a detailed analysis.

43 Parker (2024).

44 In 2023, the number of people enrolled in the program was higher than the number of eviction filings prepandemic, demonstrating that landlords—though not evicting their tenants—are still not receiving regular payments.

45 See Joint Center for Housing Studies (2024).

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Regional Spotlight

Technology vs. the Middle Class

Over the last 50 years, technological change helped eradicate midwage jobs. Can we do better in the age of AI?

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The views expressed in this article are not necessarily those of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

A pressing concern cited by researchers and policymakers alike is that the middle class has fallen behind—or at least, it's not what it once was. Over the last 50 years, wage inequality has worsened, and the share of income held by the middle class has fallen.[1] The rapid onset of automation, made possible by advances in information technology, coincided with this period of decline, making automation by computers and computerized robots an important area of study for researchers trying to understand why our middle class is facing challenges. The current rise of artificial intelligence (AI) technologies brings new relevance to this research. Now is the time to take a closer look at how technological advancement can change the skills we demand from our workforce, and how these changes have previously held back midwage workers.

In this article, I explain how technological change during the last several decades shifted the dynamics of midwage work for the United States. I then focus on the three states of the Philadelphia Fed's district to show how these dynamics played a role in our region. Lessons from this research may help policymakers

address the newest technological leap forward, AI.

Technology and Job Polarization: 1980 to the Information Age

New technologies create demand for certain skills and therefore for the workers who have those skills. For example, the demand for skilled typists only came about after the invention of the typewriter. The mechanical typewriter helped businesses save time and money, and this need paved the way for an explosion in the typist profession in the first half of the 20th century.[2] Eventually, however, new inventions replace the old, weakening demand for previously sought-after skills. In recent decades, for example, the invention of the desktop computer and eventual ubiquity of typing rendered the typist profession almost obsolete. Understanding how technology has impacted the demand for skills is important for explaining the shifts in midwage occupations over the past several decades.

A substantial body of economic research has solidified our understanding of how technological change has impacted the demand for skills and exacerbated *job polarization* in the United States since the 1980s.[3] Thanks, in part, to technological advances, there has been stronger job growth in high- and low-wage occupations than in midwage occupations.

We can better understand the connection between technology, skills, and job polarization if we take a closer look at the tasks required by an occupation. Each task requires certain skills. Some of these tasks are routine—that is, these tasks follow a repeated series of steps. Other tasks are nonroutine and are not easily described by a set of rules. Many prominent midwage jobs of the mid-20th century, such as office clerks and machine operators, relied on routine tasks. Automation rendered many of these tasks obsolete. However, these new automation technologies couldn't accomplish *nonroutine* tasks associated with the highest- and lowest-wage occupations. For example, a lawyer must exercise expert judgement that computers aren't able to replicate. Nor can computers employ the interpersonal skills and flexibility required of a good waiter. As a result, we have seen job growth in high- and low-wage occupations but a decline in the middle. The result is what economists call a more *polarized* labor market.

*See **Four Kinds of Tasks***

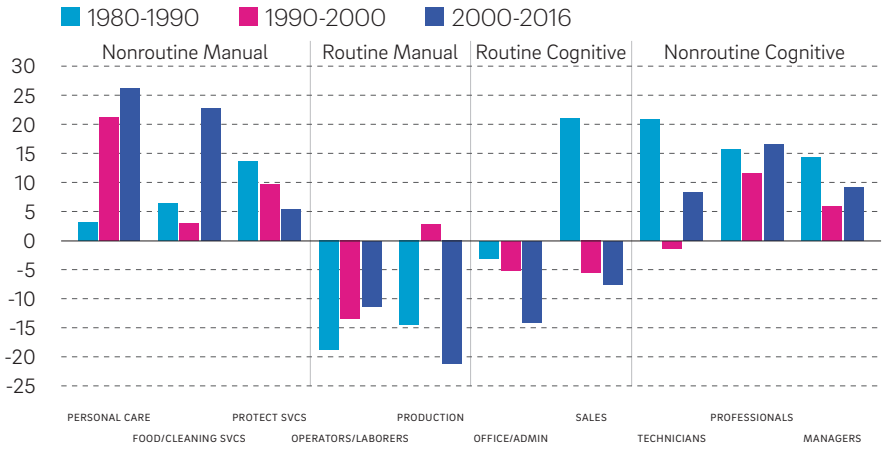
A main finding from the research showcases changes in employment share across 10 major occupation categories (Figure 1).[4] The first three categories comprise nonroutine manual occupations, often low-wage and with limited

FIGURE 1

The U.S. Labor Market Has Become More Polarized

Since 1980, job growth in traditionally midwage occupations has slowed compared to low- and high-wage occupations.

