A STUDY ON THE KEYNES' ANALYSIS OF WAGES AND UNEMPLOYMENT

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I. Introduotion

The last decade has witnessed a considerable rehabilitation of Keynes's monetary theory of unemployment, stemming from the reappraisal of the message of the General Theory by Clower (1965) and Leijonhufvud (1968). Although their interpretation of Keynes has been questioned on grounds of textual content (Yeager, 1973) and overall consistency of the behavioral assumptions of the General Theory viewed in this light (Grossman, 1972), the Clower-Leijonhufved work—located in a microeconomic analysis of general equilibrium processes—has certainly thrown new light on the phenomena to which Keynes addressed himself, while providing a choice theoretie explication of them lacking in conventional textbook treatments of the Keynesian model.

The Clower-Leijonhufvnd reappraisal of Keynes deals primarily with the monetary aspects of the General Theory. Significantly, Leijonhufvud's (1968, pp. 95~98) major work is subtitled "a study in monetary theory" and addresses itself only in passing to Keynes's analysis of wage determination. Over recent years, however, there has also emerged a new interpretation of Keynes's treatment of the latter. This development is attributable to Tobin (1972) and Trevithick (1976a, 1976b, 1977), whose analysis have also been favorably commented upon by Solow (1979)[1]. While this reappraisal has attracted much less attention than the Clower-Leijonhufvud work, it does in fact provide an alternative theoretical foundation for the analysis of involuntary unemployment to that suggested by Clower and Leijonhufvud.[2] Moreover, while the dynamic disequilibrium (or

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1) The recent reappraisals by Young (1975, 1976) of the role of desired variables in the Keynesian system also express themes related to those developed by Tobin and Trevithick.

2) We note that the two analyses are not necessarily incompatible. The work of Clower, in particular, is concerned with a different problem, that of examining the implications of non-market clearing. The TT approach might be characterized as an analysis of the problem of the occurrance or non-market clearing.

income-constrained) processes analyzed by the latter "…has more to tell us about depression than about inflation" (Yeager, 1973, p. 158), the new reappraisal of Keynes's theory of wages offers insights into the processes underlyirg contemporary inflation in the advanced Western economies. More particularly, it is claimed (e.g., Tobin, 1972 ; Trevithick, 1976b) that the new variant establishes a theoretical underpinning for the wage-wage spiral analyses of inflation proposed by other Keynesian such as Kahn (1976) and Hicks (1974).

Although the new analysis provides a significant alternative approach to that of Clower and Leijonhufvud—seeking as it were to "rehabilitate" Keynes by a different route—the two approaches exhibit important and interesting points of correrpondence. First, both are grounded in microeconomic, choice-theoretic analysis. Both visualize Keynes as groping in the General Theory towards an alternative rational choice theory-based analysis of macro-phenomena to that provided by the pre-Keynesian "classical" theory—while recognizing that Keynes did not spell out this explanation (sufficiently) fully. Thus the new view of Keynes's theory of wages also offers us an interpretation of Keynes the micro-theoretican and as such is in stark contrast to Shove's alleged portrayal of him at lacking all knowledge of value theory.[3] Second, and relatedly, both reappraisals imply that we need to make a distinction between Keynesian economics (as conventionally presented) and the economics of Keynes himself.

However, the two reappraisals do differ in the manner in which they relate the "real" economics of Keynes to "Keynesian economics," or the "neo-classical synthesis" (of Keynes and the classics). Leijonhufvud describes the "terms of truce" implicit in the neo-classical synthesis in the following manner:

> "(1) the model which Keynes had the gall to call his "general theory" is but a special case of the Classical theory, obtained by imposing certain restrictive assumptions on the latter, and (2) the Keynesian "specialcase," while theoretically trivial, is nonethless important because it so happens that it is a better guide to the real world than is the general (equilibrium) theory." (Leijonhufivud, 1968. p. 7).

The Clower-Leijonhufvud reappraisal denies the valdity of both propositions. But the new view of Keynes's theory of wage formation does accept that Keynes's argument rests on the introduction of certain restrictive assumptions (concerning the form of the labor supply function), and also that it is theoretically "trivial" yet important because this is the way that the labor market appears to operate "in the real world." Thus Keynes is

3) "Gerald Shove used to say that Maynard had never spent the twenty minutes necessary to understand the theory of value". (Robinson, 1962, p. 79).

portrayed as less of a "revolutionary" thinker than Clower and Leijonhufvud envision.

The purpose of this paper is to subject the new Tobin-Trevithick (TT) view of Keynes's analysis of wages to critical scrutiny. We begin with a review of the conventional or orthodox interpretation of Keynes's treatment of wage determination, as this established itself in the years following the publication of the General Theory. Next, we outline the new TT interpretation and offer on evaluation of it. Finally, we draw together the threads of the preceding arguments.

Ⅱ. The Conventional Interpretations of Keynes's Analysis of Wages

What might be called the orthodox interpretation of Keynes's treatment of the labor supply function and wage determination originated in Leontief's (1937) review of the General Theory. Leontief argued that the difference between Keynes's theory and the Classical scheme boiled down to a difference in one basic assumption. Classical theory assumed that all demand and supply functions, those for labor included, exhibited the property of zero degree homogeneity in prices.[4] Keynes, maintained Leontief had retained this assumption for the labor demand function; in which case he had assumed that workers were subject to money illusion. The renunciation by Keynes of the homogeneity postulate (as Leontief termed it) in the case of this particular supply function constituted the basic difference between Keynes and the Classics, because

> "…in a frictionless system with at least one or more non-homogenous elements the quantity of money ceases to be a neutral factor" (Leontief, 1937, p. 194).

