E C O N O M I C S B U L L E T I N

Does the distribution of New Deal spending reflect an optimal provision of public goods?

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Abstract

Since 1969 more than a dozen studies have explored the grossly unequal state-level distribution of New Deal spending. Why did small population rural states such as Nevada, Montana, and Wyoming receive up to six times as many federal dollars per capita as densely populated states such as Connecticut, Rhode Island, and New York? Empirical studies employing economic and political variables have had mixed results in explaining this distribution. What past studies neglect is that a large proportion of New Deal dollars went towards the creation of public goods, which had spillover effects particularly upon those who lived in close proximity to these projects. This note suggests that the state-level distribution of per capita expenditures during the 1930s is consistent with what would be expected to follow from an economically efficient allocation of public goods.

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1. Introduction

For more than three decades, scholars have explored the efficacy and cause of the unequal state-level distribution of per capita New Deal expenditures between 1933 and 1939.[1] To illustrate, states with small populations, and particularly those that are sparsely populated, such as Montana, Wyoming, and Nevada received up to *six times* as many federal dollars per capita as states with large and/or dense populations such as New York, Rhode Island, and Connecticut. Of course New Deal spending was supposed to target economic need. If these past studies had found, for example, that Nevada had six times the need for economic relief and recovery, as proxied by unemployment rate, percentage income decline, and other measures, than states such as New Hampshire and Rhode Island, scholars would likely have concluded that the pattern of expenditures was, in fact sensible. However, per capita spending "loser" states, such as New York, Connecticut, and Massachusetts, generally had higher unemployment and saw sharper income declines during the Great Depression than did the "winner" rural states.

In absence of finding a strong empirical relationship between economic need and spending, public choice interpretations, starting with Wright (1974), have explored political explanations for the variation in the state-level spending. For example, the aforementioned Mountain states tended to be "swing states" whose Electoral College votes were generally among those most "in play" for presidential elections. Additionally, small population states have, by construction, the most electoral votes per capita since they have more senators per capita, an important measure in public choice studies of congressional influence.[2] These findings suggest that New Deal spending may have been used to carry out political agendas at the expense of economic efficiency.

An underlying premise of the New Deal expenditure literature is that per capita spending is a suitable proxy for the per capita impact those dollars had on the lives of citizens. Empirical models used to examine whether political or economic variables can explain the variation in New Deal spending implicitly assume that citizens of Montana, where per capita spending was $986, benefited four times as much as citizens of New Hampshire, where $248 per capita was spent. We offer a "spillover" interpretation which could help explain some of the rural state per capita expenditure bias, a bias that has also been found in studies of the postwar era such as Atlas, et. al. (1995), which has not been discussed previously. Given that a large portion of New Deal spending went toward spillover-creating public capital, economic theory suggests that in order to meet the efficiency condition for public goods, densely populated states would receive less *per capita* spending than rural states *for any level of per capita economic benefit*, as is

[1] Arrington (1969), Reading (1973), Wright (1974), Wallis (1984, 1987, 1998, 2001) Anderson and Tollison (1991), Couch and Shugart (1998, 2000), and Fleck (1999, 2001), among others have examined the state-level distribution of New Deal expenditures. Fishback, Kantor, and Wallis (2003) have expanded these studies through the use of county-level data.

[2] For a recent example of the importance of senators per capita, see Atlas, et. al. (1995) who empirically demonstrate that states "overrepresented" in the Senate—that is small population states—secured significantly higher per capita expenditures between 1972 and 1990.

consistent with 1930s expenditure patterns. Given this, the state-level per capita distribution of New Deal expenditures appears to be consistent with economic efficiency.[3]

2. Public capital and the New Deal

While clearly not all New Deal spending went to such projects, the expansion in spillover-creating public capital such as roads, bridges, water and sewage systems, schools, hospitals, power plants, and airports, among others, during 1930s is indisputable. For example, the installed capacity of publicly owned electricity generating plants rose 55 percent between 1932 and 1939, while capacity of hydroelectric power rose 35 percent across the decade.[4] Miles of surfaced roads on state highway systems increased 34 percent from 1930 to 1940.[5] The number of municipal airports rose 42 percent between 1932 and 1938.[6] The construction of new school capacity accompanied a 50 percent boost in enrollment in public high schools from 1930 to 1940.[7] Hospital bed capacity rose 35 percent between 1933 and 1942.[8] Although the economy languished well below full employment throughout the 1930s—and some New Deal spending went toward either direct income redistribution or so-called "leaf raking" projects that brought no spillover benefits—the stock of public capital boomed in large part due to a series of government re-employment projects entailing the construction of such investments.

