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Pigou’s Wage-Good Method
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On its appearance in 1933, Pigou’s Theory of Unemployment was variously described as ‘one of the great books of recent years’, ‘a supreme intellectual achievement’ or ‘simply nonsense from beginning to end’. Other readers were perplexed or equivocal: in 1937 Hicks wrote that ‘to most people its doctrines seem quite as strange and novel as the doctrines of Mr. Keynes himself’ and even Robertson who was as familiar as anyone with Pigou’s ideas admitted sheepishly that ‘I have always fond the Prof’s wage-good method hard to get into, but I thought I was satisfied it worked out all right.’

The theory — the one that evoked these reactions and is the subject of this paper — is a short-period analysis of unemployment using such classical devices as a wages-fund framework and a dichotomy of goods into wage-goods and non-wage-goods. ‘Neo-Ricardian’ seems an apt label for work that is quite different from the macroeconomics produced by his Cambridge

The titles of Pigou’s books have been abbreviated as follows:
WW = Wealth and Welfare;
TU = Theory of Unemployment; IF1 = Industrial Fluctuations, 1st edition;
IF2 = Industrial Fluctuations, 2nd edition.

1 See the reviews of TU by Harris (1934) p. 286 and Harrod (1934) p. 19, with Keynes dissenting (1973a, p. 310). The reviews of Sweezy and Hawtrey were much cooler than those of Harris and Harrod.

2 From Mr. Keynes and the ‘Classics’ as reprinted in Hicks (1967 p. 126).

3 Robertson writing to Keynes (Keynes (1973a) p. 313). In the prefaces of both TU and IF, Pigou had thanked Robertson for his help but at the same time it is clear that Robertson was uncomfortable with the method.
contemporaries, not to mention post-{	extit{General Theory}} reconstructions of the 'Classics'. To avoid possible misunderstanding it should be noted that in emphasising the 'classical' affiliations of Pigou's analysis we are not necessarily endorsing Keynes' view of Pigou as a 'classical' economist. Keynes was by no means consistent in his use of the term 'classical' but it is more than arguable that the {	extit{Theory of Unemployment}} was as non-classical as the writings of D.H. Robertson.

Pigou's use in his early writings of the wages fund framework is the subject of section I; section II discusses his work of the 1920's concentrating on his use of marginal productivity analysis in employment theory. Section III sets out the analysis of the {	extit{Theory of Unemployment}} and Section IV discusses the relation of Pigou's work with that of Marshall and Keynes.

This paper does not by try to give a comprehensive survey of Pigovian macroeconomics nor even a complete account of his work on unemployment; some attention will be paid to his monetary analysis to avoid giving a distorted impression but the microeconomic analysis of unemployment which Pigou took very seriously will not be discussed here.

I

To make any progress we need some basic terminology and an initial orientation; it is specially important to define the terms 'wages fund framework' and 'short period'. All that will be meant by saying that Pigou uses a wages fund framework is that he uses a method of aggregative analysis based on the notion of a flow of goods from employers to work people in payment for the latter's labour. The wages fund theory (of wages) is the best known theory using this framework but Pigou's work shows that the framework could be used for other purposes — for instance for a theory of employment. In fact, Pigou followed Marshall in rejecting the wages fund theory and, as we shall see below, was very critical of the notion of a fixed wages fund. Although Pigou's work differs from the main classical tradition in dealing with problems of the short-run rather than with problems of the long-run, it has its classical forerunner in the Ricardo-Mill discussion of the machinery issue. We find that Pigou has two concepts of the short-period — the first which Keynes was to use in the {	extit{General Theory}} namely a period such that 'industrial equipment, both in form and quantity may properly be regarded as more or

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1 Hicks (op.cit) continues: 'Professor Pigou's theory runs to a quite amazing extent in real terms... The ordinary classical economist has no part in this {	extit{tour de force}}.' (p. 127). Also Hawtrey wrote to Keynes: 'But (Pigou's theory of wage goods) is special to Pigou and cannot be treated as 'classical'.' (Keynes (1973b) p. 19).
less fixed' (TU p. 39) and the second which he calls the 'very short period' which is shorter than the 'period of production of the generality of wage goods' (TU p. 88-9). There is a trend in Pigou's work away from the use of the very short period until in his major post-*General Theory* work *Employment and Equilibrium* (1941) it is finally discarded.

A natural corollary to the wages fund approach is the dichotomy of goods into wage goods (the goods which can be paid as wages) and non-wage goods — a division which only becomes important in Pigou's writings of the late 1920's when he adopts a more formal approach to his employment analysis. The 1920's also saw the introduction of marginal productivity analysis at first independently of (or perhaps in opposition to) the wages fund approach but subsequently in harness with it.

The wages fund approach first appears in those chapters of *Wealth and Welfare* that deal with short-run variations in the 'real income of the working classes'; the account is a hybrid of distribution theory and employment theory for these chapters contain a theory of the determination of the wages fund (the 'real income of the working classes') plus some hints about the effects of changes in the wages fund on employment. The treatment recalls Book II of Mill's *Principles* : wages (in kind) are advanced to workers but capitalists and entrepreneurs receive their income at the end of the production cycle; workers' consumption does not appear explicitly in the analysis (it is taken for granted that they consume their entire income) but non-workers' consumption is one of the key choice variables; altogether, the dominant decision maker is the representative non-wage earner. Of course, we shall expect differences e.g. Pigou's routine application of utility analysis, his emphasis — after Marshall and Bagehot — on expectations and the importance he attaches to 'storage', but his basic vision is classical.

The following passage sets the scene : 'We pass behind the distorting veil of money and recollect that resources that come into the hands of the people in control of industry, are devoted to three purposes, immediate consumption by entrepreneurs and capitalists, storage, and the purchase of labour to produce goods for the future.' (p. 477). Two factors determine the size of the wages fund : the size of the national dividend (total output) and 'the comparative attraction which persons in control of resources feel for the three uses of immediate consumption, storage and investment in the purchase of labour.' For a closed economy, 'spontaneous variations' in the size of the national dividend come about through variations in the 'bounty of nature'. There is a formalistic analysis of the effect of variations in the size of the dividend on the different uses, which starts from the premiss that 'it is evidently a condition of equilibrium that the marginal utility yielded to entrepreneurs by the A units consumed by them, the B units devoted to wages
and the C units stored by them should all be equal,' but this argument fizzles out. (p. 441). The treatment of spontaneous variations in the second factor is more interesting. Spontaneous variations in the attractiveness of consumption are not to be expected — 'we may regard the absolute estimate which people entertain of the attractiveness of the consumption use — in technical terms, the form and position of the utility curve relevant to that use — as fixed.' (p. 451). The important choice, then, is between storage and investment in labour and Pigou's discussion leans heavily on entrepreneurs' expectations: 'Since the main function of stored goods is to safeguard the holders against the risk of bad debts and other unfortunate results of investment while the main function of goods devoted to the purchase of labour is to yield further goods in the future, it is easily seen that diminished desire for storage and increased desire for investment... are, in general, correlated results of a deeper-lying cause, namely, changes in the expectations, which businessmen entertain concerning the probable yield of resources. Hence in the last resort, the causes out of which variations in the attractiveness of investment in the purchase of labour, as compared with the rival uses, arise, are to be found to be equivalent to those which bring about variations of the expectations of businessmen as to the yield of any nth unit of resources invested in the purchase of labour designed to make « future goods ».' (p. 453). In his later work on Industrial Fluctuations Pigou developed much further these ideas on expectations.

