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by

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1. Introduction

Wage drift is a phenomenon which has intrigued many economists in recent years. In the context of this paper, wage drift refers to the difference between what workers are actually paid (wage earnings) and what one would expect them to be paid on the basis of their negotiated contracts (wage rates). This earnings-rate gap has been studied extensively, particularly with regard to countries where collective bargaining takes place on a national level.[1] Wage drift has also appeared on occasion in centrally planned economies, as Holzman's Study [6] of inflation in the Soviet Union during the period of the 5 year plans indicates. Where wage bargaining is on a more isolated basis, the existence of wage drift is more problematical. Thus, in a country like the United States, where bargaining is often done at the level of the individual firm, the existence of wage has generally been disregarded. Nevertheless, it is possible that the phenomenon of wage drift may not be unique to those economies in which settlements are on an industry-wide or economy-wide basis. In this paper, we investigate several potential factors influencing wage drift; in particular, we shall focus on the issue of whether the effects of these variables differ in an important manner from those influences affecting wage

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[1]This is especially true for the United Kingdom and Sweden. An analysis of the wage drift in these countries is important to any nation-wide attempt at wage control. If the authorities pursue policies aimed at controlling inflation, it is important to know whether the difference between earnings and rates is supported by a change in labour productivity or whether it is mainly demand-induced.

drift in countries with centralized wage negotiations.

There have been many explanations of wage drift put forward. All of them can be classified into one of two categories: those emphasizing macroeconomic forces, and those which are microeconomic (industry-specific) in origin.

Wage drift on an economy-wide scale is generally held to be associated with an excess demand for labour. To support this theory, it is argued that, as the labour market tightens, employers raise payments above negotiated rates in order to hold their present employees and to attract new workers to their firms. As the demand for labour may be viewed as a derived demand, reflecting an increased desire for the final product, it is often asserted that longer hours of work and more overtime to meet the new demand are closely connected with a low level of unemployment. In fact, hours worked is often used as a measure of the excess demand for labour on the grounds that "it is one of the most sensitive indicators of economic activity." ([8], p. 470.) Other variables which have been employed to test the theory of the influence of the excess demand for labour are the unemployment rate, the number of unfilled vacancies, and the difference between unfilled vacancies and numbers unemployed. Empirical findings in Sweden, the United Kingdom, Germany and the Netherlands all give support to a significant relationship between wage drift and labour demand.[2] Similarly, Holzman [6] attributes the Soviet wage drift of the 1930's primarily to the strong demand pressures emanating from planned over-full employment. Denmark, on the other hand, has proved to be an exception as the economy has experienced drift even with high rates of unemployment. A middle position was taken by Dicks-Mireaux [3], who concluded, from an investigation

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[2]For a summary of the findings on wage drift in Denmark (p. 298), Germany (p. 330), the Netherlands (p. 370), Sweden (p. 398), and the United Kingdom (p. 432), see [4].

of British data from 1954-1957, that there was no well-defined relationship between an upward drift in earnings and the excess demand for labour.

Wage drift has also been thought to vary with labour productivity. This is especially true for countries where a large proportion of the workers are on piece rates. Earnings in these countries are expected to rise automatically as both skill and technology improve. It is argued that, although major technological developments will entail re-negotiation of the structure of piece rates, it is virtually impossible to prevent workers from capturing minor productivity gains, under a system of piece rate payments. The relationship between productivity and wage drift, however, is a far more controversial issue than is the association of drift and excess demand for labour. In Sweden, where a high proportion of the labour force consists of piece rate workers, one would expect, according to this theory, to see a strong association between wage drift and increases in productivity. The facts do not seem to justify such expectations. Hansen and Rehn conclude that "our statistical material gives no support to the hypothesis that wage drift is an automatic consequence of increase of productivity in piece-work." ([5], p. 133.) The O.E.E.C. explains this finding as follows:

> "...while the possibility of wage drift depends largely on the existence of piece rates..., the amount of wage drift depends mainly on the care with which employers supervise the revision of piece rates in line with improved efficiency, and this is strongly influenced by the degree of labour shortage".[3]

In the United Kingdom, Klein and Ball found a significant relationship between wage drift and the level of labour productivity; however, when they introduced first differences of the original variables to correct for the high degree of autocorrelation in the original equation, they found that the productivity variable became insignificant.

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[3] [4], p. 404.

Micro-economic studies tend to give more weight to the productivity contribution to wage drift. Aarvig [1], in a study of sixteen Norwegian industrial companies, concluded that the dominant type of wage drift is the productivity drift induced by piece work payments. While Turner [14] argues that increases in productivity are an important influence on drift, he does not exclude, as does Lydall [12], the contribution of an excess demand for labour. The complications that can arise in trying to determine the exact mechanism by which changes in productivity influence wage drift are well set out in both Turner's reply [15] to Lerner and Marquand [9] and in Lerner's subsequent reply [10] to Turner's comments.