Percent change in share of U.S. employment, by occupational category, 1980–1990, 1990–2000, and 2000–2016



Data Source: U.S. Census Bureau's American Community Survey (ACS)

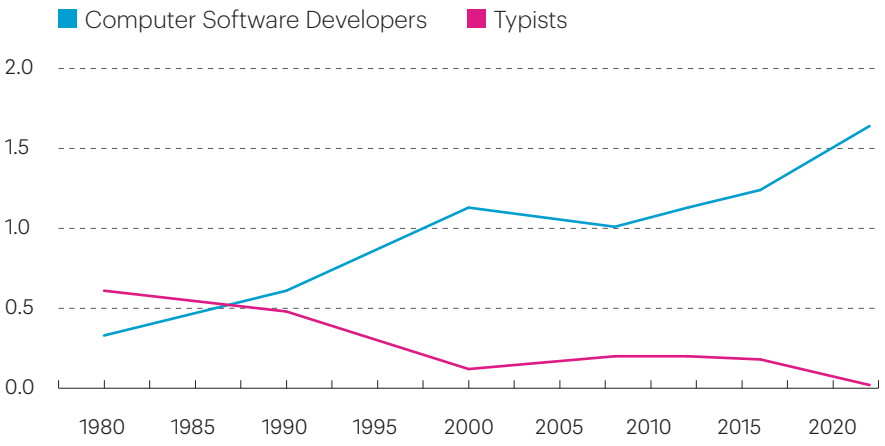
Note: Results replicated based on Autor (2015) and Autor (2019). The sample includes the working-age (16–64) civilian noninstitutionalized population in nonagricultural employment. Employment is measured as full-time equivalent workers.

FIGURE 2

Thanks to Computers, Typists Lost Their Prominence in the Labor Market

But it's been a great time to be a software developer.

Share of employment, typists and software developers, 1980–2022



Data Source: U.S. Census Bureau's American Community Survey (ACS)

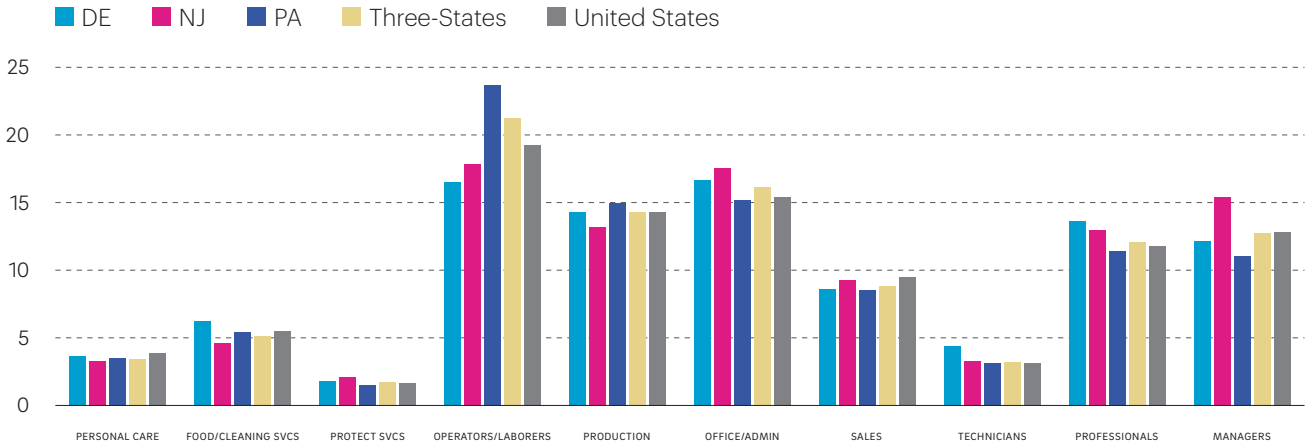
Note: The sample includes the working-age (16–64) civilian noninstitutionalized population. Employment is measured as full-time equivalent workers.

FIGURE 3

Blue-Collar Manual and Administrative Occupations Were Overrepresented in the Third District in 1980

This may explain why the region saw a bigger loss of middle-class jobs in subsequent decades.

Share of employment by occupational category, U.S. and the three states of the Third District, 1980



Data Source: U.S. Census Bureau's American Community Survey (ACS)

Note: The sample includes the working-age (16–64) civilian noninstitutionalized population in nonagricultural employment. Employment is measured as full-time equivalent workers.

educational or training requirements. The next four categories are midwage routine occupations that require training or specialized expertise but often do not require a college degree. The last three categories feature high-wage nonroutine cognitive occupations that often require substantial training or experience and at least a college degree. Since 1980, the share of workers in traditionally midwage occupations has contracted while the shares within low- and high-wage categories have grown.

As our society changes, so too does our mix of occupations. Change itself is not surprising nor necessarily alarming. In fact, this changing mix can create new opportunities for some workers. Although new technologies may render some occupations obsolete, they can also increase demand for existing occupations or bring about new types of work.[5] For instance, typists were replaced by new computer technologies, but this same period of technological advancement triggered rising demand for software developers (Figure 2).

