Are We Understating the Impact of
Economic Conditions on Welfare Rolls?

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Policy Brief

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Dan A. Black, Terra G. McKinnish, and Seth G. Sanders

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In this brief we argue that welfare participation is more sensitive to economic conditions than previously believed. Why? Prior research focused on short-term economic fluctuations and ignored differences between high- and low-skilled workers. As welfare reform is long-term (i.e., permanent) it makes more sense to make comparisons with long-term economic trends. Also, since low-skilled workers are more likely to end up on welfare, it is proper to focus on their economic opportunities. Thus, we focus on the long-term impact of economic conditions on welfare participation, and we concentrate our analysis on low-skilled workers. Specifically, we analyze long-term changes in the supply of high-paying jobs for coal and steel workers as they affect certain heavy coal and steel-producing regions of the United States during the 1970s and 1980s. Our findings indicate that welfare participation in these regions closely mirrors the long-term local availability of high-paying jobs for low-skilled workers. This has serious policy implications for the long-term success of welfare reform.

Introduction

On August 22, 1996, President Clinton signed the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) into law, thus fulfilling his campaign promise to "end welfare as we know it." This act limited eligibility for assistance to five years for most people, added work requirements and strong incentives for states to move welfare recipients into jobs, toughened child support enforcement provisions, and increased support for families moving from welfare to work (US DHHS 1996). Prior to this, the Clinton Administration had granted 43 states "welfare waivers" to experiment with their own welfare reform in hopes of creating more successful programs

than the former Aid to Families with Dependent Children (AFDC).

During this period of welfare reform, there was a tremendous reduction in welfare rolls. Between January 1993 and March 1999, the number of welfare recipients declined by nearly half, from 14.1 million to 7.3 million. Not surprisingly, policy makers were quick to take credit for this dramatic change.

At the same time, however, the United States economy was in the midst of an extremely strong expansion, during which nearly 14 million additional jobs were generated. And there were other policy changes such as the expansion of the Earned Income Tax Credit, which was designed to increase the incentive of low-skilled workers, especially women, to work. Dickert, Houser, and Scholz (1995) and Meyer and Rosenbaum (1999) document the dramatic impact that changes to the Earned Income Tax Credit had on the economic incentives of families to participate in the labor market. Meyer and Rosenbaum also document a host of other changes to transfer payment programs that affected the incentives of families to participate in the labor market.

Given that the economic expansion coincided with the change in welfare policy, a natural question arises:

- *What fraction of the reduction in welfare rolls is the result of the policy change and what fraction is the result of the economic expansion and other changes in the economic environment?*

Last year the Council of Economic Advisers provided their answer (CEA 1999). Examining the reduction in state caseloads between 1996 and 1998, they found that (a) welfare reform was responsible for about 35 percent of the reduction in welfare rolls while (b) reduction in the unemployment rate accounted for only a modest 10.5 percent reduction. Their findings are important because they suggest that much of the recent reduction is

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permanent and results from implementation of welfare reform rather than the booming economy.

Other economists looked at data from a few years earlier and reached the same conclusions. In 1997 Rebecca Blank, a former senior economist with the CEA, used state-level data from 1964-96 and found that while there is a statistically significant relationship between state-level economic conditions and AFDC caseload, the magnitude is so small that economic conditions appear to explain little of the movement in caseloads (Blank 1997). Similarly, John Fitzgerald, an economist at Bowdoin College, used data from the Survey of Income and Program Participation (SIPP) to look at how economic conditions in counties and county groups affect the length of time that people spend on welfare (Fitzgerald 1995). For most measures, he finds that areas with better economic conditions (e.g., lower unemployment rates) are generally not associated with shorter welfare spells. He does find that black women living in areas with better local economic conditions do have shorter welfare spells, but even those results become insignificant after he includes additional controls for the geographic area.