It has further been suggested that the amount of drift at a particular point in time depends to some extent on the size of the change in the negotiated rate in the previous period or periods. This would seem to indicate that scheduled rises and drift are alternative ways of arriving at a particular level of wage earnings. This theory assumes that if employers grant large rate increases, they will be less willing to concede further increases in actual earnings. Similarly, it is asserted that the workers will not agitate for still higher earnings if their wage rate has risen by a large amount instead. In other words, it is asserted that there exists a unique equilibrium rate of actual wage earnings at a single point in time. This theory has not withstood empirical testing. For example, the O.E.E.C. found that, in Denmark, "wage drift has not been systematically higher or lower in the years in which there were no negotiated increases than in the years when new agreements have been signed."[4]

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[4] [4], p. 298. Similarly, in Germany, it was found that there was no tendency for a low rate of drift to be associated with a high rate of negotiated wage increase. ([4], p. 331) J. E. Isaac, in his study [7] "Wage Drift in the Australian Metal Industries," also considered the relationship between wage drift (over-award pay increases) and wage rate increases (award wage increases). His findings, however, give virtually no support to the theory of an equilibrium wage level, as of a moment of time.

A high profits level has sometimes been cited as a possible influence on wage drift. It is argued that if profit rates are high, employers will be more inclined to meet the higher wage demands of particular individuals. In addition, when profit rates are high, the opportunity cost of foregone output arising from labour turnover incurred if claims to higher earnings are not granted is also likely to be higher than at other times. Hansen and Rehn in their study of the Swedish manufacturing industry tested this profits variable but found it to be insignificant. ([5], p. 110.) One could argue that the influence of profits is largely accounted for by other variables. For example, one would expect a positive correlation between excess demand and above-normal profits. Thus, the influence of above-normal profits may largely be already incorporated in the excess demand for labour variable. Theoretically, changes in sex, age, industrial and occupational composition of the labour force could cause average earnings to drift above or below the negotiated rate. For example, more women in the labour force would tend to reduce the general average, while a shift of workers away from a low wage region would be expected to raise the average. Such adjustments have not contributed significantly to the economy-wide wage drift in any of the countries studied by the O.E.E.C.[5] It is often true that a shift in one direction is offset by movements in the other direction as the labour force is in a state of constant but unsystematic flux.

The present study, which also approaches the issue from a macro-economic point of view, is primarily concerned with investigating some of these theories of wage drift with reference to the economy of the United States from 1953 to 1957. Before discussing the method of analysis, it is perhaps in order to make a few comments on the nature of wage drift in the context of the economy

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[5]This fact is mentioned specifically for Denmark, Germany, and the United Kingdom.

of that country.

Wage drift in the United States is something of an unknown quantity. The fact of its existence has been questioned, denied and consequently neglected. Most economists studying wage drift have ignored the United States because:

> "Due to the low level of the negotiations and the detailed nature of the agreements, it is generally assumed that there is no 'wage drift' in the United States comparable to that experienced in many European Countries."[6]

However, on more detailed study, one finds that such an assumption is questionable and that something resembling wage drift does indeed exist in the United States. The decentralized system of wage negotiations in the United States need not necessarily make the wage drift disappear, although it does make any drift that may be present much more difficult to measure.

John E. Maher, in an article in The Review of Economics and Statistics, "An Index of Wage Rates for Selected Industries, 1946-1957" [13], contends with most of the difficulties involved in measuring drift in the United States and produces wage rate and wage earnings series from which our measure for the wage drift has been calculated. (See Charts 1 and 2 below.) While the data come from a sample of only thirteen industries, these industries were chosen "on the basis of how adequately key bargaining situations reflected the general rate movements in those industries" ([13], p. 277). In this way, Maher has assumed that changes negotiated by the key bargainers trace the course of wage rates for the whole industry. Not only might one argue that the individual company or companies are representative of the industry but one might also suggest that the aggregate indices calculated from the company data adequately

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[6] [4], p. 457. Similarly, Isaac ([7], p. 146) is sceptical regarding the possible existence of wage drift in the United States.

reflect economy-wide trends. The data cover almost two million production workers in industries as different as steel, meat packing, coal mining, and telegraph. Thus, while American wage-setting institutions differ from those of Europe in that negotiations are technically not as centralized, in practice, for many industries, the resultant industry-wide wage rate is of quite a similar nature. If one concedes that Maher's work has established the existence of wage drift for the United States, one may reasonably ask whether wage drift in the context of this economy responds to the same influences as those which are important in the cases of the European economies, with their more centralized wage-setting mechanisms.

2. The Method of Analysis and the Results of this Study

The basic sources of the data employed in this study are presented in the appendix; however, a few adjustments have been made to the original series and these will be discussed below. A few comments will also be made on the choice of variables.