But this period of automation has created both winners and losers. The "losers"—occupations prone to automation—were routine jobs that enabled workers to join the middle class, whereas the "winners"—occupations growing in demand and not subject to this same automation—were nonroutine jobs at the low and high ends of the wage spectrum.

This bifurcation of the labor market has contributed to rising wage inequality.[6] Workers with a college degree—and thus access to high-wage nonroutine cognitive occupations—have seen their earnings increase because technology has more often augmented rather than replaced their jobs. Spreadsheets, for example, made many accountants and other analysts more productive, and more-productive workers (usually) earn more money.[7] Meanwhile, workers without a college degree have seen their earnings stagnate partly because technology has replaced many routine midwage jobs. Many of these workers were unable to transition into higher-wage work and have entered lower-paid occupations because of degree or credential requirements at the high end.[8] This partly explains why we've seen growing wage inequality and an eroded middle class.[9]

Job Polarization in the Third District

Each region of the United States hosts a unique mix of occupations. This mix reflects each region's advantages, such as proximity to natural resources, transportation infrastructure, and early industrial development.

How was the Federal Reserve's Third District positioned in 1980 in terms of the 10 broad occupational categories discussed above? Were midwage occupations overrepresented in the District? Did this leave the region's workers particularly vulnerable to automation? When we compare the United States with the three states of the Third District, we see similar employment patterns emerge in these 10 broad categories, but midwage occupations were indeed overrepresented in the three-state region (Figure 3). In 1980, Pennsylvania was home to much larger shares of the operator and laborer occupations associated with the region's strong manufacturing base, such as machine operators and production checkers, graders, and sorters. Office and administrative occupations such as secretaries, stenographers, and general office clerks were also more represented in the region than in the United States, with a higher share of these workers in New Jersey and Delaware, perhaps because of the region's proximity to business-rich New York City and Philadelphia. Overall, the three-state region may have been more vulnerable to a weakened middle class given its concentration of blue-collar manual jobs and administrative work.

When we examine the change in employment share for the three-state region, the pattern that emerges is similar to what we see in the United States (Figure 4, top panel): The share of

employment rose in high- and low-wage occupations but fell substantially in the middle.

Although this job polarization mirrors what we see for the United States, three of the four midwage categories saw a bigger drop in the three states than in the entire country. Operator and laborer occupations experienced their greatest decline between 1980 and 1990: a 26 percent loss in the share of employment, compared with 19 percent in the United States. Office and administrative occupations experienced their largest loss later: 18 percent between 2000 and 2016, compared with 14 percent in the United States. Production occupations suffered slightly more than in the United States across each period. Sales occupations grew more between 1980 and 1990 in the three states than in the United States but follow a similar pattern of loss in the subsequent two periods. Personal care occupations, as well as managers and professionals, experienced higher relative growth in the three states compared with the United States, perhaps due to the region's concentration of education and medical institutions.

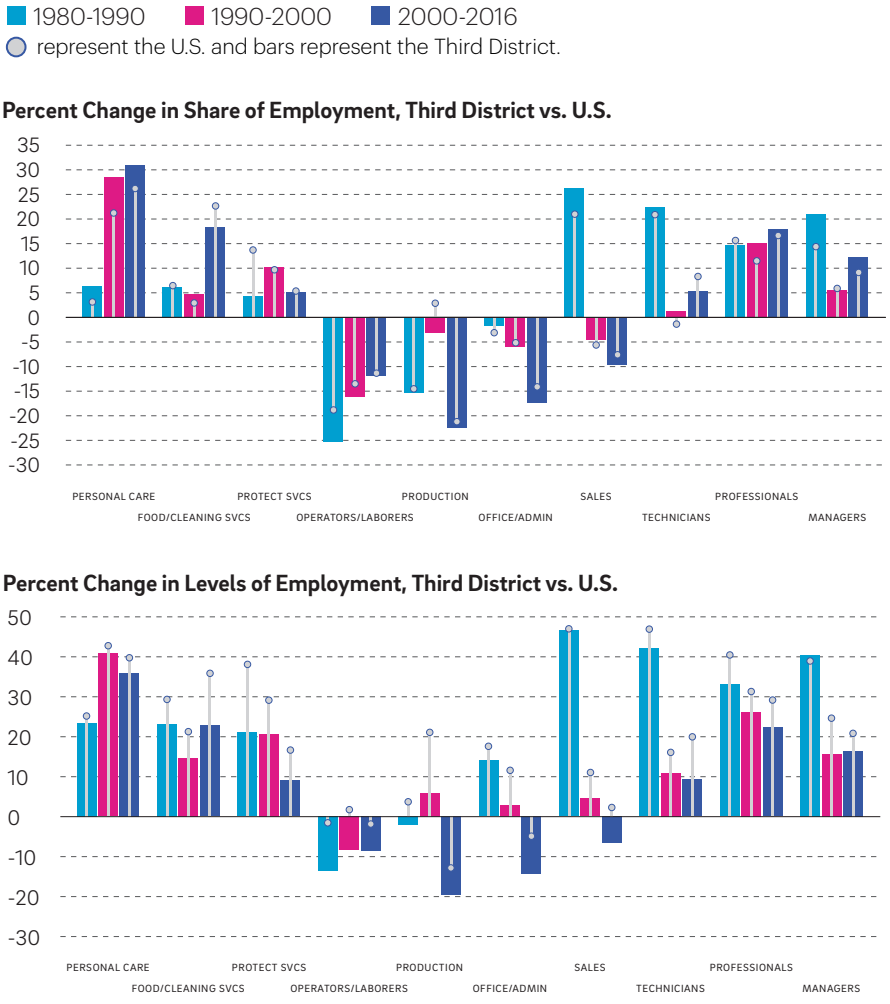
To elucidate whether these changes in share translated to actual declines in employment or slower relative growth, we examined similar results in terms of employment level (Figure 4, bottom panel). Within each of the four midwage categories, the three-state region experienced employment losses at some point. Overall, the three-state region experienced more employment loss or slower employment growth across nearly every category and period in comparison to the United States.