There is a recent cohort of studies that have used more dynamic specifications of the relationship between state economic conditions and AFDC caseloads. Figlio and Ziliak (1999) estimate a model of state AFDC caseloads that includes multiple year lags of both the caseload and the state unemployment rate. Once they allow for these lag effects, they find that there is a substantial relationship between economic conditions and AFDC caseload, to the extent that they are able to attribute 75 percent of the dramatic decline in caseloads from 1993 to 1996 to changes in macroeconomic conditions. Wallace and Blank (1999) obtain very similar results in their dynamic analysis of state AFDC and Food Stamp caseloads. The observed importance of lagged effects implies that the persistence of changes in economic conditions is an important factor in the size of their effect. Similarly, Bartik and Eberts (1999) find relatively large impact of

lagged economic conditions on AFDC caseloads. McKinnish (1999) uses a measurement error framework to show that if long-term changes in economic conditions affect AFDC participation more than short-term changes, non-zero coefficients will be generated on lagged values of both the caseload and economic variables. In her view, the findings that lagged values of the unemployment rate affect current AFDC rolls is evidence that recipients respond to long-term economic conditions rather than short-term fluctuations. Finally, Mueser et al. (1999) examine the effect of economic conditions and welfare reform measures on entry and exit from welfare in five cities. Unlike other studies that use dynamic specifications, they find that economic conditions played almost no role in the reductions of entry onto welfare and the increase in welfare exit during the 1990s. The observed importance of lagged effects of economic conditions and caseloads implies that the persistence of changes in economic conditions is an important factor in the size of their effect, and that including these lagged effects allows these authors to better measure the full effect of economic conditions on welfare participation. However, these studies still use general economic indicators, rather than measures of labor market conditions for the low-skilled and, because they all include state or local fixed-effects in their model, the impacts of local labor market conditions are identified using transitory time-series variation in economic conditions.

These analyses, therefore, may drastically understate the impact of economic conditions on welfare rolls. The current economic expansion is the longest such period since the turn of the century. Indeed, except for the short recession of 1991-92, the economy has continued to expand since late 1982.

We use evidence from the decline of the steel industry and the coal boom and bust to examine the effects of long-term changes in local economic opportunities for low-skilled workers on welfare expenditures. Both coal mining and steel manufacturing have historically provided high-paying jobs to low-skilled men.

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We find that there was a substantial *increase* in welfare expenditures in response to the collapse of the steel and coal industries in the 1980s. We also find that there was an even more substantial *reduction* in welfare expenditures in response to the boom in the coal industry during the 1970s. Our findings indicate that welfare receipt is extremely responsive to the availability of high-paying jobs for low-skilled men.

We find a much stronger relationship between economic conditions and AFDC participation than is found in most previous studies. Our estimates indicate that a 10 percent increase in county earnings associated with a boom in industrial jobs is associated with a 7 to 8 percent decrease in AFDC expenditures. We also confirm that more general short-term variation in local economic conditions has a much weaker correlation with AFDC participation within the states we study.

Two United States Industries in Decline: Steel and Coal

We take advantage of two separate opportunities to study the effect of long-term changes in local economic opportunities for low-skilled workers on AFDC participation.

First we examine the response of AFDC participation to the decline of the steel industry in the 1980s in eight states that were historically large steel producers. Six of these states are situated in or near the Ohio Valley region. Until about 1979 many localities in that region thrived due to substantial employment in local steel mills. Then the steel industry collapsed, fueled in part by increased foreign competition, and these same localities suffered heavy losses of employment and earnings.

We also study the effect of a boom and bust in the coal industry during the 1970s and 1980s on welfare receipt in four states that include coal-producing regions of rural Appalachia. During the 1970s, regulatory changes and an oil embargo imposed by the

Organization of Petroleum Exporting Countries (OPEC) drove up the price of coal and generated an enormous boom in the coal-producing sector. There was a tremendous infusion of high-paying jobs for coal workers as new mines were opened and existing ones were expanded. The coal boom lasted for more than a decade. By 1983, however, oil prices had declined, alternative strip mines had opened in the West, and automated mining technology had reduced the demand for coal workers. The coal boom reversed into a bust, similar to what occurred in the steel manufacturing sector during the 1980s.

We should point out a few important differences between coal and other manufacturing-type industries such as steel. First, the coal industry has traditionally been located in rural, rather than urban areas. In our study, the four counties with concentrated steel employment (see Figure 1 below) had an average population of 228,825 in 1970, while the four counties with the largest coal reserves (see Figure 2 below) had an average population of only 66,250. Second, while more than 12 percent of steelworkers in the eight-state steel region were black in 1970, only 3 percent of coal workers in the four-state coal region were black.

