

2010

Estimating the Costs per Job Created of Employer Subsidy Programs

Timothy J. Bartik

W.E. Upjohn Institute, bartik@upjohn.org

Citation

Bartik, Timothy J. 2010. "Estimating the Costs per Job Created of Employer Subsidy Programs." Presented at Upjohn Institute conference on "Labor Markets in Recession and Recovery," October 22-23, Kalamazoo, MI.
<http://research.upjohn.org/confpapers/19>

This title is brought to you by the Upjohn Institute. For more information, please contact ir@upjohn.org.

Estimating the Costs per Job Created of Employer Subsidy Programs

Timothy J. Bartik, Senior Economist

October 22, 2010

**W.E. Upjohn Institute for Employment Research
300 S. Westnedge Ave.
Kalamazoo, MI 49007
bartik@upjohn.org**

Presentation at Upjohn Institute conference on,
“Labor Markets in Recession and Recovery”

Focus of This Talk

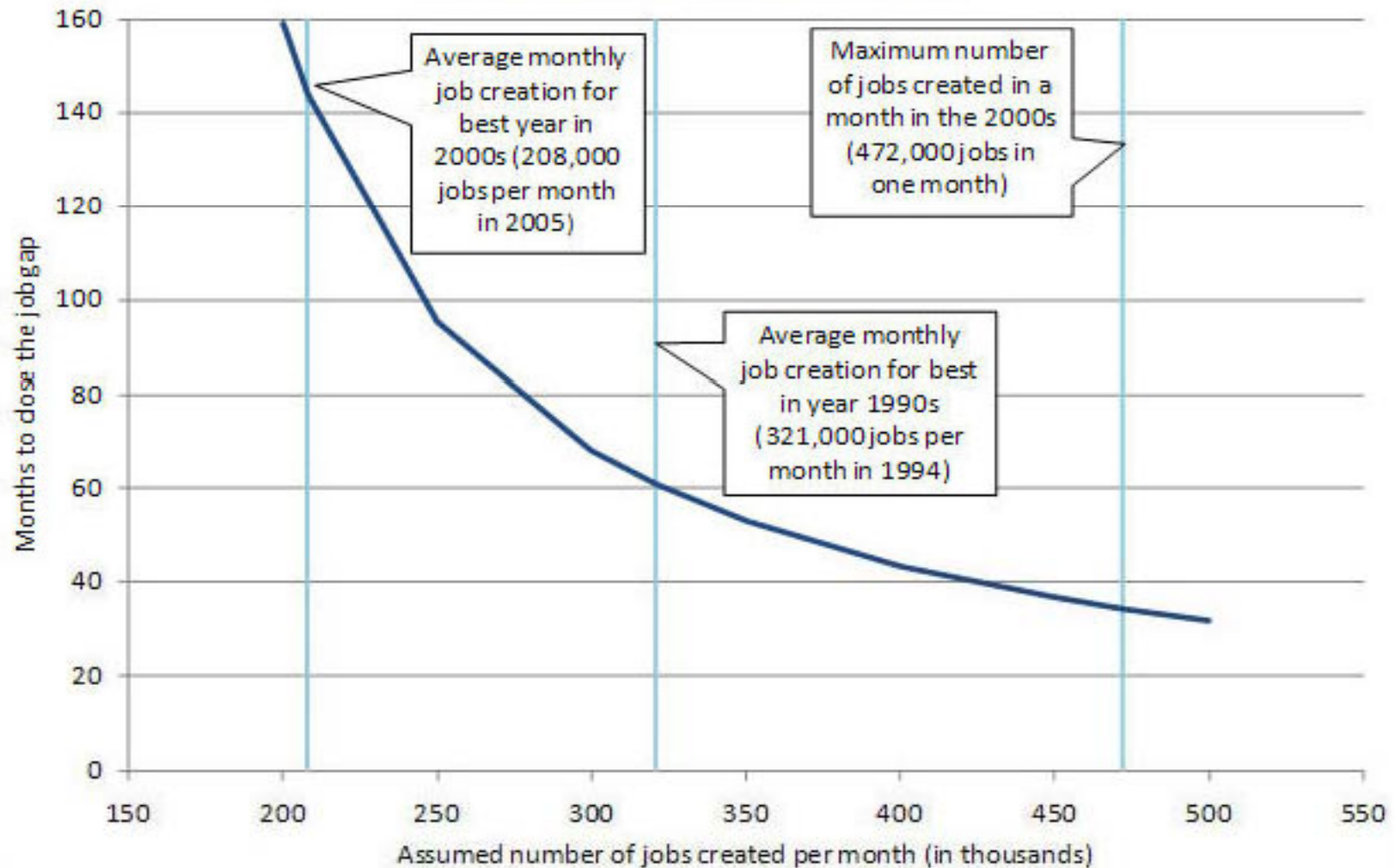
- Size of job need, and why we need job-creation policies that are more cost effective than conventional policies
- Cost per job estimates from four of my recent projects:
 - (1) Job creation tax credit (with Bishop)
 - (2) MEED program (Minnesota)
 - (3) MEGA program (Michigan) (with Erickcek)
 - (4) Hamilton Project on job creation in distressed areas:
customized training, manufacturing extension, Empowerment Zones
- Ideas for improving estimates