FIGURE 4

Job Polarization Also Occurred in the Third District

But the Third District experienced larger changes than the U.S., especially in operators and laborers and office and administrative occupations.

Percent change in share and levels of employment in the three states of the Third District and the U.S., by occupational category, 1980–1990, 1990–2000, and 2000–2016.



Data Source: U.S. Census Bureau's American Community Survey (ACS)

Note: The sample includes the working-age (16–64) civilian noninstitutionalized population in nonagricultural employment. Employment is measured as full-time equivalent workers.

To further examine employment change, let's compare the United States to each state's overall change in level of employment for the four midwage categories in terms of their 1980 share (Figure 5). Pennsylvania suffered worse employment changes, even when compared with states with a similar 1980 concentration of these occupations. Pennsylvania had among the highest employment losses in operators and laborers and production occupations, as well as slower growth in office and administrative and sales occupations compared with most other states between 1980 and 2016. New Jersey also fared poorly: It was one of a handful of states to *lose* office and administrative jobs, and it experienced one of the largest losses in overall production employment. As in the United States, the three Third District states have seen a hollowing out of their midwage work, but they seem to have suffered even greater employment losses in these occupations, especially those occupations overrepresented in the region compared with the United States in 1980.

We can make another observation from this comparison. Higher shares of operators and laborers and of office and administrative occupations in 1980 correspond to a higher level of employment loss in each of these categories. However, this pattern differs in the production and sales categories. Although we still need to disentangle other economic forces that influence these relationships,[10] this finding points to the potential for regions with higher shares of certain at-risk occupations to experience more job loss. Future researchers may want to take a closer look at the regional factors that lend themselves to these varied employment changes. Doing so would help us understand job polarization at a localized level and the factors that may make a community more resilient.

FIGURE 5

Pennsylvania Suffered More Job Loss or Slower Growth, Even When Compared to States With a Similar Concentration of These Occupations

New Jersey also fared poorly in comparison to other states.

Percent change in level of employment for four midwage occupational categories, U.S. and Third District states, 1980–2016; the X axis is percent share of employment in 1980; the Y axis is percent change in employment from 1980 to 2016

Data Source: U.S. Census Bureau's American Community Survey (ACS)

Note: The sample includes the working-age (16–64) civilian noninstitutionalized population. Employment is measured as full-time equivalent workers. Nevada has been excluded for charting purposes. Its values (share of employment in 1980; percent change in employment) are Operators and Laborers (11; 242); Office and Administrative (14; 216); Production (12; 165); and Sales (11; 264).

AI's Implications for the Future

New technologies can create a paradigm shift in the demand for workers with certain skills. Just such a paradigm shift is upon us with the rise of AI. Although AI is still in its early stages of deployment, recent advancements, most notably generative AI, have grabbed the public's attention thanks to their ability to automate nonroutine tasks. For instance, drafting an email and optimizing the distribution of assignments to team members were once nonroutine cognitive tasks not easily replicated by machines (and core tasks of managers). Generative AI may soon accomplish these and other nonroutine tasks with a simple prompt.

Although generative AI and its deployment may differ from previous technologies, the findings I present in this article can help us imagine some of the risks and opportunities for our labor market.

We know that technological shifts *can* contribute to job loss and wage inequality. Understanding the tasks—and thus the occupations—likely to be replaced rather than augmented by AI is important if we are to assist those workers who are likely to be harmed by these changes. Although it's too early to be definitive, preliminary research suggests that nonroutine cognitive jobs may be most at risk of automation, especially scientific occupations with little face-to-face interaction, such as researchers, software engineers, and data scientists. (Many of these workers fall into the broad occupational categories of technicians and professionals.)[11] Ironically, software developers may experience a pattern of decline similar to what typists experienced in the 20th century (Figure 2). If this happens, will these workers successfully transition into better jobs (that is, jobs that require more expertise and provide higher pay)? Or will they fall into lower-expertise, lower-wage work?