The Decline of Steel Manufacturing in the 1980s

In this section, we describe the decline of the steel industry during the 1980s and provide some descriptive evidence of the impact of the decline of the steel industry on AFDC expenditures. Our analysis of this decline focuses on eight states: Alabama, California, Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania. Together, they accounted for nearly 69 percent of total primary metals employment in the United States in 1969, about 90 percent of which was related to steel. The fraction of total earnings attributed to primary metals manufacturing more than halved between 1979 and 1987. The steel industry did not recover from this drop, nor did the workers who were displaced by steel mill closings. Carrington and Zaman (1994) document that primary metals workers experienced a nearly 25 percent reduction in wages after displacement. Jacobson, LaLonde, and

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Sullivan (1993) found that primary metal workers, five years after displacement, typically experienced an earnings loss of over $10,000 (in 1987 dollars).

This collapse of steel manufacturing was not felt equally across all counties in our eight sample states. Steel manufacturing is a geographically concentrated industry. In 1970, 5 percent of U.S. counties contained 48 percent of all primary metals employment. Some counties in the sample states contained little steel employment and, except for regional spillover effects, were left relatively untouched by the decline in steel manufacturing. Other counties, however, with a high concentration of steel employment, were very hard hit by the decline.

Relative per Capita Personal Income between 1969 and 1987

In Figure 1 we depict per capita income in four large steel-producing counties relative to national per capita income between 1969 and 1987. For example, Whiteside County, Illinois started
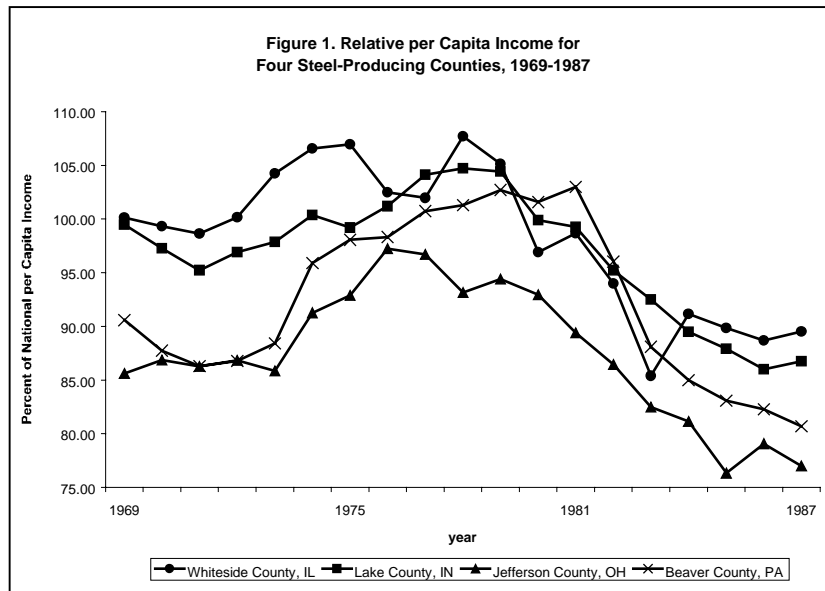
Figure 1. Relative per Capita Income for Four Steel-Producing Counties, 1969-1987

Source: Authors' calculations from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

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out with relative per capita income at 97 percent in 1969. This figure increased somewhat to 108 percent by 1978, then fell to 85 percent of national per capita income by 1983, a decline of 23 percentage points. In Lake County, Indiana (which includes the city of Gary), per capita personal income started roughly even with national per capita income in 1969, increased modestly to 105 percent by 1978, then declined to 86 percent by 1986. This 19 percentage point drop was the smallest of the four counties in our sample.

We anticipated that this negative shock to the steel industry would have a substantial effect on AFDC participation for three reasons. First, this was a permanent shock; geographic localities affected by the collapse of steel manufacturing experienced a long-term economic event, rather than just a business-cycle fluctuation. Second, the steel industry employed primarily low-skilled men. And third, the shock was geographically concentrated; in counties with high concentrations of steel employment, it is likely that the loss of steel employment generated large spillover effects into other local industries.

Characteristics of Steel Workers

In 1970, 92.7 percent of steel workers in our sample states were male and a sizeable fraction of them had low educational attainment (Table 1). Over 46 percent of them had less than a high school education, compared to 34 percent of all workers. About 9 percent of the total sample workforce was black, but 12.4 percent of the steel workers were black.

Between 1970 and 1990, the skill level required of steel workers increased dramatically. By 1990 only 22 percent of them had less than a high school education. While it is true that the entire workforce had increased levels of education, the adoption of capital-intensive production technologies in steel production lead to an "up-skilling" of steel worker labor relative to the workforce as a whole, and a decline in the demand for low-skilled steel workers.

