W.E. UPJOHN INSTITUTE FOR EMPLOYMENT RESEARCH

Employment Research Newsletter

Volume 19 | Number 4 Article 1

10-1-2012

Employment Effects of the Washington High Technology Business and Occupation Tax Credit

Timothy J. Bartik
W.E. Upjohn Institute, bartik@upjohn.org

Kevin Hollenbeck
W.E. Upjohn Institute, hollenbeck@upjohn.org

Citation

Bartik, Timothy J. and Kevin M. Hollenbeck. 2012. "Employment Effects of the Washington High Technology Business and Occupation Tax Credit." Employment Research 19(4): [1]-4. https://doi.org/10.17848/1075-8445.19(4)-1

UPJOHN INSTITUTE Employment Research

OCTOBER 2012

Vol. 19, No. 4

Employment Research is published quarterly by the W.E. Upjohn Institute for Employment Research. Issues appear in January, April, July, and October.

The Institute is a nonprofit, independent research organization devoted to finding and promoting solutions to employment-related problems at the international, national, state, and local levels. The Institute is an activity of the W.E. Upjohn Unemployment Trustee Corporation, which was established in 1932 to administer a fund set aside by Dr. W.E. Upjohn, founder of the Upjohn Company, to conduct research on the causes and effects of unemployment and seek measures for the alleviation of the hardships suffered by the unemployed.

W.E. Upjohn Institute
for Employment Research
300 S. Westnedge Avenue
Kalamazoo, MI 49007-4686
(269) 343-5541
www.upjohn.org

Randall W. Eberts
President

Timothy J. Bartik and Kevin M. Hollenbeck

Employment Effects of the Washington High Technology Business and Occupation Tax Credit

This article summarizes findings from Upjohn Institute Working Paper No. 12-187. Visit www .upjohn.org *to read the paper.*

Washington State has a High Technology Business and Occupation Tax Credit that allows a credit against the state's gross receipts tax for firms that exceed a certain threshold of qualified research and development (R&D) spending. A major purpose of this credit is to stimulate employment growth. In spring 2012, the Joint Legislative Audit and Review Committee of the state legislature contracted with the Upjohn Institute to conduct a study that would estimate the extent to which the High Tech Tax Credit does, in fact, stimulate employment growth.

To address this question, we used tax return data from firms that claimed a tax credit on their business and occupation tax returns between 2004 and 2009. Companies that claim the credit must also file the state's Annual Tax Incentive Survey, and we used that survey data as well.

Self-Reported Employment Creation

One question on the Tax Incentive Survey asks firms to report "the amount of credit claimed for the calendar year," and another question asks "how many new employment positions did your firm create in Washington State during the calendar year?" Table 1 summarizes these survey data by year.

Interpreted naively, these data might seem to indicate that the credit is very cost-effective in creating jobs. If one assumes that all the employment created in these firms was due to the credit, then the credit cost per job created is low, averaging less than $2,000 annually per job-year (for example, the total credit cost over all years of about $123 million divided by about 74,000 jobs yields a cost per job-year of $1,662).

Models

Table 1 does not reveal, however, whether the tax credit created the reported employment. Does causality run from the credit to employment growth or from growth to more credits claimed? Firms that are expanding may choose to spend some of their additional revenue on R&D, thereby increasing credits claimed. Alternatively, the tax credit may incent firms to invest in R&D, which increases employment. Without further evidence, we cannot determine the direction of causation.

Unraveling the direction of causality is the key to estimating the effect of the tax

ISSN 1075–8445

Table 1 Self-Reported Employment Creation and Tax Credit, by Year

Year	Average employment created	Total employment created	Average credit ($)	Total credits taken ($, millions)
2004	5.39	3,223	39,611	23.687
2005	31.07	16,622	31,003	16.587
2006	27.49	13,937	34,229	17.354
2007	27.05	14,309	37,499	19.837
2008	33.17	16,885	43,599	22.192
2009	18.25	9,305	46,696	23.815
All years	23.30	74,281	38,730	123.472

SOURCE: Washington Tax Incentive Survey.

credit on employment. In this study we identified causation through instrumental variables, which cause shifts in R&D credits for the firms that are unrelated to the firm's own decisions.

