

EXPLORATIONS IN THE OFFICIAL REGISTER:

STATISTICAL ANALYSES OF POSTMASTER COMPENSATION DATA FROM

19TH CENTURY NEW HAMPSHIRE

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ABSTRACT

For most of the 19th Century and the early part of the 20th Century the Official Register published biannually the salaries of postmasters of every post office in the United States. These salaries were a function of the amount of business done by each individual post office. Thus, the postmaster compensation data may provide valuable economic information on the business climate and activity in individual towns across the nation both geographically and temporally at a level of detail heretofore unavailable. In this paper we provide preliminary examples of the usefulness of the Official Register postmaster compensation data. It is our intent, through these analyses, to demonstrate the potential usefulness of this data set for the analyses of a greater range of economic variables.

The raw compensation data is not particularly useful as such because over the years different formula were used to derive compensation from income accruing at a post office. It is necessary to transform the raw compensation data by use of these formulae. In our analyses we have examined the relationships between economic and demographic data and postmaster compensation from the state of New Hampshire. New Hampshire was chosen because New Hampshire census data is available on-line and we had the complete Official Register compensation data for all New Hampshire post offices available.

Our findings suggest that, when transformed, the postmaster compensation data does provide a useful source of information on economic activity at the local level.

I. INTRODUCTION.

A continuing problem for economists interested in wealth, income and economic activity in 19th century America is a distinct lack of good economic data, especially for the early part of the century. There seems to be no data set that could provide these variables that is anywhere near complete both geographically and temporally. Thus, economists have been forced to rely on measures that are, to say the least, quite removed from the actual economic variables of interest. Worse, the data sets economic historians have used are comparatively crude, haphazard, non-random and irregular “precursor” materials. Probate records, farm books (Mr. Jefferson’s is a classic example), village tax records, newspaper reports of price, merchant inventories, export and import data related to excise tax collections, letters and tax records have all been used. Early American governments often taxed personal as well as fixed wealth. Tax documents can be found that detail taxes paid by households subject to such levies.

For the earliest years, capitalizations of the great trading companies, from the West India Company to the Hudson’s Bay Company, as well as other sources, have been used to make indirect, wealth based estimates of income. Excellent examples of this can be found in Coclanis’ (2005) edited volume. Data sources used include capital invested in the West India Company, wine imports into New York, expenditures on Indians in South Carolina and average wealth at death of certain persons in New York, Massachusetts, South Carolina and Jamaica. This last data source focused on estates in which there were significant holdings of wine, especially Madeira. Wines, especially expensive ones such as Madeira, attracted the attention of the tax authorities and thus careful records were

kept (or fudged – who knows?) by individuals charged with reporting to the probate courts.

Engerman and Gallman (19??, p. 6) point out that “Such measures are neither comprehensive nor unbiased”. For example, Jones (1980) used probate records to estimate per capita wealth in early America and came up with a figure of 76 pounds. Hughes and Cain (19??, p. ???) use this figure and then note that “dividing this figure by various capital output ratios produces a result that is a measure of output (income) per head... Historic capital output ratios fall somewhere between the boundries 3/1 and 5/1.” Thus, the estimated income per head could be anywhere from 15 to 25 pounds, a rather wide range. According to Abramovitz and David (19??, p. 66) income estimates for the period before 1870 “are surrounded by particularly wide margins of uncertainty”. In this essay, the authors refer to highly aggregated data on the national level. Detailed data at the local level has heretofore simply been unavailable. Most income estimates made by historians who study the 18th and 19th centuries are built up from such indirect data..

It appears that virtually all of the standard information used by economic historians to estimate income and economic activity in the 19th century is either highly aggregated or, when micro economic, irregular in time and incomplete in geographic extent. This state of affairs has led to at least one highly creative attempt obtain more comprehensive data. Komlos (1987) used the heights and weights of West Point cadets as surrogates for economic variables. While highly creative, the use of such data suggests a bit of desperation on the part of scholars in this field if they are willing to use variables that have at best an extremely distant and at worst ultimately unknowable relationship to the actual variable(s) of interest.

