Table 1. Recent Estimates of the Effects of Welfare Reform on Labor Supply

Study	Time Period	Labor Supply Effect	Brief Description of Methodology
1. Levine and Whitmore, adapted by Bartik[1]	1993-96 1993-98	59,000 290,000	Estimated effects of state welfare reform waivers on welfare rolls
2. Blank, adapted by Bartik[2]	1990-95	191,000	Estimated effect of state welfare policy variables on welfare rolls
3. Meyer and Rosenbaum, adapted by Bartik[3]	1993-96	249,000	Estimated effects of state welfare policy variables on employment probability of single mothers versus childless single women
4. Bishop[4]	1996-98	571,000	Change in single parent LFPR between 2nd quarters of 1996 and 1998 that cannot be explained by declining unemployment and trends
5. Daly, adapted by Bartik[5]	1996-97	325,000	Labor force growth trends for women maintaining families versus U.S. population
6. Bartik, based on LFPRs of female heads[6]	1993-96 1996-97 1993-97	348,000 415,000 763,000	Labor force participation rate trends of female household heads with less than college degree vs. other women with less than college degree
7. Bartik, based on LFPRs of single mothers[7]	1996-97	310,000	Labor force participation trends of single mothers vs. those of other mothers
8. McMurrer, Sawhill and Lerman[8]	1996-2002	no recession: 832,000 recession: 1,699,000	Calculated effects of bill's escalating requirements for percentage of caseload that must be working
9. Chernick and Reschovsky[9]	1996-2002	1,144,000	Calculated effects on state welfare spending of switching from matching grants under AFDC to block grant fixed in nominal terms under 1996 bill.
10. Duncan, Harris, and Boisjoly[10]	1996-2005	383,000	Calculated percentage of caseload that will reach 5-year lifetime time limit on welfare receipt within 8 years.
11. Bartik baseline estimates used in this paper[11]	1993-96 1996-97 1996-98 1996-2002 1996-2005 1993-2005	146,000 300,000 597,000 1,032,000 1,256,000 1,402,000	Estimated declines in welfare rolls that cannot be explained by unemployment, extrapolated into the future, and assumed work participation rates for participants

Notes:

1. Levine and Whitmore (1997) report that 0.31 of the change in the natural logarithm of the welfare receipt rate (proportion of population receiving welfare) from 1993-96 can be explained by welfare waivers. I apply these numbers to the welfare caseload of 4.981 million in fiscal year 1993 and 4.553 million in fiscal year 1996. Multiplying the change in the log of the welfare caseload from 1993 to 1996 by 0.31, and then adding this amount back to the log of the 1996 welfare caseload, and unlogging and subtracting from the 1996 caseload, gives the estimate that state waivers lowered the welfare caseload by 128,000 in 1996. Assume that those removed from welfare rolls by waivers were all single adult or two-adult cases who were not exempt from welfare work requirements (e.g., no child-only cases or single parent cases with the youngest child less than one year old). I use figures from McMurrer, Sawhill and Lerman (1997b) that non-exempt single adult cases are 65.5 percent of the caseload, and non-exempt two-adult cases are 7.3 percent of the caseload. Then the effect on labor supply of 128,000 fewer welfare cases is 59,000 = 128,000 * [0.47(65.5/72.8) + 0.378(7.3/72.8)], where 0.47 and 0.378 are

Table 1. (Continued)

assumed changes in labor force participation rates to one parent and two parent cases forced off of welfare. For 1993 to 1998, I assume that during this time period, 0.31 of the change in the log of the welfare rolls continues to be due to welfare reform policies—this is probably an understatement given the large changes in federal welfare law in 1996, followed by state implementation beginning in 1997. With welfare rolls of only 3.224 million in March 1998, these calculations suggest that welfare reform has reduced welfare rolls from 1993-98 by 628,000 and increased labor supply by 290,000.