Large National Job Creation Needs:

- September 2010: Would need 10 million jobs to restore the U.S. employment to population ratio to its December 2007 rate
- In addition, need 125,000 jobs per month to keep up with natural labor force growth
- Need over 320,000 jobs created per month to close job gap in 5 years

Number of months required to close the job gap

(including job losses through September 2010)



Source: Hamilton Project, Brookings Institution, available at http://www.brookings.edu/opinions/2010/1008_jobs_greenstone_looney/chart-3.aspx

Even prior to recession, large job creation needs for some groups and regions

- As of 2006, for all males with less than a college degree to have same employment rate as white males with same education had in 1979, would need 2.9 million jobs. (Bartik & Houseman, Intro to *A Future of Good Jobs*)
- Less-educated single women still have employment rates less than similarly educated white men.
- From 2000 to 2007, 40 out of 180 BEA economic areas had declining employment to population rates, equivalent to loss of 1.2 million jobs.

National Job Needs

- Conventional fiscal stimulus is too costly per job created to fill huge job gap
 - \$814 billion stimulus
 - \$112,000 average cost per job created
 - Result: 7.3 million job-years
 - But no more than half in any one year
 - 10 million job gap is after current job creation of 3 million or so
 - Would need triple stimulus spent in one year to close 10 million job gap

Why Does All Conventional Fiscal Stimulus Cost About \$100,000 per Job Created?

- Examples: Tax cuts, \$145,000; State fiscal relief, \$117,000; direct Federal spending, \$92,000; Unemployment benefit increase, \$95,000; Cash for Clunkers, \$86,000; Cash for Caulkers, \$80,000
- Why? GDP per employee close to \$105,000, if create jobs as byproduct of increasing spending for some other goal, costs will be close to \$105,000
- Can we do better with measures that aim more directly at job creation?

States: Also Difficult to Meet Job Needs

- For example, Michigan has lost 860,000 jobs since June 2000
- To increase state employment by one job requires general business tax breaks with present value of \$206,000
- To fill job gap, would need general business tax cuts with present value of \$177 billion, compared to state annual general fund of \$7 billion
- Can we do better?

Job Creation Tax Credit (with Bishop)

- Updated version of 1977-78 New Jobs Tax Credit
- 15% credit 1st year, 10% credit 2nd year, for increased payroll since base period
- Because new credit in different economy, could not easily use previous research, so simulated plausible effects based on assumed elasticities and BLS data

Simulated effects of JCTC

Simulated effects of JCTC

| Item number | Baseline data and behavioral assumptions | Units of measure | Description |
|-------------|--|---|---|
| 1 | 6.2534E+12 | 2008 dollars | Non-federal wage and salaries as of 2008, from National Income and Products Accounts, Table 6.3 |
| 2 | 124344000 | # of FTE employees | Non-federal full-time equivalent employment as of 2008, from NIPA Table 6.5d |
| 3 | 50944 | Equals item 1/item 2 | Wages and salaries per non-federal fte employee, 2008 |
| 4 | 61736 | Compensation in 2008 dollars per FTE employee | Non-federal compensation per FTE employment, calculated from NIPA Tables 6.2d and 6.5d |
| 5 | 10.6% | Jobs created by openings and expansions in one-year period, as % of base jobs | Derived from Business Employment Dynamics database of the U.S. Bureau of Labor Statistics. See appendix C text. |
| 6 | 1.4 | Ratio of item 5 concept for two year period to item 5 | Assumed by authors |
| 7 | 0.841 | Equals ratio of total wages taxed by Soc. Sec. to total wages | Based on Tax Policy Center data. |
| 8 | 0.3 | Equals absolute value of labor demand wage elasticity | Based on Hamermesh (1993) |
| 9 | 0.263 | Proportion of wage credit immediately repaid in increased taxes on business profits | Weighted average of business tax rates for corporate and non-corporate businesses. See text of ap |
| 10 | 0.615 | Proportion of total non-federal employment that is affected by wage credit in 2010 | Based on Business Employment Dynamics data. See appendix C text. |
| 11 | 0.733 | Proportion of total non-federal employment that is affected by wage credit in 2011 | Based on Business Employment Dynamics data. See appendix C text. |
| 12 | 0.38 | Dollar reduction in budget deficit due to dollar increase in GDP | Based on CBO estimates. See Appendix C text. |