Economic historians agree that “measurement and analysis of economic growth ... call for a very large volume of data”. Unfortunately, “before 1840 no regular or reasonably complete census of economic activities was carried out in the United States” (Davis, 1972, p. 16). Even after 1840 data that closely mirrors economic activity at the local level and is available at regular chronological intervals throughout the remainder of the 19th century has not been known to economic historians.

In the next section we describe a data set previously unknown to economic historians that contains data that we argue provides a measure of economic activity in every town in the United States every two years from 1816 to 1911 that is much more accurate than anything previously known.

II. THE OFFICIAL REGISTRAR.

For most of the 19th century and the first decade of the 20th, the federal government published biannually a listing of the salaries of every government employee. While the exact title of this publication changed from time to time (Harris, 1977; Hecht, 1961), it is generally referred to as the *Official Register*, abbreviated hereinafter as OR. The OR is of special interest to economists and economic historians as it reports the salaries of the postmaster of each post office in the United States and territorial. Postmaster salaries were, during the period the OR was published, a function of the amount of business each post office did. The formulae for deriving total postal income at a given post office from the salary data in the OR are available in the appropriate United Statutes At Large. Happily, they have been summarized in a Congressional report (Joint Commission on

Postal Salaries 1921). It is our hypothesis that local level postal income can be used as a measure of economic activity at the local level. By examining changes in local postal income over time and space, local, regional and national trends in economic activity can be charted at a level of detail previously impossible. We will test this claim in the next section.

The OR data was first discovered and used by postal historians, generally philatelists who are interested in postal rates, the transportation of the mails, the postmarks and other postal markings used on envelopes (termed “covers” in philatelic jargon) and postal procedures. This is a major portion of modern organized philately and has it’s own considerable technical literature.

Postal historians have been interested in the OR data as it gives an idea of how rare covers from various post offices are. Generally, one would expect that post offices doing less business would generate fewer covers and covers from such offices would be rarer than those from offices doing more business. Stach (2003, undated) has found that the correlations between postmaster compensation and number of known covers from post offices in the Nebraska and South Dakota Territories are, respectively, $r = + .94$ and $r = + .88$.

The original printed volumes of the Official Register are extremely rare. Even the largest institutional libraries do not have anything approaching a complete set. Such a set does exist in the collection of the Library of Congress. However, efforts are now underway to digitize the OR data through the 1871 volume (O’Reilly 2006).

III. OR DATA AND ECONOMIC VARIABLES.

This section provides a preliminary analysis, using the data from New Hampshire post offices, of the relationships between postmaster compensation data and economic and demographic variables. New Hampshire was chosen because one of us (TH) has copies of the New Hampshire data from all the ORs and because New Hampshire is the only state for which census data is available on-line. This data can be found at the web site of the New Hampshire Historical Society, www.nhhistory.org.

The specific data reported in the OR varied over the almost 100 years of this title's publication. For the entire period, 1816 through 1911, compensation for each postmaster is reported. For the years 1841 through 1869, in addition, the "net proceeds" at each office is reported. Adding the compensation to the net proceeds results in the total postal income for the post office that year (Harris, 19??).

While it was always the case that as postal income increased, postmaster compensation increased, this relation was not a simple one but an incremental one. That is, as income increased, postmasters received a decreasing percentage of incremental income. Further, the exact formula for compensation varied over the years as Congress altered the way postmaster compensation was computed. The details of these changes in compensation rates are beyond the scope of this paper, but can be found in Joint Commission on Postal Salaries (1921). As an example, under the Act of June 22, 1854, postmasters received 60% of the first \$100 of income, 50% of the next \$300, 40% of the next \$2000 and 15% on all income over \$2400.

The incremental nature of the compensation formulae presents a problem for some statistical analyses. This is because the formulae result in distributions of compensation values that have smaller variances than the distributions of actual income values. In other words, the distributions of compensations are compacted relative to the distributions of actual incomes. Especially for correlational analyses, the restricted range of the compensation data may cause one to miss effects that would be found were the total postal income data, with its greater variance, to be used. This, of course, isn't a problem for those years when both compensation and net proceeds are provided as one may simply add the two (but see below). However, for years where only compensation is provided it is necessary to calculate the income based on the compensation schedules provided in the Joint Commission on Postal Salaries (1921) publication. Happily, for most years this is rather straightforward.

