THE IMPACT OF FEDERAL TRANSFERS UPON U.S. INFANT MORTALITY RATES

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KEY POINTS

Question: What is the impact of federal transfers upon U.S. infant mortality rates?

Findings: A fixed-effects regression model is used to estimate the impact of federal transfers upon state-level infant mortality rates during the years of 2004 to 2013. After controlling for differences across states, increases in federal transfers are significantly associated with lower infant, neonatal, and postneonatal mortality rates. Holding all other variables constant, a $200 increase in the amount of federal transfers per capita would save one child's life for every 10,000 live births.

Meaning: Increases in federal transfers are strongly associated with reductions in a state's infant mortality rate.

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ABSTRACT

Importance: Despite having the largest economy in the world, the United States has an infant mortality rate that ranks 26th among OECD countries, with wide variation across U.S. states.

Objective: In order to improve health outcomes, the federal government allocates hundreds of billions of annual dollars to individual states in order to further the well-being of its citizens. This study examines the impact of such federal intergovernmental transfers upon reducing state-level infant mortality rates.

Design: Using a fixed-effects regression model to control for unmeasurable differences between states, the impact of federal transfers upon state-level infant mortality rates is estimated.

Setting: Annual data is collected from all 50 U.S. states between 2004 and 2013.

Participants: Entire U.S. population under the age of 1 between 2004 and 2013.

Main Outcomes and Measures: State level infant mortality rate, neonatal mortality rate, and postneonatal mortality rate.

Results: After controlling for differences across states, increases in per capita federal transfers are significantly associated with lower infant, neonatal, and postneonatal mortality rates. Holding all other variables constant, a $200 increase in the amount of federal transfers per capita would save one child's life for every 10,000 live births.

Conclusions and Relevance: Considerable debate exists regarding the role of federal transfers in improving the well-being of children and families. These findings indicate that increases in federal transfers are strongly associated with reductions in infant mortality rates. Such benefits should be carefully considered when state officials are deciding whether to accept or reject federal funds.

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Despite having the largest economy in the world, the United States has an infant mortality rate that ranks 26th among OECD countries.[1] In 2010, the U.S. infant mortality rate of 6.1 was considerably higher than that of virtually every country in Europe.[1-3] In addition, there is considerable variation in infant mortality across the U.S. states. For example, infants born in Mississippi (infant mortality rate of 9.7 in 2013) were more than twice as likely to die before reaching the age of one year than infants born in Iowa (infant mortality rate of 4.1).[4] Such wide differences in infant mortality are largely the result of socioeconomic differences across states.[5-6]

As a result, the federal government allocates hundreds of billions of dollars annually to state and local governments to fund programs intended to improve the well-being of the overall population, and specifically the health and well-being of low-income infants and pregnant women. Improving the health of pregnant women is important because prematurity and low birth weight are among the strongest predictors of infant mortality,[7] and lower socioeconomic status (particularly poverty) is strongly linked to these conditions.[1,8] Federal resources allow low-income infants and pregnant women to receive benefits from several programs, including Medicaid, the Children's Health Insurance Program (CHIP), the Supplemental Nutritional Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF), the Healthy Start Program, and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC).[9]

Such programs are funded by a combination of federal and state funds. This occurs through a system of fiscal federalism, whereby the federal government collects revenue at the national level and then redistributes these funds to the states. The states then use this money (matching it with some of their own) to administer the programs. A strength of this system is

that it allows the federal government to partially address fiscal inequities across state lines. Since not all states have the same tax base from which to draw resources for funding public health or other well-being initiatives, the federal government provides intergovernmental transfers to maintain the viability of the programs. Fiscal federalism thus attempts to ensure that residents of all states are provided with a minimum standard of living.[10]

Yet what evidence exists to show that this fiscal federalism is actually effective? In particular, does it reduce infant mortality? While prior research has examined the effects of specific programs on infant mortality,[11] this study is the first to analyze whether the aggregate amount of federal transfers (per capita) is associated with reductions in state-level infant mortality rates. A strong argument can be made that these resources should be examined in total because their overall effect may be much greater than that of any individual program.[12] If such transfers are positively related to the quality of care and well-being that infants and pregnant women receive, then increases in the amount of federal transfers a state receives on a per-capita basis should predict reductions in the state's infant mortality rate. On the other hand, it is possible that increases in federal transfers might actually increase infant mortality if the transfers undermine local decision-making, create unhealthy competition among service providers, or lead to an inefficient allocation of resources.[13]

