**Centralization and Subnational Capacity:**

**The Struggle to Make Federalism Work Equitably in Public Education**

**Technical Appendix**

**1.0 Variable Information**

|  |  |  |
| --- | --- | --- |
| **Variable Name** | **Measure** | **Source** |
|  |  |  |
| *Technical Capacity* | Technical capacity includes the following classifications: instructional coordinators and supervisors. The number of administrators is aggregated from the school district to school-year, and is weighted by the number of students. | Common Core of Data Local Education Agency Universe Staff Survey Data, 1997 - 2015 , https://nces.ed.gov/ccd/pubagency.asp |
| *Administrative Capacity* | Administrative capacity includes the following classifications: school administrative support staff, Local Education Agency (LEA) administrative support staff, school administrators, and LEA administrators. The number of administrators is aggregated from the school district to school-year, and is weighted by the number of students. | Common Core of Data Local Education Agency Universe Staff Survey Data, 1997 - 2015 , https://nces.ed.gov/ccd/pubagency.asp |
| *Nongovernmental Capacity* | Education service organizations has 69,761 observations, or 8,118 unique organizations. Only organizations required to file Form 990, and thus have annual operating budgets of more than $25,000, are included in the dataset. The analysis included organizations classified as: 1) special education, 2) libraries, 3) student services, 4) educational services, and 5) remedial reading and encouragement. Other analyses using these data appear in Moffitt et al. (2018). | National Center for Charitable Statistics Core Trend Public Charities (PC) 1989 to 2015, <https://nccs-data.urban.org/data.php?ds=core> |
| *Police Capacity* | Police employees include full time employees in the following categories: police with the authority to arrest (or police officers) and other police employees. From 1997-2011, the two categories of police officers and other police employees were added together. From 2012-2015, the police other category was used. | US Census Annual Survey of Public Employment and Payroll, 1997-2015, <https://www.census.gov/programs-surveys/apes/data/datasetstables.2015.html> |
| *Police Expenditures* | Amount of general expenditures classified as police protection, in the thousands. | US Census Survey of State Government Finances, 1997-2015, <https://www.census.gov/programs-surveys/state/data/tables.html> |
| *Population* | Annual (2010-2015) and intercessional estimates of population within each state. | U.S. Census state annual and intercessional estimates, 1997-2015, https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html; https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-state.html; <https://www.census.gov/data/tables/time-series/demo/popest/intercensal-1990-2000-state-and-county-totals.html> |
| *Poverty Quintiles* | Counties are divided into income quintiles by childhood poverty levels (percent of the population aged 5-17 living in poverty). The average poverty level for low poverty counties is 9.3 percent and the average poverty level for high poverty counties is 32.8 percent. | Small Area Income and Poverty Estimates (SAIPE) County, 1997 to 2015, https://www.census.gov/programs-surveys/saipe/data.html |
| *Number of Students* | The number of students is aggregated from the school district to school-year. | Common Core of Data Local Education Agency Universe Membership Survey Data, 1997 - 2015, https://nces.ed.gov/ccd/pubagency.asp |