2. Blank (1997) calculates that political and program factors from 1990-95 caused the AFDC caseload to decline for the AFDC-basic program, as a proportion of the female population age 15-44, by 0.008. Her figures for the 1995 female receipt rate of AFDC-basic is 0.075. Using figures from McMurrer, Sawhill, and Lerman (1997c), the AFDC-basic caseload is 0.745 of the total caseload. The total caseload in 1995 was 4.876 million. Hence, the change in labor supply from political and program reductions in the AFDC-Basic caseload is 4.876 * 0.745 * (0.008/0.075) * 0.47 = 0.182 million. For the AFDC-UP caseload, Blank calculates a decline from 1990-95 in the log of the caseload, due to political and program factors, of 0.063. The estimated AFDC-UP caseload in 1995, based on McMurrer, Sawhill and Lerman, is 4.876 * 0.073 = 0.356 million. Adding 0.063 to the natural log of 0.356 million and then unlogging and taking the difference yields an estimate that policy lowered the AFDC-UP caseload by 23,000. Multiplying this by 0.378 yields the effect on labor supply of 9,000. The total effects of policy during the 1990-95 period on labor supply is 182,000 + 9,000 = 191,000.

3. Meyer and Rosenbaum (1998) estimate that changes from 1993-96 in the average state values of welfare benefits, waivers, and JOBS program variables changed the probability of employment for single mothers during a typical week by 0.0185. Calculations from the Current Population survey-Outgoing Rotation Group data base indicate that female household heads, ages 16-44, with other relatives in the household, and less than 16 years of education, numbered 6.860 million in 1997. Hence, based on Meyer and Rosenbaum's calculations, the increase in employment for this group would be 0.0185 * 6.860 million = 127,000. Data from the March 1997 CPS indicates that this particular group is about 51 percent of the total population of adult welfare recipients (most of the remaining welfare recipients are women who either are older than 44 or who are not household heads). Assuming that welfare reform's effects on labor supply are of proportional magnitude for all welfare recipients, the total effects on the employment rate of the 1993-96 changes in state welfare policies would be 127,000/0.51 = 249,000.

4. These numbers are taken directly from Bishop's comments on p. 25, and appear to be based on time series regressions that examine how much of single parent mothers' LFP rates cannot be explained by unemployment and long-term trends.

5. Mary Daly (1997) estimates that the 1996 welfare reform had by July 1997 increased the labor supply of single women maintaining families by 296,000. This is based on trends in labor force participation rates of this group versus other groups in population. Women are 0.9099 of adult welfare recipients, based on March CPS data. Assuming that effects of welfare reform are similar for all welfare recipients, the implied effects on total labor supply would be 296,000/0.9099 = 325,000.

6. These calculations are based on trends in labor force participation rates of female heads, ages 16-44, with less than 16 years of education, compared to trends in labor force participation rates of other women, ages 16-64, with less than 16 years of education. The latter group is used as a control, as less than 3 percent of this group receives welfare. Subtracting the change in the labor force participation rate of the latter group from the former group gives a change in labor force participation rates that is plausibly due to welfare reform. For example, over the 1993-97 period, the labor force participation rates for female heads went up from 68.64 percent to 75.70 percent, whereas the labor force participation rate for other less-education women went up from 65.09 percent to 66.47 percent. Multiplying the difference between these changes by the number of female heads in 1997 (6.86 million) gives 390,000 as an estimate of the number of female heads who entered the labor force due to welfare reform and other changes from 1993-97. But female heads are only 51.07 percent of the overall welfare population, based on March 1997 CPS data. (Even though the other less educated female group has a welfare receipt rate of less than 3

Table 1. (Continued)

percent, this group is so much larger than the female head group that it comprises almost 40 percent of all welfare recipients.) Hence, if all welfare recipients have their labor supply affected similarly by welfare reform, the total change in labor supply from 1993-97 would be 763,000 (=390,000/0.5107). Similar calculations yield the figures for other time periods.

