tion does produce a residual pattern similar to that observed. Regression II, Table 3, is designed to test this explanation for Model A. A corresponding test for Model B was not made. Since "usual" output cannot be directly observed, the hypothesis was modified slightly by identifying departure from the usual with large changes in output from the previous year, the assumption being that firms with stable output were likely to be near the optimal long-run output. Thus, the absolute percentage changes in output should be positively related to total costs. Unfortunately, they are negatively related and significantly so.

Part of the explanation for this unexpected result is suggested by a more careful examination of the data. Almost all firms with large changes had positive changes and had been experiencing rapid growth for some time. It is well known, though unfortunately not taken into account in these analyses, that there is a steady rate of technological progress in generating equipment. Since expanding firms purchase new equipment in the process, the average age of a plant in those firms experiencing large changes in output is lower than that of firms with more stable outputs. Hence, the former tend to have lower costs because of the inadequacy of the capital-cost data to reflect obsolescence. Thus, while one would not want to reject the Friedman hypothesis on the basis of this evidence, it clearly does not explain the residual pattern.

2. Fortunately, the observed result can be explained by a much simpler hypothesis, namely, that the degree of returns to scale is not independent of output, but varies inversely with it. Figure 3 illustrates this explanation: The solid line gives the traditional form of the total cost function, which shows increasing returns at low outputs and decreasing returns at high outputs. If we try to fit a function for which returns to scale are independent of the level of output, e.g., one linear in logarithms, a curve such as the dashed one will be obtained. The shaded areas A and B show the output ranges, high and low, for which total costs are underestimated.

Capacity figures might have been used. However, those available appear to be somewhat unrealistic. These are based on generator name-plate ratings, which refer to the maximum output that can be produced without overheating. According to the Federal Power Commission, however, units of the same size, general design, and actual capability may show as much as a 20 per cent difference in rating [5, p. xi]. Furthermore, in a multiple-plant firm, total generator capacity is not the only factor to be considered. Such defects in the capacity figures also led to grouping firms by output rather than by capacity in the analyses of covariance presented below.

Treatment of capital costs is the source of one of the most serious shortcomings of the present study, as indeed capital measurement is in most studies of production. Solow's recent contribution to the study of the aggregate production function [18] offers considerable promise of an appropriate measure of capital used in the production of electric power. I hope, in future work, to make use of a model of production that involves fixed coefficients ex post at the plant level, but that permits substitution of inputs and that changes over time ex ante.
If the true cost function is not linear in logarithms, we can either fit an over-all function that reflects this fact or attempt to approximate the actual function by a series of segments of functions linear in logarithms. Because of fitting difficulties and the problem of determining the form in which factor prices enter the cost function, I initially chose the latter course. Firms, arrayed in order of ascending output, were divided into 5 groups containing 29 observations each. A list of the firms used in the analysis appears in Appendix C. The results of fitting five separate regressions of the form indicated by Model A are given in lines IIIa through IIIe of Table 3 and the corresponding implications for the parameters in the production function in lines IIIa through IIIe of Table 4. Similar results for regressions of the form indicated by Model B are presented in lines VIa through VIe of Tables 5 and 6.

The results of these regressions with respect to returns to scale are appealing. Except for statistically insignificant reversal between groups C and D, returns to scale diminish steadily, falling from a high of better than 2.5 to a low of slightly less than 1, which indicates increasing returns at a diminishing rate for all except the largest firms in the sample. However, in the case where prices enter the latter.

Analyses over-all significant into five because other than VI are neutral in scale but A is scale.

A half test of coefficients same for output is tested and are presented for the regression freedom hence, we results of returns to returns consisting of a

For a

Hence, if each given

Note, cannot re
the case of regressions III, the elasticity of output with respect to capital price behaves very erratically from group to group and has the wrong sign in groups A and C; in regressions VI the elasticity of output behaves erratically, both with respect to labor and with respect to capital, having the wrong sign in groups B and C for the former and in group D for the latter.

Analyses of covariance for regressions III and VI, compared with the over-all regressions I and V, respectively, gave F-ratios of 1.569 and 1.791 in that order. With 141 and 125 degrees of freedom, these ratios are significant at better than the 99 per cent level. Thus, breaking the sample into five groups significantly reduces the residual variance. However, because of the erratic behavior of the coefficients of independent variables other than output, it appears that we may have gone too far. Regressions III and VI are based on the assumption that all coefficients differ from group to group. Economically, this may be interpreted as the hypothesis of non-neutral variations in returns to scale; i.e., scale affects not only returns to scale but also marginal rates of substitution.