It is relevant to note here that Leonfief was hard pressed to establish the construction that he had put upon Keynes's message from the textual evidence of the General Theory itself:

> "Unfortunately for the present discussion, he (Keynes) does nat commit himself to a precise, clear-cut statement of this basic postulate…… The nearest Mr. Keynes comes to a precise formulation of the crucial issue is his assertion that the supply of labor depends not upon the "real" but (also?) upon money wages (pp. 8~9)."[5] (Leonfief, 1937,

4) To quote Leontief (1937, p. 192) : "the quantity of any services or any commodity demanded or supplied by a firm or an individual remains unchanged if all the prices upon which it (directly) depends increase or decrease exactly in the same proportion."

5) The page numbers guoted by Leontief refer to Keynes (1936). What Keynes actually wrote was:

pp. 195～6).

A second major theme of the orthodox interpretation initiated by Leontief, and upon which he was subsequently to elaborate (Leontief, 1947), was that Keynes's labor supply function unlike that of (neo-) classical economic theory, constituted a fundamental postulate or "arbitrary" axiom of his system, not derivable from more basic, underlying assumptions about behavior. The homogeneity postulute of classical theory, Leontief argued, was not an axiom of that system; rather, it was derived from more fundamental assumptions concerning the behavior of economic agents (e.g., the assumption of rational, maximizing behavior by individuals). However,

> "the monetary supply curve of labor is a fundamental postulate of the General Theory in the true sense of the term. A starting point of a long chain of deductive reasoning, it is itself not theoretically derived within the body of the Keynesian system…" (Leontief, 1947, p. 233).

An important implication of this orthodox interpretation is that while the classical labor supply function rests on an underlying assumption of rational, utility-maximizing behavior by workers, the Keynesian labor supply function denies such behavior and is no way derivable from it. This is a major point of departure in the new TT interpretation.

In his 1937 paper Leontief argued merely that the Keynesian labor supply function was non-homogeneous, but did not seek further to describe its properties. Subsequent orthodox interpretation has been divided on the issue of the shape and content of the Keynesian labor supply function.

One line of interpretation, espoused in Ackley's (1961) famous text, is that Keynes "substituted an autonomously determined money wage [for the classical labor supply function]…[although]…in his verbal discussion he admitted some departure from the assumption of a completely rigid money wage…" (Ackley, 1961, p. 403). This suggests a Keynesian supply function of the form

$$N^s = N^s(W) \qquad (1)$$

where N^s is the quantity of labor supplied

W is the (autonomusly-determined) general nomey wage level and which has the property that

$$\frac{\partial N^s}{\partial W} \cdot \frac{W}{N^s} = \infty \qquad (2)$$

Another commonly-encountered textbook interpretation (e.g., Denrburg and McDougall,

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that "…it may be the case that within a certain range the demand of labor is for a minimum money-wage and not for a minimum real wage." (Keynes, 1936, p. 8).

1968, pp. 200~203) in the orthdox tradition retains the assumption of (1) but introduces the nation of a kink in the labor supply schedule at the level of "full employment" (i.e., that level of employment consistent with zero involuntary unemployment). Here condiction (2) is substituted by the dual condition

$$\frac{\partial N^s}{\partial W}\cdot\frac{W}{N^s} \text{ for } N<N^f, \qquad (3)$$

$$0<\frac{\partial N^s}{\partial W}\cdot\frac{W}{N^s} \text{ for } N>N^f .$$

where N^f is the full employment level of employment, N is the actual of employment

A third interpretation stems from Modigliani's (1944) comparison of the classical and Keynesian macro-models. This presumes a dichotomized Keynesian labor supply function, with (1) and (2) describing its properties for $N<N^f$, and

$$N^s=N^s\left(\frac{W}{P}\right) \text{ for } N>N^f . \qquad (4)$$

Once full employment is attained, therefore, the Keynesian labor supply schedule suddenly becomes a function of real and not money wages.

Presumably, the various interpretations reflect the fact that "Keynes himself did not consider in any detail the conditions of a labor supply possibly exceeding [the] full employment [i.e., zero involuntary unemployment] level" (Leontif, 1947, p. 233).

Another area of disagreement in the orthodox interpretation of Keynes's analysis of labor supply and wage formation concerns the underlying rationale in Keynes's mind for this supposedly fundamental postulates of his system.

One possibility, first noted by Leontief (1947), is that Keynes implictly assumed that workers are utility maximizers but that they are also subject to money illusion, simultaneous doubling of the money wage level and the price level will loclate workers on a higher utility plane. This formulation contends that the money wage rate directly enters the worker's utility function, as follows

$$U^i=U^i\ (x_1^i, x_2^i, \cdots\cdots x_n^i\ ;\ W^i) \qquad (5)$$

where U^i is the utility of the i-th worker

$x_1^i \cdots x_n^i$ are the physical quantities of (future and present commodities consumed by the i-th worker W_i is the money wage of the i-th worker.

A labor supply function that breaches the homegeneity postulate may certainly be rationalized on the basis of (5). Indeed, this seems to be the interpretation initially favored by Tobin (1947), and it remains a familiar textbook interpretation(Dernburg and McDougall, 1968, p.200).

Unfortunately, this rationale for the Keynesion labor supply function involves difficulties regarding the comprehension of other Keynesian precepts, most notably the notion of involuntary unemplayment. For, as Leontief (1947, p. 236) has noted:

"…it deprives Keynes's unemployment concept of its principal attribute. Why should

any given rate of employment or unemployment be called "involuntary" if it is determined through real income?"

Secondly, the money illusion/utility maximization view renders the General Theory logically inconsistent as a whole or, rather, assumes that individuals behave inconsistently. Tobin (1947) pointed out that the Keynesian consumption function presumes that individuals base their spending decisions on real and not money income. Why, asked Tobin, should people behave in one way when they buy (in the goods market)and in a different way when they sell (in the labor manket)?