**2.0 Additional ITSA Tables from Figures 7 and 8**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 5: Nongovernmental Service Organizations ITSA, 1997-2015   |  |  | | --- | --- | |  | **Model 1** | |  |  | | VARIABLES |  | |  |  | | Year | 0.00\*\*\* | |  | (0.00) | | NCLB (1 = NCLB) | 0.00 | |  | (0.00) | | NCLB \* Year | 0.00 | |  | (0.00) | | Recession (1 = Recession) | 0.00 | |  | (0.00) | | Recession \* Year | -0.00 | |  | (0.00) | | Constant | 0.004\*\*\* | |  | (0.00) | |  |  | | Post NCLB Linear Trend | 0.00\*\*\* | |  | (0.00) | | Post Recession Linear Trend | 0.00\*\*\* | |  | (0.00) | |  |  | | Observations | 19 | | Standard errors in parentheses |  | | \*\*\* p<0.001, \*\* p<0.01, \* p<0.05 |  | |  |  |
|  |  |  |
| Table 6: State Administrative Capacity ITSA, 1997-2015   |  |  | | --- | --- | |  | **Model 1** | |  |  | | VARIABLES | *State Administrative Capacity* | |  |  | | Year | 0.002 | |  | (0.002) | | NCLB (1 = NCLB) | -0.025\* | |  | (0.009) | | NCLB \* Year | -0.003 | |  | (0.002) | | Recession (1 = Recession) | -0.006 | |  | (0.004) | | Recession \* Year | 0.000 | |  | (0.001) | | Constant | 0.200\*\*\* | |  | (0.004) | | Post NCLB Linear Trend | -0.001 | |  | (0.000) | | Post Recession Linear Trend | -0.001\*\*\* | |  | (0.000) | | Year | 0.002 | |  |  | | Observations | 19 | | Standard errors in parentheses |  | | \*\*\* p<0.001, \*\* p<0.01, \* p<0.05 |  |   **3.0 Robustness Checks**  As a robustness check on whether the trends we observe in education reflect federalism or merely trends in state budgets, we examine trends in capacity among police departments. By collecting state-level data on police staffing, we assess whether variations in administrative capacity that we observe in our analysis in education are related to broader trends in subnational government expenditures across states. To measure state administrative police capacity, we gathered the number of other police employees from the U.S. Census Annual Survey of Public Employment and Payroll from 1997-2015.[[1]](#endnote-1)  Table 7 and figure 9 present the results from the Interrupted Time Series Analysis using police staffing, weighted by population, from 1997 to 2015. There is no evidence of police departments "building-up" capacity during the period between NCLB and the Great Recession, as we observe with technical capacity in public education. The analysis presents further evidence that the expansion of subnational technical capacity in education in the wake of NCLB is related to the federal policy intervention, rather than general trends in state spending and employment. State police administrative capacity did decline after the Great Recession of 2008.  Table 7: Police Administrative Capacity ITSA, 1997-2015   |  |  | | --- | --- | |  | **Model 1** | |  | *Police* | | VARIABLES | *Administrative Capacity* | |  |  | | Year | 0.0002\*\*\* | |  | (0.00003) | | NCLB (1 = NCLB) | -0.0003 | |  | (0.0002) | | NCLB \* Year | -0.0004\*\*\* | |  | (0.00005) | | Recession (1 = Recession) | -0.0001 | |  | (0.0002) | | Recession \* Year | 0.0001 | |  | (0.00004) | | Constant | 0.013\*\*\* | |  | (0.0001) | |  |  | | Post NCLB Linear Trend | -0.0002\*\*\* | |  | (0.0000) | | Post Recession Linear Trend | -0.0002\*\*\* | |  | (0.0000) | |  |  | | Observations | 19 | | Standard errors in parentheses | |  | | \*\*\* p<0.001, \*\* p<0.01, \* p<0.05 | |  | |  |  |

Figure 9: Police Administrative Capacity ITSA, 1997-2015



We tested whether the decline in employees after an economic recession is dependent upon reductions in state spending. Levels of administrative capacity could be conditioned by state budgets, particularly after the Great Recession. To test this possibility, we employ a dataset of state police expenditures from 1997-2015. We gathered this data from the U.S. Census Survey of State Government Finances. Police expenditures are weighted by population.[[2]](#endnote-2)

The results of the ITSA on state police expenditures from 1997-2015 appear in table 8 and figure 10. Despite the shock of the Great Recession, state police expenditures continue to increase, albeit at a slower rate than pre-recession levels. This suggests that state budgets are not solely responsible for reductions in state employment.

Table 8: Police Expenditures ITSA, 1997-2015

|  |  |
| --- | --- |
|  | **Model 1** |
|  | *Police* |
| VARIABLES | *Expenditures* |
|  |  |
| Year | 0.204\*\*\* |
|  | (0.011) |
| NCLB (1 = NCLB) | -0.290\* |
|  | (0.124) |
| NCLB \* Year | -0.066\*\* |
|  | (0.020) |
| Recession (1 = Recession) | -0.201\* |
|  | (0.088) |
| Recession \* Year | -0.078\*\* |
|  | (0.023) |
| Constant | 2.759\*\*\* |
|  | (0.027) |
|  |  |
| Post NCLB Linear Trend | 0.138\*\*\* |
|  | (0.022) |
| Post Recession Linear Trend | 0.0598\*\*\* |
|  | (0.010) |
|  |  |
| Observations | 19 |
| Standard errors in parentheses | |  |
| \*\*\* p<0.001, \*\* p<0.01, \* p<0.05 | |  |

