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Industry Decline and Household Finances

Joshua Blonz, Brigitte Roth Tran, Sarah Siegel, Erin Troland, and Cindy Zhao

Technological innovations that displace demand for local producers can hurt finances for households in the same area. Demand for Appalachian coal declined precipitously between 2011 and 2018 following a technology-induced shift in electricity generation from coal to natural gas. This coal decline decreased people's credit scores in that region and increased their credit utilization rates, credit card delinquencies, third-party collections, and bankruptcies. Credit scores fell the most for households that were already near the subprime threshold, where small changes can have large impacts on borrowing costs and access.

Technological advances often present new economic opportunities. However, they can also drive down demand for some existing industries. In regions that depend heavily on industries with declining demand, households may struggle to make up for lost income and thus face significant financial challenges. A prominent example of this kind of economic transition was the decline in U.S. manufacturing due to China's rise in low-cost production, which had significant and persistent negative impacts on local employment and other outcomes (see, for example, Autor, Dorn, and Hanson 2013, 2021).

The recent decline in demand for Appalachian coal is another important example of a major shock that caused a regional economic transition. This decline was primarily driven by a series of technological developments that first lowered the cost of building natural gas power plants—increasing natural gas generation capacity—and then lowered the cost of natural gas itself via fracking. As a result, generating electricity with natural gas became relatively less expensive than with coal and demand for coal declined (Cullen and Mansur 2017).

In this *Economic Letter*, based on research by Blonz, Roth Tran, and Troland (forthcoming), we use individual-level credit report data to assess how the 2011–18 decline in demand for Appalachian coal affected local household finances. We show that the decline in coal mining decreased credit scores and increased subprime prevalence, credit utilization, credit card delinquencies, third-party collections, and bankruptcies. Credit score declines were largest—about 7 points—for people with credit scores near the threshold for subprime status, where small changes can have large impacts on borrowing costs and access. We further find variation in how the coal industry decline affected households. People with higher baseline credit scores increased credit utilization—measured as a person's total credit card balance divided by the total limit—while people with lower baseline credit scores were pushed into third-party collections and bankruptcy.

Local effects from declines in coal demand

As low-cost natural gas from fracking displaced coal in the electricity sector, Appalachian coal production dropped 40% and employment in the sector fell 49% between 2011 and 2018. Given the central role that coal has historically played in the Appalachian economy, such large drops were likely to cause sizable declines in local incomes and strain household finances. At the same time, households that had access to credit could increase their debt levels to help them adjust.

To analyze how much the decline in coal mining affected household finances in Appalachia, we use the New York Fed/Equifax Consumer Credit Panel—a 5% random sample of individuals with credit reports in the United States. We focus on individuals ages 25 to 65 who lived in Appalachian coal-mining counties.

Household finance measures like credit scores, delinquencies, collections, and bankruptcy provide a useful snapshot of current financial well-being based on observed activity. Because adverse events on credit reports can limit people's ability to weather future negative shocks—making it harder to qualify for new loans, get jobs, or rent apartments—credit outcomes also often engender more persistent implications for people's future financial well-being.

To estimate how the decline in demand for coal affected household finances, we use regression analysis to examine how yearly deviations from trends in individual credit outcomes responded to deviations from trends in coal demand. Because there is no available data series for demand for local coal, we measure how much coal is consumed annually at power plants within 200 miles (by rail) of active coal-mining counties. This reflects demand for locally produced coal because (a) the majority of Appalachian coal is consumed by the electricity sector, and (b) the high cost of transporting coal limits the set of plants a given mine in Appalachia can sell its coal to without incurring losses.

We find that, if not for the decline in coal, average credit scores for our sample would have been about 2.7 points higher in 2018. This is a meaningful negative effect, given that the average credit score for our sample changed only about 2½ points between 2011 and 2018 (see details in Blonz et al. forthcoming). Similarly, the share of people with subprime credit scores would have been 1.6 percentage points lower, and average credit utilization would have been 1.3 percentage points lower. In addition, we find that there would have been fewer delinquent accounts, less money in third-party collections, and fewer bankruptcies.