These difficulties led Leontief (1947, p. 236) to offer an alternative construction of Keynes's thinking:

"Much more in keepig with the spirit of the General Theory is an interpretation which ascribes the monetary bias of the Keynesian supply curve of labor to the influence of some outside factors, that is, factors clearly distinguishable from the preference system of the workers."

Leontief offered a minimum wage law as a "good example" of one such factor. A problem with this interpretation—if problem it be—is that it reduces the General Theory to a special (and trivial) case of the classical model. The classical economists had not denied that impediments to market clearing such as minimum wage laws might result in a less-than full employment equilibrium. This remained the predominant line of interpretation of the Keynesian message (until the work of Clower and Leijonhufvud) under the aegis of the "neo-classical synthesis." However, there are textual problems in viewing the Keynesian message in this light. Thus, Keynes actually writes in the General Theory of the "demand of labor for a minimum money wage" (Keynes, 1936, p. 8) and also of situations where "labor stipulates (within limits) for a money-wage rather than a real wage" (Keynes, 1936, p. 9). Both quotations suggest that money wage rigidity arises from workers and not from Leonfief's "outside factors." Indeed, Leontief (1947, p. 237) himself noted that "Keynes explicitly refuses to limit the application of his theoretical scheme to obvious instances of such outside influence."

A third possible rationale was advanced by Johnson (1957) who, eschewing both the interpretation of money-illusioned worker utility maximization and "outside factors," argued that:

"the fundamental difference···between Keynesian and classical monetary theory lies in the Keynesian assumption of rigid wages, which in turn rests on an assumption of economic irrationality on the part of wage earners." (Johnson, 1957, p. 34).

As Johnson went on to note, this interpretation implies that in Keynesian thinking "the determination of the wage level is placed outside the purview of economic analysis···"[6].

6) Johnson (1957, p. 34) also noted, significantly, a qualification to this statement "···except to the

Such a portrayal does at least tie in fully with Leontief's claim that the Keynesian labor supply function is a fundamental axiom divorced from the maximizing assumptions obout economic agents underlying classical thinking. Furthermore, this interpretation would seem to be favored by the Cambridge ("Circus") contemporaries of Keynes, such as Professor Lord Kahn and Joan Robinson. For example, Kahn (1975, p. 30) writes:

> "The rate of increase of wages at any moment of time is largely a matter of historical accident and the influence of recent history on the states of mind of the various parties concerned."

Combined with the proposition that the central tenet of Keynes's analysis was that "…in an industrial economy, the level of money-wage rates governs the level of prices…" (Robinson, 1966, p. 19), this yields an historical accident theory of inflation/deflation—which is, as Johnson noted, outside the purview of economic analysis.

However, it is difficult to reconcile the "worker irrationality" postulate with the textual evidence of the General Theory. Why should it be assumed that one side of the market (the supply side of the labor market) is imbued with irrational decision-makers when the other, the demand side, was clearly assumed by Keynes to be populated by profit-maximizing and rational enterpreneurs?[7] Indeed, if workers are assumed to behave irrationally as sellers in the labor maket, why then did not Keynes also assume that they would behave irrationally as buyers in the product and asset markets? A thorough-going application of an "irrationality" postulate to all the behavioral relations in the General Theory would reduce it to a theoretical shambles.

To conclude, the orthodox interpretation of Keynes's analysis of wage determination initiated by Leontief exhibits a variety of particularistic interpretations, most notably concerning the shape and content of the Keynesian labor supply function and the implicit reasoning thought to underlie Keynes's own analysis. Further, the various rationales advanced for the latter give rise to problems in relation to the comprehension of the Keynesian system as a whole.

Nevertheless, common themes underlie all such variants. First, they all presume that the Keynesian analysis of the labor supply function, and hence wage determination, jettisons the principle that labor supplies are rational, maximizing agents; or at least assume that they are not "fully rational" (in the money-wage-in-the-utility-function variant), in the se-

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extent that an economic rationale can be found for wage rigidity as a long-run phenomenon." This is precisely what the new TT view sets out to establish.

7) Keynes (1936, p. 17) states openly that his theory "maintains the first postulate" of classical theory, namely that "the wage is equal to the marginal product of labor" (Keynes, 1936, p. 5). This rests on the assumption of profit-maximizing enterprises.

nse of being money illusioned. Secondly, and relatedly, the Keynesian labor supply function is viewed as a fundamental postulate of his system, not deducible from the assumptions about motivation underlying (neo-) classical thinking on labor supply and wage determination.

Ⅲ. The New TT(Tobin-Trevithick) Interpretation

The TT interpretation challenges orthodoxy on both counts. Thus the Keynsian labor supply function is not taken to be a fundamental postulate of his system in the sense defined by Leontief. It does rest upon other, more fundamental, assumptions descernible in Keynes's own writings on the matter. Also, and even more startlingly, it is asserted that Keynsian supply function rests upon the self-same premise of utility maximization as undelies the neo-classical labor supply function. And it is claimed that this does not reduce to the possibility, noted and rejected by Leontief, that Keynes assumed the money wage to be an argument in workers' utility functions. The new view interprets Keynes as presuming the relative wages (a real magnitude) enter the utility function; that is,

$$U^i = U^i\left(x_1,\ x_2, \cdots\cdots x_n\ ;\ \frac{W^i}{W^1},\ \frac{W^i}{W^2}, \cdots, 1, \cdots,\ \frac{W^i}{W^m}\right) \qquad (6)$$

where 1⋯ m is the set of all wage rates is the economy and all other variables are as defined in equation (5).

The TT view in effect protrays the Keynesian labor supply function as a labor market application of Duesenberry's (1949) relative income hypothesis. On this view, Keynes's analysis of wage determination is not "outside the purview of economic analysis."