If one wishes to evaluate the relative welfare gains brought about by New Deal expenditures, the use of *per capita* spending is clearly problematic.[9] Public capital projects are to some extent non-rival and/or non-excludable. Multiple people, in some cases the entire population, may benefit from the production of such projects. Aschauer (1988, 1989, 2000), Deno (1988), Munell (1990) Barro (1991), and Easterly and Rebelo (1993), among others, empirically demonstrate that public capital investments significantly increase the rate of return to private capital investments. Similarly, Haughwaut (2002) notes that public capital can favorably influence the location of future economic activity and provides

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[3] We not concerned with intent in this note—i.e. we do not speculate as to whether or not New Dealers meticulously attempted to meet the efficiency condition for the allocation of public goods. Independent of motive, which has been a large focus of past work, the primary purpose of this note is to show that the distribution of New Deal spending is in line with what would be expected to follow from an efficient allocation of public goods.

[4] Power capacity statistics are from the 1940 *Statistical Abstract of the United States*, tables 444 and 457.

[5] *Statistical Abstract of the United States*, 1943, table 484.

[6] *Statistical Abstract of the United States*, 1940, table 514.

[7] *Statistical Abstract of the United States*, 1943, table 231.

[8] The data point for 1933 is from the *Journal of the American Medical Association* (1934), page 1009, and the 1942 data point is from the *Statistical Abstract of the United States*, 1943, table 87.

[9] Not to say that this is the primary objective of past New Deal political economy studies. Such studies have generally been attempting to measure the responsiveness of federal spending to political and economic variables, rather than the impact of that spending. However, "impact" may provide a potential explanation for the general weakness of political and economic variables in capturing the variation in New Deal spending.

various non-pecuniary household benefits. Thus public capital projects likely helped promote recovery from the Great Depression in the areas near such projects beyond any demand stimulus those dollars may have provided.

Past literature has focused primarily on divining the "intent" behind the distribution of federal expenditures while "efficacy" has been largely implicit in the background. Let us shift the focus. What if New Dealers, intentionally or not, spent economically efficient amounts on public goods—that is shifting any appropriation from one state to another would cause a net loss in aggregate welfare (i.e. the marginal benefits of spending are equalized across all states)?[10] What attributes would such an allocation amongst the states have?

The law of diminishing marginal returns suggests that the benefits of each additional dollar spent are falling. Clearly, the marginal benefits of the initial dollars spent creating public capital, then, will be highest in highly populated areas, *ceteris paribus*, since this is where a spillover-producing project would generally affect the most people. In fact, highly populated states like New York received the most *total* New Deal spending, consistent with such efficiencies. To illustrate, dollars spent on the Triborough Bridge complex benefited millions of people in the New York metropolitan area either directly or indirectly through lower traffic congestion, increased rates of return to investment, and increased leisure time. Were those same dollars spent upon a similar project in a far smaller urban area such as Pocatello, Idaho, they would clearly have had a much smaller welfare impact.

Now consider the *marginal returns of per capita spending*. Because of spillover effects, the marginal return on an additional dollar of *total* spending and an additional dollar of *per capita* spending are predictably incongruent. In particular, the marginal return on per capita spending on public capital is necessarily *falling faster* in highly populated areas than it is in lowly populated ones. This follows because, for any given amount of per capita spending, a high population state, by definition, has more *total* spending than a low population one and with respect to the production of perfectly non-rival public goods, it is the total quantity of spillover-creating goods, not the per capita quantity, that most closely correlates to benefits. The end result is that, *ceteris paribus*, a high population state will generally reach its efficiency condition with *fewer per capita dollars* spent on spillover-creating public capital than a low population one.