| Item number | Policy Parameters | Units of measure | |
|-------------|-------------------|--|-------------------|
| 13 | 15.0% | Tax credit percentage, 2010 | Policy assumption |
| 14 | 0.667 | Ratio of 2011 tax credit percentage to 2010 percentage | Policy assumption |

| Item number | First year results | Formula | Description |
|-------------|--------------------|--|--|
| 15 | 6.159E+10 | Equals (item 1)*(item 5)*(item 13)*(item 7)*(1-item 9) | Wage credit costs for openings and expansions that would have occurred even if there were no wage credit |
| 16 | 2.840E+06 | Equals (item 2)*(item 10)*(item 13)*(item 3/item 4)*(item 8) | Employment increase due to labor demand response of affected employers to assumed wage credit |
| 17 | 1.825E+10 | Equals (item 16)*(item 3)*(item 7)*(item 13) | Wage credit costs for induced jobs |
| 18 | 7.984E+10 | Equals item 15 + item 17 | Total wage credit costs first year |
| 19 | 28116 | Equals item 18/item 16 | Wage credit costs per induced job due to program |
| 20 | 5.64 | Equals(item 16 + item 2*item 5)/(item 16) | Ratio of jobs receiving wage credit to jobs induced by credit |
| 21 | -6.662E+10 | Equals (item 16)*(item 4)*(minus item 12) | Reduction in budget deficit due to increased GDP due to induced jobs |
| 22 | 1.322E+10 | Equals item 18 plus item 21 | Net cost of wage credits, after budget deficit effects of increased GDP |
| 23 | 4656 | Equals item 22 / item 16 | Net cost per induced job due to program |

Other JCTC-related Costs Per Job Estimates

- Lower elasticity to 0.15, gross costs per job created of \$50,000
- Perloff and Wachter estimates based on business knowledge of 1977 NJTC implied \$21,000
- Kalamazoo survey: \$16,000
- CBO, 0.08 demand elasticity and other changes, \$56,000 or greater

Why Can JCTC Do Better than \$100,000?

- Credit of \$7,000 per job
- Don't need a great hit rate to beat \$100,000
- Plausible that don't need to be close to earnings per job or GDP per job to induce job creation

Political Events

- Obama bill similar to JCTC, with considerable technical improvements
- Schumer-Hatch bill passed, which:
 - Subsidized hires, not net job creation
 - Smaller
 - Targeted at unemployed more than 60 days
- Estimated cost per job created for Schumer-Hatch: \$97,000 (hires: 46%)
- CBO disagreed, never pinned down why

Minnesota MEED Program (1983-89)

- \$10/hr. (2008 \$) wage subsidy for 6 months
- Private and public
- New jobs, retention requirements
- Agencies match employers/workers
- Included unemployed without benefits, but targeted at more needy
- Small business, export-base
- At peak, equivalent to \$191 million today, 20,000 annual participants; 1.1 million nationally

Because MEED program only evaluated through surveys, made a number of assumptions to simulate costs per job:

1. Assumed new program would be one year subsidized job
2. Public service substitution % based on Ellwood
3. Multiplier effect for PSE
4. Surveys of MEED businesses used to estimate % of private jobs induced
5. PSE substitution equal to general tax cut
6. Non-induced private jobs equal to business tax cut
7. If tax financed, some negative effects
8. Gross costs per job created is \$34,000, net cost after federal offsets is \$18,000 net costs after adding state offsets is \$7,000. Net costs if tax financed is \$41,000

