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The Impact of Changing Federal Procurement Outlays on Selected Sub-Sectors in the Washington Region's Economy

Research Paper 2

Research and Development in the Social Sciences and Humanities

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Research Paper 2: Research and Development in the Social Sciences and Humanities

Recent declines in federal procurement spending have highlighted the drawbacks to an economy too reliant on a single market. As federal procurement spending slowed in the Washington region, local economic growth ground to a halt.¹ However, some sub-sectors continued to grow as not all sub-sectors of the Washington region's economy are equally dependent on federal procurement spending. This paper is the second in a series that examines the dependence of local sub-sectors on federal procurement spending in the Washington region.

To analyze federal dependence, employment by economic sub-sector was graphically compared with federal procurement spending in the Washington region. This paper analyzes the "research and development (R&D) in the social sciences and humanities" sub-sector using two simple methods. The first method estimates the direct jobs impact of federal procurement spending. The second method directly compares federal procurement spending with total wages paid in the sub-sector.

Federal Dependence of the "R&D in the Social Sciences and Humanities" Sub-Sector

The "R&D in the social sciences and humanities" sub-sector was analyzed for two reasons. First, the sub-sector is large and economically important to the Washington region. In 2016, annual average employment in the Washington region was 14,550. The average annual wage in this sub-sector was \$93,898 in 2016, totaling \$1.37 billion in wages paid. Second, following a period of little change in either employment or federal procurement spending, the sub-sector made substantial employment gains even as federal procurement spending remained flat. Several contractors awarded federal contracts in 2016 in this sub-sector include: Mathematica Policy Research, Westat, and The MITRE Corporation.

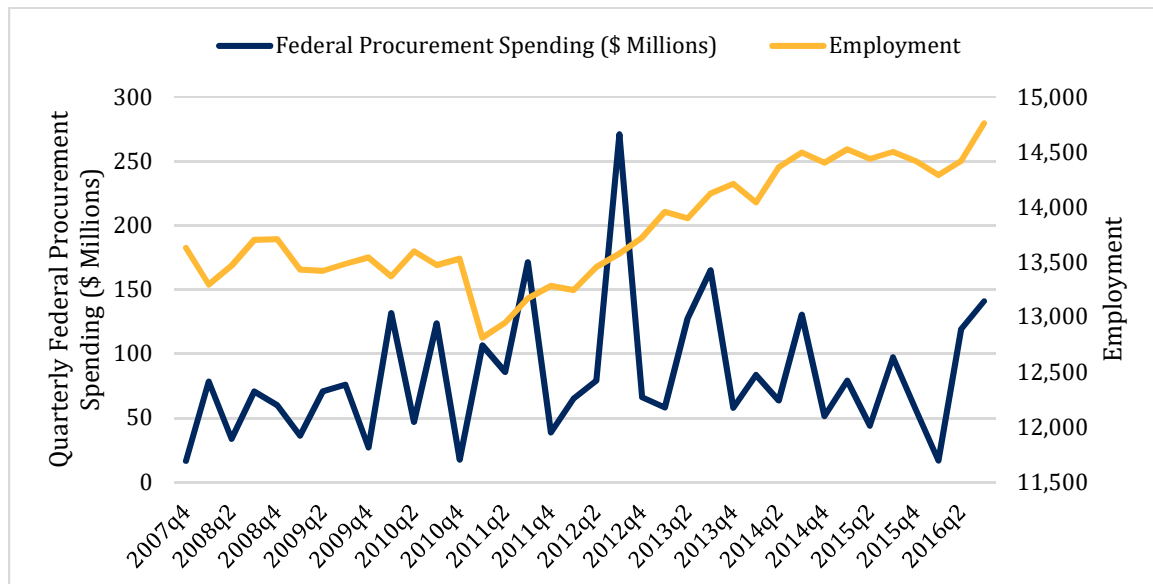
Employment and Federal Procurement

Overall, regional employment and federal procurement spending in the "research and development in the social sciences and humanities" sub-sector diverged starting in the first quarter of 2011 (Figure 1). From the fourth quarter of 2007 through the fourth quarter of 2010, quarterly employment averaged 13,512. Following a low of 12,814 jobs in the first quarter of 2011, employment in the sub-sector increased 15.2 percent to 14,762 jobs in the third quarter of 2016. In contrast, federal procurement spending in this sub-sector remained relatively stable ranging from \$50 to \$125 million per quarter for the study period, apart from procurement spending in excess of \$150 million in the third quarters of 2011, 2012 and 2013.²