The TT analysis seeks to provide, first, a new interpretation of the Keynesian wage rigidity/"involuntary" unemployment theorem; second, an economic explanation of the supposed wage spillover process; and, third, an analysis of the phenomenon of stagflation or inflationary recession. The new view thus seeks to build on Keynes's analysis and to extend this to an explication of other phenomena. We briefly review these three aspects of the new analysis of wages and unemployment in turn.

First, consider the re-interpretation of Keynes's wage rigidity postulate. TT seek to provide an economic rationale of the hypothesis. Trevithick (1976a), in particular, denies that Keynes assumed money illusion or worker irrationality, and ascribes the postulate of downward wage rigidity in the General Theory to workers' concern for relative and not absolute wage levels. As Tobin (1972, p. 5) puts it:

"rigidities in the path of money wage rates can be explained by worker's preoccupations with relative wages and the absence of any central economy-wide mechanism for

altering all money wages together."

More specifically, workers are assumed to withdraw their labor if wages full relatively to wages elsewhere even though they would not withdraw that labor were real wages to fall uniformly everywhere. The textual evidence for this interpretation of Keynes's analysis of wages builds heavily on a few passages in the General Theory (Trevithick, 1976b, pp. 327~8).

The Key to the argument is that in a decentralized wage bargaining process a decision by one particular group to accept a cut in its nominal wage will not be followed by similar wage cuts by other groups, due to the relative wage arguments in (6). Money wages cannot fall in any one market without impairing the relative status of workers in that market. A general rise in prices, on the other hand, would be neutral and universal method of reducing real wages. Price inflation thus reconciles the downward rigidity of money wages (due to the relative income effect) with the attainment of full employment equilibrium.

In short, Keynes is interpreted as meaning that relative wages are the arguments in labor supply functions. Equation (6) implies that labor supply functions will be interdependent. Trevithick (1976a) thus postulutes a simplified supply schedule for the i-th labor market of the form:

$$S_i = S_i\left(\frac{W_i}{P}\ ;\ \frac{W_1}{W_i}, \cdots,\ 1, \cdots,\ \frac{W_n}{W_i}\right) \qquad (7)$$

As we have shown elsewhere (Addison and Burton, 1979), and as Trevithick (1976a, p. 330) himself admits, this specification is formally the same as the neo-classical labor supply function, "recognizing as it does the complex web of interdependence which exists between labor markets." However, Trevithick argues that the departure from orthodoxy of Keynes derives from the following restrictions on (7) :

$$\left.\begin{aligned} &\frac{\partial S_i}{\partial W_i} = \infty, \\ &-\infty < \frac{\partial S_i}{\partial P} < 0. \end{aligned}\right\} \qquad (8)$$

Hence there is supposed to be asymmetry in the response of labor supply to a given reduction in the i-th money wage and an equal percentage increase in the general price level.

So much for the TT view of the Keynesian depression wage rigidity postulate, and the utility function interdependence/wage spillover process that is presumed to underpin it. What of the interpretation of inflationary recession in the TT schema? The General Theory contains no direct analysis of this phenomenon: it is concerned with deflationary recession and not inflationary recession. However, both Trevithick (1976a, 1976b, 1977) and Tobin (1972) argue that Keynes's labor supply function, as they now interpret it, has

implications for the explication of stagflation as well because (7) is couched entirely in terms of real wages and wage differentials. Thus, exponential increases of nominal wages and prices can be handled by the same apparatus as is applied to the downward wage rigidity postulate. Not only does the Keynesian labor supply function rationalize downward inflexibility of the level of money wages but also of the rate of change of that variable, in the face of labor market slack. Accordingly, Keynes's analysis of the labor supply function is capable of rationalizing a wage adjustment function of the form (Trevithick, 1976b, p. 47): [8]

$$\dot{W}_t=\phi(U_t-U_f)\dot{P}_e{}^t+\dot{X}_t, \tag{9}$$

which is subject to the conditions:

$$\left.\begin{array}{l}\phi\leq\phi(\quad)\leq 1\\ \phi'(\quad)\leq 0\\ \lim_{U_t\to U_f}\phi(\quad)=1\end{array}\right\} \tag{10}$$

where $\dot{W}$ is the proportional rate of change of money wages

$\dot{X}$ is the rate of change of labor productivity

U is the level of unemployment

$\dot{P}^e$ is the expected rate of price inflation

U_f is the "full employment" (zero involuntary unemployment) level of un employment and

t is a time-subscript.

Thus (9) presumes that workers will refrain from seeking full compensation for (expected) inflation as long as the actual rate of unemployment exceeds that of zero involuntary unemployment; but as the latter is approached the compensating element rises until, at full emplyment, compensation becomes complete. According to (9) and (10), therefore, it is possible to reduce involuntary unemployment by an escalation of the rate of price inflation as wages will not rise *pari passu*.

Yet, according to the TT analysis, it is not possible to engineer a reduction in involuntary unemployment in stagflationary episodes by means of a reduction in the rate of growth of nominal wages. Since all groups are concerned with their relative wages—and thus directions/rates of changes of those magnitudes—each will seek to resist a reduction in its rate of wage advance, viewing this as affecting only itself. The result is a general downward inflexibility in the rate of wage inflation even though $U_t>U_f$, due to a ratchet effect emerging from the direct interdependence of worker utilities via relative wages.

This proposition is presented by Trevithick (1976a, pp. 45～46) and Tobin (1972, pp. 4

8) Trevithick is here only formalizing somewhat the verbal argument presented in Tobin (1972, p. 5).