Estimated effects of MEED program in first year

Estimated effects of MEED program in first year

| Item number | Assumptions and Policy Parameters | How defined | Sources and rationale |
|-------------|-----------------------------------|---|--|
| 1 | 1.00E+06 | Jobs slots first year | Assumptions about feasibility based on CWA, CETA |
| 3 | \$10 | Wage subsidy per hour | Updated version of MEED wage and benefits subsidy |
| 4 | 0.8 | wage subsidy percentage | Assumed policy parameter |
| 5 | \$12.50 | equals item3/ item4 | Assumed average compensation per hour |
| 6 | 2.00E+10 | equals 2000 times item 3 times item 1 | Total wage subsidy cost first year |
| 7 | 1.00E+10 | equals one-half of item 6 | Assumed cost of job developers and job support |
| 8 | 3.00E+10 | equals item 6 plus item 7 | Total first year cost |
| 12 | 60.0% | Public sector share first year | Assumed based on MEED experience |
| 14 | 25.0% | Public worker substitution percentage | Assumed based on Ellwood statement, based on research, that well-run PSE targeted on disadvantaged can reduce public worker substitution to under 25% |
| 15 | 1.3 | Multiplier effect of new PSE jobs | Midpoint of CBO range for multiplier effects of non-infrastructure aid to state and local government, from their letter to Senator Grassley (March 2009) (Zandi, 2008, says multiplier of 1.36) |
| 16 | 145351 | Cost per job year of creating jobs through tax cuts | From CEA May 2009 report on impact of stimulus on job creation and GDP |
| 17 | 57.6% | Percent of private jobs that would not have been created "but for" wage subsidy | From 1987 participants' survey by Jobs Now Coalition, "MEED Means More Business," March 1988. |
| 18 | 0.2 | Policy multiplier from increases in business cash flow | Midpoint of CBO range for multiplier effects of tax cuts primarily affecting business cash flow, from their letter to Senator Grassley (March 2009) |
| 19 | 105000 | Ratio of GDP per job | From CEA May 2009 report on impact of stimulus on job creation and GDP |
| 20 | 0.38 | Deficit effect per \$ increase in GDP | Median from CBO Research reports |
| 21 | 0.75 | Share of deficit effect due to revenue increases | EPI interpretation of CBO estimates |
| 22 | 0.71 | Ratio of state and local own source revenue to federal revenue | From Tax Policy Center, figures for 2006, available at http://www.taxpolicycenter.org/briefing-book/background/numbers/revenue-breakdown.cfm |
| 23 | 92000 | Cost per job year of jobs created through public spending | From CEA May 2009 report on impact of stimulus on job creation and GDP |
| 24 | 33.7% | Average business tax rate on windfall profit increases | Weighted average of corporate and non-corporate tax rates on profits, using wage share of each sector from |

Estimated effects of MEED program in first year (continued)