IV. PRELIMINARY ANALYSES..

Before undertaking an analysis of the compensation data, it is important to establish that the basic data on postal income is economically relevant. One way to approach this question is to examine postal income data at the national level and see if it is correlated with important economic variables. The 1911 Annual Report of the Postmaster General gives the audited postal revenues for each fiscal year from 1837 through 1911 (p. 387). These figures were correlated with the nominal Gross Domestic Product of the corresponding years taken from the on-line economic history databases at www.eh.net. The resulting Pearson product-moment correlation is $r = +$

.976 ($p < .001$). This very high correlation shows that, at least at the national level, postal revenues do correlate impressively with GDP and thus suggests that postal revenues do reflect economic activity. For even earlier years, the 1831 Annual Report of the Postmaster General reported total postal receipts for 1789 through 1830. Correlating these numbers with nominal GDP (starting with 1780 – nGDP is not available for 1789) resulted in another high correlation: $r = + .84$ ($p < .001$). These high correlations gave us some confidence that postal data have some relationship to economic factors and spurred further analyses.

As noted above, for some years the OR reported only the postmasters' compensation. Using the formulae published in the statutes relating compensation to total postal income, it should be possible to derive total postal income from the compensation data. For example, in 1859 the Concord NH postmaster received \$1783 (rounded to the nearest dollar) in compensation. But for the year 1859 the OR reports not only the compensation, but also the net income. Adding the two together produces total postal income (Harris, 19??) of \$5424. If compensation were based only on postal income, a calculation of the 1859 Concord post office income using the compensation rates in effect at the time should result in a figure of approximately \$5425. This calculation actually yields a figure of \$7553, a difference of \$2129, or 39%.

TABLE I. Calculation of estimated income for Concord NH 1859.

Actual Compensation	Net	Sum
\$1783	\$3641	\$5424

Calculation:

Range	Income Amount	Comp. %	Comp	Remainder
				\$1783
\$0 - \$100	\$100	60%	\$60	\$1723
\$100 - \$400	\$300	50%	\$150	\$1573
\$400 - \$2400	\$2000	40%	\$800	\$773
\$2400+	\$5153	15%	\$773	\$0
Sum	\$7553		\$1783	

This calculated figure is higher than the actual income because postmaster compensation included monies for things other than postal income such as box rents, extra pay for delivery of late mails, delivery newspapers and the like. One would expect that the discrepancy between the actual reported income and estimated income would be in the positive direction. Further, the discrepancy should be larger for larger post offices where the postmaster would have greater opportunities for earning additional compensation not directly related to the amount of money his office received. To test this hypothesis and to get an idea of how generally reflective of true total postal income the reported compensation figures were, a total of 25 New Hampshire post offices varying in size were selected from the 1859 OR. For each office, the compensation due based on the reported compensation plus net income figure was calculated. The difference was then expressed as a percentage with positive percentages indicating the reported compensation was greater than the

calculated compensation. The average difference was 12% with a standard deviation of 22. Of the 25 offices, 19 had positive differences and six had negative differences.

Positive differences are fairly easy to explain. Postmaster compensation included monies for things other than postage paid at the office. Depending on the specific compensation rules in effect, these included extra compensation for such things as receipt of newspapers, post office box rents, onward routing of letters, receipt of mails after a certain time at night. These extra sources of compensation a postmaster earned would be more likely to occur at the larger post offices. This supposition is supported by the fact that the correlation between the percentage difference between reported and calculated compensation and reported compensation is a significant $r = + .40$ ($p = .047$).

The negative differences may have been due to fines for various infractions but additional research will be needed to investigate the rules for such fines and the characteristics of post offices with negative differences.

V. POPULATION EFFECTS.

In the previous section the general validity of calculating estimated post office income from the published postmaster compensation data was established. This being the case, it is appropriate to investigate further the factors that correlate with the estimated income variable. An obvious candidate is population. A simple prediction is that as the population of a town or city increases, so will the amount of business its post office does, resulting in a higher postal income for that town. There are two ways to examine the relationship between population and estimated income. The first is to

examine the relationship for a each census year for which data is available. Here this means the decennial census years of 1820 to 1910. The year 1880 is not included in the present analysis as the law in effect in 1880 relating the postmaster compensation is extremely unclear as to how compensation was calculated. Thus, it has not, yet, been possible to calculate estimated postal incomes. For the other years, however, the correlations between estimated income and population are consistently high and positive, as shown in Table II. All correlations reported in this paper are Pearson Product-Moment correlations.