A halfway house between the hypothesis of no variation in returns to scale with output level and the hypothesis of non-neutral variations in scale is the hypothesis of neutral variations in returns to scale. A general test of this hypothesis is equivalent to testing the hypothesis that the coefficients for the various prices in the individual group regressions are the same for all groups while allowing the constant terms and the coefficients of output to differ. The hypothesis of neutral variations in returns to scale is tested in this way only in the context of Model A. The regression results are presented in lines IVa through IVe of Table 3 and their implications for the production function in Table 4. An analysis of covariance comparing regressions III and IV gives an F-ratio of 1.576. With 133 and 125 degrees of freedom, a ratio this high is significant at better than the 99 per cent level; hence, we cannot confidently reject the hypothesis of non-neutral variations in returns to scale on statistical grounds alone with this test. Examining the results derived from regressions IV, however, we find that the degree of returns to scale steadily declines with output until, for the group consisting of firms with the largest outputs, we find some evidence of diminishing returns to scale. Furthermore, the elasticities of output with

---

8 For a generalized Cobb-Douglas the marginal rate of substitution between $x_i$ and $x_j$ is

$$
\frac{\partial y}{\partial x_i} / \frac{\partial y}{\partial x_j} = \frac{a_i}{a_j} / x_i / x_j.
$$

Hence, if the ratio of $a_i$ to returns to scale, $r$, is restricted to be the same for each output group, the marginal rates of substitution will be invariant with respect to output level at each given factor ratio.

9 Note, however, that the estimated value is insignificantly different from one, so that we cannot reject the hypothesis of constant returns to scale for this group of firms.
respect to the various input levels are all of the correct sign and of reasonable magnitude, although I still feel that the elasticity with respect to capital is implausibly low. Thus, on economic grounds, one might tentatively accept the hypothesis of neutral variations in returns to scale.

If one accepts the hypothesis of neutral variations in returns to scale, a somewhat more refined analysis is possible, since we may then treat the degree of returns to scale as a continuous function of output. That is, instead of grouping the firms as we did previously, we estimate a cost function of the form

\[ C = K + \frac{1}{r(Y)} Y + \frac{a_1}{r} P_1 + \frac{a_2}{r} P_2 - \frac{a_3}{r} P_3, \]

where \( r(Y) \), the degree of returns to scale, is a function of the output level. Since neutral variations in returns to scale are assumed, the coefficients of the prices are unaffected. A preliminary graphical analysis indicated that returns to scale as a continuous function of output might be approximated by a function of the form

\[ r(y) = \frac{1}{\alpha + \beta \log y}. \]

Thus, instead of regressions of the form suggested by (10) or (11), we fit

\[ C - P_s = K + \alpha Y + \beta Y^2 + \frac{a_1}{r} [P_1 - P_s] + \frac{a_2}{r} [P_2 - P_s] + V \quad (\text{Model C}) \]

and

\[ C = K' + \alpha Y + \beta Y^2 + \frac{a_1}{r} P_1 + \frac{a_2}{r} P_2 + V \quad (\text{Model D}). \]

The results obtained for regressions based on Model C and Model D are reported in Table 7 for regressions VII and VIII, respectively. The implications of these results for the production function are given in Table 8. Note that returns to scale and the other parameters have been computed at five output levels only, so that the results in Table 8 may be readily compared with those in Tables 4 and 6.

Perhaps the most striking result of the assumption of continuously and neutrally variable returns to scale of the form suggested in (13) is the substantial increase in our estimate of the degree of returns to scale for firms in the three largest size groups. Whereas before, we found nearly

\[ \text{Footnote:} \quad 10 \text{ See p. 179.} \]
and of reasonable with respect to one might tennis to scale.
returns to scale, a \( y \) then treat the output. That is, estimate a cost

\[ P_3. \]

\( n \) of the output med, the coefficient analysis output might be

or (11), we fit

\[-P_3 + V \]