There is a sketch of the behaviour of the economy over time: 'a variation in the volume of resources devoted to the purchase of labour to be employed in making future goods, whether it is the result of a variation in the volume of the dividend, or of a variation in the relative attractiveness felt for different uses, in general reacts upon the volume of the resources devoted to the purchase of labour in those years'. Incidentally there are three exogenous variables in the model, the 'bounty of nature', the terms of trade and business confidence and although there is some discussion of the interactions of these variables, there is no genuine multi-period analysis; none the less the foundations had been laid for the books on industrial fluctuations.

The book contains an argument which was to reappear in all his works on unemployment for the next seventeen years and is a good example of his use of the very short period and of the wages fund framework. It is a

Pigou's argument may seem very weak for the conclusion he wishes us to draw. His other discussions are more elaborate — for instance in Unemployment account is taken of the financing of public works by taxation whilst IF2 answers Hawtrey's criticisms by extending the discussion to deal with the behaviour of banks — yet the analysis is concerned with feasibility in a physical or accounting sense rather than with the properties of a behavioural system. Partly this limitation reflects the absence of technique commented on at the end of section III.
refutation of the argument that 'philanthropy and the State are necessarily
impotent even to reduce the variability of the real income of the working
classes as a whole because the quantity of resources devoted to the purchase
of labour at any time is rigidly determined.' (p. 477). Pigou undermined this
argument, a variant of the 'Treasury View', with the observation that the
wages fund could be enlarged by transferring resources from capitalists' con-
sumption and inventories. 'Such transferences may be effected in times of
depression without the necessity of any transference being made in the
aggregate, if resources are borrowed by philanthropists or by the state in bad
times and repaid with interest in good times.' He mentions also a further
source from which resources can be drawn viz. 'Charity and the Poor Law'.
'In so far as the purchase of labour by the state in bad times checked
unemployment and the resulting pauperism, the expenses involved in it
would be balanced by a corresponding reduction in the expenses incurred by
these agencies'. (p. 478). Although Pigou's views on policy were quite diffe-
rent from those of a wages fund theorist like Mrs. Marcet their conceptual
frameworks are very similar as a comparison of their treatment of poor relief
shows: Mrs. Marcet (1819), 'The greatest evil that results from this provision
for the poor is, that by encroaching on the funds destined for the mainte-
nance of labourers, it diminishes the demand for labour and consequently
lowers wages' (p. 174); Pigou (1933), 'all gratuitous payments to poor people
and all social services, in so far as they are financed at the expense of the richer
non-wage earning classes, whatever benefit they confer on the community in other respects, of necessity reduce pro tanto the quantity of labour
demanded at a given real wage rate.' (p. 155). However, Pigou remained as
convinced of the value of a public works policy in 1933 as he had been in 1912
or even 1908, when he had defended the same principle in his inaugural
lecture, although that treatment is monetary rather than physical. Of course,
as is clear from the WW passage, Pigou is envisaging a policy of re-schedu-
ling of public works so that they are concentrated in periods of depression not
a permanent policy to prevent or mitigate chronic unemployment.

This account of WW would be seriously incomplete without a discussion
of the 'monetary factor''. The variables that Pigou is trying to explain — the
national dividend and the real income of the working classes — are real
variables and although he believes that discussion could proceed quite far
without introducing money, ultimately money had to be taken into account.
His view was that money is part of the machinery of exchange and that in a

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*This paper does not treat Pigou's 'pure' monetary theory; monetary matters are treated in so
far as they impinge on employment. See Eshag (1963) or Patinkin (1965, 1973) for discussion
of Pigou's monetary theory.*
stationary economy or one in which ‘all changes in general prices are perfectly forseen’ the intervention of the monetary medium is ‘without effect’. (p. 443). Though money makes a difference, it never makes all the difference; Pigou is very far from Keynes’ position of the ‘30s that a ‘monetary production economy’ is essentially different from a barter economy. Until Employment and Equilibrium, Pigou’s books are organised into separate real and monetary discussions, using accounting systems that do not mesh, but this is not to say that the monetary sector does not impinge on the real sector. The influence of the monetary factor is, however, a sign of disequilibrium; for instance, a spontaneous increase in the ‘inflowing stream of commodities’ with a given supply of money will lower general prices but as wages-rates ‘cannot be varied until much friction has been overcome’ — there is, in effect, ‘a raising of the supply schedule of labour in terms of commodities.’ (p. 445). This example illustrates one of Pigou’s constant themes — the greater plasticity of product prices than of wages — a theme which recurs in Pigou’s work up to and beyond the Theory of Unemployment.

It is noteworthy that product prices are introduced into the analysis along with the monetary factor — they are not part of the ‘real’ analysis; if the mark of neo-classical economics is integration of product and factor markets, then this is not neo-classical economics (cf. the passage quoted in Section IV, below, from Marshall, 1886). Pigou’s model is not a model of an exchange economy if this means an economy in which products are exchanged for the only explicit exchange is of labour for wage goods; of course, goods are produced for sale but their production and sale is, as it were, off stage. Prices appear to be part of that veil which must be penetrated — the vision is thus like that of, Mill’s Principles with its treatment of Exchange after the treatment of Distribution.7

Although WW has no worked out theory of employment, it has, in the real analysis of the determination of the wages fund, the basis for such a theory. Pigou’s popular book Unemployment goes some way to supplying that theory and although it is much simpler than later works such as TU, it contains very little that is contradicted by later analysis. There is a chapter devoted to ‘the plasticity of wage rates’, which amplifies the WW treatment and has a long discussion of money illusion. In Wealth and Welfare it had been argued that entrepreneurs were at an advantage vis à vis wage earners and capitalists because they were better able to foresee price changes; this

7 Running through Pigou’s work is the conviction that employment is a matter of the labour market — of supply and demand for labour — and could be treated without direct reference to the goods or capital markets. This conviction partly accounts for his strong reaction to Keynes’ suggestion that a reduction in money wages would not increase employment.
point is amplified in *Unemployment* in connection with creditors. In respect, therefore, of old and new loans alike businessmen, in times of industrial activity, obtain a special gain at the expense of their creditors, and are, therefore, led to extend their investments, and hence the aggregate wage-fund further than they would otherwise have done.' (p. 121). The wording of this passage suggests a wealth effect rather than a substitution effect.