This future is unknown and, importantly, undecided. Just as no one could have predicted the rise of the software developer before the invention of the computer, and the typist before the typewriter, so too can we only guess at what new types of work will arise in the coming decades. AI might add new types of work, or it could augment rather than replace many types of work. In his 2024 working paper, Massachusetts Institute of Technology professor of economics David Autor indeed asserts this as a possibility—and an opportunity—for policymakers to address concerns about the middle class. New AI technologies *could* help more workers rise to higher-paying jobs that require more expertise if these technologies pair well *with* workers to augment their skills and knowledge—and improve their productivity—without the worker needing higher credentials or needing to develop full expertise on their own (which may otherwise take years). For example, a primary task of software developers is writing computer code. If demand for these skills remains and computer-coding skills are made more accessible to a broader set of workers by AI, could more of these workers transition to higher-paid work? If so, this may raise encouraging possibilities for the middle class.

Conclusion

The occupations that make up our labor market will keep evolving. Technological change is a major factor driving this evolution. The question policymakers must ask is, what decisions can be made to ensure that new technologies help a broad range of working Americans? Automation weakened the country's and the Third District's middle class by putting midwage workers at a disadvantage. The resulting automation-induced loss of midwage occupations contributed to higher wage inequality. Regions with higher concentrations of certain midwage workers, such as the states of the Third District, may have been more disrupted by these changes. If policymakers heed the task framework and lessons learned over the last several decades, their AI-related policies might strike the balance between mitigating risk and embracing the opportunities of AI.

Four Kinds of Tasks

In studying the impacts of automation, economists often divide tasks into four categories. An occupation can often be described by which of these tasks it relies on. By employing this conceptualization, we discern patterns in the types of occupations most impacted by automation.

Routine Cognitive Tasks
Office, administrative, and sales occupations, such as bank tellers and office clerks. These jobs require literacy, memory, attention, logical reasoning, or information processing, but they generally follow explicit rules or procedures.

Routine Manual Tasks
Operators, laborers, and production occupations, such as machine operators and construction laborers. These jobs require physical strength, agility, or manual dexterity and follow explicit rules or procedures.

Both types of routine occupations have been subject to replacement in the era of automation.

Nonroutine Cognitive Tasks
Technicians and professional and manager occupations, such as teachers and lawyers. These jobs require abstract problem-solving, intuition, persuasion, or creativity. A college degree and often a postgraduate degree or training is required.

Nonroutine Manual Tasks
Personal care and food and cleaning service occupations, such as waiters and health aides. These jobs require situational adaptability, visual and language recognition, and in-person interactions. Often they do not require formal education beyond a high school diploma or extensive training.

Automation has augmented rather than automated some of these occupations.

NOTES

1 See Kochhar (2024).

2 See Hoke (1979).

3 See, for example, Acemoglu and Autor (2011) and Autor, Levy, and Murnane (2003).

4 See Autor (2015).

5 See Lin (2011).

6 See, for example, Acemoglu and Restrepo (2022).

7 See, for example, Krueger (1993) and Akerman et al. (2015).

8 See, for example, Cortes et al. (2017).

9 There are other factors contributing to job polarization and wage inequality. Other lines of research include unionization patterns, minimum wage policy, and globalization.

10 For instance, there may be important differences in how the Great Recession or an aging workforce affected a region's employment patterns.

11 See Eloundou et al. (2024).

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Research Update

These papers by Philadelphia Fed economists, analysts, and visiting scholars represent preliminary research that is being circulated for discussion purposes.

The views expressed in these papers are solely those of the authors and should not be interpreted as reflecting the views of the Federal Reserve Bank of Philadelphia or Federal Reserve System.

Savings Versus Debt: The Effects of Survey Question Order on Consumers' Reported Financial Priorities

Survey after survey indicates that building savings and reducing debt are among the top financial goals for many Americans. However, because of limited resources and inherent trade-offs, achieving these two goals can be challenging and often requires prioritizing one goal over the other. We conduct two survey experiments with national samples of U.S. adults to understand how individuals balance saving and paying off debt, while taking into account survey context and question effects that might influence self-reports of behaviors. Both studies find a significant question order effect, in which respondents provide different answers about their preferred financial choice depending on the placement of questions within the survey. Specifically, when asked how to allocate their discretionary income between savings and debt payments, respondents generally indicate a greater preference for savings. However, when asked about their personal financial values before the allocation question, they are more willing to allocate a larger portion toward debt payments. These findings highlight the importance of considering survey context and question content when interpreting survey responses about personal finances.

WP 24-17. Tom Akana, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Will Daniel, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Amber Hye-Yon Lee, Federal Reserve Bank of Philadelphia Consumer Finance Institute.

Uniform Priors for Impulse Responses

There has been a call for caution regarding the standard procedure for Bayesian inference in set-identified structural vector autoregressions on the grounds that the common practice of using a uniform prior over the set of orthogonal matrices induces a nonuniform prior for individual impulse responses or other quantities of interest. This paper challenges this call by formally showing that when the focus is on joint inference, the uniform prior over the set of orthogonal matrices is not only sufficient but also necessary for inference based on a uniform joint prior distribution over the identified set for the vector of impulse responses. In addition, we show how to conduct inference based on a uniform joint prior distribution for the vector of impulse responses.