¹ Fuller, S., Chapman, J. (2015). What Are the Economic Consequences of a Reduction in Federal Spending? *The Stephen S. Fuller Institute*. Arlington, VA.

² Data are aggregated by the date the federal contract was signed.

Figure 1. Research and Development in the Social Sciences and Humanities



Sources: usaspending.gov; Bureau of Labor Statistics, Quarterly Census of Earning and Wages; The Stephen S. Fuller Institute at the Schar School, GMU

For robust statistical analysis, a first-difference regression model is used. The model analyzes the correlation between changes in federal procurement spending and changes in employment in the sub-sector. As in the first paper in this series, correlation coefficients suggest that the direct job impact is one quarter after the contract is signed. In contrast with analysis for the “other management consulting services” sub-sector, the seasonal dummy variable was not significant and was removed from the model.

The coefficient obtained from the regression suggests that a \$1 million increase in federal procurement from local contractors in the “research and development in the social sciences and humanities” sub-sector is correlated with an increase of 0.904 direct jobs in the sub-sector the following quarter.³ While this result is suggestive, it lacks statistical significance. A model with simple standard errors provides a statistically significant coefficient, but robust standard errors place the level of significance just above the generally accepted 10 percent level. Additionally, the portion of variation explained by the model is low, at just 12.7 percent. Such results should perhaps be expected given the simplicity of the model and the substantial divergence of the trends beginning in early 2011.

³ Durbin-Watson, Alternative Durbin, Breusch-Pagan and lagged errors all indicate no serial correlation. Limitations include the small sample size and omitted variables

Table 1. First-Difference Regression of Employment on Federal Procurement Spending – Research and Development in the Social Sciences and Humanities

	Coefficient	Robust Std. Error	P- Value
First-Difference Federal Procurement Spending (1-Quarter Lag)	0.904	0.569	0.122
Constant	40.44	33.84	0.241
$R^2 = 0.127$, $F = 2.52$, $n = 34$			

Sources: The Stephen S. Fuller Institute at the Schar School, GMU

Estimated employment in the "research and development in the social sciences and humanities" sub-sector is provided using the obtained coefficient even though the coefficient was found to be statistically significant (Table 2). This will permit comparison with the other two sub-sectors analyzed in this series. Federal procurement data are aggregated annually and the coefficient is applied to estimate the number of direct jobs supported. The estimated number of jobs supported by federal procurement spending in the Washington region increased from a low of 189 in 2009 to 435 in 2012 before declining to 250 in 2015. These estimates place the share of total jobs in the sub-sector supported by the federal procurement spending between 1.4 percent and 3.2 percent during the study period.

Table 2. Employment Impacts of Federal Procurement Spending - Research and Development in the Social Sciences and Humanities

Year	Annual Federal Procurement Spending (\$ Millions)	Average Total Employment	Estimated Jobs Supported by Federal Procurement Spending	Estimated Share of Jobs Supported by Federal Procurement Spending
2008	242.6	13,543	219	1.6%
2009	209.5	13,470	189	1.4%
2010	319.9	13,494	289	2.1%
2011	402.5	13,055	364	2.8%
2012	481.3	13,501	435	3.2%
2013	408.4	14,048	369	2.6%
2014	329.0	14,327	297	2.1%
2015	276.9	14,472	250	1.7%

Sources: usaspending.gov; Bureau of Labor Statistics, Quarterly Census of Earning and Wages; The Stephen S. Fuller Institute at the Schar School, GMU

Wages and Federal Procurement

A second method for estimating federal dependence is to assume federal procurement spending directly supports wages in the sub-sector. During the study period, federal procurement spending in the “research and development in the social sciences and humanities” sub-sector increased from a low of \$209.5 million in 2009 to a peak of \$481.3 million in 2012. Following the 2012 peak, federal procurement spending in the sub-sector decreased to \$276.9 million in 2015, a 42.5 percent decline. In contrast, total annual wages increased annually from \$1.07 billion in 2008 to \$1.34 billion in 2015, a 25.1 percent increase.