\( \gamma \) and Model D respectively. The \( \eta \) are given in

ters have been

Table 8 may be

of continuously tested in (13) is returns to scale we found nearly

constant returns to scale, it now appears that they are increasing. In addition, all the coefficients in both analyses are of the right sign, and the results based on Model D yield results of plausible magnitude for the elasticity of output with respect to capital as compared with the elasticities with respect to labor and fuel. Analyses of covariance, comparing regressions VII and I with regressions VIII and V, yield \( F \)-ratios of 1.631 and 9.457, respectively; both are highly significant, with 141 and 140 degrees of freedom. A comparison of regression VII with regression III yields an \( F \)-ratio of 1.032, which, though not significant, does suggest that neutral variations in returns to scale of the form used are indistinguishable from non-neutral. Hence the hypothesis of neutral variations in returns to scale may be accepted both on economic grounds and on grounds of simplicity.

\[ \text{Using the variance-covariance matrix for the coefficients in (14) or (15), one could easily compute, for a given } y, \text{ a conditional standard error for } 1/r, \text{ which could then be used to test whether } 1/r \text{ were significantly less than one (i.e., whether the finding of increasing returns was statistically significant). Unfortunately, the regression program used did not print out the inverse of the moment matrix, so this test could not be made. But there is little doubt, in view of the extremely small standard errors of the estimated } \alpha \text{ and } \beta, \text{ that such a test would have shown the increasing returns found to be statistically significant.} \]

### Table 7

<table>
<thead>
<tr>
<th>Regression No.</th>
<th>Coefficient</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII ( Y )</td>
<td>0.151</td>
<td>0.958</td>
</tr>
<tr>
<td></td>
<td>0.117</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.062</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(( \pm 0.02 ))</td>
<td></td>
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<tr>
<td></td>
<td>(( \pm 0.012 ))</td>
<td></td>
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<tr>
<td></td>
<td>(( \pm 0.11 ))</td>
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<td></td>
<td>(( \pm 0.151 ))</td>
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<tr>
<td></td>
<td>0.468</td>
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<tr>
<td></td>
<td>0.062</td>
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<td></td>
<td>(( \pm 0.11 ))</td>
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<tr>
<td></td>
<td>(( \pm 0.151 ))</td>
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</tbody>
</table>
| Model D: Dependent Variable \( W \) as \( C \)
<table>
<thead>
<tr>
<th>Regression No.</th>
<th>Coefficient</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIII ( Y )</td>
<td>0.137</td>
<td>0.952</td>
</tr>
<tr>
<td></td>
<td>0.118</td>
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<tr>
<td></td>
<td>0.234</td>
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<td>(( \pm 0.064 ))</td>
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<td>(( \pm 0.013 ))</td>
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<td>(( \pm 0.234 ))</td>
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<td></td>
<td>(( \pm 0.54 ))</td>
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</table>
3. Conclusions and Prospects

<table>
<thead>
<tr>
<th>Estimates of Output with Respect to Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
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<tr>
<td>D</td>
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<tr>
<td>E</td>
</tr>
</tbody>
</table>

Regression VII (Model I)

<table>
<thead>
<tr>
<th>Estimates of Output with Respect to Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<tr>
<td>B</td>
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<tr>
<td>C</td>
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<td>D</td>
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Regression VII (Model C)

<table>
<thead>
<tr>
<th>Estimates of Output with Respect to Earnings</th>
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<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
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<tr>
<td>D</td>
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<tr>
<td>E</td>
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</tbody>
</table>

From results presented in Table 7, for 16 firms in 1955

TABLE 8

Marc Nerlove
not affect the marginal rates of substitution between different factors of production for given factor ratios.

These substantive conclusions derive from two conclusions of methodological interest:

1. The appropriate model at the firm level is a statistical cost function which includes factor prices and which is uniquely related to the underlying production function.

2. At the firm level it is appropriate to assume a production function that allows substitution among factors of production. When a statistical cost function based on a generalized Cobb-Douglas production function is fitted to cross-section data on individual firms, there is evidence of such substitution possibilities.

Inadequacies in the estimation of capital costs and prices and in the treatment of transmission suggest, however, that a less aggregative approach is called for. On a less aggregative level, it may be possible to produce more adequate measures of capital and to introduce transmission explicitly. A simple model of optimal behavior on the part of the firm may then allow us to combine this information in a way that will yield more meaningful results on returns to scale at the firm level.

