Replication Read Me for: *School Spending and Student Outcomes: Evidence from Revenue Limit Elections in Wisconsin*

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Data Availability Statements

All datasets and programs used to support the findings of this study have been deposited in the AEA Data and Code Repository. The Project ID is openicpsr-125821. The paper uses publicly available data obtained primarily from the Wisconsin Department of Public Instruction (WDPI) and the National Center for Education Statistics (NCES). The data citations in the main article contain the full URLs. In this file, I also link to the websites containing the datasets in the Description of Datasets Section below.

Dataset list

Data file	Source	Provided
`Final/onestep panel figures.dta`	WDPI, NCES	Yes
`Final/onestep panel tables.dta`	WDPI, NCES	Yes
`Final/itt cross section.dta`	WDPI, NCES	Yes
`Final/itt panel.dta`	WDPI, NCES	Yes
`Intermediate/Master Admin Data Final.dta`	WDPI, NCES	Yes
`Intermediate/referendum.xls`	WDPI	Yes
`Intermediate/cpiu.dta`	BLS	Yes
`Intermediate/membership 1993 2018.dta`	WDPI	Yes
`Intermediate/external validity.xlsx`	NCES	Yes
`Intermediate/property values.xlsx`	WDPI	Yes
`Intermediate/hasany.dta`	WDPI	Yes
`Intermediate/adjustment history.xls`	WDPI	Yes

Description of Datasets

There are three types of datasets included in the Data Folder: Raw, Intermediate, and Final.

1. Raw datasets include district-level information on test scores, dropout rates, postsecondary enrollments, teacher compensation and experience, student-staff ratios, expenditures, revenues, demographics, urbanicity, and infrastructure condition, and school-level information on student-teacher ratios and teacher compensation. These raw datasets are used to construct Intermediate/Master Admin Data Final.dta and are located in the folder Data/Raw. These datasets come from the WDPI (WDPI, 2015, 2016a,

2016b, 2019a, 2019b, 2019c, 2020b) and the NCES (NCES, 2017).

2. Intermediate datasets are used in the construction of the final panels needed to implement the dynamic RD strategy. These include the following:
   (a) Intermediate/Master Admin Data Final.dta: This is a district-by-year panel containing information on each Wisconsin public school district from 1996-97 through 2014-15. This panel is constructed by cleaning and merging all of the data files included in the Data/Raw folder. It contains variables such as each school district's demographic information, test scores, dropout rates, postsecondary enrollments, teacher characteristics, and finances. Information on each school district's demographics, student outcomes, and teacher characteristics can be easily accessed through the WDPI WiseDash (WDPI, 2015, 2016a, 2016b, 2019a, 2019b, 2019c, 2020b). Financial data for each school district in Wisconsin can be accessed through the NCES Common Core of Data (NCES, 2017). NCES data can be merged to WDPI information using the unique numeric identifier provided by each dataset. All of these datasets are publicly available.
   (b) Intermediate/referendum.xls: This dataset contains each referendum attempt (either for operational or capital bond purposes) for each Wisconsin school district from 1993-2018 (WDPI, 2020a). This dataset is publicly available can be accessed here.
   (c) Intermediate/cpiu.dta: This dataset contains the Midwestern CPI-U from 1980-2018. It is publicly available through the Bureau of Labor Statistics here (BLS, 2018).
   (d) Intermediate/membership 1993 2018.dta: This dataset contains each Wisconsin school district's membership (enrollment) information from 1993-94 through 2018-19. It is reported by the WDPI and can be accessed here.
   (e) Intermediate/external validity.xlsx: This dataset contains information on each state's school finance system during the 2014-15 academic year. It is publicly available through the NCES Digest of Education Statistics.
   (f) Intermediate/property values.xlsx: This dataset contains information on each Wisconsin school district's equalized property values. It is publicly available through the WDPI here.
   (g) Intermediate/hasany.dta: This dataset contains an indicator for whether or not each of Wisconsin's 421 school districts held a referendum at some point from 1996-97 through 2014-15, the sample period of this study. It can be easily constructed from Intermediate/referendum.xls.
   (h) Intermediate/adjustment history.xls: This dataset contains information on Wisconsin's legislature's annual adjustments to revenue limits per pupil. It is publicly available through the WDPI here.
3. Final datasets include panels required for the implementation of the one-step and ITT dynamic RD estimators.
   (a) Final/onestep panel figures.dta: This is a district-by-year where I can

implement the one-step estimator developed by Cellini et al. (2010) QJE. This particular dataset includes leads and lags, to show figures of the TOT effects of referendum approval on outcomes prior to and after the election. In particular, this district-by-year panel is used in creating Figure 1, Figure 2, Figure 5, Figure 6 in the main body of the paper as well as Figure B.5, Figure B.6, Figure B.7, Figure B.8, Figure B.9, Figure B.10, Figure B.11, Figure B.12 in the Online Appendix.

(b) Final/onestep panel tables.dta: This is a district-by-year where I can implement the one-step estimator developed by Cellini et al. (2010) QJE. This particular dataset is used to estimate TOT effects of referendum approval on outcomes following the election. In particular, the district-by-year panel generated in this do-file is used in creating Tables 4, 5, 7, 8 in the main body of the paper as well as Tables B.1, B.3, B.4, B.5 in the Online Appendix.