The wages fund framework is much less evident than in WW and, although fluctuations in the wages fund are discussed, the term is nowhere defined and the characteristic excursions behind the veil of money are missing. There is an interesting argument, adapted from Marshall and deriving ultimately from Mill, against some popular remedies for unemployment. ‘Why are these people unemployed? They are unemployed because at the wage they ask, there is no demand for their services and, unless the wage they ask is lowered, they can only cease to be employed if such a demand comes into being. But from whence can such a demand come? It can only come from the general income of the country, that is to say, from the product of the labour and capital of the rest of the community. It follows that the exclusion of competing imports ... can create employment for them on one condition only; namely, that these devices succeed in rendering the labour and capital of the rest of the community more effective in production.’ (p. 47). Mill’s argument — that no change could increase employment unless it increased the capital of the country (or ‘industry is limited by capital’) — controls the first part of the argument about ‘general income’ which also fits the WW account of the determination of the wages fund. The Marshall argument, quoted in Section V below, uses marginal productivity analysis (a technique that Pigou did not use in *Unemployment*) and works behind the final stage of Pigou’s argument.

*Unemployment* contains an enunciation of a basic Pigovian doctrine that unemployment is ‘wholly caused by maladjustment between wage-rates and demand’ (p. 51) and that, if wage rates were perfectly plastic, unemployment would be eliminated. The book does not provide a theoretical basis for these statements, instead they are treated as obvious. In the next section we see

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Patinkin (1973) has drawn attention to the preoccupation of the Cambridge cash-balance theorists with wealth effects rather than with substitution effects. See also the more elaborate analysis from TU that is discussed in section III below.

cf. TU p. 252: ‘With perfectly free competition among work people and labour perfectly mobile... there will always be at work a strong tendency for wage rates to be so related to demand that everybody is employed. Hence, in stable conditions everyone will actually be employed. The implication is that such unemployment as exists at any time is due wholly to the fact that changes in demand conditions are continually taking place and that frictional resistances prevent the appropriate wage adjustment from being made instantaneously'.
Pigou applying this doctrine to the high post-World was I levels of unemployment and at the same time devising a theoretical justification for the doctrine.

Pigou subsequently elaborated his theory of the 'variability of the national dividend' until it reached book length in *Industrial Fluctuations* (1927 and 1929) in which a great deal of historical and statistical material is introduced. But the wages fund as it appears in IF or TU is greatly reduced in significance for the wages fund no longer constitutes the demand for labour as it did in WW (or Mill's Principles). The term does not even appear — it is replaced by 'real wages bill' — and Pigou warns us against an interpretation like that given above of WW. 'The method of exposition which I have employed may, perhaps, unless a caution is given, suggest the inference that the aggregate real wages bill to be expended in any year or month is determined by the expectations of business men independently of the conditions of labour supply, these conditions merely deciding whether a high rate of wage shall be paid to a smaller number or a low rate to a larger number of men. This is not so. The expectations of profit entertained by businessmen help to determine the demand schedule for labour; this and the supply schedule together determine the wages bill.' IF2, p. 192.

This treatment is in line with the marginal productivity development that is discussed in the next section, as well as foreshadowing the TU treatment although in other respects the latter represents a return to the framework of WW.

A clue to Pigou's reasons for disenchantment with the WW framework is to be found in his discussion of a 'false scent' — a theory of fluctuations that he ascribes to Tugan-Baranovsky. The key idea is that 'unused savings [of wage goods] are gradually accumulated and as soon as they are massed in sufficient quantities, are thrown forward into industry.' *Economics of Welfare* (1920) p. 809 but substantially repeated in IF1 and 2). This theory is rejected because it cannot be reconciled with the — 'facts of real life'. With it Pigou seems to reject the WW notion of a prior build-up of wage-goods for he identifies Tugan-Baranovsky's argument with the one given in WW that the size of the wages fund depends on the size of the national dividend. In IF Pigou argues that the 'proximate causes' of changes in the demand for labour are changes in expectations and *not* changes in real income\(^1\). We see below

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\(^1\) As 'expectations' are so stressed in IF, especially in IF2 from which these words are taken (p. viii), it would be as well to comment on Pigou's treatment. In his emphasis on expectations Pigou is somewhat exceptional and is regarded by Haberler (1958) as one of the writers who have laid the 'greatest stress on "psychological reactions" in the explanation of the various phases of the cycle' (p. 143) and even Keynes in an unusually generous passage of the *General
that in TU Pigou returned to a formulation close to that of WW but without the notion of a prior build-up because he had changed from working in the very short-period to working in the short-period and so avoided the irreconcilable ‘facts of real life’.

Instead of devoting a great deal of space to discussing IF 1 and 2 (and the first, 1920, edition of the Economics of Welfare) we shall note the similarities and differences between them and TU when we discuss the latter in section III.

II

In this section we consider a series of contributions beginning with Wage Policy and Unemployment (1927) and ending with Pigou’s work for the Macmillan Committee and the Committee of Economists (1930); these dealt with the contemporary unemployment problem and were notable for their marginal productivity analysis of employment in a one-sector economy. In the preface to IF, Pigou wrote that ‘the conditions prevailing in the great post-war boom and subsequent depression have been so abnormal that I have not examined them here’, and by 1927 he had come to believe that the high post-war levels of unemployment may be the result of a new long-run factor and that the analysis of IF, however appropriate it was to the pre-war cycle, was inadequate for understanding this new situation. There was strong reason to believe ‘that partly through direct state action, and partly through the added strength given to workpeople’s organisations engaged in wage bargaining by the development of unemployment insurance, wage rates have, over a wide area been set at a level which is too high in the above sense; and that the very large percentage of unemployment which has prevailed during the whole of the last six years is due to considerable measure to this new factor in our economic life’ (1927 p. 355). Some data is presented showing that productivity per head and weekly real wages had changed very little from before the war but that the length of the working week had fallen;

Theory described IF as ‘mainly a study of fluctuations in the marginal efficiency of capital’ (p. 190). Expectations as ‘proximate’ causes may be justified by real factors — harvest variations, inventions and so on — or they may be unjustified and Pigou places great emphasis on ‘errors of optimism’ and ‘errors of pessimism’; his language suggests a future existing independently of expectations rather than a future created by actions based on expectations but this may only be a matter of language for in both IF and the much later Employment and Equilibrium Pigou entertains the possibility of cumulative psychological booms. Of course, in Pigou’s work uncertainty enters production decisions rather than ‘liquidity’ decisions and this constitutes a large difference from Keynes.
‘In these conditions we should have expected real weekly wages to fall nearly in proportion to the change in hours of labour. The fact that they have not done so might be expected a priori to inhibit the working population from securing full employment.’ (p. 356). No theoretical backing is provided for these views but, from a discussion later in the paper of the efficacy of wage subsidies as a remedy for unemployment, we can infer that the had in mind a demand function for labour based on marginal productivity theory. These arguments are rather different in nature from those of Wealth and Welfare (or Industrial Fluctuations) for the problem being attacked is not one of fluctuations in the level of employment but the average level itself. The wage fund appears in all of his works on fluctuations — as though in a profound sense the problem of fluctuations is the problem of fluctuations in the wages fund.