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	1970		1990	
Characteristics	**Steel Workers**	**All Workers**	**Steel Workers**	**All Workers**
Years of Schooling				
Less than 8 years	22.2	14.4	6.2	5.0
9 to 12 years, no diploma	24.1	19.5	15.8	13.3
High school graduate	40.0	37.4	45.8	30.7
Some college	8.8	15.1	23.0	29.1
College graduate	4.9	13.6	9.3	21.9
Gender				
Male	92.7	62.1	89.0	54.7
Female	7.3	37.9	11.0	45.3
Race				
White	87.2	89.6	86.5	82.8
Black	12.4	9.1	9.0	7.8

Table 1. Characteristics of Steel Workers versus All Workers in Eight Steel-Producing States, 1970 and 1990: (percents and 1970 dollars)

	Steel Workers		All Workers	
Earnings in 1970 by Years of Schooling	**Mean Earnings**	**Median Earnings**	**Mean Earnings**	**Median Earnings**
Less than 8 years	$7,614.7	$7,849.5	$4,963.2	$4,649.5
9 to 12 years, no diploma	8,012.1	8,049.5	5,101.6	4,749.5
High school graduate	8,039.6	8,049.5	5,785.0	5,249.5
Some college	8,692.4	8,249.5	6,417.6	5,649.5
College graduate	14,277.3	12,549.5	9,514.1	8,449.5

Note: The eight states are Alabama, California, Indiana, Illinois, Michigan, New York, Ohio, and Pennsylvania. Steel workers are defined as those working in "blast furnaces, steel work, rolling and finishing mills or in other primary iron and steel industries." Source: Authors' calculations from the 1970 and 1990 Public Use Microdata Samples (PUMS) from the 1970 and 1990 Censuses.

The first panel of Table 2 shows total county earnings in 1970, 1979, and 1987 in thousands of 1983 dollars by concentration of steel employment. During the period from 1970 to 1979, the steel economy was stable and healthy. We can see that mean county earnings (in 1983 dollars) for Heavy Steel counties increased 30 percent between 1970 and 1979, compared to 21 percent for Medium Steel counties and 20 percent for Light Steel counties. 1979 to 1987 was a period of steep decline for the steel industry. Between 1979 and 1987, mean county earnings fell by 26 percent in Heavy Steel counties, while earnings remained relatively unchanged in Medium Steel counties and increased by 5 percent in Light Steel counties. Table 2 shows that counties in Illinois with traditionally high concentrations of steel employment

prospered somewhat more during the 1970s and suffered much more during the 1980s than counties with low concentrations of steel employment.

Table 2. Earnings and AFDC Benefit Expenditures in Illinois Counties by Concentration of Steel Employment: 1970, 1979, and 1987 (in thousands of 1983 dollars)					
	Earnings				
Concentration of Steel Employment	**Mean 1970**	**Mean 1979**	**Percent Change 1970-79**	**Mean 1987**	**Percent Change 1979-87**
Light Steel	$598,886	$717,400	**+20**	$753,901	**+5**
Medium Steel	335,274	404,111	**+21**	404,088	**-0**
Heavy Steel	827,204	1,071,637	**+30**	798,303	**-26**
	AFDC Benefit Expenditures				
Light Steel	$1,360	$2,270	**+67**	$1,773	**-22**
Medium Steel	928	1,072	**+16**	921	**-14**
Heavy Steel	4,124	4,448	**+8**	4,214	**-5**

Note:Light Steel category is bottom quartile of fraction of men employed in primary metals in 1969 (less than 1 percent); N=23. Heavy Steel is top decile of fraction of men employed in primary metals in 1969 (more than 8.7 percent); N=10. All other counties are Medium Steel; N=59.

Source: Authors' calculations from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

AFDC Expenditures by Steel Employment

Is there evidence that these trends in county-level earnings affected AFDC participation as well? In the second panel of Table 2 we repeat the exercise, this time using county AFDC expenditures (in 1983 dollars) as the variable of interest. Between 1970 and 1979, while the steel economy prospered, mean county AFDC expenditures in the Heavy Steel counties increased only 8 percent, while they increased 16 percent in Medium Steel counties and 67 percent in Light Steel counties. Between 1979 and 1987, while the steel economy suffered, mean county AFDC expenditures fell 22 percent in the Light Steel counties, but fell only 14 percent in Medium Steel counties and only 5 percent in Heavy Steel counties. Therefore, we see evidence that AFDC participation was indeed influenced by the health of the steel economy.