METHODS

Data Sources

Our empirical analysis relies on annual data for all 50 U.S. states between the 10 year period of 2004 and 2013. This period was chosen because information was available on each of our variables during these years. Consequently, every state has a series of 10 observations per variable; one for each year from 2004-2013, resulting in a total of 500 observations (50 states times 10 observations per state).

Our dataset is constructed from a variety of sources. Infant, neonatal, and postneonatal mortality data were obtained from the National Vital Statistics Reports published by the U.S. Department of Health and Human Services.[14] Federal per capita transfers received was obtained from the Urban Institute/Brookings Institution Tax Policy Center.[15] Data regarding a state's proportion of African-American and Hispanic residents, as well as rates of poverty, were obtained from the U.S. Census Bureau.[16-18] Gross Domestic Product (GDP) data were obtained from the U.S. Department of Commerce Bureau of Economic Analysis,[19] while state level Gini coefficients (an overall measure of income inequality) were extracted from a database maintained by Mark Frank, a professor of economics at Sam Houston State University.[20] State and local direct expenditures were obtained from the Tax Policy Center.[15] The average freshman graduation rate data were obtained from the National Center for Education Statistics.

Dependent and Independent Variables

We use state-level infant, neonatal, and postneonatal mortality rates as our dependent variables. The infant mortality rate is defined as the number of children per one thousand live births who die before reaching the age of one year. The neonatal mortality rate is the number of children per one thousand live births who die between the age of 0 and 27 days. The postneonatal mortality rate is the number of children per one thousand live births who die between the age of 28 days and 364 days. Each dependent variable was inspected for skewness and kurtosis; they each approximated the normal distribution and did not require special estimation procedures.

Neonatal mortality accounts for two-thirds of infant mortality.[21] Neonatal deaths are frequently related to prematurity and low birth weight, while postneonatal deaths are more likely to result from post-birth events such as accidents and disease that are related to hospital access, as well as the regionalization of care.[22-24] For this reason, our analysis examines the effect of

federal transfers on the infant mortality rate, the neonatal mortality rate, and the postneonatal mortality rate using three separate regressions.

The main independent variable of interest is the amount of federal transfers received per capita. Each year the federal government transfers money to state and local governments to fund programs such as Medicaid, SNAP, and WIC. The size of these federal transfers has grown considerably over time. In 1929 federal transfers comprised approximately 1% of state and local revenue.[25] By 2009 this figure had climbed to 28%, with the federal government distributing roughly $600 billion in aid to state and local governments annually.[15] We examine whether changes in the amount of per capita federal transfers received by a state over time are associated with changes in the state's infant mortality rate, neonatal mortality rate, and postneonatal mortality rate.

To accomplish this, it is important to control for confounding variables that might affect the infant mortality rate. These variables include race and ethnicity,[21] economic conditions (poverty rate, income inequality as measured by the Gini coefficient, and state-level gross domestic product),[26] education (the average freshman graduation rate), and the overall amount of state expenditures. Each of these variables is included in our models to isolate the effect that federal transfers may have on state-level infant, neonatal, and postneonatal mortality rates.

Statistical Analyses

We rely on a fixed-effects regression to estimate the main models. Because each of the 50 states differs in ways that are difficult to measure, performing an ordinary least squares (OLS) regression on the pooled data would result in biased coefficient estimates.[27] For state-level panel data, the fixed-effects method is preferred.[28] The fixed-effects model addresses the problem of unobserved heterogeneity by examining variation that occurs within a state over time; this allows a limited form of endogeneity.[29] Thus, the fixed-effects model is examining each state

individually (ignoring variation between the states, as this may occur for unobservable reasons) and estimating how changes in the independent variable (the amount of federal transfers to the state) predict changes in the dependent variable (the infant, neonatal, or postneonatal mortality rate for that state). The fixed-effects approach is widely used in economic analysis of panel data and nested groups,[27-29] and it assumes a linear relationship between the independent variable of interest and the dependent variable. This study also controls for year effects to rule out the possibility that the results are driven by broader trends in infant mortality rates or federal transfers.