During May 1930, Pigou appeared as a witness before the Macmillan Committee and his evidence, which surveys Britain’s post-war economic problems, concentrates on unemployment; it builds on the 1927 article but the presentation is less tentative11. He attributes the higher level of unemployment to ‘three factors related together in rather a complicated way. First, the relative demand for labour in different occupations has altered, and the transfers of labour appropriate to those alterations have not taken place ... Secondly, on top of that the aggregate real demand for labour has not it seems to me expanded in anything like the degree corresponding to the rise in the real rate of wages ... [Thirdly, presumably] there is a maladjustment and the two sides of the thing do not fit... So I do not want to say that unduly high wages are the cause; I want to suggest that the two sides, the demand and the wages side, do not fit together, that they have got out of adjustment’. (p. 48). Thus the diagnosis is the same as that of the 1927 paper but the underlying reasoning is more fully set out, as in the following passage. ‘The most convenient way to start, I think is to take a perfectly simple case and imagine that you have only got one industry, say, growing wheat, and that wages are paid in bushels of wheat. You have got so many men employed, the difference made to the total product by one man when that number is being

11 The 1927 paper paid no attention to monetary factors (or international factors) and concentrated on an explanation in real terms of the new trend phenomenon. But before the Macmillan Committee he discussed the role of monetary factors in similar terms to those he used later in TU. The treatment is influenced by Robertson’s work and Keynes apparently found less to disagree with in this part of the evidence than in the ‘real’ part. One of the themes emerging in the evidence and in his work for the Committee of Economics is the possibility that a perverse monetary policy would thwart an expansive public works policy (Pigou 1930a, 1930b). This idea was common ground with Keynes (see Can Lloyd George Do It? in Keynes (1972)).
employed will then be equal to the wage he gets; it will pay an employer to engage that number of men at that wage. If he engaged any more at the existing rate of wage he would lose. In these circumstances, clearly, if you allow him to pay a smaller number of bushels of wheat per man, he will be able to take on more men, whose work, added to the existing men’s, does not produce so much. So that always if you reduce the real wage in that simple case there is bound to be a bigger demand for labour, and employers are prepared to take on more men at a lower wage than they were prepared to take on at a higher wage’. (p. 52). After being challenged about the disposal of the extra output of wheat (that, as a result of the change, the employers would have to consume more wheat) he admits that ‘it does not sound so good, because I have taken the particular thing, wheat and then consumption is limited. Wheat is a representative thing... [If] you take more than one commodity it is more complicated, but I do not think it alters it in principle’. (p. 80). Although we are not directly concerned with Pigou’s policy proposals (see Hutchison) — it is worth quoting Pigou’s rationale for the measures he proposes for the ‘immediate emergency’, measures that include public works with guarantees of interest if necessary, and an expansionary monetary policy, but not a lowering of wages. ‘The above policy should be regarded as a temporary one designed to enable present real-wage rates to be maintained without abnormal unemployment during the interval that must elapse before the growth of capital equipment and improved technique, in company with the contraction in the annual supply of new labour that will result, a few years hence, from the low birth rate of the war period, allows normal employment to be maintained at existing real wage-rates without special government intervention’. (p. 93).

At about the same time as the Macmillan Committee was sitting Pigou was writing papers for the Committee of Economists. The basic approach was the same, more schematic and technical, but still drawing insights from a one commodity world. ‘If x be the quantity of employment and Φ(x) the total production yielded by x men in the existing environment, x is given by the equation \( \Phi'(x) = W \) where W is the rate of real wage. Hence employment can only increase if either W is diminished or Φ is so changed that for relevant values of x, \( \Phi' \) is made larger’. In a one commodity world the significance of \( \Phi \) is ‘obvious’ but in a many commodity world it represents demand for labour in terms of wage goods, which admittedly is not so clear — is there one for each industry, or is this an aggregate function and, if so, how is it constructed? Nevertheless Pigou invites us to draw certain forceful conclusions — assuming W fixed ‘the real demand curve will, in general be raised if [and implicitly, only if]

(1) productive method improve.
(2) there is more equipment.
(3) in respect of goods that take time to produce, the rate of interest falls'. (p. 1).

Furthermore 'no manipulations of money direct or indirect, except in so far as they bring into play one or another of these fundamental causes, can increase employment'.

As far as demand for labour in the wage-good industry is concerned this is already the analysis of the Theory of Unemployment and in a one commodity world would be a complete analysis. But the extension to a many good economy presented problems, for Pigou saw that industries would be interdependent and aggregate demand for labour could not be obtained by summing the separate industry demand functions if each were based on the assumption of ceteris paribus for the rest of the economy. At the same time it is clear that Pigou believed that within its limits the single good analysis gave the right answers. In TU, and to some extent in IF2, he presented a solution to this problem; a further problem also partially solved in IF2 was how to integrate the marginal analysis into the wages fund framework for this had not been used in the contributions we have been considering.

IF2 appeared in 1929 and was an important step towards TU for some crucial chapters were rewritten and marginal productivity analysis and the wage-good/non-wage good dichotomy became more prominent. However theoretical novelties are not displayed to maximum publicity in the second edition of a comprehensive (historical, as well as theoretical) treatise and the book was not even reviewed in the major journals. A little later in 1929 Pigou contributed a fascinating argument to the debate on primary and secondary employment; it appeared in his review of Hawtrey's Trade and Credit, a work consisting largely of criticism of Pigovian macroeconomics. Pigou and Hawtrey had differed for many years over the validity of the Treasury View and on this occasion Pigou advanced the stronger claim than the one discussed in Section I above, namely that an employment campaign would not only increase total employment but would generate further secondary employment. The reason could not be the derived demand argument of Keynes and Kahn (which was later formalised as the 'multiplier') for Pigou had already rejected the basis of that argument in IF2. As this criticism is repeated in TU, we shall discuss it below. Pigou's own 'multiplier' argument can be interpreted as a multiperiod extension of Ricardo's argument from his chapter on machinery; it is an argument that depends crucially on the wage-good/non wage good dichotomy. Ricardo (and later Mill) had argued that the building of a machine might divert workers away from producing wage-goods thus reducing the size of the wages fund and hence employment in the immediate future; 'whenever that is the case, it will be injurious to the
labouring class, as some of their number will be thrown out of employment, and population will become redundant compared with the funds which are to employ it. (Principles, p. 390). Pigou’s basic idea is the same but applied to the reverse situation of an increase in output of wage-goods. Wage goods are needed to set labourers to work; if they work in the wage-goods industries then their output will be available to set to work more men.

To turn to the details, it is assumed that the labourers ‘insist absolutely on a wage of one bushel of wheat per week’ and at this level they cannot all find work. So the government organises an employment fund, spending each week R bushels of wheat. ‘However, the gross number of men for whom employment will be created is not necessarily R. If the government spends its weekly R bushels in setting men directly to work on roads, bridges or any form of capital development, then, indeed the number is R. But, if it sets them to work in making consumable goods... it then gets back and has available for further wage payments what these men produce; and so on. How many men it calls into work altogether depends on the shape of the curve depicting the marginal wheat output of various numbers of men. If this curve is a straight line with a slope of 45 degrees, the total number called into work will be R (1 + 1/2 + 1/3 ...) i.e. 2R men’. (p. 189). The contrast with the Kahn multiplier is striking for instead of a demand multiplier here is a supply multiplier with a directly contrary moral for policy — do not stimulate investment as it has no (positive) multiplier effects. Despite these differences, the development of these two arguments based on geometric series about the same time in the same place is curious. Given Pigou’s commitment to marginal analysis in his other work of this period the assumption of a 45° degree line, even for an illustration is strange because as Hawtrey pointed out, diminishing marginal productivity is incompatible with a geometric effect.