| Item number | First year impacts and net costs | | |
|-------------|----------------------------------|--|---|
| 25 | 4.50E+05 | equals item 1 times item 12*(1 minus item 14) | Public sector direct job creation |
| 26 | 1.13E+10 | equals item 25 times item 5 times 2000 | direct GDP increase due to public sector job creation |
| 27 | 3.38E+09 | equals item 26 times (item 15 minus 1) | multiplier GDP effect due to public sector job creation |
| 28 | 3.21E+04 | equals item 27 divided by item 19 | Multiplier jobs created by public sector jobs |
| 29 | 4.82E+05 | equals item 25 plus item 28 | Total PSE jobs plus multiplier jobs |
| 30 | 1.463E+10 | equals item 26 plus item 27 | GDP effects of these PSE jobs plus multiplier jobs |
| 31 | 2.06E+04 | equals item 6 times item 12 times item 14 divided by item 16 | Jobs created through tax cuts generated by public worker substitution |
| 32 | 2.17E+09 | equals item 31 times item 19 | GDP generated by tax cuts from public worker substitution |
| 33 | 2.30E+05 | equals item 1 times (1 minus item 12) times item 17 | Private sector jobs not created "but for" subsidy |
| 34 | 5.76E+09 | equals item 33 times item 5 times 2000 | GDP associated with these private sector jobs |
| 35 | 6.784E+08 | equals item 6 times (1 minus item 12) times (1 minus item 17) times item 18 | GDP associated with profit flow to private businesses |
| 36 | 6.461E+03 | equals item 35 divided by item 19 | Jobs created by increased private business cash flow |
| 37 | 1.09E+05 | equals item 7 divided by item 23 | Jobs created by increased job developer and support services spending |
| 38 | 1.14E+10 | equals item 37 times item 19 | GDP created by increased job developer and support services spending |
| 39 | 8.48E+05 | equals item 25+item 28+item 31+item 33+item 36+item 37 | Total jobs created first year |
| 40 | 35363 | equals item 8 divided by item 39 | Gross cost per job created |
| 41 | 3.46E+10 | equals item 26 plus item 27 plus item 32 plus item 34 + item 35 plus item 38 | Total GDP generated first year |
| 42 | 1.14E+09 | equals item 6 times (1 minus item 12) times (1 minus item 17) times item 24 | Revenue increase from increased corporate tax flow with zero GDP effects |
| 43 | 2.89E+10 | equals item 8 minus item 42 | Net cost after direct revenue offsets |
| 44 | 34014 | equals item 43/item 39 | Net cost per job created after direct revenue offsets |
| 45 | 9.87E+09 | equals item 41 times item 20 times item 21 | Increased federal revenue from GDP effects |
| 46 | 1.90E+10 | equals item 43 minus item 45 | Net cost after allowing for increased federal revenue from increased GDP |
| 47 | 3.29E+09 | equals item 41 times item 20 times (1 minus item 21) | Federal spending reductions due to increased GDP |
| 48 | 1.57E+10 | equals item 46 minus item 47 | Net federal cost after allowing for all federal budget offsets due to increased GDP |
| 49 | 18496 | equals item 48 divided by item 39 | Net federal cost per job created after allowing for all direct and indirect federal budget |
| 50 | 7.01E+09 | equals item 45 times item 22 | Increased state and local revenue due to GDP effects |
| 51 | 2.34E+09 | equals item 47 times item 22 | State and local spending reductions due to increased GDP |
| 52 | 6.34E+09 | equals item 48 minus (sum of item 50 plus item 51) | Net government cost after allowing for all federal, state, and local budget offsets due to |
| 53 | 7479 | equals item 52 divided by item 39 | Net government cost with all offsets per job created |
| 54 | 206397 | equals item 8 divided by item 16 | Job loss due to tax financing of program, which is assumed at state and local level |
| 55 | 2.167E+10 | equals item 54 times item 19 | GDP loss due to tax financing of program, which is assumed at state and local level |
| 56 | 641942 | equals item 39 minus item 54 | Total jobs created if program is tax financed |
| 57 | 1.297E+10 | equals item 41 minus item 55 | Total GDP generated if program is tax financed |
| 58 | 2.625E+09 | equals item 57 times item 22 times item 20 times item 21 | Total SL revenue generated if program is tax financed |
| 59 | 8.750E+08 | equals item 57 times item 22 times item 20 times (1 minus item 21) | Total SL savings in spending programs if program is tax financed due to GDP increases |
| 60 | 2.65E+10 | equals item 8 minus (sum of item item 50 plus item 51) | Net state and local government cost of program after allowing for all state and local budget offsets due to increased GDP |
| 61 | 41281 | equals item 54 divided by item 39 | Net state and local government cost per job created, allowing for GDP offsets |

Why Does MEED Beat \$100,000?

- PSE jobs: because jobs are low-wage
- Private jobs: Subsidy % is generous because these are low-wage jobs, so plausible that induces high %

Possible “Supply-Side” Effects of MEED

- Extra work experience of MEED may increase human capital, hence future employment rates and wage rates
- Such effects will lower MEED cost per job created over time
- One simulation: gross costs are reduced from initial \$34,000 to \$13,000 after 10 years of program

Political Events

- MEED introduced into MN legislature, but did not pass
- Franken introduced in DC, but caught up in stimulus backlash
- MEED has some similarities to TANF Emergency Contingency Fund (except greater targeting, no job creation requirements), which had 250,000 job slots, and expired on 9/30/2010

MEGA Program (with Erickcek)

- Refundable credit, awarded with some discretion to “export-base” businesses to encourage creation or retention of jobs, with credit tied to income taxes paid by additional workers
- Average credit per job-year: \$2,188
- Average time period of credit: 15.75 years (shortened in recent years)
- 49% of credits in auto-related industries, 31% in other manufacturing, 20% in non-manufacturing
- Average earnings: \$72,000
- Multiplier: 3.88

Given Difficulties of Finding Control Group for MEGA, We Did Simulation:

- Assumed that MEGA induced a location decision in $k\%$ of all jobs it subsidized
- Allowed for opportunity cost of public funds by assuming that MEGA was financed by reduced government spending
- Entered both $k\%$ of the MEGA subsidized jobs, and the reduced government spending, into the Institute's REMI model of Michigan, and calculated the effects on employment, personal income, and population. This yields costs per job.