7. These calculations are based on the Bureau of Labor Statistics publication, "Employment Characteristics of Families in 1997" (U.S. Department of Labor, 1998), which in turn is based on the Current Population Survey for 1997 and 1996. BLS reports that the labor force participation rate for mothers with spouse present increased from 70.4 percent to 70.7 percent from 1996 to 1997. Labor force participation rates for single mothers increased from 71.8 percent to 75.0 percent. Assuming that without welfare reform, single mothers' labor force participation would have increased the same as married mothers (0.3 percent), the effect of welfare reform was to increase labor force participation rates for single mothers by 2.9 percent. Applying this increase to the publication's estimates of the number of single mothers in 1997 gives an estimate that welfare reform increased the number of labor force participants among single mothers by 282,000. Assuming that welfare reform had similar proportional effects among all welfare recipients, and noting that women are 0.9099 of all adult welfare recipients (calculated from March Current Population Survey), the estimated total effect of the 1996-97 welfare reform would be to increase the number of labor force participants by 310,000 (=282,000/0.9099).

8. The figures given in this table are taken directly from spreadsheets provided to me by Daniel McMurrer (McMurrer, Sawhill and Lerman, 1997b). I greatly appreciate his providing me with these spreadsheets, which clearly documented the exact methodology their study used to derive their labor supply estimates.

9. Chernick and Reschovsky (1996) do projections for California and Kentucky for the effects on the 2002 welfare caseload of the 1996 switch from a matching entitlement program to a fixed block grant, and do alternate projections under assumptions of both small and large fiscal responses by states to the different incentives of a fixed federal welfare block grant. I calculated the average of the small and large responses for California as a percentage of the 1994 California caseload; this average was a reduction of 60 percent in the caseload. (The percentage reduction is very close under small and large responses, and in California versus Kentucky: California's small and large responses were -55 percent and -65 percent, and Kentucky's small and large responses were -54 percent and
-59 percent.) I applied this percentage reduction to the total U.S. caseload in 1994 to calculate a U.S. caseload reduction in 2002 of 3.028 million. Assume, following McMurrer, Sawhill and Lerman (1997b), that 74.5 percent of the caseload is single adult cases, 7.3 percent is two parent families, and 18.2 percent is child-only cases. Further, assume that pushing single parents off of welfare increases their labor force participation rates by 0.47, and pushing two-parent cases off of welfare increases their labor force participation rate by 0.378. Then the effects of these different state policies will be to increase the labor supply of single parents pushed off of welfare by 3.028 * 0.745 * 0.47 = 1.060 million. A single calculation yields an effect on two adult cases of increasing their labor supply by 0.084 million.

10. Duncan, et al (1998) project that 41 percent of the caseload at any point in time will reach a 5-year time limit on welfare receipt within five years. States under the 1996 welfare bill are allowed to exempt 20 percent of the caseload from the time limit. If the caseload would otherwise stay constant at the fiscal year 1997 level of 3.946 million, and if states exempt the full 20 percent from the time limit, and if future welfare recipients follow the same dynamics of welfare receipt as they did in the past, then 0.21 * 3.946 = 0.829 million welfare recipients will be kicked off of welfare due to time limits in the period from five to eight years after the time clock "starts ticking." (The clock starts when the state submitted its plan for operating under the new welfare bill, which was 1997 in most states.) Assume that all of those kicked off of welfare due to time limits are adults, and that those kicked off are divided between single parent and two-parent families in proportion to their current representation in the caseload. Then the labor supply effects of the time limits for single parents by 2005-2006 would be 0.355 million = 0.829 million * [0.745/(0.745 + 0.073)] * 0.47. A similar calculation implies that the labor supply effects on two adult cases would be 0.028 million.

Table 1. (Continued)

11. The Bartik baseline calculations are explained fully in my previous paper, "The Labor Supply Effects of Welfare Reform." The calculations begin by comparing the actual 1993-98 change in caseloads, and the predicted change in welfare caseloads based only on the change in unemployment and the growth in population. The effects on unemployment are derived from Blank (1997). The baseline prediction assumes that the unexplained trend in caseloads from 1996-98 represents half the long-term effect of welfare reform on welfare caseloads, with the economy gradually adjusting to its long-term welfare reform effect using a first-order autoregressive process. The case load reduction is divided among single-parent and two-parent cases according to their proportion of the overall caseload, and the effect on labor force participation rates is assumed to be 0.47 for single parents, and 0.38 for two-parent cases. In addition, I assigned assumed work percentages for single-parent and two-parent cases that are in-between the current work percentages and the bill's requirements; specifically, I assume the proportion of the caseload working gradually increases to 0.50 for two parent cases and 0.30 for one parent cases, for all years from 2000 on. Finally, I assume a recession begins in 2001, with a recovery beginning 2004, and unemployment returning to its pre-recession level by 2006.