The next stage in the analysis is the calculation of the reduction of employment in the private sector due to the withdrawal of wage-goods to feed the employment fund. Pigou’s analysis here is faulty, as Hawtrey pointed out (December 1929), for no account has been taken of the downward ‘multiplier’ effect due to possible withdrawal from wheat production of the wage-goods that are transferred to the state. In his rejoinder to Hawtrey (December 1929), Pigou concedes that ‘his argument, together with comments which I have received privately have convinced me that the analysis... is incorrect’, and the argument does not reappear in The Theory of Unemployment. Indeed that later work has no formal multiperiod analysis perhaps because it was felt to be incompatible with the short-run assumption underlying the whole argument for Pigou clearly attached importance to multi-period analysis as is shown by the analysis of ‘real levies’ in IF and his criticism of an early draft of Kahn’s multiplier article on the ground that it was a comparison of equilibria and not a description of the underlying dynamic process. Although Pigou put
forward his ‘multiplier’ argument to support public works programmes (a prominent feature of the Liberal election programme of 1929), it is clear that its tendency, if reformulated to deal with objections, is against such a programme; public works of the kind envisaged would have no secondary expansionary effects and unless the resources come from storage or capitalist’s own consumption the secondary effects would be to create fresh unemployment in the private sector.

The situation on the eve of TU may be summarised as follows: Pigou had taken up two theories of the demand for labour, marginal productivity theory and the wages fund theory. If we think back to the WW scheme where the wages fund $Z$ depends on exogenous factors and write the wage fund identity $Z = xW$ where $x$ is employment and $W$ the wage rate, then clearly if $W$ is given we have $x$. But if we maintain the wages fund framework and add in a marginal condition $\phi'(x) = W$, there is one equation too many. So the marginal analysis cannot just be inserted into the WW framework — other things have no change. Pigou’s thought in the 20’s was much richer than it had been in WW but there still seemed to be a basic incompatibility between two deeply held views. This incompatibility had been resolved in the work of Marshall and his contemporaries by the elimination of the wages fund set-up but Pigou’s *Theory of Unemployment* contained a different solution.

III

*The Theory of Unemployment*, published in 1933, brings together Pigou’s contribution of the preceding few years to the debate on unemployment. Although our main concern is with one facet of the work — the real analysis of the demand and supply of labour it will help to have an overall picture of the work. Useful but not easy to present because Pigou’s ‘simplified model of the economic world’ is never set out in one place but instead emerges in the course of a whole series of investigations. There are many short chapters with local assumptions (and notations) and it is unclear whether an assumption is binding just for a single argument or for the whole work. In its style, the work is a loose collection of arguments based on a common viewpoint rather than the working out of an explicit mathematical model. The effect is strange for whilst all the arguments are in mathematical notation, the style is closer to that of *Industrial Fluctuations* (minus the realistic detail) than to the much tighter modelling that appears in later works such as *Employment and Equilibrium* (1941). This situation makes the formulation of the underlying model of TU a precarious undertaking (as well as, perhaps, a foolish one) because if the model seems to be incomplete this may be because a question that would require the closing of the model had not been asked and not
because it is meant to be incomplete. Because assumptions are introduced as they become necessary in the course of an argument, often by expressing one variable as an arbitrary function of another, it is uncertain whether an equation is a ‘structural’ equation or one reduced from a system of equations\textsuperscript{12}.

There is also a more basic, methodological point — it would be wrong to assume that Pigou was attempting the kind of static equilibrium analysis that became popular after the General Theory; the introductory chapter of IF had surveyed what we call macroeconomics and distinguished two kinds of problems: short and long period movements in the national dividend (cycles and growth) — but neither category obviously includes macro-static analysis. Although TU has a theory of employment, interest and money it may be more plausible to regard it as a supplement to the cycle analysis of IF; if so, it is also important to remember that the cycle was not autonomous; there were important exogenous effects on the system.

The focus of the enquiry is on the elasticy of demand for labour as a whole and Keynes’ comment that Pigou ‘arbitrarily takes two items namely employment and real wages, out of a complex and treats them without proof or enquiry as being analytic functions of one another’ seems fair although it would not prepare the reader for about 250 pages of elaboration of this theme. In fact, the work is very ill-balanced with a long investigation into aspects of the demand for labour, occupying the first four parts of the work, set against a brief and unclear treatment of the supply side. The preface’s promise that ‘finally in Part V the results obtained are brought together and utilised in a direct discussion of unemployment and its fluctuations’ is not really made good.

The scheme that I have adopted for discussing this book may seem arbitrary but it follows Pigou in analysing the effects of variables (other than the wage rate) in two ways: monetary factors (and some others) are treated as exogenous to the labour market and involve shifts in the demand and supply of labour schedules: but other variables notably the real rate of interest are affected by movements along the demand curve and can be regarded as endogenous to the labour market. The explanation of employment is approached by means of aggregate demand and supply functions, relating the real wage rate and the quantity of labour; the demand for labour equation is derived from the system of equations (1) to (5) below explaining the rate of interest, employment levels in two sectors and the price ratio for

\textsuperscript{12} See for example the discussion around equation 4 of page 341 below. Regarding the completeness of the model, it is more likely that Pigou meant it to be incomplete but inadvertently made it complete! See the discussion on p. 344.
the two kinds of good. Thus monetary factors (like changes in the money price level) shift the functions whilst the behaviour of the interest rate is already accommodated in the demand function.

The demand curve is downward sloping — if it were drawn — but the supply curve is not introduced formally at all. Pigou’s remarks about supply seem coherent but they can be ‘modelled’ in more than one way. He speaks of the ‘rate of real wage asked for by workpeople’ and in the short-run regards this as fixed (other things being equal, in particular, the price level). In the long-run, however, this is variable to such an extent that the real demand for labour is irrelevant to the level of unemployment: ‘the real rates of wages for which workpeople stipulate adjust themselves to the average state of real demand for labour, and therefore differences in the average states of real demand between various places and times are not correlated with differences in the percentage of unemployment’13. The outcome is not necessarily full employment and Pigou argues, along the lines of the 1927 paper, that the change in ‘wage policy’ after the Great War had made full employment a most unlikely outcome. ‘Wage policy’ is Pigou’s name for the long-run relation between the real wage stipulated for and the real demand for labour and is affected by the bargaining power of trade unions or state intervention in labour markets — the basic notion is more Marxist than conventionally neo-classical. Some of the elements may be put on the diagram. Let \( W^o \) be the actual real wage stipulated by workpeople and \( x^o \) the associated level of employment. Let the labour force be \( x^* \) and the corresponding full employment wage rate by \( W^* \), \( W^+ \) is the minimum wage rate imposed by union pressure or public opinion. In the long-run, the horizontal line \( S \) falls while there is unemployment until it intersects \( D \) at \( x^+ \); it is not allowed to fall any further.