Responses varied by credit score

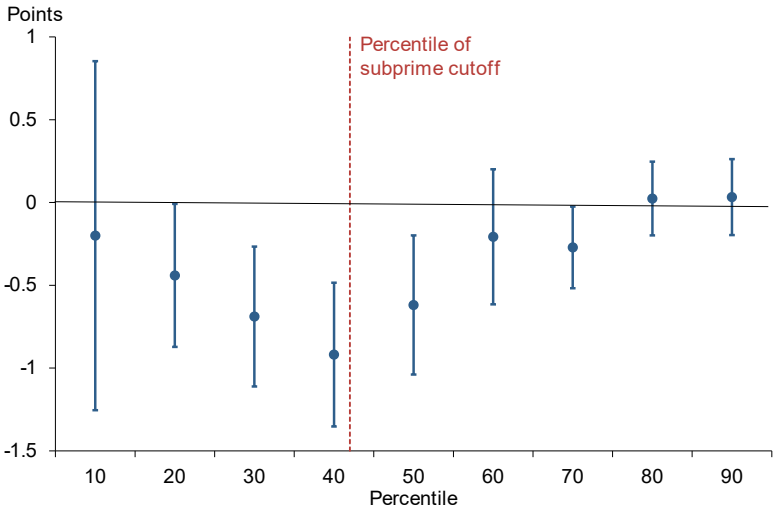
This average negative effect masks substantial differences in how people at different points of the credit score distribution were affected. While people with extremely high or extremely low scores generally may not face significant harm if their credit scores move a few points, small changes can make a big difference for people whose credit scores are close to key thresholds. We take two approaches to examine which segments of the credit distribution and population were most affected.

First, we examine how credit scores shifted along the credit score distribution—which ranks households from lowest to highest credit scores. We separately estimate how each percentile along that credit score distribution moved in response to lower coal demand. The dots in Figure 1 indicate the average number of

points that the credit scores for each percentile shifted in a typical year in response to the coal decline; the lines around each dot indicate the 95% range of statistical confidence around the estimate.

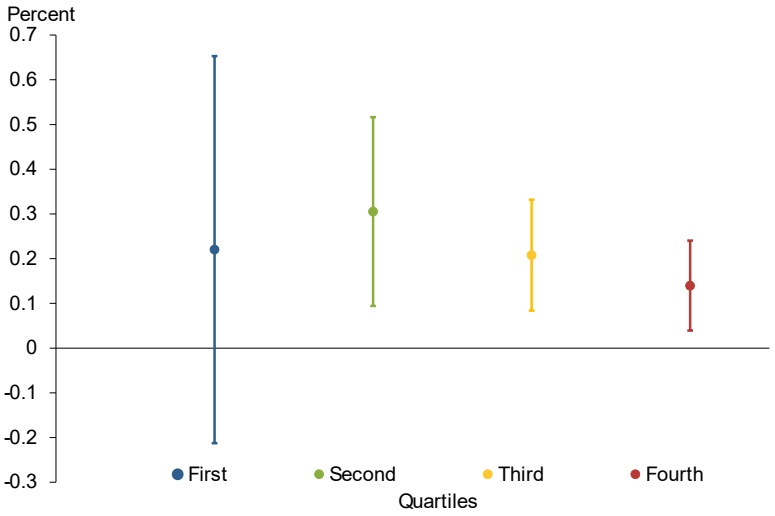
The figure reveals that credit score declines were concentrated in the lower to middle part of the distribution, around the 20th to 50th percentiles, and were largest at the 40th percentile—about 7 points over the full sample period. Because the subprime threshold is around the 42nd percentile of the sample, this means the negative impacts on credit scores are largest at precisely the part of the distribution where access to credit is most sensitive to minor credit score movements.