3. A simple two-state example

For the purpose of exposition, suppose that in a state, "Small," with a population of 100, the federal government spends $1,000, i.e. $10 per capita, on a perfectly non-rival public good that creates an average of $20 of benefit to each citizen of Small (assume benefits do not spillover to other states). Suppose that another state, "Large," with a population of 500, also receives $1,000, in this case only $2 per capita, for the creation of the very same public good, which also generates an average of $20 of benefit to each of its

[10] This definition of efficiency says nothing about "global efficiency." It does not presume that New Dealers necessarily spent the efficient amount on public goods for the entire economy. Rather it examines efficiency for any given total allocation of public goods in the United States. The analysis in this paper is independent of whether or not global efficiency is met.

citizens. Both of these states receive the same *per capita economic benefit* from the public good, an average of $20, even though federal *per capita spending* is five times higher in Small than in Large.[11]

From here consider the effect of an *additional dollar* spent creating non-rival public capital in the two states. The one-thousand and first dollar would clearly have more positive impact in Large since five times as many people could benefit from the public capital's creation. Clearly then, other factors constant, an efficient provision of public goods would have more *total* spending in Large than in Small. Following through on this logic, suppose efficiency—i.e. where the marginal benefits of spending are equal in the two states—was reached at, say, $4,000 of total spending in Large, and $2,000 in Small. In per capita terms, Large receives $8, while Small receives $20. While the margins are equated, with respect to total per capita benefits, citizens of Large are actually better off than those of the Small even though they received *fewer per capita* expenditures. See the *Appendix* for a graphical analysis of this particular case and for more general support of the supposition that an efficient level of per capita spending on pure public goods will normally be higher in small population states.

4. Impure public goods, population, and population density

Of course the analysis above is a simplification, as perfectly non-rival public goods, which have a similar impact upon everyone in a state are the exception rather than rule. Most public capital projects cannot be classified as pure public goods, but rather *impure* ones. In particular, spillovers from public capital such as roads, bridges, schools, libraries, and streetlights will generally create economic benefits only to those who live or work in the areas near them rather than equally to all citizens of the state. To the extent that depression-era public capital projects were associated with geographically-limited spillovers, a state's *population density* would play a particularly important role in determining the economic benefits accrued from the creation of public capital. Specifically, *ceteris paribus*, citizens in a densely populated state such as Rhode Island would have received more per capita economic benefit from a dollar spent on the creation of public capital than those living in a sparsely populated, rural state such as Wyoming or Montana, because a greater number of Rhode Islanders would have been likely to live in the vicinity of the capital. This suggests that highly and densely populated states should have received *fewer* per capita expenditures than small population and rural states, other factors held constant, if the distribution of spending on public goods was economically efficient.

Table 1 lists the 48 states in order of their per capita allotment of New Deal spending between 1933 and 1939 and reports the state's ranking with respect to both inverse population and the inverse of its population density. The correlation is striking. The nine least densely populated states (and 14 of 15) are also the nine states that received the most per capita New Deal expenditures. Whether New Dealers meant it to be or not, this expenditure distribution is entirely consistent with an efficient provision of spending on spillover-creating public goods.

[11] Another way to view this is that the *total* benefits are five times higher in the large population state than the small given the same level of *total* spending.

Relevant to this discussion, Wallis (1998, 2001) and Fleck (2001) recently incorporated population and population density into their analyses of New Deal spending and have found, not surprisingly in light of Table 1, that these measures can account for the vast majority of the state-level variation.[12] In fact, when Fleck (2001, p. 302) includes inverse population density (land per capita), he claims his regressions, which have high r-squares and coefficients on the political and economic variables that are consistent with their predicted signs, reveal "an empirical relationship that has eluded economists for over 25 years." While Wallis and Fleck attribute the explanatory power of population and population density to factors such as spending formulas or needing money to maintain land, these variables serve as a useful *proxy for the quantity of spillover effects* associated with public goods. A public goods analysis, then, could provide an alternative explanation to past findings.