Table 2. This Paper's Best Forecast of How Welfare Reform Will Affect Labor Supply, 1993-2008

Year	Unemployment Rate	Cumulative Effects on Overall Labor Supply (in millions)	Effects on Labor Supply of Single Parents	Effects on Labor Supply of Two-Parent Families
1993	6.9	0	0	0
1994	6.1	0.027	0.025	0.002
1995	5.6	0.048	0.045	0.004
1996	5.4	0.146	0.136	0.011
1997	4.9	0.446	0.384	0.062
1998	4.3	0.744	0.661	0.082
1999	4.3	0.918	0.823	0.095
2000	4.3	1.056	0.950	0.106
2001	5.2	1.107	0.998	0.109
2002	6.6	1.178	1.063	0.115
2003	7.1	1.287	1.163	0.124
2004	6.6	1.385	1.252	0.133
2005	5.4	1.402	1.268	0.134
2006	4.3	1.351	1.222	0.129
2007	4.3	1.286	1.164	0.122
2008	4.3	1.256	1.137	0.199

Notes: The numbers are estimated and forecast *cumulative* numbers of additional labor force participants that are induced by welfare reforms from 1993 to the year reported. The actual change in additional labor force participants from the year before can be derived by subtracting one number from the number above it. The unemployment rates used are actual for 1993-1997, based on preliminary data for 1998, and a forecast from 1998 to 2008. This forecast includes a recession, dated as beginning in 2001, and which is assumed to have effects on unemployment rates similar to the average of all recessions since the 1960s. The reported effects on single-parent and two-parent families do not exactly add to the total effects due to rounding.

I also considered alternative forecasts for the labor supply effects of welfare reform (see Bartik (July, 1998) for details). The labor supply impact as of 2005 under these alternatives, each of which differ from the baseline in only one feature, are as follows: no recession through 2005: 1.2 million; no increase in employment rate of welfare recipients: 1.0 million; only one-third of welfare bill's effects on caseload completed as of 1998: 1.5 million; no further policy reductions in caseloads after 1998: 1.2 million; five-year time limit begins cutting cases in 2003: 1.5 million.

Table 3. Comparison of Welfare Shocks to the Labor Force with Employment Levels for States and Metropolitan Areas

State/MSA	1993-2005 shock as % of total employment	1993-2005 shock for women as % of employment of less-educated women	High or low labor market impact?
California	1.47	4.93	High
Texas	0.80	2.62	
New York	1.29	4.45	High
Florida	1.03	3.01	
Illinois	1.01	3.14	
Pennsylvania	0.93	2.71	
Ohio	1.23	3.71	
Michigan	1.36	3.95	High
North Carolina	0.91	2.80	
New Jersey	0.85	2.87	
Georgia	1.04	3.29	
Virginia	0.56	1.80	
Massachusetts	0.91	3.38	
Indiana	0.65	1.79	
Missouri	0.84	2.66	
Washington	0.98	3.27	
Tennessee	1.04	3.24	
Wisconsin	0.77	2.21	
Minnesota	0.64	1.95	
Maryland	0.85	2.49	
Colorado	0.54	2.08	
Arizona	0.97	3.21	
Alabama	0.68	2.02	
Louisiana	1.23	4.07	
Kentucky	1.19	3.70	
South Carolina	0.80	2.34	
Connecticut	0.84	2.73	
Oregon	0.72	2.33	
Oklahoma	0.84	2.64	
Iowa	0.62	1.76	
Kansas	0.56	1.89	
Arkansas	0.59	1.76	
Mississippi	1.33	4.04	High
Utah	0.52	1.68	
Nebraska	0.47	1.37	Low
Nevada	0.45	1.44	Low
New Mexico	1.07	3.63	
West Virginia	1.47	4.21	High
Hawaii	0.68	2.56	
Maine	0.98	2.79	
District of Columbia	0.90	9.36	
New Hampshire	0.48	1.38	Low
Idaho	0.37	1.16	Low
Rhode Island	1.18	3.35	
Montana	0.72	2.37	
South Dakota	0.47	1.53	Low
Delaware	0.77	2.47	