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13 The same point had been made in *Unemployment* (p. 50).
The size of the labour force is given — it is not a function of the real wage; this view and the diagram are confirmed in a 1937 letter from Pigou to Keynes\textsuperscript{14}. In IF2 Pigou had given a more conventional neoclassical supply curve; that analysis is concerned with fluctuations in employment which are discussed in terms of movements of the demand for labour curve. In the short run the supply functions is fixed but in the long-run it drifts after the demand function as workers alter their customary standard of comfort. (IF2, Ch. II).

\begin{center}
\includegraphics[width=0.5\textwidth]{demand-supply.png}
\end{center}

Rigidity of real wages is the neatest assumption that could be made but Pigou makes it clear that the ‘forces of inertia’ are more likely to stabilise money wage rates in a money economy. Unfortunately the assumption of sticky money wages does not fit neatly into this framework. It is pointed out that ‘upward price movements often accompany rises in the aggregate demand function for labour’ and with rigid money wages this implies that the real rate of wage stipulated for often falls when the aggregate real demand function for labour is rising (p. XXIV). This association causes the aggregate volume of employment to fluctuate more widely than it would do if there were no such association. So these curves are shifting around due to changes in the ‘monetary factor’; the details of these shifts are not worked out and this lack of integration suggests that this method of real demand and supply analysis is not very satisfactory.

Pigou’s view of the monetary factor is that it causes shifts in these functions, and that it is significant only in so far as it affects these functions. Part IV deals with ‘monetary factors affecting variation in the level of the real demand function for labour’. Referring to the ‘real’ Parts, the author says: “All the influences of which an account has been given play their part there

\textsuperscript{14} This letter closes an amusing exchange of views between Keynes and Hawtrey about the content of classical theory and (in particular Pigou’s work) in the course of which Keynes wrote: ‘I suppose in the end we shall have to ask him [Pigou]! But it would be a pity spoil the argument too soon’. Keynes 1973b, p. 39.
in the way that has been described. We have, in short, not assumed that there is no money, but simply postponed our discussion of its role.” (p. 185). The general approach could be called Wicksellian for the monetary factors affect employment by means of ‘divergences between the actual and the proper rate of bank interest’\(^\text{15}\). After dismissing as ‘ambiguous and unanswerable’ the question ‘what “difference” is made to employment and its fluctuations by the existence of “the monetary factor”, Pigou sets up a ‘certain imaginary standard system as a norm of reference for the study of actual systems’. (p. XVIII). ‘The fundamental characteristic of the standard monetary system is... such regulation of the rate of money interest charged by the banks that variations in the money required by industrialists to pay for labour are always balanced by equal and opposite variations in the expenditure of themselves and the people from whom they borrow upon wage-goods or imported non-wage goods... I shall speak of that rate of money interest charged by the banks which satisfies the needs of the standard monetary system as the proper rate of bank interest’. (p. 215). This notion of the standard monetary system is an attempt to define a monetary equilibrium which if it were preserved would mean that the monetary factor had no effect on output or employment. Although the ultimate monetary cause of real effects is the change in the rate of bank interest, the price level is the means by which these effects are brought about. The standard monetary system is so regulated that the overall price level is kept constant — or this would be so if there were only one good but the best that can be achieved in a many good world is that the price level would be ‘fairly stable’. The temptation to interpret the standard system as one in which there is full employment is very strong but has to be resisted for maintenance of the standard system seems to be compatible with any state of real demand and supply of labour. Pigou does say some very suggestive things about the proper rate of interest — for instance, the proper rate may be negative: ‘if the real factors [making for contractions on money income] are sufficiently powerful, it [movement in the bank rate of interest] may not be adequate to cancel them. It is, indeed, always possible for the Central Bank, by open market operations, to force out money into balances held by the public. But in times of deep depression, when industrialists see no hope anywhere, there may be no positive rate of money interest that will avail to get the money used... In these circumstances attempts to uphold the standard monetary system, so long as reliance is placed on purely monetary defences, are bound to fail. If, however, at the

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\(^{15}\) The theory of the ‘proper’ rate had not figured in Pigou’s earlier work unlike the theory of real levies which was taken over from IF. The theory can be seen as a natural development of earlier ideas as well as Pigou’s domestication of an idea that Keynes, Robertson and Hayek were all working on at the time.
same time that the banking system keeps money cheap the Government adopts a policy of public works, the risk of failure is greatly reduced. For this policy, providing, as it does, new openings for real investment, pushes up the proper rate of bank interest about what it would otherwise have been. (p. 213). One of the interesting aspects of the relationship between Keynes and Pigou is that the latter, throughout these years, was consistently more pessimistic about the effects of cheap money on the level of economic activity.

The transmission mechanism for these changes is rather obscure: when the bank rate of interest is less than the proper rate businessmen are borrowing from the banks and prices are rising. Together the loans and the rising prices bring about forced saving which makes the capitalists better off and so they lower the rate of return they require from their projects; in the analysis of the real model given below it is seen that ‘anything which depresses the real rate of interest (in wage goods)... makes the aggregate real demand function for labour rise’, and so there is an increase in employment. ‘When the actual rate of bank interest is below the proper rate, industrialists are in part financing additional employment with money obtained otherwise than by a reduction of expenditure of themselves and of people from whom they borrow on wage-goods and imported non-wage goods. This money achieves what may fairly be called a forced levy of wage-goods for use in investment from holders of fixed money incomes... if in any short period normal income is I and industrialists inject a sum of money R into the income expenditure circuit in purchase of wage-goods, the levy they achieve must lie between R/I and R/I + R times the total real income, as valued in wage-goods accruing in that period. The former figure, of course, implies that prices do not rise. This is not impossible. The injected money may buy goods which often people are forced to go without, not by a price rise but simply because, though they have the money and are anxious to buy at the ruling prices, there are no goods left in the shops’. (p. 227). Presumably in the absence of a price rise, the forced levy falls not on holders of fixed money incomes but on the people who are late to the shops. The argument continues with the industrialists, better off for the levies, being ready to offer less in return for any resources lent to them.

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11 This statement is probably fool-hardy because one of the maddening features of Pigou’s monetary analysis is its indefiniteness. His real analysis generates guesstimates of elasticities that are meant to be relevant to the contemporary situation but the application of the monetary analysis is left quite vague. In the passage concerning the possibility of a negative proper rate, there is no indication of whether this is just a theoretical curiosum or whether it was likely or whether it was actually the situation in 1933. The related idea that monetary policy was less effective in dealing with depression than with inflation seems to have been common ground between Robertson and Pigou and not a Keynesian innovation.
The conclusion of the discussion of the proper rate of interest namely, 'that in an economy where divergences are possible the rate of interest, and therefore the real demand for labour, fluctuated more widely than it would otherwise because divergence are likely to be correlated with shifts in the real demand function for labour' (p. 231) is similar to the conclusion of the discussion of rigid money wages. In each case, the situation is defined as a real phenomenon aggravated by a monetary complication and the impression is given that the real phenomenon is the basic one that has to be analysed most thoroughly. Perhaps he offers his own defence in the preface: 'In recent years, as is to be expected in a period of monetary disorganisation, economists have been inclined to concentrate attention on the money end. The result, in my opinion, has been to overemphasize somewhat the role that money plays in more normal times, and to put in the background very important factors of a non-monetary character'. (p. V).