WP 22-30 Revised. Jonas E. Arias, Federal Reserve Bank of Philadelphia Research Department; Juan F. Rubio-Ramírez, Emory University, Federal Reserve Bank of Atlanta, and Federal Reserve Bank of Philadelphia Research Department Visiting Scholar; Daniel F. Waggoner, Emory University and Federal Reserve Bank of Atlanta, Emeritus.

The Effect of Student Loan Payment Burdens and Nonfinancial Frictions on Borrower Outcomes

Rising student loan debt and concerns over unaffordable payments provide rationale for "income-driven repayment" (IDR) plans, which aim to protect borrowers from default and resulting financial consequences by linking payments to income. We estimate the causal effect of IDR payment burdens on loan repayment and attainment for several cohorts of first-time IDR applicants using a regression discontinuity design. Borrowers who are not required to make payments see short-run reductions in delinquency and default risk, primarily due to lower costs of inattention, but these effects fade over the longer run as some borrowers become disconnected from the student loan repayment system.

WP 24-08 Revised. Tomás Monarrez, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Lesley J. Turner, University of Chicago and Federal Reserve Bank of Philadelphia Consumer Finance Institute Visiting Scholar.

One Threshold Doesn't Fit All: Tailoring Machine Learning Predictions of Consumer Default for Lower-Income Areas

Improving fairness across policy domains often comes at a cost. However, as machine learning (ML) advances lead to more accurate predictive models in fields like lending, education, health care, and criminal justice, policymakers may find themselves better positioned to implement effective fairness measures. Using credit bureau data and ML, we show that setting different lending thresholds for low- and moderate-income (LMI) neighborhoods relative to non-LMI neighborhoods can equalize the rate at which equally creditworthy borrowers receive credit. ML models alone better identify creditworthy individuals in all groups but remain more accurate for the majority group. A policy that equalizes access via separate thresholds imposes a cost on lenders, but this cost is outweighed by the substantial gains from ML. This approach aligns with the motivation behind existing laws such as the Community Reinvestment Act, which encourages lenders to meet the credit needs of underserved communities. Targeted Special Purpose Credit Programs could provide the opportunity to prototype and test these ideas in the field.

WP 22-39 Revised. Vitaly Meursault, Federal Reserve Bank of Philadelphia Research Department; Daniel Moulton, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Larry Santucci, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Nathan Schor, Federal Reserve Bank of Philadelphia Research Department.

Inference Based on Time-Varying SVARs Identified with Sign Restrictions

We propose an approach for Bayesian inference in time-varying structural vector autoregressions (SVARs) identified with sign restrictions. The linchpin of our approach is a class of rotation-invariant time-varying SVARs in which the prior and posterior densities of any sequence of structural parameters belonging to the class are invariant to orthogonal transformations of the sequence. Our methodology is new to the literature. In contrast to existing algorithms for inference based on sign restrictions, our algorithm is the first to draw from a uniform distribution over the sequences of orthogonal matrices given the reduced-form parameters. We illustrate our procedure for inference by analyzing the role played by monetary policy during the latest inflation surge.

WP 24-18. Jonas E. Arias, Federal Reserve Bank of Philadelphia; Juan F. Rubio-Ramírez, Emory University and Federal Reserve Bank of Atlanta; Minchul Shin, Federal Reserve Bank of Philadelphia; Daniel F. Waggoner, Emory University and Federal Reserve Bank of Atlanta, Emeritus.

Testing for Endogeneity: A Moment-Based Bayesian Approach

A standard assumption in the Bayesian estimation of linear regression models is that the regressors are exogenous in the sense that they are uncorrelated with the model error term. In practice, however, this assumption can be invalid. In this paper, under the rubric of the exponentially tilted empirical likelihood, we develop a Bayes factor test for endogeneity that compares a base model that is correctly specified under exogeneity but misspecified under endogeneity against an extended model that is correctly specified in either case. We provide a comprehensive study of the log-marginal exponentially tilted empirical likelihood. We demonstrate that our testing procedure is consistent from a frequentist point of view: As the sample becomes large, it almost surely selects the base model if and only if the regressors are exogenous, and the extended model if and only if the regressors are endogenous. The methods are illustrated with simulated data, and problems concerning the causal effect of automobile prices on automobile demand and the causal effect of potentially endogenous airplane ticket prices on passenger volume.

WP 24-19. Siddhartha Chib, Olin Business School, Washington University in St. Louis; Minchul Shin, Federal Reserve Bank of Philadelphia; Anna Simoni, CREST, CNRS, ENSAE, and Ecole Polytechnique, Institut Polytechnique de Paris.