Our model assumes that a firm's hiring decisions are based on its profits. Profits are negatively related to costs, so hiring is negatively related to a firm's costs. The high tech tax credit influences a firm's decision making by reducing the cost of R&D. We assume that the effect of the R&D subsidy on business location and expansion decisions is proportional to this subsidy's effects on business costs.

The outcomes that we have analyzed include employment and overall wages paid at the firm. We examined how changes in the credit subsidy affect the firm's growth in employment or wages, and we estimated our model using firms' average credit ratios and marginal credit ratios. The latter is the additional tax credit that would be earned by spending one additional dollar on R&D. For many firms, these two ratios are the same—equal to the credit subsidy rate for that industry and year. However, because the credit is nonrefundable, the marginal credit ratio drops to 0 if the amount of the credit for which the firm is eligible exceeds its tax liability, or if the firm's computed tax credit exceeds $2 million.

Hypotheses

We structure our empirical model around how the R&D credit lowers a business's costs. The research literature on state and local business taxes suggests that the long-run effects of a 10 percent increase in all state and local business taxes is to reduce a location's business activity by between 1 and 6 percent (Bartik 1991). Because state and local business taxes have usually averaged around 5 percent of business costs in the United States, this implies that a one-half of a 1 percent increase in business costs (a 10 percent increase in business taxes when business taxes are 5 percent of overall costs) will reduce business activity by between 1 and 6 percent, and therefore a 1 percent increase in business costs will reduce business activity by between 2 and 12 percent. Our model is structured so that the R&D credit variable is scaled by its effects on business costs, so we would expect the credit variable to have a coefficient of between −2 and −12. Scaling the credit by effects on business costs means that the credit price is scaled by the firm's R&D spending as a share of total costs, which is what economists call R&D's "factor share."

We tried three different instrumental variables for the R&D factor share: 1) the average R&D factor share in Washington in an industry where the average was calculated by omitting the firm; 2) the national R&D factor share for the industry using data from the National Science Foundation; and 3) the firm's projected factor share in a year, in which the projection was accomplished by applying the national rate of R&D expenditure growth in the industry (from the National Science Foundation [NSF] data) to the firm's factor share in the first year of data.[1] All of these instrumental variables are designed to predict a firm's R&D spending and credit but be independent of the firm's own changing decisions. The third instrument has the most variability because it incorporates the most firm-specific information, which should increase prediction in estimation.

In theory, average credit rates would be germane to a major location decision. If decision makers at a firm are trying to decide whether to locate in Washington, then they might compare the net tax rates from several jurisdictions as part of their decision-making process, and in Washington that would include the average credit rate. However, if they are making decisions at the margin, such as expanding R&D or employment, then they are going to respond to the marginal tax and credit rates.

Table 2 shows the estimation results for models in which employment growth and earnings growth are explained by changes in R&D costs, using the marginal credit ratio, for the three sets of instrumental variables. Our preferred specification is using the instrumental variable that is presented in the third column, that is, using a baseline R&D factor share and inflating it annually at the rate of growth of R&D in the industry, as these estimates are the most precise.

To estimate the job growth that resulted from the tax credit, we used the firms' data and the parameters from our preferred estimated model with the actual marginal credit ratio and with a marginal credit rate of 0 to predict employment growth with and without the credit.[2] We did a similar calculation for total wages at the firm. Table 3 presents these results.

As seen in the table, the number of jobs created by the tax credit annually ranged between about 380 and about 510, which represented a growth in jobs at these firms of between 0.53 and 0.62 percent. The amount of earnings generated in the state from these jobs ranges from about $14.2 million to $23.0 million. The levels of earnings represented a growth in earnings of between 0.20 and 0.25 percent.[3] We calculate the average cost per job created by dividing the entries in the last column of Table 3 by the jobs created in the second column. These averages range from $40,409 (2006) to $50,291 (2009).