5. Conclusion

While social scientists face clear challenges in attempting to divine the intent behind government spending, we can examine those expenditures in light of economic efficiency. The economic theory of public goods suggests that the general distribution of New Deal spending, with rural states getting more per capita spending than densely populated ones, is consistent with this end. Further empirical work should examine the composition of state-level New Deal projects to more precisely determine the extent that expenditures in various states went to spillover-creating public capital rather than simply transfer payments such as agricultural subsidies or "leaf-raking" type projects.

[12] Wallis (2001) finds that a parsimonious regression with an intercept, inverse population, and population density as independent variables, can explain over 70 percent of the variation in per capita New Deal spending. Inverse population is positive and significant while population density is negative and significant.

Table 1
Per Capita Spending, Inverse Population, and Inverse Population Density Rank

State	*Per Capita Allocation*	*Inverse Pop Rank*	*Least Dense Pop Rank*
Nevada	1499.39	1	9
Montana	986.30	10	2
Wyoming	896.91	2	1
Arizona	791.46	6	4
Idaho	744.15	7	5
North Dakota	707.84	11	8
South Dakota	701.61	12	7
New Mexico	689.76	8	3
Utah	569.49	9	6
California	538.10	44	22
Nebraska	536.87	17	12
Oregon	535.66	15	11
Washington	527.77	19	15
Colorado	506.30	16	10
Iowa	466.70	29	23
Kansas	434.30	20	13
Minnesota	425.50	31	18
Arkansas	396.12	25	20
Vermont	390.49	4	21
Wisconsin	390.26	36	30
Michigan	388.99	42	37
Ohio	383.24	45	41
Florida	377.21	23	19
Louisiana	369.88	28	25
Illinois	364.88	46	40
Texas	361.70	43	14
Mississippi	358.18	26	24
Maryland	344.82	21	42
Tennessee	344.48	34	33
Oklahoma	342.66	27	17
Missouri	340.07	39	28
Maine	336.07	14	16
New York	334.81	48	44
Indiana	333.22	37	38
New Jersey	330.47	40	47
Delaware	310.13	3	39
Alabama	309.78	32	29
South Carolina	306.43	22	31
Massachusetts	286.26	41	46
Georgia	272.69	35	26
West Virginia	265.11	24	36
Pennsylvania	260.88	47	43
Virginia	254.91	30	32
Kentucky	251.04	33	34
New Hampshire	247.76	5	27
Rhode Island	246.56	13	48
Connecticut	236.92	18	45
North Carolina	227.55	38	35

Source: New Deal expenditures are from Reading (1973). Population density was computed by dividing population by acres of land—both variables come from the 1940 Census.

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Appendix

Figure 1A shows the corresponding marginal benefits of pure public goods in the case of two states described in the text, "Small" with population of 100 and "Large" with population of 500. Two properties of note are:

(1) The marginal benefit equals zero (intercept of the X-axis) at the same quantity of pure public goods in both states. This follows by construction since we assume that the citizens of Large and Small have identical preferences such that the same Q^{th} unit of the pure pubic good provides no additional utility.

(2) The marginal benefit curve of Large (MB_L) is always five times higher than the marginal benefit curve for Small (MB_S), for all positive marginal benefits. This follows because each unit of the pure public good provides the same average benefit to each citizen, and there are five times as many citizens in Large as in Small. Note that for this to be true, MB_L is sloped five times as steeply as MB_S, so that the marginal benefits of additional projects are falling five times faster in Large as in Small.

Given the properties described by (1) and (2), at any quantity of pure public goods, such as Q_S, the marginal benefit for Large ($5c$) is five times that for Small (c). Furthermore, for any constant marginal cost of providing a unit of the pure public good, such as c, "Large" will always (assuming the equal-marginal definition of efficiency) receive a greater provision than "Small" so that $Q_L > Q_S$. However, since Large's population exceeds Small's by a factor of five, Small will have more *per capita* spending so long as Q_L is less than five times as large as Q_S ($Q_L < 5Q_S$). This will be true for all c below $c\sim$. In summary, for any marginal cost below $c\sim$, an efficient level of *per capita* spending on public goods will necessarily be higher in Small than in Large.