The dependent variable, the wage drift, is the absolute difference between the quarterly average of the earnings index and the average of the wage rate index for the same period. The movement of the two defining variables is plotted on Chart 1. While both series show an upward trend, it is interesting to note that, in almost all cases, the wage rate index exceeds the earnings index. Thus, for the period from the first quarter of 1953 through the fourth quarter of 1957, the algebraic value of the drift in the United States is negative. At the same time, there is a strong tendency for average earnings to drift upwards from quarter to quarter.

One can detect a marked seasonal pattern in the movement of the wage drift (see Chart 2). For this reason, seasonal dummies have been included as

CHART #1.

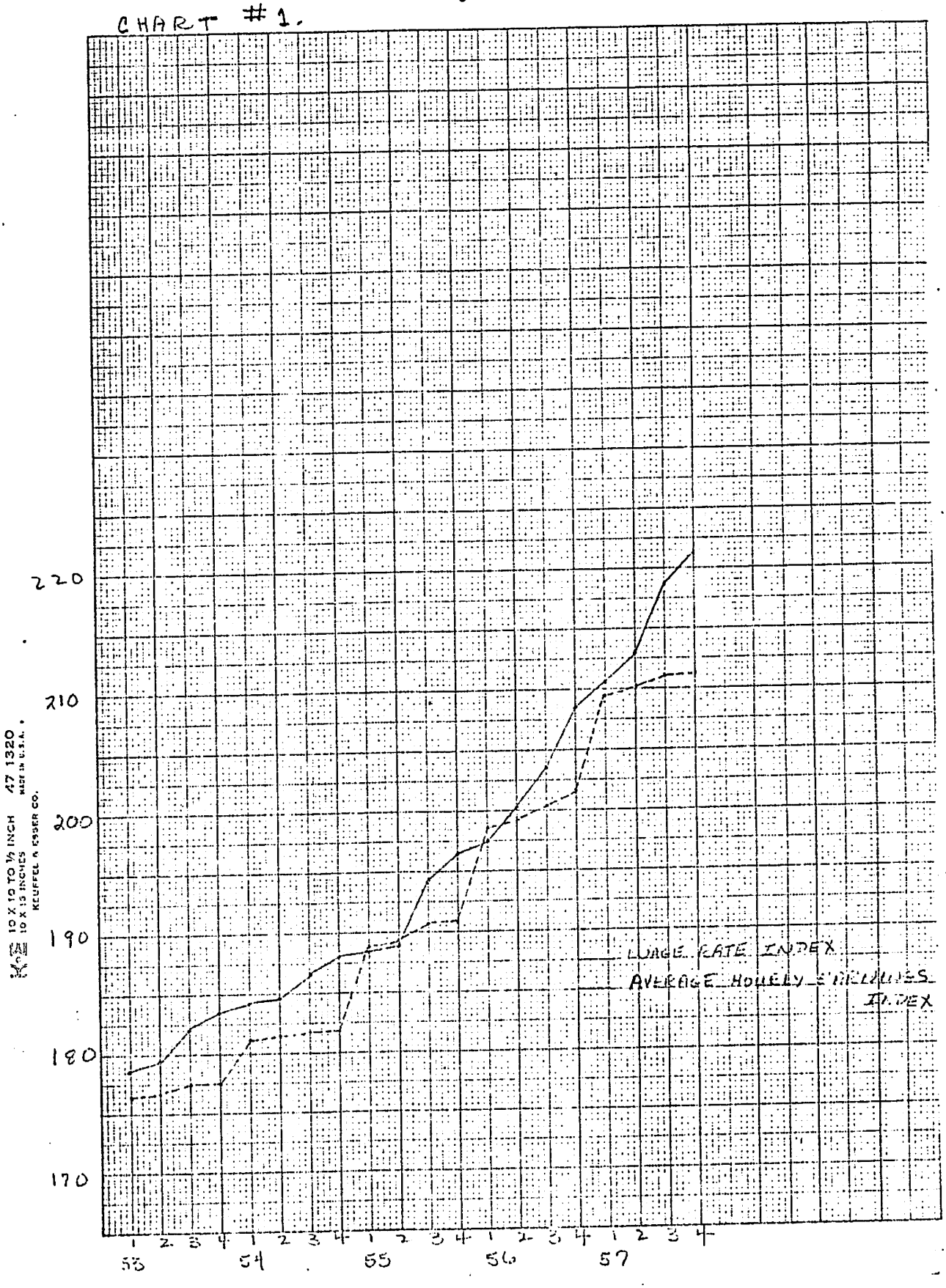
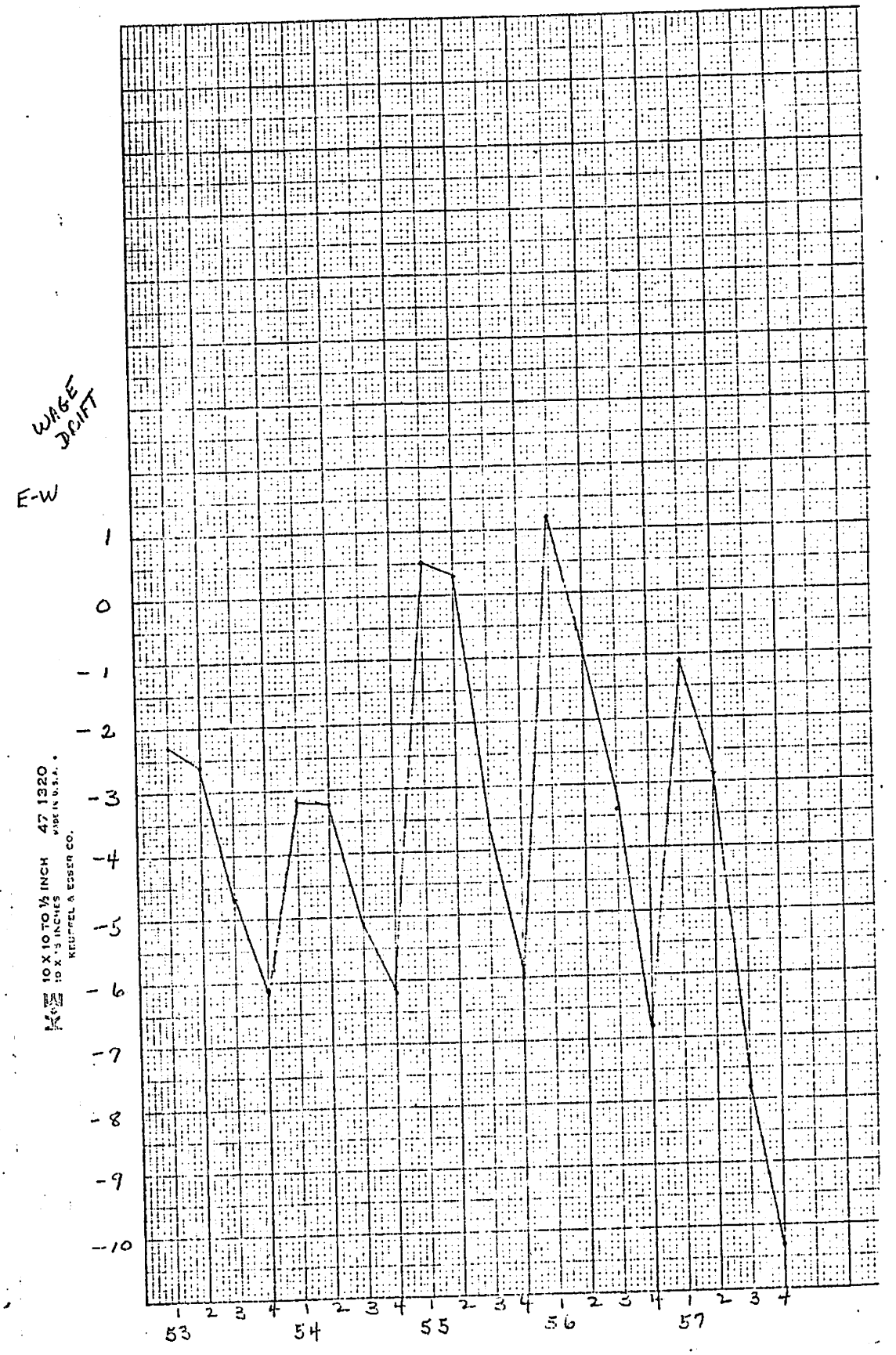