~5) as the stagflationary counterpart of the General Theory proposition that an increase in the price level, and not money wage cuts, is the solution to involuntary unemployment. For TT this superiority of inflation over reductions in the rate of growth of money wages rests on the premise that inflation is a neutral method of reducing the general level of real wages. Unlike piecemeal wage cuts/reductions in wage increases, inflation leaves relatives undisturbed.

Ⅳ. Evaluation

In appraising the TT construction of Keynes's analysis of the labor supply function and wage determination two basic questions arise. First, what is the evidence that the interpretation actually represents Keynes's "real" thinking, as against the orthodox line of interpretation discussed in Section II? Second, ignoring the doctrinal question, what does the TT analysis contribute to an understanding of wage sluggishness, unemployment and wage inflation? Specifically, does it provide a theoretically satisfactory and logically consistent analysis of these issues?

The Question of Doctrinal Authenticity

It is certainly possible to uncover, as does Trevithick (1976b), certain passages in the General Theory that seem to give credence to the TT interpretation. But, equally, Keynes's statements on these issues are brief and vague. To recall Leontief's (1947, p. 233) words, Keynes "does not commit himself to a precise, clear-cut statement" on the determination of wages anywhere in the General Theory. Other economists, including leading Keynesians, have experienced similar difficulties in divining Keynes's analysis of this matter. Thus, Sir John Hicks (1974, p. 61) notes:

> "It is hard to see that in his book he [Keynes] has any theory about the causation of change in money wage."

And in similar vein, Professor Lord Kahn (1975, p. 17) reflects:

> "Keynes's analysis of the behavior of money wages is unsystematic and unsatisfactory."

Yet to appeal to such quotations in "refutation" of the TT interpretation of Keynes's message would be to rest upon the fallacy of *argumentum ad verecundiam*. There are, however, two more serious objections that serve to question the authenticity of that interpretation. First, in replying to Leontief's (1937) contention that he had dropped the homogeneity postulate of the classical labor supply function, Keynes (1937) in fact conceded that this was so, and further argued:

"…I should have thought, however, that there was abundant evidence from experence to contradict this postulate" (Keynes, 1937, p. 209).

Second, as Leijonhufvud (1968, p. 97) noted, a relative-income-hypothesis interpretation of Keynes's explication of wage determination is "implausible" because it is inconsistent with other behavioral postulates of the General Theory. If relativity variables enter directly in utility functions, then they not only affect the shape of the labor supply function but also content of the arguments in the consumption function. In other words, if the TT interpretation is correct, we should have expected Keynes to anticipate Duesenberry's (1949) analysis of consumption and saving by some thirteen years. Yet, as Leijonhufvud (1968, p. 97) reminds us:

"…Keynes's two chapters on the consumption function (in the General Theory) show no trace of such a 'keep up with the Joneses' hypothesis".

In the light of these observations, it is appropriate to register an agnostic position on the authenticity of the TT interpretation of Keynes. Whether this interpretation is the correct one is a moot point. It is certainly a possible interpretation but, most obviously in connection with Keynes's concession to Leontief, not necessarily the correct interpretation. We find much sympathy with Solow's (1979, p. 343) comment:

"I suspect the truth of the matter is that there are several strands in the General Theory; and Keynes need not have been conscious that they are only partially consistent, or even not consistent at all."

The Question of Substance

It is expositionally convenient to examine the three major aspects of the TT analysis in the following order: First, the question of the relative wage hypothesis and its implications for the wage spillover and inflation processes; second, the interpretation of inflationary recession, and the alleged superiority of extra price inflation (over a slowing of nominal wage growth) as a means of reducing unemployment in such a situation; and, third, the explication of downward wage rigidity in deflationary recession.

First, consider the relative income hypothesis that underlies the new interpretation of Keynes's analysis of wages, and the foundation that it allegedly provides for explicating a spillover process of wage determination and a stable pattern of wage differentials. Solow (1979) has commented most sympathetically on the TT introduction of relative wage variables to the utility function, suggesting that this "unconventional" assumption (whatever its doctrinal authenticity) might well explain observed wage phenomena much better than orthodox microeconomic or "new microeconomic" approaches.

However, the mere introduction of relative wage variables into worker utility functions

does not in and of itself generate any predictions about behavior. Knowledge of the utility function, to make an obvious but fundamental points, is insufficient to generate propositions about choice unless we also have a specification of the constraints impinging upon the choice set; in particular, the behavior of the demand side of the labor market and its effects upon wage determination. If, for example, we were to assume that firms act as visualized in the orthodox, text-book theory of the firm, then a stable pattern of wage differentials would be predicted only if worker utility were solely a (infinitely elastic) function of "established relativities";[9] so that other variables, such as the bundle of real goods workers could acquire from employment—as assumed in equation (6)—and the probability of employment, are omitted from the worker utility function. In this case, the supply curve facing the firm would be horizontal at the established relative wage for that group of workers, and demand shifts would leave the pattern of wage differentials unchanged. If, on the other hand, we combine the orthodox theory of the firm with a worker (expected) utility function, in which the relative wage variables enter alongside real goods consumed, and where the probability of employment also affects choice, the demand shifts for particular firms/markets may be predicted to give rise to bargaining over relative wage changes. To explain in these circumstances why employers (and, indeed, employees) do not bargain for relative wage reductions when such perceived demand contractions occur, it would seem necessary to have recourse to some other assumption such as Solow's (1979) introduction of the relative wage into the firm's production function, or the Williamson, Wachter and Harris (1975) analysis of idiosyncratic exchange in "obligational" labor markets. The general point is that the TT specification of worker utility functions of the form of equation (6) does not, by itself, rationalize the prediction of a rigid wage spillover system and a stable pattern of wage defferentials.