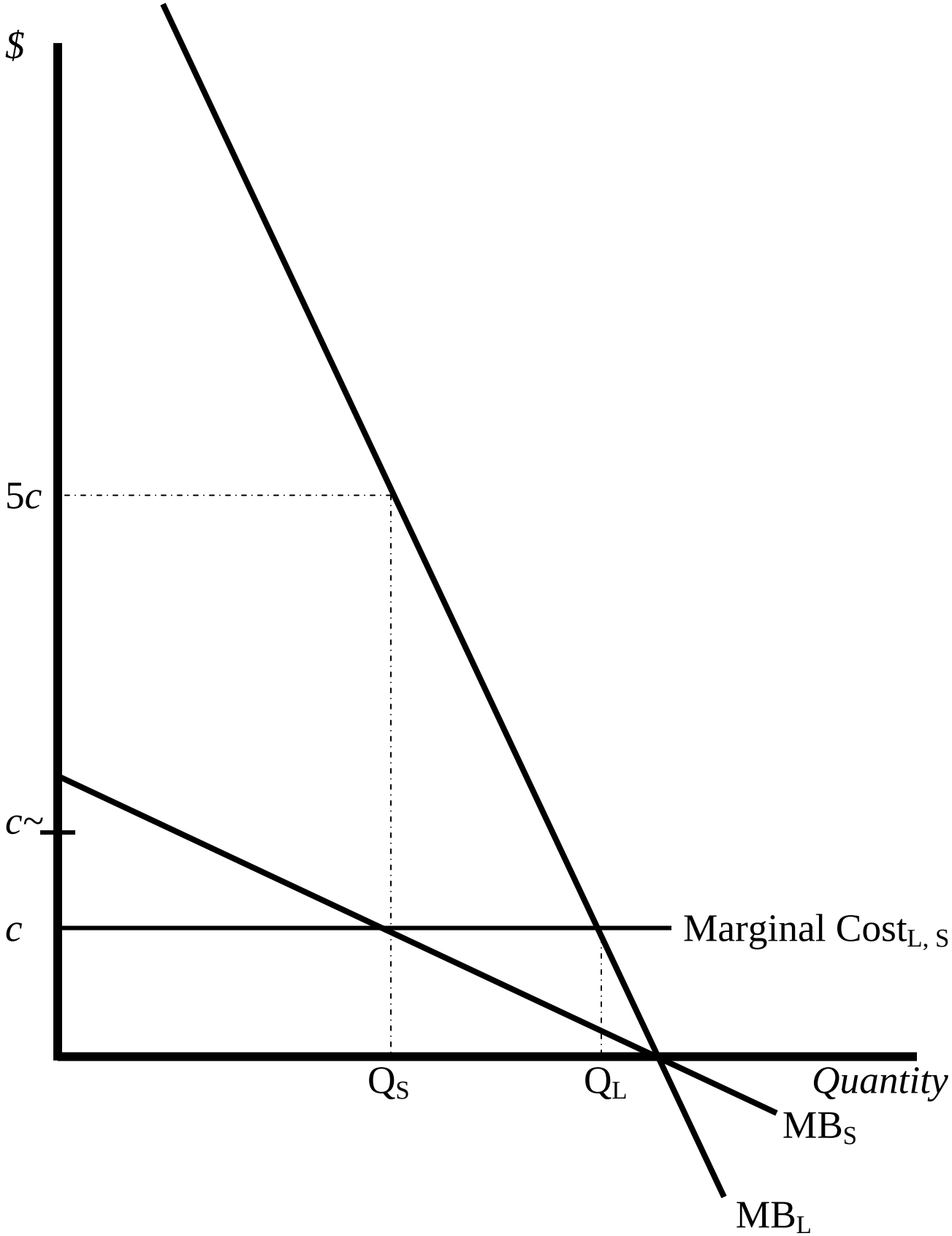

Figure 1A