**APPENDIX A**

**A Relation Between Returns to Scale at the Plant Level and at the Firm Level for an Electric Utility**

Consider a firm that produces $x_i$ units in each of $n$ identical plants. If plants and demand are uniformly distributed, all plants will produce identical outputs, so that the total output produced will be $nx$, where $x$ is the common value. Under these circumstances, a general formula that has been developed by electrical engineers to express transmission losses [8] reduces to

(A.1) \[ y = bn^2x^2, \]

where $y$ is the aggregate loss of power. That is, with uniformly distributed demand and identical plants, transmission losses are proportional to the square of total output.

If $z$ is delivered power, we have

(A.2) \[ z = nx - y = nx - bn^2x^2. \]

Let $c(x)$ be the cost of producing $x$ units in one plant. Production costs of the $nx$ units are thus $nc(x)$. And let $t = T(n, x)$ be the cost of maintaining a network with $n$ plants, each of which produces $x$ units. We may expect that
\( t \) increases with \( x \), \( \partial T/\partial x > 0 \), since larger outputs require more and heavier wires and more and larger transformers. However, \( t \) may or may not increase with \( n \). It is likely to decrease with \( n \) if the expense of operating and maintaining long transmission lines is large relative to the cost of a number of short lines, and likely to increase if the converse is true.

The total cost of delivering an amount \( z \) of power \( T(z) \) is the sum of production costs of a larger amount of power and transmission costs:

\[
T(z) = nc(x) + T(n, x).
\]

Suppose that the firm chooses the number and size of its plants in order to minimize \( T(z) \) for any given \( z \). The values of \( n \) and \( x \) that minimize \( T(z) \) subject to (A.2) are given by solving

\[
\alpha(x) + \frac{\partial T}{\partial n} - x\lambda \mu = 0,
\]

\[
nc'(x) + \frac{\partial T}{\partial x} - n\lambda \mu = 0,
\]

\[
z - (nx - bn^2x^2) = 0,
\]

where

\[
\mu = 1 - 2bnx
\]

\[
= \frac{z - y}{nx}.
\]

The degree of returns to scale at the plant level, \( p(x) \), may be defined as the reciprocal of the elasticity of production costs with respect to output:

\[
p(x) = \frac{c(x)}{xc'(x)}.
\]

It follows from (A.4), (A.5), and (A.8) that

\[
p(x) = 1 - \frac{t}{(nx)c'(x)}(e_x - e_n),
\]

where

\[
e_x = \frac{x}{t} \frac{\partial T}{\partial x}, \quad e_n = \frac{n}{t} \frac{\partial T}{\partial n}.
\]

Since \( nx, t \) and \( c'(x) \) are positive, it follows that returns to scale are greater or less than one, according to whether the elasticity of transmission costs with respect to output exceeds or falls short of the elasticity with respect to number of plants. If transmission costs decrease with a larger number of plants, then under the particular assumptions made here, the firm will operate plan operate as a

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(A.11)
\]

Substitution we obtain t

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(A.12)
\]

By definiti- hence

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(A.13)
\]

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Although assumptio views and supply. D. diminishur
operate plants in the region of increasing returns to scale. It may nonetheless operate as a whole in the region of decreasing returns to scale.

Let $P(z)$ be the degree of returns to scale for the firm as a whole when it delivers a supply of $z$ units to its customers:

$$P(z) = \frac{\Gamma'(z)}{\Gamma'(x)}.$$  

(A.10)

It is well known that the Lagrangian multiplier $\lambda$ is equal to marginal cost; hence, from (A.5),

$$\Gamma'(z) = \lambda = \frac{1}{n_\mu} \left[ nc'(x) + \frac{\partial T}{\partial x} \right].$$  

(A.11)

Substituting for $\Gamma'(z)$ from (A.11), $\mu$ from (A.7), and $\Gamma(x)$ from (A.3), we obtain the following expression for $P(z)$:

$$P(z) = \frac{\Gamma'(z)}{\Gamma'(x)} \cdot \frac{n(x - y)}{n[xc'(x) + \frac{\partial T}{\partial x}]}$$

$$= \left(1 - \frac{y}{z}\right) \frac{nc(x) + t}{x[xc'(x) + \frac{\partial T}{\partial x}]}.$$  

By definition,

$$p(x) = \frac{c(x)}{xc'(x)},$$

hence

$$P(z) = p(x) \left(1 - \frac{y}{z}\right) \frac{nc(v) + t}{nc(x)} \cdot \frac{[p(x)e_x]}{t}.$$  