220
210
200
190
180
170
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
53 54 55 56 57
LOADS RATE INDEX
AVERAGE HOURLY EARNINGS INDEX
10 X 10 TO ½ INCH 47 1320
10 X 15 INCHES
KEUFFEL & ESSER CO.
MADE IN U.S.A.

CHART # 2.


WAGE DRIFT
E-W
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
53
54
55
56
57
10 X 10 TO ½ INCH 47 1320
10 X 5 INCHES
KEUFFEL & ESSER CO.

explanatory variables in the regression analysis.[7]

In order to test the excess demand for labour theory, one could choose either the unemployment rate (U), or an index of hours worked by employees in the private sector of the economy (h). While the former was used in a few test cases, the latter was most often employed on the assumption that it is a better measure of the state of the economy, particularly in the short run. Before more workers are hired to meet increased demand, the present employees will be used more intensively, that is, they will work longer shifts and have more overtime.[8]

The productivity variable (X/Eh) was derived by dividing gross private output (except housing services), X, by the product of non-military wage and salary employment minus civilian government employment (E) and the average weekly hours index (h).[9] When the change in productivity was used as an explanatory variable, it was the difference between the productivity in the current quarter and that in the corresponding quarter of the previous year.

Three different variables have been used to determine the influence of previous wage rate changes on the difference between wage rates and earnings. One is the simple difference between the present wage rate and the rate prevailing in the same quarter of the previous year (ΔW). The other two are the

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[7]The highly significant regression coefficients of these seasonal dummies should not be interpreted as indicating that the other explanatory variables contribute nothing to the explanation of seasonality in our measure of wage drift. The key explanatory variables of this study were only available to us in seasonally adjusted form.

[8]Of course, it must be recognized that part of the reason for the importance of an hours variable is the institution of paying overtime rates on hours worked beyond the customary or legal work week.

[9]These variables are basically the variables utilized in the Econometric Model of the U.S. economy of the Office of Business Economics, described in [11]. We are very grateful to Maurice Liebenberg and his colleagues for making unpublished data on these variables available to us.

averages of four quarter to quarter differences. One starts in time (t), while the other is lagged one quarter; that is,

$$\Delta W^{*} = 1/4\ [(W_{t-1} - W_{t-5}) + (W_{t-2} - W_{t-6}) + (W_{t-3} - W_{t-7}) + (W_{t-4} - W_{t-8})] \quad \text{and}$$

$$\Delta W^{**} = 1/4\ [(W_{t} - W_{t-4}) + (W_{t-1} - W_{t-5}) + (W_{t-2} - W_{t-6}) + (W_{t-3} - W_{t-7})].$$

An additional variable was introduced in order to test the possible influence of a change in prices, $\Delta P = P_t - P_{t-4}$. This variable was included on the assumption that employees may demand wage increases over the negotiated rate as the cost of living increases during the current period. The Consumer Price Index of the U.S. Bureau of Labor Statistics (P) was used for this purpose.

Three techniques of analysis have been employed. Ordinary least squares regressions were first used to determine the relative significance of the different variables. The best results are shown in Appendix 1, with some other wage drift relationships judged to be of interest presented in Appendix 2. In order to correct for the autocorrelation indicated by the low value of the Durbin-Watson statistic, the regressions of Appendix 1 were then rerun using variables transformed with an autoregressive transformation, in which the coefficient of autocorrelation was successively 0.25, 0.50, 0.75, and 1.00. While this operation effectively removed the autocorrelation of the residuals, it also greatly reduced, and in some cases eliminated, the significance of the variables.

The most promising results were those from the two stage least squares regressions. These results are shown in Table 1. The dependent variable is the wage drift variable described above. The regression coefficients are those followed by the symbols for the variables. The number below the regression coefficient, written in parentheses, is the associated standard error

while the entry in the square brackets is a $\underline{t}$ ratio. The symbols h', (X/Eh)', $\Delta W^{**}{}'$, $\Delta W'$ indicate that the explanatory variables employed in these regressions were the first stage estimates for the variables in question when they were run as dependent variables on the principal components series of the O.B.E. econometric model referred to in the preceding footnote.[10] Q_1, Q_2, and Q_3 represent seasonal dummy variables. (Q_i is equal to unity in the i-th quarter and is zero otherwise.) The symbol R^2 denotes the coefficient of multiple determination, unadjusted for degrees of freedom, and d is the Durbin-Watson test statistic.[11]

The index of hours worked variable is consistently the most significant. The results indicate that there is a strong positive relationship between the number of hours worked and the wage drift. This finding provides further support to the hypothesis that the divergence between average earnings and wage rates is strongly influenced by the state of demand in the labour market.

The level of productivity also proves to be a significant variable though its influence, as measured by the $\underline{t}$ ratio, is not so large as that of

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[10] These principal components are derived from the set of exogenous variables of the O.B.E. econometric model; the first 5 principal components were employed as explanatory variables in the first stage regressions. The coefficients of multiple determination of these first stage regressions were high (around 0.9 or so) but not so high as to make the difference between the endogenous explanatory variable and its estimate from the first stage regression virtually negligible. We would argue that the two stage least squares estimating technique utilized in this study is a sensible one to use, as we conceive of our wage drift relationship as one that belongs in the context of a larger econometric model of the U.S. economy, like that of the O.B.E. It may be mentioned that the two stage least squares estimates are based on the period from the second quarter of 1953 through the fourth quarter of 1957 because the principal components series were not available for the first quarter of 1953.

[11] The reliability of the Durbin-Watson statistic is testing for autocorrelation in a simultaneous equations context is open to question, particularly when some of the predetermined variables of the system are lagged endogenous variables. However, for what they are worth, the numerical values of the Durbin-Watson test statistic in Table 1 suggest an absence of autocorrelation in the residuals of these regression relationships.