It was not feasible to calculate the estimated income for all the several hundred post offices in new Hampshire every census year. To simplify matters, a quasi-random sample of 19 post offices was chosen from the list of New Hampshire post offices operating in 1850. This resulted in the year 1820 having fewer than 19 offices in the sample as seven offices that were operating in 1850 had not yet opened in 1820. By 1910, one office, Middleton, had closed, thus reducing the 1910 sample to 18 offices. In order to assure that the obtained correlations would not be artifactually small due to range restriction effects, all the largest post offices were included in the sample as well as a range of other sizes from medium to small.

TABLE II. POPULATION VERSUS ESTIMATED POSTAL INCOME FOR CENSUS YEARS 1820 TO 1910.

Census Year	Correlation	Significance	N
1820	.88	.001	12
1830	.85	.001	19

1840	.91	.001	19
1850	.96	.001	19
1860	.97	.001	19
1870	.97	.001	19
1880	not calculated – see text.		
1890	.92	.001	19
1900	.96	.001	19
1910	.97	.001	18

Correlations were also calculated between population and the uncorrected “raw” compensation data. These correlations were also consistently high and positive. As would be expected based on the argument above that the compensation figures truncate the actual distributions of income, these correlations were generally somewhat smaller than those reported in Table II. The correlation for 1880 was $r = + .90$ ($p < .001$).

It is also possible to examine the correlations between population and estimated postal income by examining this relationship at individual post offices over the period 1820 (or 1830 in the case of offices not open in 1820) to 1910. Table III shows these correlations for the 19 post offices in the sample.

TABLE III. CORRELATIONS BETWEEN POPULATION AND ESTIMATED INCOME FOR INDIVIDUAL POST OFFICES.

Post Office	Correlation	Significance	Change in	
			Population (%)	Period

Bethlehem	.91	.002	78	1830-1910
Brookline	-.77	.026	-20	1830-1910
Center Harbor	-.73	.026	-1	1820-1910
Concord	.90	.001	657	1820-1910
Dover	.87	.002	361	1820-1910
Goshen	-.60	.120	-57	1830-1910
Hanover	-.44	.240	-7	1820-1910
Keene	.94	.001	431	1820-1910
Kingston	.23	.555	20	1820-1910
Lebanon	.97	.001	234	1820-1910
Middleton	-.09	.840	-47	1830-1900
Portsmouth	.48	.191	54	1820-1910
Randolph	.34	.414	-4	1830-1910
Sanbornton	-.64	.064	-74	1820-1910
Springfield	-.48	.234	-65	1830-1910
Strafford	.74	.023	152	1820-1910
Walpole	.80	.010	32	1820-1910
Whitefield	.82	.012	139	1830-1910
Windham	-.41	.276	-34	1820-1910

The pattern of correlations in Table III is clearly far from consistently positive. Of the 19, seven are significantly positive, two are significantly negative and one almost so.

The others are insignificant. This hardly seems to be the pattern expected based on the results of the analyses of the correlations between population and estimated income seen in Table II.

What characteristics of the different towns could account for this pattern of correlations? Inspection of the data suggested that in cases where the population of a town increased over the period in question, the correlation between population and estimated income was positive. But if the population of a town declined, the correlation was negative. To test this, the percentage change in population (also shown in Table III) of each town for the period in question was correlated with the correlation between estimated income and population. This resulted in a highly significant correlation of $r = +.89$ ($p < .001$).