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The Coal Boom and Bust

William Julius Wilson, in his book *When Work Disappears: The World of the New Urban Poor* (1996), argues that pervasive welfare receipt occurs with the loss of manufacturing jobs, which have traditionally provided relatively high-wage jobs to low-skilled male workers. The decline of the steel industry in the Ohio Valley region caused exactly the same long-term loss of high-wage jobs for low-skilled workers, particularly male workers, that Wilson and others blame for many of the ills plaguing today's urban areas. Implicit is the belief that an *infusion* of high-wage manufacturing jobs into a depressed area would substantially reduce underclass behaviors such as welfare receipt.

In this section, we take advantage of a unique opportunity to study one of the few *booms* in industrial jobs in a depressed area that has occurred in the past several decades. We describe the boom and bust in the coal industry that occurred during the 1970s and 1980s. Our analysis of the coal economy focuses on the states of Kentucky, Ohio, Pennsylvania, and West Virginia. The Appalachian regions of these states have traditionally been relatively poor and also very dependent on the coal economy. A recent *New York Times* article observed that "Appalachia's most resistant areas—much of West Virginia, southern Ohio and eastern Kentucky—still have unemployment rates and poverty rates at least 50 percent higher than the rest of the nation"(Clines 1999).

Up until 1969 the price of coal was relatively stable. Then regulatory changes caused the real price of coal to increase 28 percent between 1969 and 1970, and the OPEC oil embargo caused the real price of coal to increase 44 percent between 1973 and 1974. These price increases generated a tremendous boom in the coal economy. West Virginia alone gained 30,000 mining jobs between 1970 and 1977. The price of coal and coal earnings stabilized for many years after these initial increases. Then, during the 1980s, the price of coal began to fall. Starting around

1982 the regional coal economy busted, not only because of the drop in the price of coal, but also because alternative mines were opened in the northern Rocky Mountains, Texas, and Louisiana, as new mining technology, the continuous mining machine, became more widely adopted. As a result of automating the mining process, mine owners were able to replace low-skilled pick-and-axe workers with fewer, but higher-skilled, workers.

As was the case with steel, these economic shocks were not felt equally in all counties in the four-state region. Some counties had substantial coal reserves and benefited tremendously from a boom in the coal industry. These counties all sit on a major coal seam. There is one large seam in western Kentucky that is part of
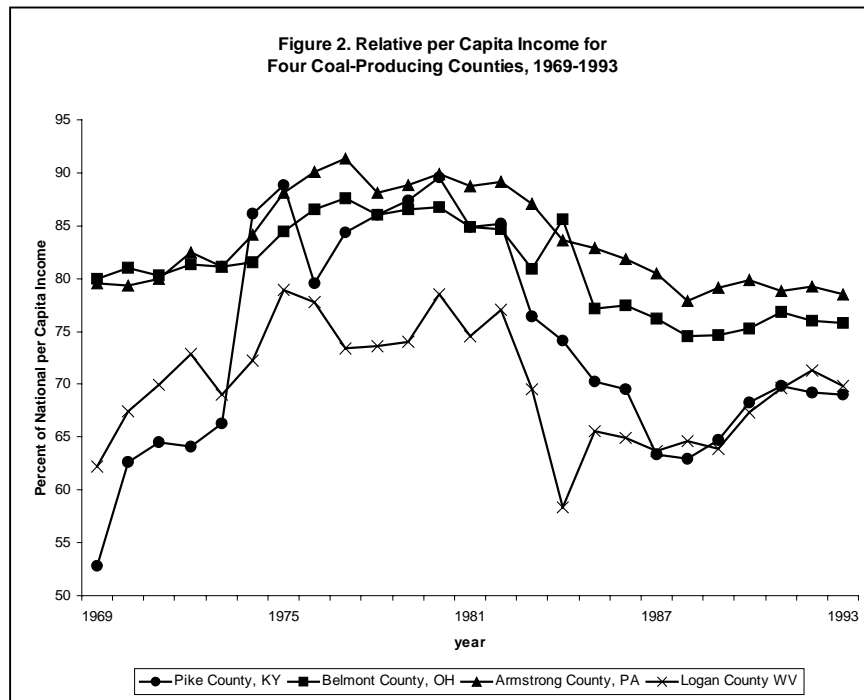
Figure 2. Relative per Capita Income for
Four Coal-Producing Counties, 1969-1993

Source: Authors' calculations from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

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the Illinois coal basin, the very large Appalachian basin in the middle of the region, and one other seam in eastern Pennsylvania. More than half of the counties in this region, however, have almost no coal reserves, and therefore were substantially less affected by the coal boom and bust.

