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SAME WORKER, HIGHER WAGE:
A STUDY OF WORKERS WHO SWITCH
FROM PRIVATE TO FEDERAL EMPLOYMENT

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Abstract: *Numerous studies, including two separate analyses by The Heritage Foundation, have concluded that federal workers receive a substantial wage premium. Most of these studies have used the cross-sectional human capital method, which compares federal workers to private workers who have the same skills. The cross-sectional method is not perfect, however, and supplemental analyses can be useful in confirming its results. Rather than comparing workers at a single point in time, this report follows individual workers as they switch between the federal and private sectors. It finds that workers who change jobs receive a substantially larger raise when they switch into federal employment rather than into another private job. This result corroborates the findings of the cross-sectional studies, providing further evidence that federal workers enjoy a wage premium.*

Federal pay was a hot-button issue during the 2010 campaign season, leading to some overheated rhetoric. Politicians[1] and journalists[2] exaggerated the federal–private pay disparity by comparing raw salary figures without accounting for the above-average skills of federal workers. On the other side, defenders of federal pay, particularly public-sector unions, unreasonably claimed that federal workers are *underpaid* and described evidence to the contrary as "lies" and "scapegoating."[3]

Lost in this back-and-forth was the actual academic literature on federal pay, which economists have been building for over three decades. The 1999 *Handbook of Labor Economics* provides a good overview of the relevant studies, which have usually found a federal wage premium of 10 percent to

1. For comments from Senator Rand Paul (R–KY), see Sherisse Pham, "Sen.-Elect Rand Paul, Incoming Republicans Target Federal Employees," ABC News, November 11, 2010, at *http://abcnews.go.com/Politics/rand-paul-incoming-republican-senator-reduce-federal-employees/story?id=12113349&nwltr=politics_featureMore* (January 19, 2011).

2. Dennis Cauchon, "Federal Pay Ahead of Private Industry," *USA Today*, March 8, 2010, at *http://www.usatoday.com/news/nation/2010-03-04-federal-pay_N.htm* (January 19, 2011).

3. For comments from union leaders, see Joe Davidson, "Dissatisfaction in Federal Employee Pay Sign of Disconnect," *The Washington Post*, October 18, 2010, at *http://www.washingtonpost.com/wp-dyn/content/article/2010/10/18/AR2010101805719.html* (January 19, 2011).

4. Robert G. Gregory and Jeff Borland, "Recent Developments in Public Sector Labor Markets," in Orley Ashenfelter and David Card, eds., *Handbook of Labor Economics*, Vol. 3 (New York: Elsevier, 1999), pp. 3573–3630. This is the most recent version of the handbook that addresses public-sector pay.

20 percent.[4] The Heritage Foundation updated that literature in 2010 with two separate analyses that reaffirmed the prior findings.[5]

PAY COMPARISON METHODS

The vast majority of studies, including both Heritage Foundation analyses, used the cross-sectional human capital method. The method's basic assumption is that workers will be paid based on their personal characteristics, meaning that federal and private employees with the same age, education, experience, race, gender, marital status, and region of residence, among other factors, should receive the same wages. If federal workers are still paid more than private workers after controlling for all of these variables, then federal workers enjoy a wage premium—that is, they are overpaid by private-sector standards.

Cross-sectional human capital analysis is the most widely used method for comparing the wages of public and private employees. One reason for its popularity is the existence of large representative datasets, such as the Current Population Survey (CPS). Conducted monthly by the Census Bureau, the CPS includes a rich set of control variables that measure human capital. The best-specified models account for 40 percent to 50 percent of the variation in wages observed at any one time in the CPS. Analysts use these detailed wage models to separate the effect of federal employment from the other observable variables.

However, this method has limitations. Unobserved differences among workers could account for some of the wage premium attributed to federal employment. Raw abilities such as intelligence and creativity are difficult to measure, and the existing data cannot adequately capture motivation, cooperativeness, leadership, business savvy, extroversion, and other personality traits. Even measurements of the observed variables lack precision. For example, whether a person has a college diploma is known, but whether it came from the Ivy League or a community college is not.

Theoretically, federal workers could appear overpaid in human capital studies only because their (allegedly) greater motivation, more prestigious diplomas, or superior miscellaneous skills are not taken into account. Little *a priori* evidence supports this hypothesis, but the cross-sectional human capital method cannot falsify it. Testing the hypothesis requires a different approach.