TABLE I

TWO STAGE LEAST SQUARES ESTIMATES OF WAGE DRIFT RELATIONSHIPS,

U.S.A., 1953 II - 1957 IV

1. Wage Drift = $-289.303 + 219.760h' + 7.7743X/Eh' + .01353\Delta W^{**'} + 5.8495Q_1 + 5.0944Q_2 + 1.70402Q_3$ $R^2 = 0.94$
(62.863) (49.162) (2.026) (0.1070) (0.6319) (0.5924) (0.5920) $d = 2.03$;
[4.47] [3.84] [0.13]

2. Wage Drift = $-283.726 + 215.328h' + 7.6479X/Eh' + 5.8539Q_1 + 5.0934Q_2 + 1.7068Q_3$ $R^2 = 0.94$
(43.020) (33.140) (1.6934) (0.6066) (0.5695) (0.568) $d = 2.02$;
[6.50] [4.52]

3. Wage Drift = $-288.489 + 219.849h' + 7.64926X/Eh' + 0.01886\Delta W' + 5.85124Q_1 + 5.09272Q_2 + 1.7021Q_3$ $R^2 = 0.94$
(49.187) (39.558) (1.7586) (0.08136) (0.63004) (0.5914) (0.5910) $d = 2.04$;
[5.56] [4.35] [0.23]

4. Wage Drift = $-302.46 + 229.519h' + 8.1722X/Eh' + 0.0393\Delta W^{*} + 5.8619Q_1 + 5.1144Q_2 + 1.6952Q_3$ $R^2 = 0.94$
(82.176) (62.488) (2.608) (.1445) (.6301) (.5959) (.5917) $d = 2.04$.
[3.67] [3.13] [0.27]

the hours variable. Klein and Ball [8] also found the productivity factor to be significant in the British economy; however, as was also observed in the case of the United Kingdom, the substitution of the rate of change of productivity for the level entails a loss of statistical significance in the productivity variable.[12] (See Equation 1 of Appendix 2; it may be remarked that the sign of the regression coefficient of productivity changes is negative and hence contrary to expectations.)

On the basis of the two stage least squares estimates, the previous change in wage rates appears to have a negligible influence on wage drift, regardless of which wage rate change variable is used. (The point estimates of the relevant regression coefficients have a perverse positive sign, but are quite small and statistically insignificant.) There is somewhat more support from the ordinary least squares regressions of Appendix 1 for the proposition that wage drift will be moderated by high wage rate increases in the present or immediate past. Even in these regressions, the statistical significance of the wage rate change variables is marginal.[13] In any case, the point estimates of the regression coefficients of these variables (for the ordinary least squares regressions) suggest that only 15 to 30 per cent of higher wage rate increases is reflected in a reduced divergence between wage earnings and wage rates .

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[12] The comparison of our findings in this regard with those of Klein and Ball is not exact since Klein and Ball introduced quarter-to-quarter differences (not differences between corresponding quarters of adjacent years) in a variant of their wage drift equation in an attempt to remove autocorrelation in the residuals of their estimated equation. In addition, Klein and Ball subjected all of the variables of their relationship to a first difference transformation in this experiment, while we have only differenced the productivity level variable.

[13] With 13 degrees of freedom and a two-tailed test, the 10 per cent and 5 per cent points are 1.77 and 2.16. Hence, even disregarding possible autocorrelation in the residuals which would vitiate tests based on classical assumptions, we can say that none of the three wage rate change variables have significant coefficients at the 5 per cent level and only two out of three of these coefficients are significant at the more permissive 10 per cent level.

These results are fundamentally in accord with other studies summarized in E. H. Phelps Brown's survey article [2] and would lead one to the conclusion that wage rate changes and wage drift are not alternative ways of attaining the same "equilibrium" level of wage earnings. Consequently, it would appear that wage drift is additive rather than alternative, i.e., that wage drift proceeds from the negotiated rate and is largely independent of the level of that rate.[14]

Negative finds also apply to the consumer price change variable and to the unemployment rate, as equations 2 and 3 of Appendix 2 indicate. The regression coefficient of the consumer price change variable has a perverse sign but is not statistically significant at the 5 per cent level (even if we ignore possible autocorrelation in the residuals of this relationship). Thus workplace bargaining over wage drift does not seem particularly sensitive to movements in the consumer price level; perhaps this is so because the anticipated increase in consumer prices is already taken into account in the wage rate increase negotiated for the period in question. The unemployment rate has the expected negative direction of effect, but it is far from being a statistically significant variable. One interpretation of this result might be that the influence of the hours variable is primarily a reflection of the institution of payment for overtime hours at premium rates of pay. An alternative explanation, which in our judgment is more accurate, is that the hours variable is a more sensitive indicator of the demand for the services of already employed workers, which in the short run may not be too closely tied to the demand for

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[14] The concept of wage drift as either an additive or alternative magnitude is discussed in greater detail by E. H. Phelps Brown ([2], p. 339.) On a theoretical level, Isaac [7] argues that one might even expect wage drift and wage rate increases to be positively (rather than negatively) correlated; however, he finds little evidence in his study to support this position.

the services of workers who are not employed or who are not nominally in the labour force. In addition, the transient phenomenon of labour hoarding may well imply that the average work week is a better indicator, in the short run, of the state of demand in the labour market than the rate of unemployment.[15]

3. Qualifications and Conclusions

There are some qualifications that must be made recognized. First, the time period, 1953 I - 1957 IV (20 observations), is too limited to allow one to draw definitive conclusions. The restriction is imposed by the lack of suitable data; before 1953, one may argue that the economy was still being influenced by postwar adjustment and the Korean War while Maher's data end in 1957 and the generation of additional data on a wage rate index was judged to be beyond the scope of this study.