Relative per Capital Personal Income between 1969 and 1993

Figure 2 shows that in 1969, for example, the per capital income in Pike County, Kentucky, was only 56 percent of national per capita income. During the coal boom this figure rose dramatically to 90 percent in 1980, and then plummeted as the coal industry began to bust. By 1988, Pike County's relative per capita income

Table 3. Characteristics of Coal Mining Workers versus All Workers in Four Coal-Producing States, 1970 and 1990 (percents and 1970 dollars)				
	1970		**1990**	
Characteristics	**Coal Workers**	**All Workers**	**Coal Workers**	**All Workers**
Years of Schooling				
Less than 8 years	44.4	16.5	9.8	3.5
9 to 12 years, no diploma	23.4	20.9	20.0	14.1
High school graduate	27.0	40.2	49.8	39.6
Some college	3.8	11.0	15.3	24.4
College graduate	1.5	11.4	5.1	18.4
Gender				
Male	97.3	63.3	95.2	54.8
Female	2.7	36.7	4.8	45.2
Race				
White	96.9	91.9	98.9	92.8
Black	3.1	7.8	1.0	5.9
	Coal Workers		**All Workers**	
Earnings in 1970 by Years of Schooling	**Mean Earnings**	**Median Earnings**	**Mean Earnings**	**Median Earnings**
Less than 8 years	$6,579.9	$7,049.5	$4,696.1	$4,349.5
9 to 12 years, no diploma	7,541.5	8,049.5	5,006.3	4,649.5
High school graduate	7,838.4	8,049.5	5,598.9	5,049.5
Some college	8,574.9	8,049.5	6,167.1	5,349.5
College graduate	11,529.5	11,199.5	9,217.2	8,049.5

Note: The four states are Kentucky, Ohio, Pennsylvania, and West Virginia.
Source: Authors' calculations from the 1970 and 1990 Public Use Microdata Samples (PUMS) from the 1970 and 1990 Censuses.

was back down to 63 percent. Similar trends can be seen in the three other counties. While we observed some growth in steel areas during the 1970s, that growth was nowhere near the magnitude of the dramatic economic expansions that occurred in these coal counties.

Characteristics of Coal Mining Workers in the Four States

Like the steel industry, the coal industry has traditionally employed low-skilled men. Coal employment is even more male and more low-skilled than steel. Table 3 shows that in 1970, 97.3 percent of coal workers were male, 49.4 percent had less than eight years of education and a full 67.8 percent had less than a high school education. By comparison, in 1990, only 63.7 percent of all workers were male, 16.5 percent had less than eight years of education and 37.4 percent had less than a high school education. However, only a small fraction of coal workers are black, because the coal mines in the sample states are generally located in the predominantly white regions of rural Appalachia.

County Earnings by Coal Employment

In Table 4, we perform analyses similar to those in Table 2. We compare counties in Kentucky with high levels of coal reserves to those with low levels of coal reserves. Counties with at least one billion tons of coal reserves are labeled *Heavy Coal.* Counties with between one hundred million and one billion tons of coal reserves are *Medium Coal,* and counties with less than one hundred million tons are *Light Coal.* These cutoffs are somewhat arbitrary, but we have observed that there is considerable mining activity in counties that have in excess of one billion tons while counties with less than 100 million tons generally have almost no mining activity.

During the period from 1970 to 1977, the coal economy boomed. Mean county earnings increased 68 percent in Heavy Coal counties and 45 percent in Medium Coal counties, but only 26 percent in Light Coal counties. Between 1977 and 1993, the coal economy stabilized and then declined. During this period, mean

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county earnings decreased 17 percent in Heavy Coal counties, increased 2 percent in Medium Coal counties and increased 22 percent in Light Coal counties. Clearly, counties with substantial coal reserves boomed in the 1970s and busted in the 1980s relative to counties without coal reserves.