We can now turn of the real analysis — or rather to the conjectured model underlying the real analysis. The economy is disaggregated into wage good industries and non-wage goods industries and the demand for labour as a whole is derived from the demands of these two sectors which as we shall see below interact in an interesting way. The rationale of this particular disaggregation is, of course, that wages are advanced to workers in the form of wage goods or, at least, that is what a peep behind the veil of money would reveal. Basic to the analysis is the notion of a 'wage-good' about which Pigou has surprisingly little to say. As Sweezy pointed out, if by wage-earners, we mean 'all who work for contractual pay, then it is very little exaggeration to say that all goods are wage goods'; he also points out how similar Pigou's usage is to that of a Marxist17. Wage goods, as the basic subsistence items, are also consumed by non-wage earners who buy luxury goods and invest as well. It is assumed either that there is only one wage-good or that workers consume the several wage-goods in fixed proportions. Pigou is aware that such assumptions are difficult to justify. In a chapter, devoted to the conceptual problem of measuring real wage changes, it is argued that the assumption of fixed proportions 'gives no help towards the solution of the theoretical difficulty', but, as the theoretical problem has no solution, we have to face the fact that there is an 'objective ambiguity' in the notion of a change in real

17 Sweezy (1934), p. 803. Pigou's practice is quite consistent — from at least Unemployment. 'employment' had meant employment of wage-earners (manual workers) only; salaried (non-manual) workers had been outside the scope of the analysis. The only instance of an explicit discussion of the nature of working-class savings propensities is in IF1 (p. 21): 'Although wages are in the main taken out in this form [wage-goods], a part of them is taken out in the form of claims to capital goods — workpeoples' investments'. There is no corresponding discussion in TU.
wages if the proportion in which goods are consumed change. This ambiguity means that no more than a 'rough approximate picture of the facts' can be obtained.

The 'arithmetic of employment' deals with the basic wage fund identity and its derivatives: 'if we write E for the quantity of employment, W for the average rate of real wage and F for the flow of wage-goods handed over to wage-earners in wages in any week \( E = \frac{F}{W} \). The method of 'goods accounting' of *Wealth and Welfare* is used but, of course, once it is realised that only certain kinds of goods are wage-goods and hence usable as payment to workers, attention has to concentrate, not on the claims made on the total flow of goods, but only on the flow of wage-goods. Wage-goods are also consumed by non-wage earners, recipients of charity or state aid and other non-wage earners and the total flow of wage-goods is augmented by imported wage-goods; in setting up an identity relating the total flow of wage-goods to the level of employment, these factors are all taken into account.

Pigou's model is of an open economy and in his usage, 'wage-goods' includes goods (or whatever kind) that are exported in return for wage-goods.

As in the earlier analysis, effects on the capital stock are ignored: 'We are primarily interested in the relation between the wage rate and quantity demanded in the short-period... The short period does not mean a certain defined number of days, the same for all occupations, but a period such that, in respect of it, over the field of any particular investigation, industrial equipment, both in form and quantity may properly be regarded as more or less fixed'. (p. 39). In the model, given below, it is assumed that production takes one time period in each industry, a convenient simplification of Pigou's practice which sometimes allows for arbitrarity long periods of production and sometimes implicitly assumes that production is instantaneous18. As noted above, some of the analysis is ordinary short-period analysis and some is very short period analysis and Pigou is very clear about the difference.

The simplest model from which distinctly Pigovian conclusions can be drawn is as follows: provisionally take the size of the wages fund \( Z \) and the rate of interest \( i \) as given and consider the effect of variations in the real wage rates in the wage-good and non-wage good industries on employment in these industries. The wages fund is allocated between the two industries as follows:

\[
Z = Wx + W_1x_1
\]

\[ (1) \]

18 A further simplification adopted here is the neglect of raw material inputs; they are introduced into the general scheme (Part II) but in much of the analysis their role is ignored. The notation adopted here does not correspond closely to Pigou's for he has no stable notation — it changes by the chapter.
where \( W \) and \( W' \) are respectively wage rates in the wage-good and non-wage good industries (these rates could be, but are not, necessarily equal) with \( x \) and \( x' \) the corresponding employment levels. The real demand function for labour in the wage goods industry is given by the discounted marginal product condition.

\[
W = \frac{1}{1 + i} \phi'(x)
\]  

(2)

Given \( i \) and \( W \), \( x \) is determined by equation (2) and \( x' \) can be deduced from (1) given \( Z \) and \( W' \).

This is enough to follow the treatment of primary and secondary employment on pages 73-76. ‘When the real — not the money — rate of wages ruling in the wage-good industries is given, the quantity of labour demanded in these industries is determined subject to certain qualifications, not here relevant, by the wage rate in relation to the productivity functions and the rate of interest. Activity in the non-wage good industries certainly will not lower the rate of interest and therefore cannot by that route increase the demand for labour in the wage-good industries’. Pigou considers that this is a refutation of the Kahn-Keynes multiplier argument for the wage good industry is completely isolated from the rest of the economy — if we continue with our provisional assumption that \( i \) is fixed. Moreover there is a marked asymmetry in the treatment of the two industries for whilst a reduction of real wages in the non-wage good industry has no effect on the wage-good industry, a reduction in real wages in the wage-good industry will have an effect on the other industry. ‘A reduction in the real wage-rate asked for in

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1 Pigou followed Fisher and Sraffa in using own-rates of interest — \( i \) is the wage-goods rate of interest. ‘There is no such thing as a rate of interest in general, irrespective of the commodity (or composite commodity) in terms of which it is specified’. p. 60.

2 Harris (1934) documents the changes in Pigou’s discussion through IF1, IF2 and TU. The TU argument, Pigou had called ‘plausible’ but ‘invalid’ when he discussed it earlier in IF2 (pp. 113-113) : ‘This argument would, I think, be valid in a world of barter. In the actual world, however, as we shall presently, an industrial expansion, wherever initiated, is usually associated with the creation of additional monetary purchasing power, which causes prices to rise and rates of real wages for a time to fall. If such a fall occurs, it will pay employers in consumption trades to set more workpeople to work. Moreover, psychological reactions are liable to be set up which expand the expectations of businessmen and so enhance their demand for labour’. IF is a much more realistic book than TU which is constructed in such a way that it is difficult to be sure of Pigou’s view on the practical matter — was the TU argument an ‘exercise’ appropriate to the particular stage of the development (before the introduction of money and expectations) or had Pigou changed his mind ? The argument of IF2 against derived demand did represent a change of mind for Pigou had put forward such an argument in IF1.
wage-good industries calls into being an increased surplus of wage-goods available for hiring labour in non-wage goods industries'. And there are some jobs to come: 'In consequence of the reduced wage-rate, it will pay employers to take on more men in the home wage-good industries. Presently after a period of production has elapsed, these new men will produce more than the aggregate of wage-goods that are paid to them at the new rate; and so the real fund available for employing labour in non-wage good industries is enlarged more than it would have been had employment in wage-good industries remained unaffected'. These subsequent effects suggest the multiplier from the 1929 paper but nothing like that is worked out. If the equations (1) and (2) really form the basis of the argument then things are not quite right because when W decreases, x may increase so much that Wx increases — so actually reducing the surplus for the non-wage good industry.

