



Data Appendix

“State Capacity for Building Infrastructure”

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A. Details on Civil Engineering Employment Figure

The BLS survey changed its occupation classification system in the years 1999, 2010, and 2019 (BLS n.d.a). Even with these changes, the definition of civil engineer remained quite similar over the period 1997-2022.¹ Because of this, that employment estimates for civil engineers are likely broadly comparable over time. For estimates of private sector civil engineers, we use the BLS's industry category for all private sector employment when available. This industry category is only available 2009-2022. For estimates of all private sector employment before 2009, we sum the employment estimates of all non-government industry categories. While some individual industries are missing employment estimates during this time, we believe the impact of these missing values on total private sector employment is likely to be small. The BLS began including the Tennessee Valley Authority in its federal government estimates in 2010 (BLS n.d.a). Though this leads to some underreporting before 2010, we believe this omission has a small impact on civil engineers because there is no major increase in the federal government employment estimates from 2009 to 2010. We are not aware of other ways that survey changes could distort our estimates.

Citations for civil engineering figure:

- Citation for the actual data:
 - o Bureau of Labor Statistics (BLS). 1997-2022. "Occupational Employment and Wage Statistics." United States Department of Labor. <https://www.bls.gov/oes/> (accessed March 22, 2024).
- General cite for info on changes to survey:
 - o Bureau of Labor Statistics (BLS). N.d.a. "Occupational Employment and Wage Statistics, Frequently Asked Questions: Can OEWS data be used to compare changes in employment or wages over time?" United States Department of Labor. https://www.bls.gov/oes/oes_ques.htm (accessed March 22, 2024).
- 1997-1998 definition of civil engineers:
 - o Bureau of Labor Statistics (BLS). N.d.b. "Occupational Employment Statistics Dictionary of Occupations, Customer Copy, 1997-1998." United States Department of Labor. https://www.bls.gov/oes/special-requests/oesdic_98.pdf.
- 1999-2009 definition of civil engineers:
 - o Bureau of Labor Statistics (BLS). 2016. "Standard Occupational Classification, 2000 SOC Archived Materials." United States Department of Labor. <https://www.bls.gov/soc/2000/home.htm> (accessed March 22, 2024).
- 2010-2018 definition of civil engineers:
 - o Bureau of Labor Statistics (BLS). 2013. "2010 SOC Definitions." United States Department of Labor. https://www.bls.gov/soc/soc_2010_definitions.pdf.
- 2019-2022 definition of civil engineers:
 - o Bureau of Labor Statistics (BLS). 2020. "2018 SOC Definitions." United States Department of Labor. https://www.bls.gov/soc/2018/soc_2018_definitions.pdf.

¹ See BLS (n.d.b.) for 1997-1998 definition, BLS (2016) for 1999-2009 definition, BLS (2013) for 2010-2018 definition, and BLS (2020) for 2019-2022 definition.

B. Details on Pay Gap Figure

This figure presents the pay gap between federal General Schedule and private-sector pay from 1963 to 2022 using available data from the Annual Reports of the President’s Pay Agent and the President’s Federal Pay Alternative Plan documents.² For the years 1963, 1965–1966, 1968–1969, and 1972, the pay gap is calculated as the percent difference between the sum of the federal General Schedule rates for the fourth grade, which represented the average General Schedule rates at the time, and the sum of the average private-sector rates. For the years 1967, 1973–1989 and 2001–2022, the pay gap is the Pay Agent’s determination of the average percent increase in federal General Schedule pay needed to achieve comparability with private-sector rates. For the years 2001–2022, the pay gap is defined as the percent by which the “overall average non-Federal rate exceeds the overall average GS rate.” Specifically, this figure is referred to as the “overall remaining pay disparity” that accounts for existing locality payments in Pay Agent reports. For 1994, the pay gap is the estimate reported by the Federal Salary Council in its memorandum to the Pay Agent. There are missing data for the years 1964, 1970–1971, 1990–1993, and 1995–2000.

The data have changed over time in several ways to improve the comparability process. The scope of the underlying BLS surveys has expanded over time to include additional occupations, occupation levels, establishments, and industries. The Pay Agent also decided to include only permanent employees who received regular, General Schedule rates in its comparison beginning in 1984. There have been several other methodological changes over time. In 1972, the Pay Agent began a three-year transition to comparing actual federal General Schedule and private-sector rates instead of assuming that the federal General Schedule rates for the fourth grade represented the average.³ At least as early as 1981, the Pay Agent also began weighting private-sector rates by General Schedule employment to produce weighted averages for private-sector pay.⁴ Additionally, the Pay Agent restricted its sample to permanent, regular-rate employees and switched from using mean salaries to median salaries in its pay calculations in 1984 (GAO 1987).⁵ Since 1984, BLS surveys expanded to include additional occupations, occupation levels, establishments, and industries (GAO 1987).⁶ In 1994 under the Federal Employees Pay Comparability Act of 1990, the Pay Agent implemented a locality-based pay system, which

² *Fact Sheet for the Chairman, Committee on Governmental Affairs, U.S. Senate, and the Chairman, Committee on Post Office and Civil Service, House of Representatives, Federal Pay: Comparisons with the Private Sector by Job and Locality*, U.S. GEN. ACCT. OFF. 4 (May 1990), <https://www.gao.gov/assets/ggd-90-81fs.pdf>.