Figure 1
Response of credit score distribution to coal shocks



Source: Calculations in Blonz, Roth Tran, and Troland (forthcoming) based on Census Bureau, Energy Information Administration, and Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Figure 2
Responses of credit utilization to coal shocks by quartile



Source: Calculations in Blonz, Roth Tran, and Troland (forthcoming) based on Census Bureau, Energy Information Administration, and Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Second, we examine how groups used credit differently by estimating average effects for people based on their pre-2011 credit scores. For this, we divide the overall distribution of credit scores into four quartiles. We find that the decline in coal demand had broad-based negative impacts, albeit to varying degrees. Individuals with the highest initial credit scores drew on their available credit, which raised their credit utilization (Figure 2) and weighed on their credit scores. Individuals whose initial credit scores were in the bottom half (first and second quartiles) of the distribution—and who thus were unable to access credit—faced additional types of financial distress, such as debt delinquency, collections, and bankruptcy (see Figure 3 for the latter effect).

Migration did not offset negative impacts of the coal decline

Migration is an important way households might respond to economic transitions like the decline in demand for coal. As local economic opportunities recede, people may want to move to locations with more opportunities. However, because migration is costly, doing so may prove difficult precisely when people are

hit with lower incomes. Our analysis (not shown) confirms that our main results are not driven by out-migration of households with higher credit scores. However, the question of how the coal decline affected migration remains open.

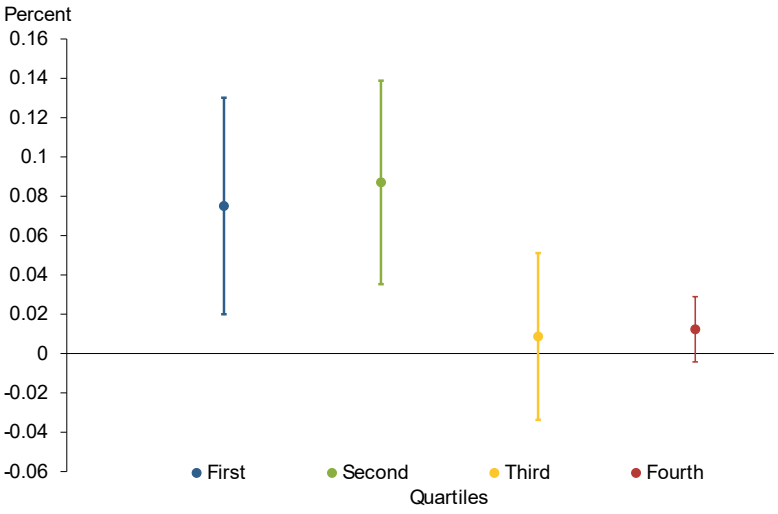
Analysis using credit data at the county level in Figure 4 shows the coal decline had no statistically significant effects on net migration. However, population churn—the number of people moving either into or out of a county—appears to have declined slightly. This suggests that the coal industry decline reduced the number of people moving into and out of the Appalachian coal-mining region, limiting the potential for migration to offset the negative impacts of this economic transition.

Caveats

Our analysis focuses on one aspect of the economic transition involved with a localized industrial decline. Thus, we do not evaluate the wide range of other potential impacts, such as the health implications of decreased coal production.