AFDC Expenditures by Coal Employment

During the coal boom between 1970 and 1977, AFDC expenditures increased 77 percent in Light Coal counties, compared to 66 percent in Medium Coal counties and 50 percent in Heavy Coal counties (Table 4). During the coal bust between 1977 and 1993, AFDC expenditures decreased 40 percent in Light Coal counties, but only 12 percent in Medium Coal counties and 13 percent in Heavy Coal counties. The coal boom and bust appear to have affected AFDC participation.

Table 4. Earnings and AFDC Benefit Expenditures in Kentucky Counties by Size of Coal Reserves: 1970, 1977, and 1993 (in thousands of 1983 dollars)

Amount of Coal Reserves	County Earnings				
	Mean 1970	Mean 1977	Percent Change 1970-77	Mean 1993	Percent Change 1977-93
Light Coal	$193,480	$243,820	**+26**	$299,509	**22**
Medium Coal	82,522	119,940	**+45**	121,759	**+2**
Heavy Coal	151,358	254,024	**+68**	211,360	**-17**
	AFDC Benefit Expenditures				
Light Coal	$1,042	$1,854	**+77**	$1,097	**-40**
Medium Coal	1,057	1,711	**+61**	1,503	**-12**
Heavy Coal	1,459	2,184	**+50**	1,892	**-13**

Note: Light Coal counties have less than 100 million tons of coal reserves; N=86. Medium Coal counties have 100 million to 1 billion tons of coal reserves; N=16. Heavy Coal counties have more than 1 billion tons of coal reserves; N=18.

Source: Authors' calculations from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

Instrumental Variables Analysis

Instrumental variables (IV) estimation has a long history in statistics, dating back to the seminal paper of Wald (1940). The essential idea of instrumental variables is to focus on the variation that arises from the "instruments," which in our work are the changes that economic shocks to the coal and steel industries generate. (The term *economic shock* refers to a large, unanticipated change in prices and incomes.) Importantly, the shocks to coal and steel were long-term changes rather than temporary fluctuations. By focusing on these shocks, we can determine how recipients respond to long-term economic changes.

Consider the case of the coal industry, for example. We want to estimate how changes in earnings affect AFDC expenditures. First, we compare the growth of earnings in coal-producing areas to noncoal-producing areas within that state. Suppose that the earnings growth is 13 percent in coal-producing areas but only 3 percent in noncoal-producing areas; we subtract the second number from the first to find a difference of 10 percentage points. Then we compare AFDC payment growth in coal-producing areas to noncoal-producing areas. Suppose that the AFDC payment growth is 5 percent in coal-producing areas and 10 percent in noncoal-producing areas; the difference is -5 percentage points. The IV estimate of the impact of earnings growth on AFDC expenditures is the ratio of differences (-5/10 = -.5).

The data we presented in the last section are strong evidence of the impact of local economic conditions on AFDC participation. We can also quantify the impact of changes in earnings on AFDC expenditures using a statistical model. Here we briefly describe our strategy for examining the impact of changes in earning on AFDC expenditures. (For a more formal presentation of our statistical model, please contact the senior author, Dan Black, at dablac01@maxwell.syr.edu.)

Data

We use county-level data from the Bureau of Economic Analysis's Regional Economic Information System. For our steel state analysis, we use data from 1970 to 1987 from Alabama, California, Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania. These states were the major producers of steel at the time of the 1970 Census. For our coal state analysis, we use data from 1970 to 1993 from Kentucky, Ohio, Pennsylvania, and West Virginia, four major coal-producing states in the eastern United States.

Strategy

We compare the growth in AFDC expenditures between counties within each state. Thus, for our steel analysis, we compare the growth in AFDC expenditures in counties with large steel plants to counties without steel plants. Similarly, for our coal analysis, we compare the growth AFDC expenditures in counties with large reserves of coal to the growth of AFDC expenditures in counties without coal. Because the shocks to the steel and coal industry had profound effects on the counties with these industries, this strategy allows us to examine how changes in local labor market conditions affect local growth in AFDC expenditures. Importantly, this strategy allows us to control for changes in the states' AFDC programs because we make comparisons only within states.

In addition, our empirical approach focuses only on the differences in economic conditions generated from changes in the steel or coal industry. Because the steel and coal industry offered high-paying jobs to low-skilled workers, changes in the steel and coal industry directly affect groups that may be at risk of entering the AFDC program.