Fixed Effects Method. The standard human capital method examines a cross-section of the workforce at a single point in time. However, controlling for unobserved characteristics requires longitudinal analysis, which follows the same workers over time as they switch between the federal and private sectors. Comparing the same person's pay when he works in the private sector with his pay as a federal employee naturally controls for all of that person's abilities, skills, traits, and preferences, as long as those characteristics do not change over time.

When a person switches jobs, he may do so because he received new training or moved to a new location, but his underlying personality traits likely remain the same. A fixed effects analysis thus controls both for changes over time in observed characteristics, such as education, and for all time-invariant personal characteristics, such as intelligence.

Writing out the model as natural-language equations helps to illustrate how it works. The following equation would apply to each worker:

$$\text{wage} = \text{observed characteristics} + \text{unobserved characteristics} + \text{random error}$$

As discussed above, the observed characteristics are anything that has been measured, while the unobserved characteristics cannot be directly measured. The cross-sectional approach effectively discards unobserved characteristics as irrelevant to the analysis, lumping them with random error:

$$\text{cross-sectional human capital analysis: wage} = \text{observed characteristics} + \text{random error}$$

A fixed effects analysis controls for those unobserved characteristics by using the same worker over time.

$$\text{Time}_1: \text{wage}_1 = \text{observed}_1 + \text{unobserved} + \text{random error}_1$$

$$\text{Time}_2: \text{wage}_2 = \text{observed}_2 + \text{unobserved} + \text{random error}_2$$

5. James Sherk and Jason Richwine, "Federal Pay Still Inflated After Accounting for Skills," Heritage Foundation *WebMemo* No. 3012, September 14, 2010, at *http://www.heritage.org/research/reports/2010/09/federal-pay-still-inflated-after-accounting-for-skills*.

In these equations, $Time_1$ and $Time_2$ represent the worker's wage at different points in time. The observed variables have subscripts, indicating that they can vary over time, but the unobserved variable has no subscript because the fixed effects model assumes that unobserved characteristics are constant. This assumption is critical to the next step: subtracting the first equation from the second equation.

$$Time_2 - Time_1 =$$
$$wage_2 - wage_1 = observed_2 - observed_1 +$$
$$unobserved - unobserved + error_2 - error_1$$

$$change\ in\ wage =$$
$$change\ in\ observed + change\ in\ error$$

Subtracting the two equations cancels out the unobserved characteristics. In other words, because the model follows the same person's wages over time, unobserved characteristics no longer affect the results. The change in wages for workers can then be regressed on any changes in their observed traits, while naturally accounting for the unobserved characteristics.

Fixed effects analysis reveals how much more money the average person earns when he works for the federal government compared to when he works in the private sector. By following the same people over time, the analysis controls not only for observable traits, such as education and experience, but also for unobservable characteristics, such as intelligence and motivation.

Past Fixed Effects Work. In 1988, economist Alan Krueger conducted one of the first fixed effects analyses of federal pay, but the weakness of his dataset limited the conclusions that he could draw.[6] Krueger used the longitudinal component of the CPS, which conducts one-year follow-up reports on households.

Although innovative, Krueger's approach suffered from two potential problems. First, the CPS follows households, not people, meaning workers who moved between surveys could not be included in the analysis. Second, the actual number of job switchers observed was low: Only 52 workers moved between the federal and private sectors in Krueger's data. Although he found a federal premium in the range of 5 percent (for federal to private switchers) to 12 percent (private to federal switchers), neither figure was statistically significant.

Krueger also used the Displaced Worker Survey, a supplemental CPS dataset, to track private-sector workers who had been involuntarily discharged. He found a statistically significant 11 percent premium for private workers who switched to federal jobs. However, his sample size was still low, with just 59 private-to-federal switchers.

A 2004 paper by Sang-Hyop Lee used the National Longitudinal Survey of Youth (NLSY), a dataset still in its infancy when Krueger was writing.[7] The NLSY follows individual workers, not merely households, over time and yielded 347 switchers between the federal and private sectors. Using fixed effects, Lee found federal premiums of 6 percent for men and 7 percent for women. However, the NLSY consisted entirely of people in their early 20s to mid-30s during the time period that Lee analyzed, calling into question the representativeness of the sample. He also did not differentiate between workers who switched to federal jobs and those who left federal jobs.