Table 3. (Continued)

State/MSA	1993-2005 shock as % of total employment	1993-2005 shock for women as % of employment of less-educated women	High or low labor market impact?
North Dakota	0.47	1.60	Low
Vermont	0.82	2.43	
Alaska	0.94	3.76	
Wyoming	0.65	2.13	
Los Angeles-Long Beach	1.68	6.15	High
New York	1.87	7.50	High
Chicago	1.15	4.15	
Washington, DC	0.52	2.15	
Philadelphia	1.25	4.04	High
Detroit	1.52	4.55	High
Atlanta	0.73	2.41	
Houston	0.80	3.00	
Dallas	0.52	1.95	
U.S. Average	0.99	3.14	

Notes: States/MSAs are sorted by total 1996 full-time and part-time employment from Regional Economic Information System (REIS), U.S. Department of Commerce. Size of welfare shocks to labor supply for nation are derived from "best forecast." It is assumed that shock to single parent families is shock to labor supply of women. Shocks are allocated to states and MSAs based on 1993 AFDC caseload. Column 2 compares overall shock to 1993 employment level in state or MSA (source: full-time and part-time employment from REIS of U.S. Department of Commerce). Column 3 compares shock to women's labor supply with total 1993 employment of women with less than a college education. Column 4 classifies states and MSAs as high and low impact. A state/MSA is high impact if it is 25% above the national average on both indicators of the size of the shock (the previous 2 columns). A state/MSA is considered to be low impact if it is less than half of the national average on both indicators.

Table 4. Single Sector Models of the Effects of Welfare Reform on Wages and Displacement

Study	Study's Assumptions	Study's Estimated Effects on Wages	Adjusted to Labor Supply Shock of 1.4 Million in 2005	Alternative labor demand elasticity assumptions: -1.0, -2.0, -3.0; [Displacement proportion in brackets]	Alternative labor supply elasticity assumptions: 0.4, 1.0, 4.0; [Displacement proportion in brackets]
1. Mishel and Schmitt (1995)	Labor demand elasticity of -0.3, labor supply elasticity of zero	-12 percent for bottom 30 percent of wage distribution	-15%	-5%, -2%, -2% [0], [0], [0]	-6%, -3%, -1% [0.57], [0.77], [0.93]
2. Holzer (1996)	Labor demand elasticity of -0.3, labor supply elasticity of 0.4 or larger	-7 to -10 percent for high school dropouts and bottom quintile of high school graduates	-5% to -7%	-4%, -2%, -1% [0.29], [0.17], [0.12]	-7%, -4%, -1% [0.57], [0.77], [0.93]
3. Bernstein (1997)	Labor demand elasticity of -0.3, labor supply elasticity of 0.4	-11 percent for female high school graduates or less, ages 16 to 35	-8%	-4%, -2%, -2% [0.29], [0.17], [0.12]	-8%, -4%, -1% [0.57], [0.77], [0.93]

Notes: Table reports percentage effects on wages of group examined in each study. Last two columns also report displacement effects in brackets, again defined for group examined in each study. Mishel and Bernstein original numbers are for shock of 0.928 million in 1994. This is adjusted to shock of 1.402 million in 2005 using assumed overall labor supply growth used in later simulations in paper, which are based on past trends for five different education/gender groups and effects of welfare reform. Holzer's original numbers are for shock of 2 million in 1994. This is simply adjusted to 1.4 million; implicit assumption is that numbers of high school dropouts and "poorly-skilled" high school graduates does not change drastically from 1994-2005. Bernstein's original numbers are for shock of 1.8 million in 1996. This is adjusted to 1.4 million in 2005 using estimated growth trends for less-educated females from 1996 to 2005. Figures for wage effects (and displacement effects in brackets) for alternative elasticity assumptions are derived from equations (1) and (3) in text of this paper, along with each study's assumptions about relevant labor market. These last two columns also use supply shock of 1.4 million. For 3 alternative labor demand elasticity assumptions, labor supply elasticity from original study is used. For 3 alternative labor supply elasticity assumption, labor demand elasticity of -0.3, which is used in all original studies, is used.