Federal procurement spending as a share of annual wages in the “research and development in the social sciences and humanities” sub-sector followed the trend of federal procurement spending, increasing in the first half of the study period and declining in the second half. Federal procurement spending in the region as a share of total wages in the sub-sector increased from a low of 19.3 percent in 2009 to 39.6 percent in 2012. This was the result of federal procurement spending increasing faster than total annual wages. From 2012 to 2015, federal procurement spending in the region declined annually even as total wages paid continued to increase. As a result of these divergent trends, federal procurement spending as a share of total wages paid declined 18.9 percentage points from 39.6 percent in 2012 to 20.7 percent in 2015.

Table 3. Federal Procurement Spending as a Share of Wages Paid - Research and Development in the Social Sciences and Humanities

Year	Annual Federal Procurement Spending (\$ Millions)	Total Annual Wages (\$ Millions)	Federal Procurement Spending as a Share of Total Wages
2008	242.6	1,070.9	22.7%
2009	209.5	1,085.7	19.3%
2010	319.9	1,124.4	28.5%
2011	402.5	1,124.6	35.8%
2012	481.3	1,215.2	39.6%
2013	408.4	1,253.4	32.6%
2014	329.0	1,295.9	25.4%
2015	276.9	1,340.2	20.7%

Sources: usaspending.gov; Bureau of Labor Statistics, Quarterly Census of Earning and Wages; The Stephen S. Fuller Institute at the Schar School, GMU

Conclusion

While federal procurement of private sector contractors in the Washington region has been the primary generator of economic growth for several decades, not all sub-sectors of the regional economy are equally dependent on federal procurement spending. This analysis applied two methods of estimating federal dependence to the “research and development in the social sciences and humanities” sub-sector in the Washington region.

The first method estimated the impact of a \$1 million increase in federal spending to be 0.9 direct jobs, however, the statistical significance is marginal and therefore results are only suggestive. This estimate does not capture indirect and induced jobs created from federal procurement spending. Applying the impact to annual federal procurement spending implies that federal procurement spending supported between 1.4 percent and 3.2 percent of employment in the sub-sector from 2008 to 2015.

The second method directly compares federal procurement spending to total annual wages paid. Federal procurement spending as a share of total annual wages paid in the sub-sector increased from 19.3 percent in 2009 to 39.6 percent in 2012 before declining annually through 2015 to 20.7 percent. While the two estimates provide a wide range of how dependent the sub-sector is on federal procurement spending, they confirm a similar outcome: federal support of the sub-sector in the region increased from 2009 through 2012 before declining through 2015.

The difference in estimated dependence provided by the two methods was also found in the first paper in this series, wages as a share of federal procurement spending was substantially higher than the estimated share of jobs supported by federal procurement spending. There are several plausible reasons for the difference. First, not all federal procurement spending goes directly towards wages, a share is needed for the overhead costs of the local private sector contractors. Second, wages are not equally distributed among employees of federal contractors, perhaps resulting in fewer new, lower paying, jobs. Finally, local contractors may be reluctant to hire based on federal contracts if they are uncertain about the future prospects of continued revenue needed to support additional workers.

About These Data

Employment and Wage Data from Quarterly Census of Earnings and Wages provided by the Bureau of Labor Statistics and retrieved on 9/21/2017. Federal procurement data are from usaspending.gov and were retrieved on 05/25/2017. Procurement spending was aggregated by place of performance by the date the contract was signed.