(c) Final/itt cross section.dta: This is a panel where I can implement the ITT estimator developed by Cellini et al (2010) QJE. In particular, the election-level panel generated in this do-file is used in creating Figure 3 and Figure 4 in the main body of the paper as well as Table B2, Figure C1, Figure C2, Figure C3, Table C2, Table C3, Table C4 in the Online Appendix. These figures and tables implement the RD strategy in an election-level panel that examines the data one year at a time. This allows me to implement cross-sectional RD strategies to test the robustness of the main findings to a cross-sectional approach.

(d) Final/itt panel.dta: This is a panel where I can implement the ITT estimator developed by Cellini et al (2010) QJE in a panel framework. In particular, the election-level panel generated in this do-file is used in creating Table C1, Table C5, Figure B13, Figure B14, and Figure B15.

Computational requirements

Software Requirements

- Stata (code was last run with version 16)
  - `estout`
  - `rdrobust`
  - `coefplot`
  - `DCdensity.ado`
  - `grstyle`
  - `palettes`
  - `colrspace`
  - `tabplot`
  - `gwtmean`

Description of programs

There are three types of programs included in the Do Files Folder.

- The first set of programs are located in the folder Do Files/Master Admin Data. These do-files intake, clean, and get ready to merge raw district-level datasets such as test scores, postsecondary enrollments, expenditures, and so on. The user need not run each of these do-files independently. Instead, I have included a master do-file in the main Do Files folder called "make master admin data.do." This do-file calls each of the individual do-files located in Do Files/Master Admin Data and creates the dataset Intermediate/Master Admin Data Final.dta.
- The second set of programs generate the final datasets needed to implement the RD estimators. These programs include: (1) make onestep panel figures.do; (2) make onestep panel tables.do; (3) make itt panel.do; and (4) make itt cross section.do.
- The last set of programs generate all figures and tables in the paper (both in the main body and the Online Appendix). These include Table1.do, Table2.do, Table 3 6 B6.do, FigB1.do, FigB2.do, FigB3 B4.do, FigE1.do, as well as onestep figures.do, onestep tables.do, itt cross section results.do, and itt panel results.do. Below I include a detailed crosswalk between each output file (final dataset, table, or figure) in the paper, and its corresponding do-file.

Instructions

- Download the Replication folder. This folder contains three main sub-folders: Data (which contains the Raw, Intermediate, and Final datasets described above); Do Files (which contains the set of programs needed to generate the intermediate and final datasets, and the remaining programs to run all figures and tables in the paper); Output (which contains all figures generated from the programs in the Do Files folder). Below is a crosswalk between each of the programs and its associated output. Each program has been clearly labeled to describe its purpose, as well as its inputs (e.g., an intermediate dataset) and outputs (e.g., Figure 1). All that the user has to do is run the do-file "install packages.do" which installs all stata packages needed for analysis and change the path global at the top of the do-file to match their corresponding file path (where the Replication folder has been stored).

Crosswalk of Final Datasets, Tables, Figures, and Programs

Output	Do-File
`Data/Intermediate/Master Admin Data Final.dta`	make master admin data.do
`Data/Final/onestep panel figures.dta`	make onestep panel figures.do
`Data/Final/onestep panel tables.dta`	make onestep panel tables.do

Output	Do-File
`Data/Final/itt cross section.dta`	make itt cross section.do
`Data/Final/itt panel.dta`	make itt panel.do
`Figures 1,2,5,6,B5,B6,B7,B8,B9,B10,B11,B12`	onestep figures.do
`Tables 4,5,7,8,B1,B3,B4,B5`	onestep tables.do
`Figures 3,4,C1,C2,C3; Tables B2,C2,C3,C4`	itt cross section results.do
`Figures B13,B14,B15; Tables C1,C5`	itt panel results.do
`Table 1`	Table1.do
`Table 2`	Table2.do
`Tables 3,6,B6`	Table 3 6 B6.do
`Figure B1`	FigB1.do
`Figure B2`	FigB2.do
`Figures B3,B4`	Fig B3 B4.do
`Figure E1`	FigE1.do

References

BLS (2018). CPI for all Urban Consumers (CPI-U): All items in Midwest urban, all urban consumers, not seasonally adjusted - CUUR0200SA0. United States Department of Labor. Accessed March, 2019 at https://data.bls.gov.

NCES (2017). School district finance survey (f-33) data. Accessed March, 2019 at https: //nces.ed.gov/ccd/ccddata.asp.

WDPI (2015). Wisconsin student assessment system. Accessed March, 2019 at https://dpi. wi.gov/wisedash/about-data.

WDPI (2016a). All staff files. Accessed March, 2019 at https://dpi.wi.gov/cst/data-collections/staff/published-data.

WDPI (2016b). Salary reports. Accessed March, 2019 at https://dpi.wi.gov/cst/data-collections/staff/published-data.

WDPI (2019a). Dropouts. Accessed March, 2019 at https://dpi.wi.gov/wisedash/about-data.

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WDPI (2019c). Property valuation. Accessed March, 2019 at https://dpi.wi.gov/sfs/statistical/longitudinal-data/property-valuation.

WDPI (2020a). Custom referenda reports. Accessed February, 2019 at https://sfs.dpi.wi. gov/Referenda/.

WDPI (2020b). Enrollment. Accessed March, 2019 at https://dpi.wi.gov/wisedash/about-data.