A second limitation of the TT specification of the worker utility functions is that it does not provide any predictions concerning the array of wage interconnection coefficients in the presumed wage spillover system, the elements of the "wage pattern matrix." In part, this lacuna reflects the failure of the TT analysis to specify clearly the influence of variations in employer resistance across sectors of the labor market. Moreover, even if it were acceptable to assume uniform employer/demand influences on wage determination across the labor marekt, the basic problem in the analysis remains unresolved; namely the relative orders of magnitude of the array of mariginal coefficients, $\partial U^i/\partial (W^i/W^j)$, cannot be predicted a priori on the basis of utility theory.[10] Tobin (1972, p.

9) Equations (7) and (8) do imply this.

10) Interestingly, this prodiem is analogous to that embedded in the sociologically-based relative deprivation hypothesis of spillover wage determination. An elaborated treatment of the relative deprivation approach is contained in Baxter (1973), and a critique of these ideas in Burton (1977a).

12) speaks of the element in the wage pattern matrix thus:

"The coefficients in each row are non-negative and sum to one, but…their distribution across markets and time lags will differ from row to row."

Clearly, this provides very little of a testable nature at all. Nor indeed can such predictions be derived on the basis of the TT analysis because that model fails to provide any theory of the pattern of the $\partial U^i/\partial(W^i/W^j)$s. Tobin (1972) falls back here upon notions of "reference standards" and talks of the "arbitrary and conventional, indeterminate and unstable" elements in comparison making. But without a theory of the selection of reference standards. Tobin's characterization of the forces at work is empty in a testable sense. Nor may such predictions be derived by drawing upon the so-called theory of social comparison-making in sociology and social psychology (Burton, 1977a). Trevithick's (1976b, p. 331) claim that :

"The general acceptance of the principle of comparability with other groups of workers by both sides of the bargaining process provides considerable support for the relative wage hypothesis".

would appear to be overstated.

We would conclude that, despite the appealing attempt to locate the Keynesian analysis of wage determination in a choice-theoretic framework, the TT analysis exhibits some notable theoretical lacunae. As presented, it fails to provide us with a firm choice-theoretic underpinning of the institutionalist view of the wage spillover process that was especially prominent in the 1950s and early 1960s.

We next turn to an examination of the TT analysis of stagflation and their associated argument favoring inflation as a means of reducing involuntary unempleyment in this context. The TT explication of stagflation rests on the premise of a ratchet effect in wage determination due to the interdependence of utility functions: that is, the self-same principle as TT have recourse to in their explication of the Keynesian wage (level) rigidity postulate under deflationary recession. We remit consideration of this question to our later discussion of the wage rigidity theorem, focusing here on the proposition that a rise in the price level may be used to reduce involuntary unemployment (for $U>U_f$) in stagflation but that once full employment is attained there is (as monetarist analysis claims) a zero trade-off between inflation and unemployment.

The possibility of price inflation reducing involuntary unemployment rests on the *ad hoc* postulate that $\phi<1$ for $U>U_f$. It is an assumption that workers have dynamic money illusion under involuntary unemployment; for if $\phi=1$ then a higher, fully expected rate of inflation could not permanently reduce unemployment. Whether or not ϕ is less

than unity for $U>U_f$ is an empirical question and one which we do not propose to comment upon. However, two points should be made regarding the logic of the TT proposition. First, the incorporation of dynamic money illusion reintroduces the non-homogeneity interpretation of Keynes's wage analysis by the back-door—and this is the very interpretation of Keynes that TT have sought to challenge.[11] Second, TT give no explanation of the psychological postulates underlying their analysis. Workers are assumed to be subject to dynamic money illusion at some rates of unemployment but not at others (that is, for $U<U_f$). What factors might explain such a change in psychology? As it stands, the assumption does not necessarily derive from (6). It is an arbitrary restriction—(8)—imposed on (7). It might thus be described as a "fundamental axiom" of the TT analysis, in the sense of Leontief.

There is one further, more fundamental, point to made regarding the TT claim that inflation can "buy" a reduction in involuntary unemployment.[12] This result obtains not simply because of money illusion but because of the TT assumption that price inflation has zero allocative (relative price) effects, while a reduction in the rate of wage inflation will (be perceived to) give rise to such effects. The assumptions under which this hypothesis may be substantiated logically are extremely restrictive. A change in the rate of growth of the money supply will have a neutral effect on the structure of relative prices if and only if we are to assume that it occurs in some Patinkinesque helicopter-drop or some other similar means of "equal scattering" of the increase in the money stock.

The TT argument that inflation can buy a reduction in involuntary unemployment is thwarted, by its own logic, if we assume, after Hayek (1935), that a change in the stock of money is effected via particular routes. Not only would the helicopter-drop scenario be extremely difficult for the monetary authorities to engineer in practice but there are theoretical reasons for arguing that discriminatory, non-neutral monetary policies will dominate non-discriminatory, helicopter-drop policies is the political choice calculus (Wa-

11) Professor, Perlman argues that equation (9) does not imply money illusion, that $\phi<1$ is "…not evidence of money illusion but of the fact that workers would be prepared to accept a cut in their real wage if $U>U_f$…". This latter proposition could equally be handled by a wage adjustment of the form:

$$\dot{W}_t=g(U_t-U_f)+\phi\dot{P}_e{}^t+\dot{X}_t \qquad (9)'$$
$$g'(\ )<0 \text{ for } U_t>U_f$$
$$g(0)=0$$
$$\phi=1$$

Equation (9)′ does not imply dynamic money illusion, yet recognizes that reservation wages are conditoinal upon the state of the labor market. At the very least, the specification of (9) is a clumsy way of expressing the point needed. As (9)′ shows, acceptance of the point does not imply $\phi<1$.