Table 5. A Multisector Model of the Wage Effects of Welfare Reform

	Less-educated women	Less-educated men	More-educated women	More-educated men
Johnson's immigration results, using education grouping of high school equivalent vs. college equivalent				
Size of immigration supply shock as % of each group's labor force	4.7%	6.7%	0	0
Long-run wage effects (elasticity of intraskill substitution of 1.5)	-1.1%	-2.4%	1.9%	1.9%
Welfare reform results, using education grouping of high-school equivalent vs. college equivalent				
Size of welfare reform supply shock	2.2%	0.2%	0.3%	0
Wage effects (intraskill elasticity of 1.5)	-1.2%	0.2%	0.1%	0.3%
Output-constant demand elasticity (intraskill elasticity of 1.5)	-1.32	-1.17	-1.24	-1.07
Wage effects (intraskill elasticity of 0.5)	-3.4%	0.6%	0.3%	0.8%
Output-constant demand elasticity (intraskill elasticity of 0.5)	-0.47	-0.44	-0.46	-0.43
Welfare reform effects, education grouping is high school dropouts vs. high school graduates				
Size of welfare reform supply shock	8.6%	0.4%	0.7%	0.1%
Wage effects (intraskill elasticity of 1.5)	-5.0%	0	-0.2%	0.3%
Output-constant demand elasticity (intraskill elasticity of 1.5)	-1.48	-1.45	-1.08	-0.79
Wage effects (intraskill elasticity of 0.5)	-14.5%	0	-0.5%	0.8%
Output-constant demand elasticity (intraskill elasticity of 0.5)	-0.50	-0.49	-0.43	-0.38
Wage effects (intraskill elasticity of 0.5, supply elasticity of 0.4 for less-educated workers)	-8.7%	-0.1%	-0.8%	0.5%

Notes: All estimates reported here assume that four types of labor are combined into overall "labor" using CES production function, and that overall output is produced using capital and composite commodity labor by a Cobb-Douglas production function. Estimates reported are long-run effect on wages that assume capital expands until rate of return on capital is restored to its original level. Johnson results come directly from Johnson's Table 1.2. Estimated shocks to labor supply in all models are measured in labor "efficiency units", that is weighting different groups by wages and hours worked. Demand elasticities reported are constant-output own-wage elasticities of labor demand. Elasticities of labor supply are assumed to be zero for all models except last model, which assumes 0.4 elasticity with respect to wages for each of high school dropout groups. With a positive labor supply elasticity, there are displacement effects. For female high school dropouts in last model, displacement rate is 0.42: for every additional female high school dropout added to labor supply (and fully employed in this model), 0.42 female high school dropouts from the "original" labor force is no longer employed in the final equilibrium.

Table 6. Summary of Wage and Unemployment Rate Effects of Welfare Reform in Wage Curve Model, as of Three Years: 2000, 2004, and 2008