To Estimate Net MEGA Costs Per Job, After State and Local Fisc:

- Net costs allowed for effects of personal income and population on tax revenues and government spending
- Assumed income and sales tax revenue responded to personal income as estimated for Michigan in a study by Bruce, Fox, and Tuttle (2006)
- State business taxes assumed to have elasticity of 1 with respect to personal income
- Because of Michigan property tax limitations, property tax revenue assumed to be based on population
- Spending categories go up with population, except welfare held fixed

How MEGA Induced K was Derived:

- K assumed to be 8.2%
- Based on elasticity of state business activity with respect to business taxes of -0.2
- With SL business tax revenue of \$5,000 per job, annual revenue foregone to create one job = $\$5,000 / 0.2 = \$25,000$
- NPV of foregone revenue, at 12% discount rate (Summers/Poterba) is \$206,000
- NPV of average MEGA deal is 8.2% of \$206,000

MEGA simulated job creation and costs over life of program

MEGA simulated job creation and costs over life of program

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|--------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| Subsidized MEGA jobs (in thousands) | 0.7 | 1.8 | 3 | 5.8 | 7.5 | 9.8 | 11.1 | 13 | 21 | 31.1 | 40.8 | 62.1 |
| Gross MEGA costs (in millions of dollars) | | 1 | 3 | 6 | 10.3 | 13.3 | 19.1 | 21.9 | 28.5 | 44.3 | 65.4 | 83.6 |
| Net job creation (in thousands) | 0.1 | 0.3 | 0.5 | 1 | 1.2 | 1.7 | 1.9 | 2.4 | 4.9 | 7.7 | 10.4 | 18 |
| Gross costs per net job created | 0 | 3,333 | 6,000 | 6,000 | 8,583 | 7,824 | 10,053 | 9,125 | 5,816 | 5,753 | 6,288 | 4,644 |
| Net costs per net job created | -3,440 | 863 | 4,515 | 4,278 | 7,230 | 6,292 | 9,156 | 8,255 | 3,863 | 3,331 | 3,573 | 1,660 |

Why is MEGA Cheaper than \$100,000?

- At state level, it only costs \$25,000 per year to create a job-year
- Multiplier of 3.88
- Note these may not be new jobs nationally, in fact most probably are not (83% zero-sum game?)

Hamilton Project Report Proposed 3 Programs:

- Federal grants for customized training in distressed areas
- Incentives for expansion of current manufacturing extension program in distressed areas
- Restore and expand original Empowerment Zone program, which had public service block grant as well as business tax breaks

To Estimate Job Creation Effects of 3 Programs:

- For EZs, have good estimates that use unsuccessful applicants as comparison group, from Busso/Gregory/Kline, of cost of \$18,000 per job created
- For customized training, and manufacturing extension, have good estimates of productivity effects
- 1% increase in local productivity assumed to increase local output by 4% and local employment by 3%, based on business tax elasticities
- Result: \$25,000 for CT, \$8,500 for MEP
- Survey estimates: \$14,000 for CT (Hollenbeck); \$17,000 for MEP (Ehlen)

Why Do CT, MEP, and Ezs Beat \$100,000?

- Creating local jobs is easier. Little national job creation.
- These programs reduce business costs more than a dollar per dollar of program costs

Job Creation Programs: Bring on the (Quasi) Experiments

- Experimental studies are a possibility if willing to randomize firms
- May be more acceptable to randomize outreach
- Distressed area targeting, which is justified on principle, allows regression discontinuity evaluation
- For Empowerment Zones, which select areas rather than businesses, follow Busso/Gregory/Kline in using unsuccessful applicants as comparison group

Summary

- We are likely to need better job creation programs for a long time, at both federal and state level
- Directly creating jobs with employers seems to have potential for being more cost-effective, because has less ambitious goals: just induce jobs, or just induce jobs at one location or for one group
- High multipliers or high productivity effects per dollar also help
- Randomization via marketing or quasi-experiments via targeting are promising evaluation approaches