12) The doyen of (neo-classical) labor economists, Albert Rees, has made the same claim. See his comments in Harris et al. (1979, pp. 130~131).

gner, 1977). For whatever reason, if changes in the stock of money do enter the economy via particular channels, the structure of relative prices will be altered. But Tobin (1972, pp. 9~12) specifically allows in his analysis that excess demand/suppty and demand-side shocks can and will alter the structure of relative wages. It follows that inflation-induced shifts in the structure of relative goods-market prices, feeding through onto labor markets, will *ex hypothesi* alter (at least temporarily) the structure of relative wages. By the very assumptions of the TT relative income hypothesis, the "lagging" groups will then be induced—by the full in their wage differentials—to try to match the wage increases secured by "leading groups", notching up their own wage claims *pari passu*. Ignoring the matter of differences in employer resistance across the labor market, as do TT, the result will be an escalation in the rate of wage inflation. Price inflation will prove unable to reduce involuntary unemployment and for precisely the some reason that workers eschew the possibility of a deceleration in the rate of nominal wage advance: it will be perceived as disturbing relativities.

Next consider the TT analysis of the Keynesian wage rigidity postulate concerning deflationary recession and the ratchet effect in money wage determination that they take to be implied by the assumption of relative wages in worker utility functions. We have earlier established that the assumed presence of relative wage variables in worker utility functions is not in itself a sufficient condition for rigid relative wages. At this point, we propose to make the further points that the relative-wage-in-the-utility-function hypothesis is not a sufficient condition for either a downwardly rigid money wage level/rate of nominal wage change or involuntary unemployment. We proceed by first making a set of assumptions that abstracts from side-issues. Specifically, we assume that:

(a) worker utility functions are as specified in equation (6);
(b) the problem of differential employer resistance across the labor market to wage demands may be ignored;
(c) the structure of relative wages is "appropriate"—that is, there is no structural unemployment caused by a wage structure that fails to reflect the true relative scarcities of different types of labor; but that
(d) the real wage exceeds its market-clearing level for the labor market as a whole.

The TT presumption is that the existence of utility interdependence implied by (a) is a sufficient condition for downward money-wage (and hence real-wage) rigidity. This is simply not so. Consider the question: why do not workers negotiate among themselves to internalize the presumed externalities? More specifically why do workers not negotiate a collective, across-the-board proportionate reduction in all (rates of increase of) money wages—thus leaving ralative wages unchanged—so as to reduce the general level of real wages? There are two possible answers.

First, assuming the costs of negotiating and policing such an agreement (i.e., the transaction costs of organizing such a collective action) were zero, the failure to undertake such a trade would imply that workers valued the increase in the probability of employment less than the reduction in the real wage (and hence the real standard of living) entailed. In this case, the unemployment could not be termed "involuntary." Rather, it is the result of choice, the preference for a higher real wage over an increased probability of employment. In this case, we have real wage rigidity—but not involuntary unemployment.

Second, assume to the contrary that workers do value the increased probability of employment higher than the real wage reduction required to clear the market, but that the transaction costs of organizing an across-the-board proportionate money wage reduction necessary to achieve this result are larger than the net utility increment resulting from the real wage reduction/employment probability improvement. Here again, rational choice will result in the collective action not being undertaken. In this case, it is legitimate to call the resulting unemployment "involuntary" because, in the absence of positive transaction costs of collective action, workers would undertake such action. The more important point, however, is that neither the failure to adopt an across-the-board money wage cut nor the resulting involuntary unemployment is the result of the interdependence of worker's utliity functions. It is a reflection of the prohibitive costs of negotiating and policing a collective money wage cut or reduction in the rate of increase of money wages.

Positive Implications

The conclusion of the foregoing is not to be interpreted as negative in its implications for the TT analysis. We have sought only to establish that the economic consequences of direct interdependence of worker utility functions will depend importantly on the anticipated costs and of organizing and enforcing "supper-collective" bargains between all employees/groups of employees, so as to internalize the assumed wage extenalities. Recognition of this point is not to oppose the TT analysis, but rather to suggest a potentially fruitful line of further theoretical development. Much work has already been devoted to the economic analysis of collective action in large, latent groups, and to the economics of uncontracted effects under conditions of positive transactions costs, on which such a theoretical elaboration might usefully draw.

This suggested line of theoretical development raises numerous issues, the full implications of which require extensive consideration elsewhere. Here, some general pointers must suffice to establish the content of the matters arising. First, we would expect that the transactions costs of inter-group, "top-level" wage negotiations depend *inter alia* on the

legal framework underpinning, and institutional characteristics of, the industrial relations system. Thus a system in which highly centralized bargaining institutions exist, and in which top-level economy-wide agreements are enforceable, will *ceteris paribus* entail lower transaction costs of such agreements than a system with decentralized bargaining, in which labor market federations are unable to enforce a general wages "pact".[13] Secondly, and relatedly, we would expect the prospects of the emergence and continuation of voluntary incomes polices, "socially-responsible" wages polices, and government-union movement social contracts, to be determined in part by the costs of organizing such inter-group deals.

V. Conclusions

Our main conclusions may be itemized as follows. First, otherwise diverse "orthodox" interpretations of Keynes's labor supply function and wage determination anlysis all presume that be jettisoned the neo-classical assumption of labor suppliers as rational, maximizing agents in favor of some other psychological postulates; some fundamental axiom of the Keynesian system. TT deny this, and advance a choice-theoretic, microeconomically-based alternative.

Secondly, the textual evidence of Keynes's own comments on these matters are too meearge and elusively-worded to strongly sustain any particular interpretation, including that of TT (Tobin-Trevithick). An agnostic conclusion is warranted.