(A.13)

Neglecting the last term in the product on the right-hand side of (A.13) for the moment, we see that returns to scale at the firm level will typically be less than at the plant level, solely because of transmission losses; how much less depends on the ratio of losses to the quantity of power actually delivered. The final term in the product is a more complicated matter: If there are increasing returns to scale and if the costs of transmission increase rapidly with the average load (i.e., $e_x \to 1$), then it is clear that the tendency toward diminishing returns at the level of the individual firm will be reinforced. It is perfectly possible under these circumstances that firms will operate individual plants in the range of increasing returns to scale and yet, considered as a unit, be well within the range of decreasing returns to scale.

Although this argument rests on a number of extreme simplifying assumptions, it nonetheless may provide an explanation for the divergent views and findings concerning the nature of returns to scale in electricity supply. Davidson [3] and Houthakker [9], for example, hold that there are diminishing returns to scale, while much of the empirical evidence and
many other writers support the contrary view. The existing empirical
evidence, however, refers to individual plants, not firms, and many writers
in the public-utility field may have plants rather than firms in mind.

APPENDIX B
The Data Used in the Statistical Analyses

Estimation of equation (7) from cross-section data on individual firms
in the electric power industry requires that we obtain data on production
costs, total physical output, and the prices paid for fuel, capital, and labor.
Data on various categories of cost are relatively easy to come by, although
there are difficulties in deriving an appropriate measure of capital costs.
Price data are more difficult to come by, in general, and conceptual as well
as practical difficulties are involved in formulating an appropriate measure
of the "price" of capital. Such problems are, in fact, the *raisons d'être* for
Model B, which permits us to ignore capital prices altogether.

A cross section of 145 firms in 44 states in the year 1955 was used in the
analyses. The firms used in the analysis are listed in Appendix C. Selection
of firms was made primarily on the basis of data availability. The various
series used in the analyses were derived as follows.

B.1. Production Costs

Data on expenditures for labor and fuel used in steam plants for
electric power generation are available by firm in [6], but the capital costs of
production had to be estimated. This was done by taking interest and
depreciation charges on the firm's entire production plant and multiplying
by the ratio of the value of steam plant to total plant as carried on the
firm's books. Among the shortcomings of this approach, three are worthy of
special note:

(a) For many well-known reasons, depreciation and interest charges
do not reflect capital costs as defined in some economically meaningful way.
Furthermore, depreciation practices vary from firm to firm (there are about
four basic methods in use by electric utilities), and such variation intro-
duces a noncomparability of unknown extent.

(b) The method of allocation used to derive our series assumes that
steam and hydraulic plants depreciate at the same rate, which is clearly
not the case.

(c) Because of their dependence on past prices of utility plant, the use of
depreciation and interest charges raises serious questions about the relevant
measure of the price of capital. The use of a current figure is clearly inap-
propriate, but unless we are prepared to introduce the same magnitude on both
sides of the equation.

B.2.

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is clearly inappro-
magnitude on both
sides of the equation, it is difficult to see how else the problem can be handled.

B.2. Output

Total output produced by steam plant in kilowatt hours during the entire year 1955 may be obtained from [6]. This was the series used, despite the fact that the peak load aspect of output is thereby neglected. Since the distribution of output among residential, commercial, and industrial users varies from firm to firm, characteristics of the peak will also vary and this in turn will affect our estimate of returns to scale if correlated with the level of output.

B.3. Wage Rates

At the time this study was undertaken, I was unaware of the existence of data on payroll and employment by plant contained in [5]; hence, superior information was used to obtain this series. Average hourly earnings of utility workers (including gas and transportation) were available for 19 states from Bureau of Labor Statistics files. A mail survey was made of the State Unemployment Compensation Commissions in the remaining 29 states. All replied, but only ten were able to supply data. A regression of the average hourly earnings of utility workers on those for all manufacturing was used to estimate the former for states for which it was unavailable. The resulting state figures were then associated with utilities having the bulk of their operations in each state. In only one case, Northern States Power, were operations so evenly divided among several states that the procedure could not be applied. In this case an average of the Minnesota and Wisconsin rates was employed.