RESULTS

Descriptive statistics for the sample are presented in Table 1. On average, 10.6% of state residents are African-American while 10.2% are Hispanic during the sample period. The average state-level poverty rate is 13.0% and ranges from a low of 5.4% to a high of 25.8%. State and local direct expenditures, GDP, and federal transfers were converted to 2013 dollar values using the inflation calculator provided by the Bureau of Labor Statistics (https://data.bls.gov/cgi-bin/cpicalc.pl). The average state-level GDP per capita is $50,636 and varies from $33,281 to $86,195. The average amount of federal transfers per capita is $2,033.

[Table 1 about here]

In Table 2, we examine the effect that changes in federal transfers have upon changes in infant, neonatal, and postneonatal mortality rates (the results of a variance inflation factor test and Cook's distance did not reveal issues with multicollinearity or influential observations). Table 2 indicates that controlling for each state's unique makeup and economic/demographic composition, increases in federal transfers are negatively associated with infant, neonatal, and

postneonatal mortality rates. These relationships are statistically significant and suggest that increases in per capita federal transfers predict decreases in state-level infant, neonatal, and postneonatal mortality rates. This effect is particularly pronounced when examining the impact of federal transfers upon a state's overall infant mortality rate. It is important to keep in mind that our model coefficients are predicting the effects of changes in the independent variables upon changes in the dependent variables, while holding state-specific characteristics constant.[27] As noted earlier, this approach is superior to a pooled-OLS regression when using state-level panel data because it allows us to observe how changes in the amount of federal transfers received by a state predicts changes in that state's infant mortality rate, while controlling for any state-level differences that may also affect infant mortality rates.[26]

[Table 2 about here]

The practical significance of these findings is substantial. Holding all other variables constant, a $200 increase in the amount of federal transfers per capita would save one child's life for every 10,000 live births. This figure is obtained by multiplying the coefficient estimate for the federal transfer variable (in the fixed effects model with infant mortality as the dependent variable) by two hundred. This yields the figure - 0.098, which is 0.1 fewer deaths per 1,000 live births (i.e., 1 fewer deaths per 10,000 live births). Given that the value of a lost life is several million dollars (and untold emotional cost), federal transfers appear to play a valuable role in reducing overall infant mortality.

DISCUSSION

Understanding the extent to which federal transfers are associated with infant mortality is critical for several reasons. First, the United States has among the highest infant mortality rates

within the group of Western industrialized countries. Understanding the role that federal initiatives might play in bringing down this rate is essential to improving pediatric health. Second, transfers are a large part of federal expenditures and represent a substantial source of revenue for state and local governments.[30] Thus, it is important to determine whether such transfers are achieving their intended effect by equalizing fiscal inequities in health outcomes across the states. Third, federally-funded programs provide valuable assistance to millions of American families. For example, prior research suggests that government policies which increase wages can, in turn, reduce infant mortality.[31] This study provides additional evidence by showing whether per capita increases in overall federal funding can also reduce infant mortality rates. This knowledge is important for federal officials who must decide on the amount of funding to disburse as well as state officials who must decide on whether to accept these funds.

Our results strongly suggest that increases in federal transfers are associated with reductions in infant mortality rates. This supports the argument that federal aid helps to ensure a minimum standard of care.[32] Without federal funds, states that have difficulty generating tax revenue might be forced to implement budget cuts. These cuts could strain social service providers and have an adverse impact on children's health. By collecting money at the national level and distributing it to under-resourced states, the federal government helps to promote equality of opportunity for children regardless of the state in which they happen to be born. In so doing, federal transfers can increase the welfare of American society as a whole, irrespective of state boundaries or regional differences.