Thirdly, the TT analysis, although attractive in its choice-theoretic foundations, exhibits some weaknesses. Their analysis of the wage spillover process requires more precise theoretical elaboration to proceed beyond the vague implications of institutionalist spillover models and to permit empirical discrimination among the competing theories of wage interconnection. Also the money illusion interpretation of Keynes's thinking seems to enter the TT analysis by the back-door, in the context of their analysis of inflationary recession. Moreover, the suggestion that price inflation may be used to reduce involuntary unemployment would appear to rest upon a lop-sided assumption concerning the neutrality of wage and price-level changes. Finally, their analysis of the Keynesian wage rigidity theorem may be shown to rest upon certain implicit assumptions concerning the transaction costs of inter-group/individual bargaining to internalize relative wage externalities, and not simply the assumption of worker utility function interdependence alone.

To catalogue the weaker points of the TT analysis is not necessarily to reject it. We

13) Crouch (1981) presents some interesting empirical work along these lines.

have sought to elucidate a positive agenda for further theoretical elaboration via the explicit incorporation of inter-group transaction costs in bargaining to remove relative wage externalities.

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The Reinvestment Assumption and it's Consequences

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One of the most important parts of the microeconomic theory is characterized by a strange situation: Although in numerous articles the so-called reinvestment assumption has been described as a treacherous cliff, textbooks on investment calculation hardly ever mention the real consequences of nonobservance of that cliff. The following remarks try to throw a bridge between theoretic warning boards on the one hand and the practical recommandations of investment calculation formulas on the other hand.

Let us first repeat the essential of the reinvestment assumption: When the investor introduces a certain rate of interest into his model, the model is always working in such a manner, as if that rate of interest would at the same time apply to cash throwoffs and their temporary reinvestment, possibly up to the end of the project's economic life. If we e.g. introduce an interest rate of 10 per cent, our model will use this rate without any restriction, i.e. not only as an interest-payment rate but also as an interest-bearing rate. Our model then proceeds on the assumption, that the interest rat of 10 per cent is really reflecting the capital cost level as well as the capital yield level.

Thus we can say, that this rate of interest represents in a manner of speaking a communication door between the real investment object and the capital markets. In case the real object needs financial means, these means are brought up through this communication door. If, on the contrary, the real object has cash throwoffs, these throwoffs can be transferred through the same communication door to the capital markets, where they can be invested temporarily and thereby generate an additional profit. If we introduce an interest rate of 10 per cent, our model is charged to go ahead with the calculation, as if the rate of 10 per cent would be completely independent of the direction, in which we step through the communication door.

In reality, however, we generally do not find this identity of capital cost rates and capital yield rates. The interest rate introduced in the model is then realistically usable only in one respect, either in the capital cost respect (capital raising), or in the capital yield respect (interest return of throwoffs). The greater the real discrepancy of these two interest rates, the more inaccurate is the calculation result, if we allow the model to work with only one single interest rate.

We can say that all calculation variants using but one interest rate are exclusively tailored for the exceptional case of a perfect capital market. If the conditions of a perfect capital market are not given, it is impossible to apply investment calculation formulas using only one interest rate. 'Perfect capital market' means, that the communication door

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mentioned above between the real investment object and the capital market can be passed through like a revolving door, i.e. to both directions at the same easiness, respectively at the same effort: Whatever should be the direction of the monetary flow between the real object and the capital market, the part making available financial means gets from the other part an interest return for this provision of means, and that at the level of the interest rate.

In reality this perfect capital market, in which the interest rates for credits both of the asset side and of the liability side have come right to an equilibrium level, is a thinkable exceptional case. We can state that nearly everywhere interest rates of the two sides differ considerably from one another. The reasons why must not be discussed here. The discrepancy between interest rates for credits of the asset side and interest rates for credits of the liability side is a fact, from which the investment theory ought to draw practical conclusions, even if this will not be comfortable.

The most important conclusion has to be, that investment calculation formulas working with but one interest rate are useless for the great majority of all real investment cases. If in reality an investment project has to be calculated, we must investigate at the very beginning at what conditions the monetary stream between the real object and the capital markets (and vice versa) will flow. If we find out, that in the actual situation there is a noticeable difference between the interest rates for capital needed and for throwoffs to be reinvested, it is necessary to rule out all investment calculation formulas using only one interest rate. That particularly concerns all variants of present value formulas, and it is a troublesome news to all authors of investment calculation textbooks. Working with but one interest rate is a grave source of error in investment calculation, whenever the real conditions are not those of a perfect capital market.

What can be done? In the same way as other models the investment calculation has to portray the real situation. In case the real situation shows an interest margin, the project's destiny cannot remain uninfluenced by that. We must try to develop investment calculation models using more than one interest rate. This is the only way to gain a realistic investment calculation.

A second conclusion results inevitably from the first one: If we have to give up investment formulas using but one interest rate, the procedure of discounting cannot be kept up, too. An algorithm using more than one interest rate can in no case work by a retrograde reckoning. Multi-interest-rate algorithms lead to different results according as they are used in a retrograde manner or in a progressive manner. Only in the exceptional case, in which the rate of interest to pay equals the rate of interest to earn, the result is not influenced by the calculation procedure (retrograde or progressive). Comparing these two calculation forms, we can say that the variant of progressive calculation is in any case

the more realistic one. Only the progressive calculation can portray exactly the destiny of the real investment object. If the real object needs financial means, the sum of capital needed naturally grows (but does not diminish) at the extent of the capital cost interest rate. If the real object can reinvest throwoffs, these latter naturally grow (but do not diminish) at the extent of the interest bearing rate. Thus the progressive calculation method can be regarded as the genuine model of the real investment situation.

Summarizing the above mentioned facts, we have to state, that it will be indispensably necessary to remodel the investment calculation from net value algorithms to horizon value algorithms. Only horizon value models are able to avoid those sources of error, that are inherent to the traditional investment formulas.

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