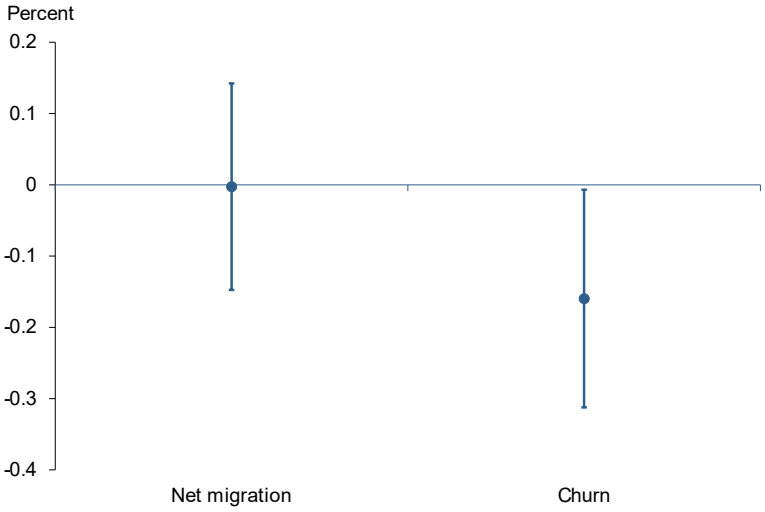
In addition, several caveats should be considered when applying our results to other economic transitions. First, the Appalachian coal-mining region may be particularly vulnerable to economic shocks because it is relatively rural and low income, and a high share of its population is over age 65. Second, our analysis uses yearly deviations from trends to estimate effects. As a result, these estimates can be thought of as a lower bound on the effects from the full decline in coal over this period. Finally, our proxy measure for coal demand may introduce some measurement errors. Reassuringly, we find that our results are largely unchanged when we use a variety of alternative approaches—such as different size regions for measuring coal demand.

Figure 3
Responses of bankruptcy to coal shocks by quartile



Source: Calculations in Blonz, Roth Tran, and Troland (forthcoming) based on Census Bureau, Energy Information Administration, and Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Figure 4
Migration response to coal demand shocks



Source: Calculations in Blonz, Roth Tran, and Troland (forthcoming) based on Census Bureau, Energy Information Administration, and Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Conclusion

The analysis in this *Economic Letter* shows that the 2011–18 decline in demand for Appalachian coal negatively affected local household finances. It drove down credit scores and raised subprime rates, credit utilization, debt delinquencies, third-party collections, and bankruptcies. Credit scores near the subprime threshold fell the most, about 7 points over the period—meaning that negative impacts were largest among households for whom small movements can have large implications for access to and cost of borrowing. The coal decline generally affected people differently based on how high or low their credit scores were before 2011. Those with initially low credit scores were more likely to end up with third-party collections or enter bankruptcy, while those with initially high credit scores increased their use of credit in a way that drove up their credit utilization rates. In short, we find that economic transitions can have significant negative impacts on households in areas where demand for local production declines.

Joshua Blonz
Principal Economist, Board of Governors of Federal Reserve System

Brigitte Roth Tran
Senior Economist, Economic Research Department, Federal Reserve Bank of San Francisco

Sarah Siegel
Former Federal Reserve Board Research Assistant

Erin Troland
Principal Economist, Board of Governors of Federal Reserve System

Cindy Zhao
Graduate Student, Princeton University

References

Autor, David H., David Dorn, and Gordon H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103(6), pp. 2,121–2,168.

Autor, David, David Dorn, and Gordon H. Hanson. 2021. "On the Persistence of the China Shock." *Brookings Papers on Economic Activity*, Fall.

Blonz, Joshua, Brigitte Roth Tran, and Erin Troland. Forthcoming. "The Canary in the Coal Decline: Appalachian Household Finance and the Transition from Fossil Fuels." Forthcoming in *Journal of Financial Economics,* available as FRBSF Working Paper 2023-09 (revised 2024).

Cookson, J. Anthony, Erik P. Gilje, and Rawley Z. Heimer. 2022. "Shale Shocked: Cash Windfalls and Household Debt Repayment." *Journal of Financial Economics* 146(3, December), pp. 905–931.

Cullen, Joseph A., and Erin T. Mansur. 2017. "Inferring Carbon Abatement Costs in Electricity Markets: A Revealed Preference Approach Using the Shale Revolution." *American Economic Journal: Economic Policy* 9(3, August), pp. 106–133.

Gallagher, Justin, and Daniel Hartley. 2017. "Household Finance after a Natural Disaster: The Case of Hurricane Katrina." *American Economic Journal: Economic Policy* 9(3, August), pp. 199–228.

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