B.4. Price of Capital

As indicated, many practical and conceptual difficulties were associated with this series. Be that as it may, what was done was as follows: First, an estimate of the current long-term rate at which the firm could borrow was obtained by taking the current yield on the firm's most recently issued long-term bonds (obtained from Moody's Investment Manual). These were mainly 30-year obligations, and in all cases had 20 or more years to maturity. This rate was in turn multiplied by the Handy-Whitman Index of Electric Utility Construction Costs for the region in which the firm had the bulk of its operations [4, p. 69]. Two shortcomings worth special mention are:

(a) The neglect of the possibility of equity financing by the method.
(b) The fact that the Handy-Whitman Index includes the construction costs of hydraulic installations.
B.5. Price of Fuel

Since coal, oil, or natural gas may be burned to produce the steam required for steam electric generation, and since many plants are set up to use more than one type of fuel, prices were taken on a per-Btu basis. These were available by state from [4, p. 49], and the state figures were assigned to individual utilities in the same manner as wage rates.

APPENDIX C

Names of Firms and Corresponding Costs, Output, Wage Rate, Fuel Price, and Capital Price in 1955

Firms used in the analysis are listed here in order of ascending output (measured in billions of kilowatt-hours). They are divided into 5 groups containing 29 observations each. These appear on pp. 193–197 following.

(References appear on p. 198, following this Appendix.)
<table>
<thead>
<tr>
<th>Group</th>
<th>Production Costs (million $)</th>
<th>Output (billion kwh)</th>
<th>Wage Rate ($/hr)</th>
<th>Fuel Price ($/million Btu)</th>
<th>Capital Price (index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. California Pacific Utilities Co.</td>
<td>0.082</td>
<td>002</td>
<td>2.09</td>
<td>17.9</td>
<td>183</td>
</tr>
<tr>
<td>2. Brockton Edison Co.</td>
<td>0.661</td>
<td>003</td>
<td>2.05</td>
<td>35.1</td>
<td>174</td>
</tr>
<tr>
<td>3. Essex Country Elec. Co.</td>
<td>0.590</td>
<td>004</td>
<td>2.05</td>
<td>35.1</td>
<td>171</td>
</tr>
<tr>
<td>4. The Montana Power Co.</td>
<td>0.315</td>
<td>004</td>
<td>1.83</td>
<td>32.2</td>
<td>166</td>
</tr>
<tr>
<td>5. Upper Peninsula Power Co.</td>
<td>0.197</td>
<td>005</td>
<td>2.12</td>
<td>28.6</td>
<td>233</td>
</tr>
<tr>
<td>6. Alpena Power Co.</td>
<td>0.098</td>
<td>009</td>
<td>2.12</td>
<td>28.6</td>
<td>195</td>
</tr>
<tr>
<td>7. Blackstone Valley Gas and Elec. Co.</td>
<td>0.949</td>
<td>011</td>
<td>1.98</td>
<td>35.5</td>
<td>206</td>
</tr>
<tr>
<td>8. Lawrence Electric Co.</td>
<td>0.675</td>
<td>013</td>
<td>2.05</td>
<td>35.1</td>
<td>150</td>
</tr>
<tr>
<td>9. Wisconsin-Michigan Power Co.</td>
<td>0.525</td>
<td>013</td>
<td>2.19</td>
<td>29.1</td>
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<td>Output (hillion kwh)</td>
<td>Wage Rate ($/hr)</td>
<td>Fuel Price ($/million Btu)</td>
<td>Capital Price (index)</td>
</tr>
<tr>
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<td>Group C</td>
<td>Production Costs (million $)</td>
<td>Output (billion kWh)</td>
<td>Wage Rate ($/hr)</td>
<td>Fuel Price (c/million Btu)</td>
<td>Capital Price (index)</td>
</tr>
<tr>
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<td>Production Costs (million $)</td>
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<td>Wage Rate ($/hr)</td>
<td>Fuel Price ($/million Btu)</td>
<td>Capital Price (index)</td>
</tr>
<tr>
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<td>28. Illinois Power Co.</td>
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<td>29. Monongahela Power Co.</td>
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<td>Group E</td>
<td>Production Costs (million $)</td>
<td>Output (billion kwh)</td>
<td>Wage Rate ($/hr)</td>
<td>Fuel Price (c/million Btu)</td>
<td>Capital Price (index)</td>
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<td>Northern State Power Co.</td>
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REFERENCES