We would argue that governors who have turned down federal funds should reconsider the benefits offered by federal aid. Even though transfers can lead to increased spending and taxes, the benefits of reduced infant mortality may outweigh these costs. This is not to trivialize

the importance of local autonomy, decision-making, or taxation; certainly these are valid considerations. But these costs must be weighed against the benefits of federal transfers, which may save a substantial number of children's lives

When viewing the U.S. infant mortality rate in the context of other developed nations, it is clear that the U.S. has significant room for improvement. Increased reliance on a system of federal transfers may provide an important key to achieving an infant mortality rate that is on par with other modern industrialized countries. These transfers could increase the welfare of thousands of children and families by sparing them the loss of a child. In addition, they could increase the welfare of American society as a whole by reducing the amount of productivity and innovation that is lost when infant children unnecessarily die.

It should be pointed out that this study has several limitations. First, it examines federal transfers in the aggregate. Thus, it does not parse out the effects of changes in the Children's Health Insurance Program, the Supplemental Nutritional Assistance Program, or other individual programs. However, while it is important to evaluate the effects of individual programs, we have argued that it is likely these programs work in concert. The goal of this study is not to evaluate a specific program but to determine whether federal transfers, generally speaking, are linked to infant mortality rates. This is important because it goes to the heart of the debate regarding federal transfers and whether they have a role in promoting public health. Evaluations of individual programs are critical to understanding the effectiveness of those programs, but it is also valuable to inquire whether the social safety net as a whole is working. Based on the results of this study, it appears that overall federal transfers to states have saved children's lives.

Nevertheless, it is true that some federal transfers might not have a direct effect on infant mortality. For example, Medicaid constitutes about half of federal transfers, and nearly two thirds of Medicaid dollars are spent on the elderly or disabled.[33-34] To test the robustness of our

findings, we re-estimated each of our models with a federal transfer variable that subtracted the amount of federal Medicaid dollars that individual states received. The sign and magnitude of the federal transfer variable for each model were similar to the results presented in Table 2. Thus, the robustness check suggests a strong relation between federal transfers and infant mortality rates.

A second limitation of our study is that we have focused on the 10 year time period from 2004 to 2013. While we controlled for year effects in the model to take into account general trends in federal transfers and infant mortality rates, future researchers could improve upon our work by examining additional time periods as data become available.

Third, this study is limited in its ability to show causality. While the fixed-effects regression allows the component of the residual term that pertains to state-level fixed effects to be correlated with the independent variables, this does not address potential correlation between the independent variables and the component of the residual term that does not pertain to state-level fixed effects. Assuming the residual term is comprised of two components, $\upsilon + \lambda$, where υ represents state-level fixed effects and λ is the component of the residual that does not pertain to state-level fixed effects, correlation of λ with the independent variables would bias the coefficient estimates.[27] Future researchers could remedy this by using instrumental variables estimation or making use of a natural experiment.

Finally, we have not performed a cost-benefit analysis to determine whether an increase in federal transfers would be politically feasible. The purpose of this study is simply to show that changes in federal transfers predict changes in infant mortality rates over time, and that the effects on infant children are not trivial. Future researchers should perform a cost-benefit analysis to determine if the cost of increased federal transfers justifies the potential health savings. However, researchers would be wise to recognize that reducing infant mortality rates is

just one potential benefit of transfers, and that all transfer benefits (e.g., increases in mothers' health) should be considered in the aggregate when determining whether an increase in federal transfer benefits outweigh the costs.

CONCLUSIONS

The system of intergovernmental transfers that has evolved over the past one hundred years in the United States is a source of significant contention. Public health agencies laud federal transfers for providing a minimum level of health for children, while governors turn down programs that are almost exclusively federally funded. Our research indicates that federal transfers were indeed successful in reducing infant mortality rates during the 10 year period from 2004 to 2013. In short, federal transfers can prevent the unnecessary deaths of thousands of children, and these benefits should be carefully considered when state officials are deciding whether to accept or reject federal funds.