In one example, we estimate the impact of a 10 percent increase in a county's earnings caused by changes in the steel or coal industry on that county's AFDC payments. For the steel analysis,

we estimate that a 10 percent increase in a county's earnings would reduce its AFDC payments 8.0 percent. Similarly, for our coal analysis a 10 percent increase in a county's earnings would reduce its AFDC payments 7.3 percent. Thus, changes in the local labor market conditions appear to have large impacts on AFDC expenditures. Moreover, despite the demographic differences between the steel and coal area population, the impact of earnings growth is remarkably similar.

For the sake of comparison, we also estimate the impact of a 10 percent increase in a county's earnings on that county's AFDC payments using variation from all industry rather than just coal or steel. These standard estimates differ from the earlier estimates in two important ways. First, they rely on cross-state comparisons of the growth of AFDC participation. We believe these are inappropriate if there are policy changes between the states. Second, and more importantly, they use all of the variation in county earnings rather than focusing on variation that arises just from the shocks to the steel and coal industry. This, too, may be inappropriate; we suspect that economic growth in the Silicon Valley in the 1990s, where employment growth is concentrated among the highly educated, would have a different impact on AFDC participation than growth in the steel industry, which employed the low skilled.

The standard and IV estimates differ dramatically. For the steel example, we cannot reject the hypothesis that local labor market conditions have no effect on AFDC payments. The estimates suggest that a 10 percent increase in a county's earnings would lower its AFDC payments by 0.2 of a percent. For the coal analysis, the relationship is statistically significant, but still very small relative to the IV estimates. Thus, the IV estimates are between 3.6 and 40 times the size of the traditional estimates.

Conclusions

In this brief, we study the effect of two separate shocks to local economic opportunities for low-skilled workers on AFDC

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participation. We study the decline of the steel industry during the 1980s and the boom and bust in the coal economy during the 1970s and 1980s. These two shocks had several things in common. First, they were both long-term economic events. Second, they were both shocks to industries that traditionally provided high-wage jobs to low-skilled men. Finally, both industries were geographically concentrated; a small subset of counties benefited or suffered substantially more from these shocks than neighboring areas.

We use Instrumental Variables models to estimate the relationship between AFDC expenditures and changes in county earnings that can be attributed to economic shocks to the steel and coal industries. We estimate that a 10 percent increase in a county's earnings would reduce AFDC payments 7 to 8 percent, indicating the long-term shocks to industries that provide high-wage jobs to low-skilled men can have profound effects on AFDC participation levels. These estimates suggest a much larger impact of local labor market conditions than those put forth by the Council of Economic Advisers and other researchers.

Our findings support the argument of William Julius Wilson and others that the availability of high-paying manufacturing jobs for low-skilled workers is a fundamental factor in determining welfare participation levels. In particular, the results from our analysis of the coal boom in Appalachia suggest that a long-term expansion in industrial jobs will substantially reduce AFDC participation. These results challenge the "culture of welfare" argument, which predicts that welfare participation will be relatively non-responsive to changes in economic opportunities for low-skilled workers.

Policy Implications

Determining the precise reasons for the recent decline of welfare rolls is of vital importance. We are currently experiencing one of the most sustained periods of economic expansion in this country's history. At the same time there have been substantial

changes in welfare policy and other changes meant to encourage single mothers to work. During this period, welfare caseloads have dropped dramatically. Much of the recent analysis suggests that welfare reform, not the sustained economic growth, is responsible for the fall in welfare rolls. In our view, current estimates of the sensitivity of welfare rolls (Bartik and Eberts, 1999, Figlio and Ziliak, 1999, and Wallace and Blank, 1999) have understated the relative importance of the local labor market conditions on welfare rolls by focusing on aggregate measure of economic activity rather than on long-term changes in the economic conditions affecting workers with low skills. Our analysis of variation that directly affects low-skilled workers demonstrates more accurately how sensitive welfare rolls are to economic conditions.

If our economy were to go through a sustained economic contraction, there would likely be a sizeable increase in the welfare rolls. Women who have exhausted their 60-month time limit for welfare would no longer be eligible for TANF. If welfare rolls are as sensitive to economic conditions as we fear, large numbers of other women would become eligible for TANF at the very time when new programs would be needed to assist long-term welfare recipients. States would need to budget not only for the increase in TANF recipients, but also for assistance to former recipients who are no longer eligible for TANF.

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Note: Our measures of county-level AFDC expenditures, earnings, and population were obtained from the Regional Economic Information System (REIS) data provided by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). For more information, see their Web site at <http://www.bea.doc.gov>.

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