This correlation indicates that when a town's population increased, so did estimated postal income. But it further shows that even when a town's population decreased, income increased. What could account for this seemingly odd result? It appears that over the course of the 19th and into the early 20th centuries, there was a dramatic and pervasive increase in the use of the postal service. Certainly over this period, postal rates decreased, both in nominal and real terms. For example, in 1820, when postal rates were determined by the distance even a domestic letter would travel, it cost 18.5 cents to send a letter between 150 and 400 miles. That corresponds to \$3.07 in 2005 dollars. In 1910, sending the same letter cost 2 cents (\$.41 in 2005 dollars). Early in the 19th Century, because of the high cost of postage, the mails had been primarily used for business correspondence. As the century progressed postage rates decreased considerably while literacy rates increased. Both these factors led to more

correspondence. In addition, the country grew in size and, especially in northern New England, young people moved west where much better land was available. This great westward migration also led to greater correspondence as family members staying in the east corresponded with relatives who had moved west.

In economic terms the data in Table III suggest that even when population shrinks in a town, if per capita income grows sufficiently and if per capita usage of capital grows as well, postal revenue may well expand, demonstrating not only economic growth but development as well. This further suggests that postal efficiency closely parallels a general trend of increasing efficiency of capital. A question for further analysis is whether there is a difference between “public” capital efficiency (the post office) and private capital efficiency in allied communication and transportation systems such as railroads and telegraph companies. It should be realized, of course, that both these systems did receive government support in the 19th century.

The correlations between population and estimated postal income may be modified by a factor not mentioned previously. And this factor may actually add to the usefulness of the Official Register data for economic analyses. The published census data reports the total population for a given political entity such as Hanover, New Hampshire. But the town of Hanover has had, at different times, three different post offices – Hanover itself (1792 to date), Hanover Center (1828 – 1918) and Etna (1882 to date). The Official Register reports data for each post office individually, permitting a more fine grained analysis than the census data both in place and in time. This latter because, obviously, the Official Register data is available every two years and the census data only every ten years.

VI. RECESSION OF 1837.

The Official Register data may be useful for examining more directly economic variables. The National Bureau of Economic Research (NBER) supplies a list of generally accepted dates for the economic ups and downs of the national business cycle. One well known down phase was the Recession of 1837. Does evidence of this recession appear in OR data? To examine this question with regard to New Hampshire, the estimated postal income for the six largest towns (at the time) in New Hampshire (Concord, Dover, Hanover, Keene, Nashua and Portsmouth) for the years 1835 to 1845 were submitted to a one way analysis of variance.

The mean income data is shown in Table IV. Examination of the data shows that

TABLE IV: MEAN ESTIMATED INCOME, 1835 TO 1845.

1835	1837	1839	1841	1843	1845
8234	7363	8294	7736	7146	6323

while there was an increase from 1837 to 1839, from 1839 to 1845 there was a consistent decrease. However, the variance among the six different towns was so great that this trend did not even approach significance ($F(3, 23) = .383$).

New Hampshire was then, admittedly, a small and obscure state removed from the main centers of economic activity in the nation. It is perhaps thus not surprising that the Recession of 1837 had no noticeable effect on postal income even in its largest cities and towns. Examination of Official Register data from larger states and with more

sophisticated analytical tools may well reveal the effects of recessions and recoveries. To the extent that this is the case, it may be possible to examine the time course of recessions and recoveries in different parts of the country. A recession is not like an explosion that happens suddenly. Rather, the business cycle is a dynamic process that affects different geographic and demographic areas differently in both time and intensity. It is our hope that careful analysis of nationwide OR data will reveal these temporal and spatial changes in the business cycle at a level of detail heretofore unavailable.

VII. CONCLUSIONS

Our analysis of the OR data from the State of New Hampshire has shown that these data hold considerable promise as a source of previously unavailable insights into economic and demographic variables during the 19th century. We have specifically examined population effects and the effects of one recession on postal income. The OR data can be used to examine a number of other interesting historical trends. For example, how does the use of the postal service change with the advent of improved transportation and other communication systems such as railroads, telegraph lines, and road construction? Does the integration of the frontier and the re-integration of the South following the Civil War manifest in the OR data?

It should be mentioned here that similar data are available from Canada. In Canada, from at least Confederation until 1948, local postmaster compensation was based on the income accruing to each individual post office (Amyot and Willis 2003). Given this practice in Canada, it might be suspected that a similar practice was followed in Great Britain. This is not the case. In Britain, at least during the 19th century, postmaster salary was based on the individual's grade and not on the amount of business done by the office.

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