Figure 10: Police Expenditures ITSA, 1997-2015



As a robustness check, we examine another measure of technical capacity over time. Recall, the first measure of technical capacity focuses on staffing levels for instructional positions – staff supervising and coordinating instructional and curricular programming at the school district, subdistrict, or county level. As an additional measure, we collect data on technical expertise as measured by educational degree. The School and Staffing Survey (SASS) from the National Center for Education Statistics asks teacher-respondents to report their highest level of educational attainment – bachelor’s degree, master’s degree, education specialist degree, or doctorate. This measure captures an additional facet of the human capital component of technical expertise, or “what people know”. The data are available at the national level for the 1994, 2000, 2004, 2008, 2012 and 2016 academic years.

While we cannot observe discontinuities in time trends due to the intermittent nature of the SASS, we examine in table 9 the percent of teachers, by highest degree earned over time to see if the patterns look similar to the changes in technical capacity we observe in the wake of NCLB and the Great Recession. Post NCLB, we observe an increase in the percent of teachers who report having attained a master’s degree from 2004 to 2008 (40.9% to 44.5%), and a continued expansion in the 2012 and 2016 academic year. Between 2000 and 2004, there is an increase in the percent of teachers who report attaining an educational specialist or doctoral degree. It is likely that this increase in subnational technical capacity is a result of federal expansion into education policy. We do not observe declines in technical capacity, measured by degree attainment, after the Great Recession. This makes intuitive sense – the level of educational attainment in the teacher workforce, a fixed attribute that cannot be “taken away” in a recession, is unlikely to change as a result of an economic downturn.

Teacher credentialing and attainment of advanced degrees are important components of NCLB. Therefore, we would expect to see increases over time. Teacher credentials face different limitations as measures of technical expertise, however. Though “effective teachers” play a significant role in student achievement and later life outcomes, the relationship between teacher credentials and “effectiveness” is highly disputed. As a result, we find our measure included in the main text of the paper more appreciate to address the puzzle of central state expansion and subnational technical capacity.

Table 9: Trends in Teacher Credentials, 1994-2016

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Percent of teachers, by highest degree earned** | | | | |  |
| Academic Year | BA | MA | Education Specialist, Doctorate | Education Specialist | Doctor's |
| 1994 | 52.0 | 42.0 | 5.3 | 4.6 | 0.7 |
| 2000 | 52.0 | 41.9 | 5.4 | 4.7 | 0.7 |
| 2004 | 50.8 | 40.9 | 7.2 | 6.0 | 1.2 |
| 2008 | 47.4 | 44.5 | 7.3 | 6.4 | 0.9 |
| 2012 | 39.9 | 47.7 | 8.7 | 8.7 | 0.0 |
| 2016 | 40.5 | 47.3 | 9.7 | 8.4 | 1.3 |

1. Police employees include full time employees in the following categories: police with the authority to arrest (or police officers) and other police employees. This data was collected from the US Census Annual Survey of Public Employment and Payroll. From 1997-2011, the two categories of police officers and other police employees were added together. From 2012-2015, the police total category was used. Police employees were weighted by state population from the US Census annual and intercessional state population estimates, multiplied by 100. Police employee data gathered from <https://www.census.gov/programs-surveys/apes/data/datasetstables.2015.html>, accessed November 11, 2020. Population data gathered from https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html; https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-state.html; <https://www.census.gov/data/tables/time-series/demo/popest/intercensal-1990-2000-state-and-county-totals.html>, accessed November 17, 2020. [↑](#endnote-ref-1)
2. Police expenditures are in the thousands from the US Census Survey of State Government Finances. Police expenditures are weighted by population and multiplied by 100. Data was gathered from <https://www.census.gov/programs-surveys/state/data/tables.html>, accessed November 10, 2020. [↑](#endnote-ref-2)