Group	2000	2004	2008
Panel A:	Effects on Unemployment Rate (Absolute value of *t*-statistics in parentheses) [Welfare reform shock as percentage of group's labor force in brackets]		
Female heads	4.7 (2.63) [10.0]	4.6 (2.28) [12.0]	3.1 (1.92) [9.9]
Other women with less than college education	0.5 (5.94) [1.0]	-0.1 (0.75) [1.3]	-0.6 (3.22) [1.1]
Women with more than college education	0.2 (1.46) [0.1]	-0.5 (2.57) [0.2]	-1.1 (4.22) [0.1]
Men with less than college education	0.3 (3.62) [0.2]	-0.4 (2.35) [0.2]	-0.9 (4.22) [0.2]
Men with more than college education	0.2 (2.21) [0.0]	-0.5 (2.71) [0.0]	-1.0 (4.41) [0.0]
Overall average	0.5 (13.42) [0.8]	-0.1 (0.77) [1.0]	-0.7 (3.44) [0.8]
Panel B:	"Percentage" Effects on Wages (*t*-statistics in parentheses)		
Female heads	-1.3 (7.65)	-1.7 (7.63)	-0.3 (0.67)
Other women with less than a college degree	-1.1 (13.49)	-1.5 (7.80)	0.2 (0.40)
Women with college education	-1.0 (12.23)	-1.4 (7.05)	0.4 (0.69)
Men with less than college education	-1.1 (13.85)	-1.4 (7.31)	0.3 (0.63)
Men with college education	-1.1 (12.09)	-1.4 (6.70)	0.4 (0.74)
Overall average	-1.1 (14.26)	-1.4 (7.54)	0.3 (0.55)

Notes: Reported effects are actually, for unemployment rate, 100 * change in [ln(labor force) - ln(employment)], which is logarithmic version of unemployment rate. For wages, reported effects are 100 * change in ln(wages). Bracket percentages are welfare reform supply shock in that year for that group, as percentage of labor force of group subtracting out welfare reform-induced labor force. "*t*-statistics" in parentheses are actually absolute value of coefficient divided by standard deviation of estimated effects from 1000 random replications of simulation, using estimated coefficients and variance/covariance matrix of estimates. The welfare reform shock whose effects are simulated is the "best forecast" described in Table 2, which is estimated and forecast for years from 1993-2008.

Table 7. Reduced Form Estimates of the Effects of Reductions in Welfare Rolls Due to Welfare Reform on the Wage and Unemployment Rates of Various Groups

Panel A: Effects on ln(wages) of reduction in ln(welfare to population) ratio by -0.645 (maximum effect in year 2005 according to "best forecast") (absolute values of *t*-statistics in parentheses)

Group	OLS Estimates	Instrumental Estimates with ln(state welfare benefits) as Instrument	Instrumental Variable Estimates with State Welfare Waiver as Instrument	Instrumental Variable Estimates with Welfare Waiver as Instrument, and Controls for Lagged Wages and Unemployment Rates
Female heads	0.065	-0.365	-0.235	-0.195
	(8.36)	(3.43)	(2.13)	(1.68)
Other less-educated females	0.063	-0.321	0.036	0.059
	(13.69)	(3.62)	(0.88)	(1.09)
More-educated females	0.056	-0.278	0.053	0.061
	(9.59)	(3.40)	(1.04)	(0.93)
Less-educated males	0.088	-0.376	-0.074	-0.001
	(16.10)	(3.52)	(1.11)	(0.01)
More-educated males	0.045	-0.198	0.036	0.047
	(7.92)	(3.08)	(0.74)	(0.69)
Average wages	0.070	-0.324	-0.017	0.024
	(16.05)	(3.59)	(0.37)	(0.45)

Panel B: Effect on unemployment rate, defined as [ln(labor force) - ln(employment)], of reduction in ln(welfare receipt) rate by -0.645 (*t*-statistics in parentheses)

Group	OLS Estimates	Instrumental Estimates with ln(welfare benefits) as Instrument	Instrumental Estimates with State Welfare Waiver as Instrument	Instrumental Estimates with Welfare Wavier as Instrument, and Controls for Lagged Wages and Unemployment
Female heads	-0.052	-0.077	-0.094	-0.063
	(8.63)	(1.94)	(1.76)	(1.11)
Other less-educated females	-0.021	-0.037	0.052	0.057
	(10.67)	(2.81)	(1.92)	(1.67)
More-educated females	-0.007	0.024	0.004	0.007
	(4.59)	(2.01)	(0.28)	(0.49)
Less-educated males	-0.022	-0.077	0.034	0.058
	(9.16)	(3.89)	(1.27)	(1.52)
More-educated males	-0.005	-0.024	0.019	0.024
	(4.38)	(2.79)	(1.56)	(1.80)
Average unemployment rate	-0.019	-0.048	0.030	0.045
	(11.06)	(3.72)	(1.47)	(1.58)