DATA AND METHODS

This report improves upon the existing literature by using the most recent and representative dataset available for fixed effects analysis of federal wages. It combines the 2004 and 2008 panels of the Survey of Income and Program Participation (SIPP), a longitudinal series of monthly data on tens of thousands of Americans over several years. The 2004 panel lasted three years, and the 2008 panel, which is ongoing, has released data for a 20-month period.[8]

After the panels were merged, observations were kept only if they represent working-age, full-time civilian workers with exactly one job and

6. Alan B. Krueger, "Are Public Sector Workers Paid More Than Their Alternative Wage? Evidence from Longitudinal Data and Job Queues," National Bureau of Economic Research *Working Paper* No. 2500, January 1988.

7. Sang-Hyop Lee, "A Reexamination of Public-Sector Wage Differentials in the United States: Evidence from the NLSY with Geocode," *Industrial Relations*, Vol. 43, No. 2 (April 2004), pp. 448–472.

8. Because the 2004 panel has 12 waves and the 2008 panel has only five, the regression balances the data by multiplying the 2008 panel data by 12/5. The regression results without this adjustment are not significantly different.

non-imputed earnings.[9] Because the fixed effects model requires observations at multiple points in time, individuals with only one observation were also dropped.

Following the fixed effects model described above, regression analysis was used to estimate how switching to the federal workforce affects the average person's salary. However, one would expect that any kind of job change—whether from federal employment or within the private sector—will often lead to higher wages. The best regression would compare two types of people: private-sector workers who find another private-sector job versus private-sector workers who switch to a government job. If the wages of workers switching to federal jobs increase more than those moving to other jobs in the private sector, then the difference is strong evidence for a federal premium.

Therefore, the regression is limited to observations of the first and second jobs held by the 18,875 valid SIPP respondents who changed jobs at least once during the surveys. Some of these job changers switched from private employment to federal employment, while others stayed in the private sector.

The log of monthly earnings, adjusted for inflation using monthly CPI data, is the dependent variable[10] in a fixed effects regression that controls for age, age squared, years of education, marital status, metropolitan area status, four regional dummies, and 10 occupational dummies. As discussed above, the control variables reflecting workers' time-invariant characteristics (e.g., race, sex, nativity, and preference for a large or small firm) are automatically included in a fixed effects model.

The independent variables of interest are binary indicators of each respondent's sector movement from his first job to his second job: P-F for private to federal, F-P for federal to private, P-P for private to private, and so forth. (See Table 1.) Each job-sector indicator is coded zero for the first job's observations, but becomes one during the second job's observations if the respondent has followed that indicator's sectoral path. For example, every indicator for a respondent who worked in the private sector for his first job and then switched to the federal government for his second job, including the P-F indicator, would be zero for his first job's observations, but then P-F (and only P-F) would become one during the second job's observations.[11]

RESULTS

Results of the regression are displayed in Table 1. Each row shows the wage change experienced by the average SIPP respondent for each particular sectoral path. The first row shows that the P-P (private sector to private sector) wage change was just 1.0 percent. On the other hand, P-F (private to federal) switchers received an 8.9 percent raise. In contrast, F-P (federal to private) switchers absorbed a 5.7 percent decrease in their wages.

The difference in wage change between a private worker who switches to a federal job and a private worker who switches to another private-sector job is:

$$P\text{-}F - P\text{-}P = 8.9\% - 1.0\% = 7.9\%$$

Table 1 also shows the results for workers who switch between the private and state and local sectors. Unlike switchers into and out of the federal government, these workers see only small changes in their wages.[12] It appears that switching from state and local government to the federal sector leads to a large wage gain, but the sample size for that sectoral path is too low to be conclusive.

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9. People simultaneously working two jobs were dropped because their second job could be confused with a switch into a new job. Imputed earnings were dropped because they downward bias the impact of government employment.

10. An alternative specification using a calculated hourly wage in place of monthly earnings gave similar results.

11. This approach to measuring the federal premium by the direction of sectoral switching is inspired by a classic paper on the wage effects of union membership: Richard B. Freeman, "Longitudinal Analyses of the Effects of Trade Unions," *Journal of Labor Economics*, Vol. 2, No. 1 (January 1984), pp. 1–26.

12. Cross-sectional analysis typically shows state and local workers receiving a wage penalty and a benefits premium. The small positive wage changes in the fixed effects analysis could imply that the cross-sectional penalty is overstated for state and local workers. However, fixed effects tends to push regression coefficients toward zero, so the interpretation is unclear. For further information on this point, see the discussion section. For an in-depth analysis of state and local pay, see Jason Richwine and Andrew Biggs, "Are California Workers Overpaid?" Heritage Foundation *Center for Data Analysis Report* No. 11–01, March 17, 2011, at *http://www.heritage.org/research/reports/2011/03/are-california-public-employees-overpaid*.