REFERENCES

1. MacDorman MF, Mathews TJ, Mohangoo AD, Zeitlin J. International comparisons of infant mortality and related factors: United States and Europe, 2010. National Center of Health Statistics. Center for Disease Control and Prevention; 2014.
2. Chen A, Oster E, Williams H. Why is infant mortality higher in the United States than in Europe? *American Economic Journal: Economic Policy*. 2016; 8(2): 89-124.
3. MacDorman MF., Mathews TJ. Behind international rankings of infant mortality: How the United States compares with Europe. National Center for Health Statistics (NCHS) Data Brief. 2009;(23):1–8.
4. Xu J, Murphy SL, Kochanek KD, Bastian BA. Deaths: final data for 2013. National Center of Health Statistics. Center for Disease Control and Prevention; 2016.
5. Shi L, Macinko J, Starfield B, Regan J, Politzer R, Wulu J. Primary care, infant mortality, and low birth weight in the states of the USA. *Journal of Epidemiology and Community Health*. 2014; 58(5): 374-380.
6. Singh GK, Kogan MD. Persistent socioeconomic disparities in infant, neonatal, and postneonatal mortality rates in the United States, 1969-2001. *Pediatrics*. 2007; 119(4): e928-e939.
7. Schoendorf KC, Hogue CJR, Kleinman JC, Rowley D. Mortality among infants of blacks as compared with white college-educated parents. *New England Journal of Medicine*. 1992; 326(23): 1522-1526.
8. Schell CO, Reilly M, Rosling H, Peterson S, Ekstrom AM. Socioeconomic determinants of infant mortality: a worldwide study of 152 low-, middle-, and high-income countries. *Scandinavian Journal of Public Health*. 2007; 35(3): 288-297.

9. Rank, MR. *One Nation, Underprivileged: Why American Poverty Affects Us All*. New York, NY: Oxford University Press; 2004.

10. Boadway R, Shah A. *Fiscal Federalism: Principles and Practice of Multiorder Governance*. New York, NY: Cambridge University Press; 2009.

11. Moss NE, Carver K. The effect of WIC and Medicaid on infant mortality in the United States. *American Journal of Public Health*. 1998; 88(9): 1354-1361.

12. Gilbert, N. *Never Enough: Capitalism and the Progressive Spirit*. New York, NY: Oxford University Press; 2017.

13. Hatcher, DL. (2016). *The Poverty Industry: The Exploitation of America's Most Vulnerable Citizens.* New York, NY: New York University Press.

14. Murphy SL, Kochanek KD, Xu J, Heron M. Deaths: final data for 2012. National Vital Statistics Reports. US Department of Health and Human Services; 2015.

15. Tax Policy Center. State & Local Government Finance Data Query System. The Urban Institute-Brookings Institution website. Available at: http://slfdqs.taxpolicycenter.org/pages.cfm. Accessed December 12, 2016.

16. US Census Bureau. Annual Estimates of the Resident Population by Sex, Race Alone or in Combination, and Hispanic Origin. The US Census Bureau website. Available at: https://www.census.gov/popest/data/state/asrh/2014/index.html. Accessed December 12, 2016.

17. US Census Bureau. Intercensal estimates of the resident population by sex, race, and Hispanic origin for states. The US Census Bureau website. Available at: http://www.census.gov/popest/data/intercensal/state/ST-EST00INT-03.html. Accessed December 12, 2016.

18. US Census Bureau. Number of poor and poverty rate, by state: 1980 to 2015. The US Census Bureau website. Available at: http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-people.html. Accessed December 12, 2016.
19. US Department of Commerce. Bureau of Economic Analysis. The Bureau of Economic Analysis website. Available at: http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2#reqid=70&step=10&isuri=1&7003=200&7035=-1&7004=naics&7005=1&7006=xx&7036=-1&7001=1200&7002=1&7090=70&7007=-1&7093=levels. Accessed December 12, 2016.
20. Frank MW. A new state-level panel of annual inequality measures over the period 1916–2005. *Journal of Business Strategies*. 2014; 31(1): 241-263.
21. Khanani I, Elam J, Hearn R, Jones C, Maseru N. The impact of prenatal WIC participation in infant mortality and racial disparities. *American Journal of Public Health*. 2010; 100(S1): 204-209.
22. Almond DV, Chay KY, Greenstone M. Civil rights, the war on poverty, and black-white convergence in infant mortality in the rural south and Mississippi. *American Economic Review*. In press.
23. Sparks, PJ, McLaughlin, DK, Stokes, CS. Differential neonatal and postneonatal infant mortality rates across US counties: The role of socioeconomic conditions and rurality. *Rural Health*. 2009; 25(4): 332-341.
24. Grossman M, Jacobowitz S. Variations in infant mortality rates among counties of the United States: the roles of public policies and programs. *Demography*. 1981; 18(4): 695-713.