Another limitation on this study is that we have not been able to take account of micro-economic factors, which are generally non-quantifiable but which might also contribute to wage drift. This is particularly true of what is known as secondary drift. For example, excess demand for labour in one sector of the economy may raise the actual earnings of workers in that sector. The same type of workers in other areas will demand an equal increase in earnings even though there is no comparable excess demand for labour in the secondary sectors. Although the final result of this process is to make the drift larger than it would have otherwise been, it is difficult to quantify this influence. A second type of micro-economic force tending to produce wage drift is local bargaining power, of the sort emphasized by Lerner and Marquand [9].

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[15] The possible influence of both the unemployment rate and the price level change variable was examined with two stage least squares estimating techniques, with each of these variables considered as endogenous explanatory variables in the second stage. In both cases, the results were similar to those obtained by ordinary least squares.

Even if this influence is important (a question on which there is little consensus), it is very difficult to quantify the influence of this factor.

A study of the Danish case illustrates another influence on wage drift that cannot be readily measured. The major trade union in that country has followed a policy of wage negotiations intended to reduce the differentials between higher and lower paid workers. Despite this policy, the wage structure of the Danish economy has been quite stable as there has been a strong tendency to restore the original relationships by an upward drift of wage earnings from negotiated rates, for the more highly paid workers.[16]

In addition, some technical limitations of our econometric techniques must be mentioned. We have already pointed out the difficulties of interpretation of the Durbin-Watson test statistic in the context of a simultaneous equations model in which lagged endogenous variables appear as predetermined variables (which would seem to be almost inevitable with an econometric model of size greater than 3 or 4 behavioural equations). Less esoteric (but potentially more dangerous) is the point that we have taken no explicit account of errors of measurement, which can give rise to misleading conclusions regardless of sample size and which are almost certainly not negligible in our data. In addition, we have made no explicit adjustment for the fact that we have tried a number of specifications before settling on a preferred one; as is well known, this procedure induces an upward bias in the significance levels attached to the t ratios, in comparison to the significance levels relevant under classical assumptions.

These qualifications do not, in our view, destroy the validity of our findings; instead, one must simply draw tentative conclusions from the results

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[16] For a more detailed discussion of the institutional forces influencing wage drift in Denmark, see [4], p. 298, and [2].

of this study, some of which are reinforced by the findings of other investigators. With this view in mind, we may state our principal conclusion that, despite the apparent differences in the wage negotiation systems of the United States and many European countries, the forces influencing wage drift in both areas appear to be remarkably the same. This is a particularly interesting finding in view of the fact that, during the period under investigation (1953-1957), wage drift was generally measured to be negative in the United States, while it was (and is) generally positive in the European countries surveyed. There are several secondary conclusions that can be drawn, on a tentative basis, from this study as well. It would appear that the excess demand for labour, as measured by an index of average hours worked per week, is the strongest single influence causing wage earnings and wage rates to diverge, for the United States during the period under study. The level of labour productivity also appears to exert a significant, though secondary, impact on wage drift.[17] However, previous changes in wage rates do not appear to exert a significant influence on the drift, although the evidence is slightly mixed on this point. In any case, in the United States as in the European countries surveyed, wage drift appears to be largely additive (independent of wage rate changes) rather than alternative (a substitute for wage rate changes).

The findings of this paper have implications for a study of the possible trade-offs between the goals of full employment and price level stability. Most

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[17] The theoretical discussion in the first section of this paper suggests that the productivity variable that should be most closely related to wage drift is the rate of change of productivity, while we have found that only the level of labour productivity appears to be a significant explanatory variable. This conundrum may be explicable in terms of the types of considerations discussed by Wilson and Eckstein [16]; if short-term movements in labour productivity are largely a transient, cyclical phenomenon, this sort of productivity change may not be the type of productivity variable to which wage drift is geared. Instead, the long-term underlying movement of labour productivity, which presumably is the relevant factor explaining wage drift, might be more satisfactorily approximated by the measured level of labour productivity.

econometric studies of this issue based on U.S. data make use of a wage adjustment relationship, in which the rate of change of wage earnings is related to several explanatory variables, including some measure of the proportion of the labour force unemployed. If the wage drift relationship of the present study is a valid approximation of reality, it might be preferable to decompose such a wage adjustment relationship into two parts; a wage adjustment equation in which the dependent variable is the change in negotiated wage rates, and a drift relationship connecting wage rates and wage earnings. While Klein and Ball [8] followed this approach in their study of the wage-price sector of the British economy, such a study has never, to the best of our knowledge, been carried out for the U.S. economy. It would be interesting to study the trade-off curve (or "Phillips curve") of the United States under this approach, contrasting the results obtained with those of the more conventional approach to this issue. In any case, this is one possible direction for future research.