Notes: Five groups are all between 16-64. Less versus more educated is divided at less than college education, and college education or more. Female heads are less-educated female household heads, with other relatives present, and who are also between the ages of 16-44. Data used in estimation are pooled annual data on 51 states (plus the

Table 7. (Continued)

District of Columbia) from 1979 to 1997. All models include complete set of year and state dummies. All models are estimated using 1979 total state population as weights. The model in the first column is estimated using weighted least squares. The other models use weighted two-stage least squares. The second model uses ln(state welfare benefits) as an instrument. The third and fourth models use dummy variable for whether state has welfare waiver as instrument; in 1997, all states are assumed to have waivers. The fourth model includes two annual lags in wage and unemployment rate of group, and in overall wages and unemployment rates. All estimates are effects of lowering ln(welfare/population) by -0.645, which is this study's estimate of the effect of welfare reform on welfare rolls in 2005. The fourth model presents dynamic simulation estimates of effects of this shock after five years. The "*t*-statistics" for this simulation are ratios of parameter values to standard deviation of estimates from 1000 Monte Carlo repetitions of simulation.

Table A-1. Summary of a Wage Curve Model of State Labor Markets

Type of Equation	Dependent Variable	Independent Variables (in addition to year and state dummies, and two lags of dependent variable) All independent variables are included with two lags and no current values unless otherwise noted.
Overall labor demand (1 equation)	ln(state employment)	ln(wage) ln(personal income)
Employment share demand (5 equations)	ln(share of employment in group)	ln(wage of group/overall wage) current value of ln(labor force share of group) [endogenous, lagged labor force share used as instrument]
Overall wage curve (1 equation)	ln(wage)	ln(unemployment rate)
Relative wage curves (5 equations)	ln(wage of group/overall wage)	some function of relative unemployment of group, with functional form chosen for each group after preliminary testing
Labor force participation rate (5 equations)	ln(labor force participation rate of group)	ln(wage of group) unemployment rate of group ln(AFDC benefits for female head group)
Migration (5 equations)	ln(population of group)	Same as for labor force participation rate
Income (1 equation)	ln(state personal income)	ln(wage) ln(employment) ln(population) Includes current as well as lagged values of these variables

Notes: All estimates based on pooled annual time-series cross-section data for all states, 1979-97. All estimates are weighted by 1979 state population. All estimates use weighted least squares except employment share demand, which is weighted 2SLS.

Summary of empirical results from preliminary runs of the model:

Overall labor demand elasticity with respect to wages is -0.7 after five years, holding state income constant.

In the long-term, labor demand is significantly more elastic when state personal income is allowed to vary.

Relative labor demand is not particularly sensitive to relative wages (elasticity is less than 0.1 in absolute value for all groups, except female heads is -0.13).

Current labor force share has important effects on current employment share: between 0.3 and 0.5 for all groups except less-educated females (0.8).

Overall wages significantly affected by unemployment, with 1% lower unemployment increasing wage by 2.4 percent after five years, at average unemployment rate over sample (6.8 percent).

Wage curve is non-linear. Starting at unemployment of 5.0 percent, 1 percent lower unemployment increases wages by 3.3 percent after five years; starting at 9.9 percent unemployment, 1 percent lower unemployment increases wages by 1.6 percent. (Five percent and 9.9 percent are lowest and highest national unemployment rates from 1979-97.)

Relative wages are not sensitive to relative unemployment, with 1 percent change in relative unemployment affecting relative wages by less than 0.3 percent after five years.

Labor force participation rates are not particularly sensitive to wage rates, with all elasticities after five years less than 0.1. Labor force participation rates are somewhat sensitive to unemployment rates, with 1 percent lower unemployment increasing overall labor force participation rate by about 0.5 percent. Low-education groups' labor force participation rates are more sensitive than high education groups.

Migration is not particularly sensitive to wage rates, except for high education males and females, with elasticities of 0.4 and 0.2. Migration is somewhat sensitive to unemployment rates, with 1 percent lower unemployment increasing population by 0.6 percent.