25. Stiglitz JE, Rosengard JK. *Economics of the Public Sector*. 4th ed. New York, NY: W. W. Norton & Company; 2015.

26. Newman KS, O'Brien RL. *Taxing the Poor: Doing Damage to the Truly Disadvantaged*. Berkeley, CA: University of California Press; 2011.

27. Kennedy PE. *A Guide to Econometrics.* 6th ed. Malden, MA: Blackwell Publishing; 2008.

28. Wooldridge JM. *Econometric Analysis of Cross Section and Panel Data.* Cambridge, MA: The MIT Press; 2010.

29. Cameron AC, Trivedi PK. *Microeconometrics Using Stata*. College Station, TX: Stata Press; 2009.

30. Moncrief GF, Squire P. *Why States Matter*. Lanham, MD: Rowman & Littlefield Publishers; 2013.

31. Komro KA, Livingston MD, Markowitz S, Wagenaar AC. The effect of an increased minimum wage on infant mortality and birth weight. *American Journal of Public Health*. 2016; 106(8): 1514-1516.

32. American Public Health Association. The American Public Health Association website. Available at: https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/15/15/58/federal-grants-and-public-health. Accessed December 12, 2016.

33. Kaiser Family Foundation. (2017). Medicaid spending by enrollment group. FY 2011. Retrieved from: http://kff.org/medicaid/state-indicator/medicaid-spending-by-enrollment-group/?currentTimeframe=0.

34. The Pew Charitable Trusts. (2014). Federal spending in the states. Fiscal Federalism Initiative. Retrieved from: http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2014/12/federal-spending-in-the-states.

Table 1

Descriptive statistics

State-level observations, 2004-2013

	N	Mean	SD	Min	Max
Infant mortality rate	500	6.5	1.3	3.8	11.4
Neonatal mortality rate	497	4.3	0.9	1.9	6.7
Postneonatal mortality rate	497	2.3	0.7	1.0	4.7
Proportion of black residents	500	10.6	9.5	0.4	37.4
Proportion of Hispanic residents	500	10.2	9.8	0.9	47.3
Poverty rate	500	13.0	3.4	5.4	25.8
Gini coefficient	500	0.6	0.0	0.5	0.7
Gross domestic product (per capita)	500	50,636	9,800	33,281	86,195
State and local direct expenditures (per capita)	500	4,897	3,556	934	18,104
Average freshman graduation rate	500	77.7	7.6	51.3	93.3
Federal transfers received (per capita)	500	2,033	659	919	4,932

Table 2

Fixed-Effects Regressions of the Infant, Neonatal, and Postneonatal Mortality Rates

Dependent Variable: Infant Mortality Rate, Neonatal Mortality Rate, Postneonatal Mortality Rate

	Infant mortality rate	Neonatal mortality rate	Postneonatal mortality rate
Intercept	4.3	4.6	-0.17
Proportion of black residents	0.25*	0.15	0.097
Proportion of Hispanic residents	-0.12	-0.038	-0.010*
Poverty rate	-0.019	0.0025	-0.022*
Gini coefficient	0.59	-1.62	2.2*
Gross domestic product (per capita)	0.00000097	0.00000029	0.00000063
State and local direct spending (per capita)	0.000057	-0.00000058	0.000058**
Average freshman graduation rate	-0.019	-0.019*	-0.00045
Federal transfers received (per capita)	-0.00049***	-0.00027*	-0.00019*

*Note. * = $p \leq .05$, ** = $p \leq .01$, *** = $p \leq .001$. (Two-tailed test)*

Source	N	F-statistic	P-value	R^2	Adj. R^2
Infant mortality rate	500	51.7	0.00	0.89	0.87
Neonatal mortality rate	497	28.4	0.00	0.81	0.78
Postneonatal mortality rate	497	33.3	0.00	0.84	0.81