³ *Comparability of the Federal Statutory Pay Systems with Private Enterprise Pay Rates: Joint Annual Report of Director*, OFF. OF MGMT. BUDGET & U.S. CIVIL SERV. COMM’N 28-30 (1973) in REPORT ON COMPARABILITY ADJUSTMENT FOR FEDERAL STATUTORY PAY SYSTEMS, MESSAGE FROM THE PRESIDENT OF THE UNITED STATES TRANSMITTING HIS REPORT ON THE COMPARABILITY ADJUSTMENT FOR THE FEDERAL STATUTORY PAY SYSTEMS, TOGETHER WITH COPIES OF RELATIVE REPORTS AND EXECUTIVE ORDERS, H.R. Doc. No. 93-162 (93d Cong., 1st Sess., Oct. 3, 1973).

⁴ *Report of the President's Pay Agent on Comparability of the Federal Statutory Pay Systems with 1981 Private Enterprise Rates 21* (1981) in OCTOBER 1981 FEDERAL PAY ADJUSTMENT, MESSAGE FROM THE PRESIDENT OF THE UNITED STATES TRANSMITTING THE REPORTS OF HIS PAY AGENT AND THE ADVISORY COMMITTEE ON FEDERAL PAY, HIS ALTERNATIVE PLAN, AND THE EXECUTIVE ORDER IMPLEMENTING THAT PLAN, PURSUANT TO 5 USC 5305(A)(3), H.R. Doc. No. 97-83, at 1 (97th Cong., 1st Sess., Nov. 16, 1981).

⁵ *Report to the Chairman, House Committee on Post Office and Civil Service, Federal Pay: Changes to the Methods of Comparing Federal and Private Sector Salaries*, U.S. GEN. ACCT. OFF. 4, 13-14 (May 1987), <https://www.gao.gov/assets/ggd-87-8.pdf>.

⁶ *Report to the Chairman, House Committee on Post Office and Civil Service, Federal Pay: Changes to the Methods of Comparing Federal and Private Sector Salaries*, U.S. GEN. ACCT. OFF. 3, 12, 15 (May 1987), <https://www.gao.gov/assets/ggd-87-8.pdf>.

requires both general adjustments to pay based on the Employment Cost Index (ECI) and adjustments to General Schedule pay for localities where the pay exceeds 5%.

Citations to Data Sources for public-private pay gap figure:

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- Federal Statutory Salary Systems, Communication from the President of the United States Transmitting Joint Annual Report on Federal Statutory Pay Systems, Pursuant to the Federal Salary Reform Act of 1962, H.R. Doc. No. 174, at 12-13 (89th Cong., 1st Sess. May 17, 1965).
- Federal Statutory Salary Systems, Message from the President of the United States Transmitting the Joint Annual Report of the Director of the Bureau of the Budget and the Chairman of the Civil Service Commission and the Report of the Cabinet Committee on Federal Staff Retirement Systems, H.R. Doc. No. 402, at 7-8 (89th Cong., 2d Sess. Mar. 7, 1966).
- Civilian and Military Pay Raises, Message from the President of the United States Relative to Civilian and Military Pay Raises, H.R. Doc. No. 95, at 2 (90th Cong., 1st Sess. Apr. 5, 1967).
- Comparison of Federal and Private Salaries, Message from the President of the United States Transmitting a Report on the Annual Comparison of Federal Salaries with the Salaries Paid in Private Enterprise, H.R. Doc. No. 327, at 17-18 (90th Cong., 2d Sess. June 11, 1968).
- Federal Pay Rate Adjustments, Message from the President Transmitting Annual Comparison of Federal Salaries with Salaries Paid in Private Enterprise, as Provided by Section 5302 of Title 5, United States Code, H.R. Doc. No. 131, at 15-16 (91st Cong., 1st Sess. June 17, 1969).
- Comparison of Federal Salaries in the Statutory Pay Systems, Message from the President of the United States Transmitting Annual Comparison of Federal Salaries with Salaries Paid in Private Enterprise, Pursuant to 5 U.S.C. 5305, H.R. Doc. No. 92-332, at 4-5 (92d Cong., 2d Sess. Aug. 1, 1972).
- Report on Comparability Adjustment for Federal Statutory Pay Systems, Message from the President of the United States Transmitting His Report on the Comparability Adjustment for the Federal Statutory Pay Systems, Together with Copies of Relative Reports and Executive Orders, H.R. Doc. No. 93-162 (93d Cong., 1st Sess. Oct. 3, 1973).
- Report on Comparability Adjustment for Federal Statutory Pay Systems, Message from the President of the United States Transmitting His Report on the Comparability Adjustment for the Federal Statutory Pay Systems, Together with Copies of Relative Reports and Executive Orders, Pursuant to 5 U.S.C. 5305, H.R. Doc. No. 93-364, at 1 (93d Cong., 2d Sess. Oct. 7, 1974).
- Federal Pay Comparability Alternative Plan, Message from the President of the United States Transmitting A Federal Pay Comparability Alternative Plan Pursuant to 5 U.S.C. 5305(c)(1), H.R. Doc. No. 94-233, at 1 (94th Cong., 1st Sess. Sept. 3, 1975).
- Adjustments of Certain Rates of Pay and Allowances, Message from the President of the United States Transmitting A Report on the Comparability Adjustment Being Ordered for the Federal Statutory Pay Systems in October 1976, Pursuant to 5 U.S.C. 5305, H.R. Doc. No. 94-651 (94th Cong., 2d Sess. Oct. 1, 1976).
- Comparability Adjustment for Federal Statutory Pay Systems, Message from the President of the United States Transmitting A Report on the Comparability Adjustment Being Ordered for the Federal Pay Systems in October 1977, Pursuant to 5 U.S.C. 5305, H.R. Doc. No. 95-233 (95th Cong., 1st Sess. Sept. 29, 1977).
- October 1978 Federal Pay Adjustments, Message from the President of the United States Transmitting the Reports of His Pay Agent and the Advisory Committee on Federal Pay, His Alternative Plan, and the Executive Order Implementing that Plan, Pursuant to 5 USC 5305(a)(3), H.R. Doc. No. 96-35 (96th Cong., 1st Sess. Jan. 18, 1979).
- October 1979 and March 1980 Federal Pay Adjustments, Message from the President of the United States Transmitting the Reports of His Pay Agent and the Advisory Committee on Federal Pay, His Alternative Plan, and the Executive Order Implementing that Plan, Pursuant to 5 USC 5305(a)(3), H.R. Doc. No. 96-281, at 1 (96th Cong., 2d Sess. Mar. 17, 1980).
- October 1980 Federal Pay Adjustments, Message from the President of the United States Transmitting the Reports of His Pay Agent and the Advisory Committee on Federal Pay, His Alternative Plan, and the Executive Order Implementing that Plan, Pursuant to 5 USC 5305(a)(3), H.R. Doc. No. 96-381, at 1 (96th Cong., 2d Sess. Nov. 18, 1980).

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- Federal Pay Rates, Message from the President of the United States Transmitting the President's Remarks on Federal Employees' Comparability Pay Adjustment, Pursuant to 5 U.S.C. 5305(a)(3), H.R. Doc. No. 99-101, at 1 (99th Cong., 1st Sess. Sept. 5, 1985).
- Pay Adjustments for Federal Employees, Message from the President of the United States Transmitting a Plan for Pay Adjustments for Federal Employees, Pursuant to 5 U.S.C. 5305(a)(3), H.R. Doc. No. 99-262, at 1 (99th Cong., 2d Sess. Sept. 8, 1986).
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- Federal Pay Adjustments: Alternative Plan, Message from the President of the United States Transmitting an Alternative Plan for a Federal Employees' Pay Adjustment to Become Effective on the First Day of the First Applicable Pay Period on or After January 1, 1989, Pursuant to 5 U.S.C. 5305(c)(1), H.R. Doc. No. 100-227, at III (100th Cong., 2d Sess. Sept. 7, 1988).
- Federal Pay Adjustments—Alternative Plan, Communication from the President of the United States Transmitting an Alternative Plan for a Federal Employees' Pay Adjustment to Become Effective on the First Day of the First Applicable Pay Period on or After January 1, 1990, Pursuant to 5 U.S.C. 5305(c)(1), H.R. Doc. No. 101-89, at 1 (101st Cong., 1st Sess. Sept. 6, 1989).
- Federal Pay Adjustments—Alternative Plan, Communication from the President of the United States Transmitting an Alternative Plan for a Federal Employees' Pay Adjustment to Become Effective on the First Day of the First Applicable Pay Period on or After January 1, 1991, Pursuant to 5 U.S.C. 5305(c)(1), H.R. Doc. No. 101-221 (101st Cong., 2d Sess. Sept. 5, 1990).
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- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent (2014).
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent (2015) (For Locality Pay in 2017).
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent (2015) (For Locality Pay in 2018).
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent for Locality Pay in 2019.
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent for Locality Pay in 2020.
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent for Locality Pay in 2021.
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent for Locality Pay in 2022.
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent for Locality Pay in 2023.
- Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President's Pay Agent for Locality Pay in 2024.