Predicting College Closures and Financial Distress

In this paper, we assemble the most comprehensive data set to date on the characteristics of colleges and universities, including dates of operation, institutional setting, student body, staff, and finance data from 2002 to 2023. We provide an extensive description of what is known and unknown about closed colleges compared with institutions that did not close. Using this data, we first develop a series of predictive models of financial distress, utilizing factors like operational revenue/expense patterns, sources of revenue, metrics of liquidity and leverage, enrollment/staff patterns, and prior signs of significant financial strain. We benchmark these models against existing federal government screening mechanisms such as financial responsibility scores and heightened cash monitoring. We document a high degree of missing data among colleges that eventually close and show that this is a key impediment to identifying at-risk institutions. We then show that modern machine learning techniques, combined with richer data, are far more effective at predicting college closures than linear probability models, and considerably more effective than existing accountability metrics. Our preferred model, which combines an off-the-shelf machine learning algorithm with the richest set of explanatory variables, can significantly improve predictive accuracy even for institutions with complete data, but is particularly helpful for predicting instances of financial distress for institutions with spotty data. Finally, we conduct simulations using our estimates to contemplate likely increases in future closures, showing that enrollment challenges resulting from an impending demographic cliff are likely to significantly increase annual college closures for reasonable scenarios.

WP 22-20. Robert Kelchen, University of Tennessee–Knoxville and Federal Reserve Bank of Philadelphia Consumer Finance Institute Visiting Scholar; Dubravka Ritter, Federal Reserve Bank of Philadelphia Consumer Finance Institute; Douglas Webber, Board of Governors of the Federal Reserve and Federal Reserve Bank of Philadelphia Consumer Finance Institute Visiting Scholar.

Banking on Deforestation: The Cost of Nonenforcement

Despite surging environmental laws, how their enforcement influences banks' management of climate risks remains underexplored. Using the Brazilian Amazon as a laboratory, we examine the impact of a shock to environmental law enforcement capacity on bank management of risks arising from deforestation—a significant but understudied climate risk. After enforcement declined, Brazilian banks significantly altered their priorities to more short-term profitability over longer-term risk concerns. Banks greatly increased lending to agribusinesses engaged in deforestation and actively shifted resources to regions with higher deforestation potential. Results suggest that without rigorous enforcement, banks may fail to fully internalize deforestation risks, despite existing environmental laws.

WP 24-21. Allen N. Berger, University of South Carolina; Cristina Ortega, University of Malaga; Matias Ossandon Busch, CEMLA and Halle Institute for Economic Research; Raluca A. Roman, Federal Reserve Bank of Philadelphia.

Inventory, Market Making, and Liquidity in OTC Markets

We develop a search-theoretic model of a dealer-intermediated over-the-counter market. Our key departure from the literature is to assume that, when a customer meets a dealer, the dealer can sell only assets that it already owns. Hence, in equilibrium, dealers choose to hold inventory. We derive the equilibrium relationship between dealers' costs of holding assets on their balance sheets, their optimal inventory holdings, and various measures of liquidity, including bid-ask spreads, trade size, volume, and turnover. Using transaction-level data from the corporate bond market, we calibrate the model to quantitatively assess the impact of postcrisis regulations on dealers' inventory costs, liquidity, and welfare.

WP 22-22. Assa Cohen, Yeshiva University, Sy Syms School of Business; Mahyar Kargar, University of Illinois Urbana-Champaign; Benjamin Lester, Federal Reserve Bank of Philadelphia; Pierre-Olivier Weill, UCLA, NBER, and CEPR.

Data in Focus

Early Benchmark Revisions of State Payroll Employment

Everybody wants timely data, but sometimes we have to wait for the most accurate data. What to do? One solution is to post an initial estimate and then revise it as more–and more accurate-information becomes available. That's what the U.S. Bureau of Labor Statistics (BLS) does with its estimates of state employment. Every month, the BLS' Current Employment Statistics (CES) program conducts its employment survey. Thanks to the CES, we have preliminary monthly payroll employment estimates for each state and the District of Columbia. But this survey is based on a relatively small sample, so, every March, the BLS uses its more comprehensive Quarterly Census of Employment and Wages (QCEW) to revise its estimates of monthly nonfarm payroll employment for each state. So far, so good, but what if a researcher doesn't want to wait until March of each year for the revised estimates?