The job creation numbers reported in Table 3 are job-years created—they should not be interpreted as additional

Table 2 Effects of Changes in R&D Credit Subsidies on an Individual Firm's Growth

Dependent variable/model	Instrumental variable: Industry average (without firm)	National R&D factor share growth rate	Baseline factor share growing at national rate
Employment/growth	−10.44	−2.02	−4.94***
	(8.06)	(6.32)	(1.92)
Earnings/growth	−13.14	−2.64	−2.90
	(10.68)	(8.21)	(2.42)

NOTE: Entries are estimated effects of a credit subsidy on firm growth, scaled so that it shows the percentage effects on firm growth of an increase in the credit subsidy received of 1 percent of the firm's overall business costs. Robust standard errors are presented in parentheses.
***statistically significant at the 0.01 level.

permanent jobs created each year. Our model estimates that a change in the tax credit causes a once-and-for-all permanent change in the number of jobs in the state. Therefore, the job-years listed in the second column should not be summed to get a cumulative total of jobs created. In other words, our model estimates that if policymakers had eliminated the tax credit in 2009, the level of jobs in these firms would have been permanently lower by 484 jobs.

Furthermore, only about 40 percent of the employment creation in this study occurred in industries that would be expected to be "export-based" industries, that is, to primarily sell goods and services outside the state of Washington. For non-export-based firms, any expansion of the firms receiving the tax credit would likely reduce sales of other firms in that same industry in Washington, as they are competing for the same Washington customers, with little net effects on state employment. If there is a multiplier of 2.0 for the export-based firms, and 0.0 for the non-export-based firms, the net employment creation would be approximately 80 percent as large as the numbers in Table 3.

Conclusion

Our analyses of tax credit data suggest that the Washington high tech R&D tax credit does increase employment to a very modest extent. The analyses suggest that, because of the tax credit, employment grew by between 0.5 and 0.6 percent at the firms that claimed credits. Our preferred specification suggests that firms respond to the marginal credit rate, which we should note is zero for slightly less than one-quarter of the sample.

The cost per job created implied by these estimates is relatively high. The range in the above estimates is from just over $40,000 to just over $50,000 per job created. Although the jobs created may pay more than those figures, not all earnings generated are a pure benefit. We know from previous studies that only a portion of newly created jobs actually result in increased local employment rates and earnings per capita. Up to four-fifths of all new jobs in a state will end up being reflected in higher population rather than higher state employment rates. That is, a 1 percent increase in a state's employment is estimated to lead after 5 or more years to a 0.8 percent increase in state population, with a resulting increase of 0.2 percent in the state's employment to population ratio (Bartik 1991, 1993). Some of the new jobs will also help state residents advance to better-paying jobs than would have occurred otherwise, as the new jobs make it easier for them to be hired in better-paying occupations. Estimates suggest that a 1 percent increase in a state's employment leads to a 0.2 percent increase in earnings per capita due to state residents moving up to better-paying occupations (Bartik 1991).

Combining these two effects, a 1 percent increase in jobs, which would directly increase state earnings by 1 percent if the jobs pay similarly to the average state job, will actually lead to a somewhat lower 0.4 percent increase in state earnings per capita: 0.2 percent due to higher state employment rates, and 0.2 percent due to state residents moving up to better-paying occupations. The boost in state earnings of 0.4 percent is 40 percent of the 1 percent extra earnings directly associated with the new jobs. Therefore, in evaluating the benefits for state residents from new jobs, only about 40 percent of the earnings from the new jobs lead to higher earnings per capita for state residents.

Why is the cost per job created in this study relatively high? Four reasons seem most important. First, this study finds that, consistent with the research literature, state and local business activity is only modestly responsive to lower costs. Second, for the firms receiving this particular tax credit, the ratio of earnings and output to employment is relatively high, which implies that a given dollar tax credit has more modest percentage

Table 3 Estimated Employment and Earnings Creation, by Year

Year	Employment	Earnings ($, millions)	Total credit taken ($, millions)
2005	378	14.244	18.541
	(84, 672)	(−9.528, 38.016)	
2006	430	18.988	17.376
	(96, 764)	(−12.702, 50.678)	
2007	469	21.114	19.487
	(117, 833)	(−14.125, 56.353)	
2008	511	23.019	22.672
	(114, 907)	(−15.399, 61.437)	
2009	484	20.728	24.341
	(108, 860)	(−13.866, 55.322)	

NOTE: Table entries in the second and third columns are estimated jobs and earnings created as a result of the R&D tax credit. The entries in parentheses are the lower and upper bounds of a 95 percent confidence interval. The "credit taken" data are derived from tax return data, and hence differ slightly from the survey data reported in Table 1.

effects in lowering overall business costs. Third, a significant proportion of the tax credits are capped, which means that on the margin these tax credits do not lower the costs of expanding Washington employment. Fourth, a significant proportion of the tax credits are awarded to non-export-based firms, which will have lower effects on overall Washington employment.