SOURCES OF DATA

All variables in this study are based on quarterly observations. Where the data have been published in monthly form, quarterly averages have been calculated. The principal variables are:

1. Wage Rate Index; Source:
   John E. Maher, "An Index of Wage Rates for Selected Industries, 1946-57," Review of Economics and Statistics, August, 1961, p. 282.

2. Average Earnings Index; Source:
   Ibid., p. 282.

3. Average Weekly Hours index (h), Private Employees, 1957-59=1.0; Source:
   U.S. Department of Commerce, Office of Business Economics (unpublished data).

4. Productivity (X/Eh); calculated from:
   X - gross private output, except housing services;
   E - non-military wage and salary employment minus civilian government employment
   h - average weekly hours, private employees; source:
   U.S. Department of Commerce, Office of Business Economics (unpublished data).

5. Principal Components of Exogenous Variables of Office of Business Economics Econometric Model; Source:
   U.S. Department of Commerce, Office of Business Economics (unpublished data).

6. Consumer Price Index (P); Source:
   Business Statistics, 1965: Supplement to the Survey of Current Business 1965, p. 220.

7. Unemployment Rate (U): Standard series adjusted to a post-1957 definition of unemployment.

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APPENDIX 1

ORDINARY LEAST SQUARES ESTIMATES OF WAGE DRIFT RELATIONSHIPS, U.S.A., 1953 I - 1957 IV

1. $$\text{Wage Drift} = \underset{(51.863)}{-176.688} + \underset{(41.291)\ [3.18]}{131.228h} + \underset{(2.017)\ [2.38]}{4.8020X/Eh} + \underset{(.9038)}{5.7377Q_1} + \underset{(.88205)}{4.83420Q_2} + \underset{(.87372)}{1.9460Q_3} \qquad R^2 = 0.84,\ d = 1.28;$$

2. $$\text{Wage Drift} = \underset{(50.287)}{-155.848} + \underset{(40.795)\ [2.70]}{109.989h} + \underset{(1.9021)\ [2.66]}{5.0640X/Eh} - \underset{(.0922)\ [1.69]}{0.1556\Delta W} + \underset{(.8554)}{5.9076Q_1} + \underset{(.8334)}{4.9788Q_2} + \underset{(.8282)}{2.1280Q_3} \qquad R^2 = 0.87,\ d = 1.15;$$

3. $$\text{Wage Drift} = \underset{(63.313)}{-89.5401} + \underset{(49.4661)\ [1.31]}{64.7038h} + \underset{(2.1287)\ [1.20]}{2.5463X/Eh} - \underset{(0.14052)\ [2.05]}{0.28742\Delta W^{*}} + \underset{(.8162)}{5.6905Q_1} + \underset{(.7962)}{4.8300Q_2} + \underset{(0.7887)}{1.92630Q_3} \qquad R^2 = 0.89,\ d = 1.48;$$

4. $$\text{Wage Drift} = \underset{(56.400)}{-124.575} + \underset{(45.1453)\ [1.97]}{88.8629h} + \underset{(1.9520)\ [1.97]}{3.8394X/Eh} - \underset{(0.11728)\ [1.78]}{0.20932\Delta W^{**}} + \underset{(.8408)}{5.76991Q_1} + \underset{(.8209)}{4.89007Q_2} + \underset{(.8134)}{2.0095Q_3} \qquad R^2 = 0.87,\ d = 1.29.$$

APPENDIX 2

ORDINARY LEAST SQUARES
ESTIMATES OF WAGE DRIFT RELATIONSHIPS,
U.S.A., 1953 (or 1954) I - 1957 IV

1954 I - 1957 IV

1. Wage Drift = $-151.086 + 142.287h - 0.58843\Delta X/Eh + 5.8463Q_1 + 5.2250Q_2 + 1.9654Q_3$ $R^2 = 0.86$; $d = 1.20$;

(47.343) (46.831) (1.9537) (1.0967) (1.0662) (1.0600)

(3.04) (0.30)

1953 I - 1957 IV

2. Wage Drift = $-111.497 + 71.041h + 4.3363X/Eh - 0.5723\Delta P + 5.9737Q_1 + 5.0223Q_2 + 2.0450Q_3$ $R^2 = 0.88$; $d = 1.15$;

(57.858) (48.624) (1.8551) (0.2927) (0.8331) (0.8331) (0.7985)

(1.46) (2.34) (1.96)

1953 I - 1957 IV

3. Wage Drift = $-18.9239 + 1.68727X/Eh - 0.2574U + 6.4791Q_1 + 5.3411Q_2 + 2.1426Q_3$ $R^2 = 0.73$; $d = 0.51$

(17.1576) (2.303) (0.4741) (1.2481) (1.1483) (1.1315)

(0.73) (0.54)