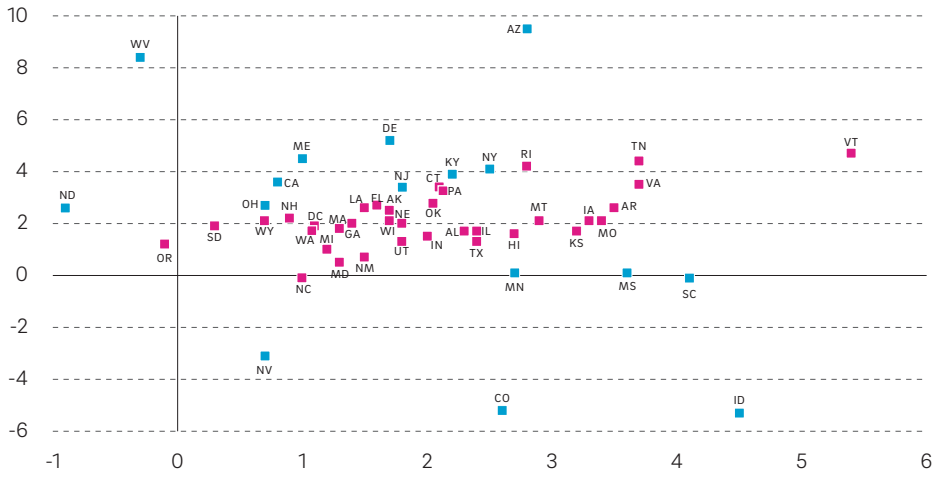
To address this lag in the data revisions, we created our Early Benchmark Revisions of State Payroll Employment. Because the QCEW is conducted and released quarterly, we can use the QCEW to revise the CES' estimates quarterly rather than annually. Our Early Benchmarks produce timely estimates of state payroll jobs that closely predict the BLS' annual benchmark revisions.

Our quarterly Early Benchmark revisions are also a helpful tool for identifying turning points in the national economy.

FIGURE 1

Our Early Benchmark Estimates Were Significantly Higher in 10 States and Lower in Six States

Each state's annualized percentage change in total nonfarm payroll employment, our early benchmarks on the Y axis vs. preliminary CES estimates on the X axis, December 2023 to March 2024



Sources: Federal Reserve Bank of Philadelphia; the BLS' Quarterly Census of Employment and Wages; and the BLS' Current Employment Statistics

Note: A pink dot indicates that the difference between our Early Benchmark estimate and the preliminary CES estimate is within the standard error (+/-) for that state. A blue dot indicates a significant difference that suggests future revisions (positive or negative) will likely be larger for that state.

If revisions to employment are significant in magnitude, pervasive across most states (and especially among states with large economies), and persistent over multiple quarters, that may suggest a turning point in the economy. Thus, our Early Benchmark Revisions may enable researchers and policymakers to identify at an earlier date when a recession has started (or ended). EI

Learn More

Online: https://www.philadelphiafed.org/surveys-and-data/regional-economic-analysis/early-benchmark-revisions
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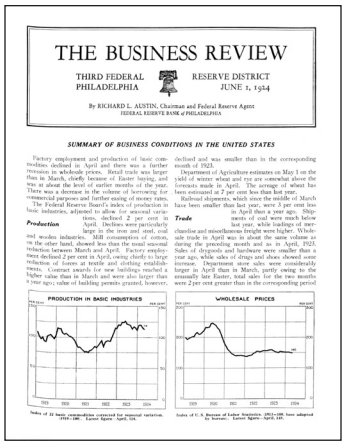

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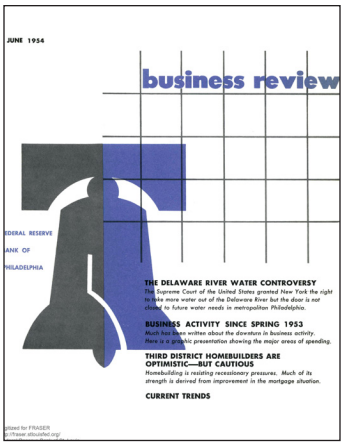

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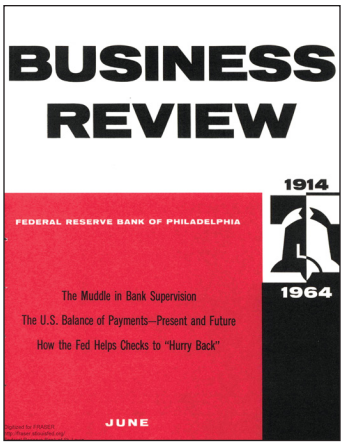

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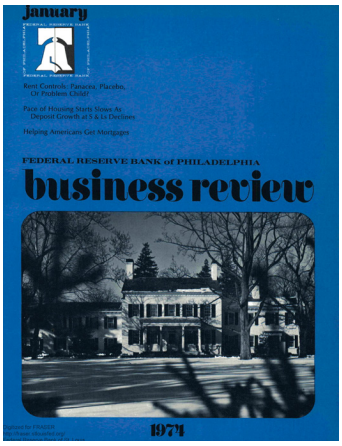

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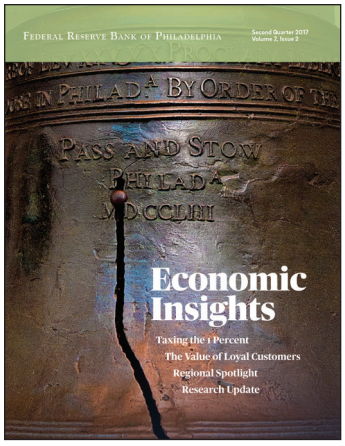

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