Change in Wages After Job Switch, by Sector

| Label | JOB CHANGE | | Wage Change | Significance Level | Sample Size |
	First Job Sector ⟶	Second Job Sector			
P-P	Private	Private	1.0%	99%	15,653
P-F	Private	Federal	8.9%	99%	146
F-P	Federal	Private	–5.7%	99%	141
F-F	Federal	Federal	10.6%	99%	271
P-SL	Private	State/Local	0.9%	90%	647
SL-P	State/Local	Private	2.2%	99%	597
SL-SL	State/Local	State/Local	3.7%	99%	1,343
SL-F	State/Local	Federal	15.0%	99%	37
F-SL	Federal	State/Local	–4.1%	95%	40

Notes: Figures shown are for full-time civilian workers only. Wage changes are adjusted for changes in age, education, marital status, region, residence in a metropolitan area, and broad occupation (10 categories), using fixed effects regression analysis. See text for details.

Source: Author's calculations based on data from 2004 and 2008 panels of the Survey of Income and Program Participation.

Table 1 • CDA 11-02 ☎ heritage.org

DISCUSSION

Results of the fixed effects analysis corroborate the findings from cross-sectional studies. Even after controlling for unobservable skills, traits, and preferences, federal workers still enjoy a wage premium over private workers. More specifically, workers who switch from private firms to the federal government receive larger pay raises than workers who switch jobs within the private sector.

Limitations. Although fixed effects regression reveals a federal wage premium of 8 percent, the magnitude is lower than the typical cross-sectional finding of 10 percent to 20 percent. One interpretation of this result is that cross-sectional analyses overestimate the wage premium by omitting key unobserved control variables. If this reasoning is correct, the fixed effects analysis has revealed a smaller true federal premium. However, fixed effects has its own limitations that could downward bias the premium estimates.

Job Selectivity. Ideally for a study like this, all job switches would be involuntary, meaning not based on expectations of higher wages elsewhere.

The presence of voluntary job switchers means that the federal premium, assuming it exists, will be observed to be lower than the true value.[13]

Tenure. The federal government tends to reward experience more than the private sector.[14] Consequently, the initial federal premium will likely become larger as federal workers gain seniority. Since the SIPP follows the same workers for three years at the most, it could miss these additional wage gains, which the cross-sectional method captures.

Measurement Error. The federal wage premium will seem smaller than it really is if some private workers incorrectly claim federal status or vice versa. Longitudinal analyses typically suffer from greater measurement error than cross-sectional analyses because each new survey risks contaminating a given individual's data. To the extent that this happens, fixed effects will underestimate the wage premium.

Summary. Fixed effects analysis reveals that workers who switch between the federal and private sectors tend to earn more when employed by the government. The premium estimated here is lower than the typical cross-sectional studies, which suggests that failing to control for unobserved variables causes an upward bias in the cross-sectional premium estimates. However, the fixed effects analysis could downward bias the federal premium in several ways. Fixed effects analysis likely gives a lower bound to the premium estimate, supporting cross-sectional findings.

CONCLUSION

Congress has become increasingly concerned that federal workers earn wages and benefits that are above market levels, creating a need for rigorous public–private pay comparisons. The most common analysis compares the wages of federal and private workers with the same observable char-

13. Freeman, "Longitudinal Analyses of the Effects of Trade Unions."

14. James Sherk, "Inflated Federal Pay: How Americans Are Overtaxed to Overpay the Civil Service," Heritage Foundation *Center for Data Analysis Report* No. 10–05, July 7, 2010, at *http://www.heritage.org/Research/Reports/2010/07/Inflated-Federal-Pay-How-Americans-Are-Overtaxed-to-Overpay-the-Civil-Service*.

acteristics at one point in time, typically finding a federal wage premium of 10 percent to 20 percent. Although well regarded and widely used, the cross-sectional method cannot account for unobserved abilities that may affect the premium estimate.

This report controls for unobserved abilities by following the same workers over time as they switch between the federal and private sectors. Private-sector workers who switch to federal jobs receive an average real wage increase of 9 percent, while private workers who find another private job earn just an additional 1 percent, implying an 8 percent federal premium. Because longitudinal analysis tends to underestimate the true premium, the result confirms the cross-sectional findings. The average private-sector worker receives a substantially higher wage when he switches to federal employment.

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