These explanations point to ways to lower the cost per job created from this policy. In particular, targeting export-based firms with high multiplier effects, and making sure that incentives affect marginal costs to firms that are expanding, will help reduce the cost per job created. Higher multiplier effects will be more likely if firms have stronger local supplier links. Finally, if the goal is job creation, directly tying the magnitude of the incentive to job creation provides a greater reason for firms to respond to the incentive with job creation.

Notes

1. Dr. Raymond Wolfe of the NSF graciously assisted us in navigating the NSF data, and released the 2008 and 2009 data slightly early.

2. Note that many firms' marginal credit ratio is 0, so that no simulated job creation occurs at these firms.

3. The fact that wages increased less than employment suggests that the credit had a negative impact on wages per employee. This finding is not surprising because one would assume that new hires make, on average, less than incumbent workers. In addition, lower-wage firms may have higher percentage effects of the tax credit on costs.

References

Bartik, Timothy J. 1991. *Who Benefits from State and Local Economic Development Policies?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

———. 1993. "Who Benefits from Local Job Growth—Migrants or the Original Residents." *Regional Studies* 27(4): 297–311.

Timothy J. Bartik is senior economist and Kevin M. Hollenbeck is vice president and senior economist at the Upjohn Institute.

Françoise Carré and Chris Tilly

Part-Time and Short Hours in Retail in the United States, Canada, and Mexico

How Institutions Matter

In sectors where full-time schedules do not dominate, total hours matter greatly for job quality. We explore hour levels and trends in retail trade, which is known for part-time work. We compare the United States, Canada, and Mexico, taking advantage of the fact that work hours regulations vary cross-nationally. By comparing retail hour levels and trends, we contribute insights into policy and regulatory impacts on job quality. Our analysis draws mainly on publicly available data from national statistical offices in the three countries; from 419 field interviews with retail executives, managers, and workers in the United States and Mexico; and from secondary sources.

U.S. retail relies heavily on part-time workers, who increasingly are guaranteed very few weekly hours, but are expected to "flex up" to 40 hours on demand.

Retail Hours—Cause for Policy Concern

The issue of insufficient hours is ubiquitous in U.S. retail. Schedules are driven by retailers' extension of opening hours, and by wide swings in shopping flows throughout the day and week, as well as seasonally. Retail in the United States relies heavily on part-time workers, who increasingly are guaranteed very few weekly hours, but are expected to "flex up" to 40 hours on demand. Moreover, today even the full-time-hours guarantee falls below 40 hours, and often below 35.

These patterns have significant implications for the workforce. Lower standard hours reduce the base level of weekly earnings that workers—full- and part-time—can rely upon. Additionally, retailers' scheduling practices generate variability and unpredictability in individuals' total hours and in the distribution of these hours. Part-timers receive few or no benefits and usually a lower hourly wage than full-time workers. For these reasons, retail work hours and the firm strategies and institutional factors that drive them warrant attention.

In each of the countries we examined, long and expanding hours of operation create two managerial goals: 1) control labor costs with lean staffing, and 2) closely match staffing levels to customer flow. However, in the United States and Canada, these twin goals lead retailers to shorten employee work hours and expand part-time jobs, whereas in Mexico they lead retailers to lengthen hours.

The three countries provide a useful comparison. They are neighbors and share many of the same retail chains—Wal-Mart is the largest retailer in both the United States and Mexico and is one of the top retailers in Canada as well. Yet the labor market and social protection institutions of the three countries are quite distinct, with important implications for hours of work.

Contrasting Hours in Canada, the United States, and Mexico

We find differing levels and trends in retail hours across the three countries in recent decades. Table 1 provides average weekly hours levels; data are broadly comparable multiyear averages (see