It is natural to ask why there is not an equation like (2) for the non-wage good industry. There is; Chapter III of part II opens with the statement: 'Provided that employers in any centre are not in a position to exercise monopolistic power against their customers the quantity of labour demanded there at any rate of real wage is such that the value in terms of wage goods of its marginal net product (i.e. of the difference made to the total physical yield made by the marginal man with the help of the existing equipment) approximates to the rate of wage plus the rate of employers' contribution to sickness and unemployment insurance'.

The following equation expresses the basic idea, abstracting from insurance and supposing that production takes a unit of time,

\[ W' = \frac{1}{1 + \psi(x')p} \]  

(3)

where \( \psi \) is the short period production function and \( p \) is the wage-good/non-wage good price ratio expected to rule at the end of the production period. Incidentally, Pigou’s treatment of expectations in TU is much cruder than in IF2; Pigou may, as in the monetary analysis, described above, talk about business confidence but equations (2) and (3) do not incorporate expectations at all; the suggested interpretation of \( p \) as an expected price ratio is mine.

Thus we have an extra equation and an extra variable \( p \); Keynes maintained that \( p \) had to be assumed constant but if that is so, the fundamental asymmetry in the model is lost for then (2) and (3) become formally identical. Therefore this assumption is incompatible with the arguments given above on primary and secondary employment. It seems best to regard (3) as determining \( p \), that \( p \) varies so that the two marginal product conditions to one another. Such a move suggests that the interpretation of \( p \) as an 'expected'
quantity is not satisfactory; combining \( p \) with the interest factor we can regard this new term as the price of wage-goods now in exchange for non-wage goods at the end of the production period. As Pigou uses the concept of own rates of interest this is probably the best interpretation.

In the model given so far \( p \) is quite unaffected by product demand and this may seem odd — however this seems to be Pigou’s intention for demand shifts are discussed without mentioning prices: ‘Shifts in desire on the part of non-wage earners’ directed to wage-goods as a whole are ‘so far as our present purpose is concerned completely sterile of effect. They cannot, from a short-period point of view, increase either the quantity of labour demanded at a given real wage in the industry producing them or the quantity of wage-goods produced. From a long-period point of view indeed, this is by no means true. For if non-wage earners come to desire wage-goods more keenly, they will do more work in cooperation with wage-earners in making these goods, and more capital equipment will be built up for that purpose.’ Of course, in the model 1-3 the wage-good sector is isolated and this argument is quite consistent with that specification.

The wage-good/non-wage good dichotomy is characteristically Ricardian — in particular, it recalls his *Essay on Profits* — and it is revealing to compare the present analysis with Ricardo’s. Equations (1) — (3) could be interpreted in the following Ricardian way: there is completely inelastic demand for corn so that output and hence employment in agriculture is given, the wage fund \( Z \) is fixed and there is a uniform real wage so that the system could be solved for \( i \) (the rate of profit), \( x^1 \) (employment in manufacturing), and \( p \) (the price ratio). The proposition that the rate of profit is determined in agriculture corresponds to the condition in the Pigovian model that employment in wage-goods is independent of the state of the rest of the economy.

The demand for labour in the non-wage good industry (equation (3)) is in the book but it does no work — unlike equation (2) which is constantly referred to in the course of the analysis. It is conspicuously absent from the discussion in Chapter IX of Part II on the elasticity of demand for labour as a whole — which does *not* proceed by summing equations (2) and (3). Actually Pigou has tackled the problem for the very short period in the passage quoted above — if there is a general lowering of real wages employment is increased in both industries. There are two analyses of the short period case. The

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21 This is Sraffa’s interpretation of Ricardo so it is interesting that Sraffa had read these parts of *TU* in manuscript (Pigou thanks him in the Preface). The substance of the argument had already appeared in *IF2* which has no similar acknowledgement. Perhaps Pigou should be regarded as the father of Cambridge neo-Ricardianism!
simplest analysis works directly with the size of the wages fund (2) and assumes that 'when the real rate of wage is reduced, and an addition is consequently made to the total of wage-goods coming into existence, not more wage goods are added to non-wage earners’ personal consumption... than the extra output of wage goods plus the reduction of non-wage earners' contribution to unemployment benefit'. Pigou argues that because of equation (2) more wage-goods will be produced and unless the capitalists consume more the wages fund will have been enlarged and hence employment will increase. The more complex treatment starts from consideration of the allocation of wage good output between different uses:

\[ \phi(x) = (x + x')W + K + S \]  

(4)

here current output equals current wages (i.e. not wages for future work), capitalists’ consumption (K) plus storage (S). Pigou does not give this equation but instead ‘freezes’ K and ignores S and states that total employment (x + x’) is a function of employment in the wage good industry (x) — what this function is, depends on K. (p. 90). The argument is that a reduction in W will increase x (through equation (2)) and hence \( \phi(x) \); the problem is what effect does an increase in \( \phi(x) \) have on K. A capitalists’ consumption function is not introduced but limits to the change in K are set viz ‘an absolutely rigid desire for wage goods’ which holds K fixed and makes capitalists use the extra wage-goods for hiring workers in non-wage goods industry only; but if they have an absolutely rigid desire for non-wage goods, they consume the extra wage-goods themselves plus the resources set free by the reduction of wages in the non-wage good industry (p. 92). In either case x is increased by a reduction in W and the worst employment outcome is an unaltered x’.

Now we can move on to more elaborate analysis and relax the assumption that \( i \) and \( Z \) are given — the variability of \( i \) has been referred to in the passage quoted from page 95 and constant \( Z \), besides being a most un-Pigovian assumption, would provide a very quick answer to the problem of the elasticity of demand for labour that occupies so much of the book. Consider another demand shift problem which provides clues to the role of \( Z \) and \( i \):

'Suppose that there has taken place, in a non-wage good industry... some event has raised the real demand for labour there... Our problem is to determine how far the addition to employment in that industry... is net, and how far it is at the expense of withdrawing wage-goods from financing employment in other industries'. In effect, this is a return to discussion of the Treasury View and in the spirit of WW the alternative uses of wage goods are considered: capitalists’ consumption, storage and unemployment benefit. The extent to which wage-goods to finance the new employees are obtained respectively by cutting down employment elsewhere and by expanding the
wages fund depends on the tendency of demand for labour elsewhere to contract under the influence of rising rates of interest, balanced against the readiness of non-wage earners to surrender, under that influence wage-goods from the three uses. The idea of demand and supply functions for ‘investible’ wage-goods is clear; now if \( p \) were fixed equations (1) to (3) could be read as expressing the demand for investible wage-goods (a relation between \( i \) and \( Z \)), provisionally let us make this assumption and move to the supply function. There are two discussions of the relation between \( i \) and \( Z \); in the first, Pigou is trying to allow for the possibility that changes in \( W \) (and so in \( Z \)) brings about changes in \( i \), so making the elasticity of demand for labour when \( i \) varies quite different from its value when \( i \) is fixed. ‘Since it is evident that the rate of interest, and so the value of \( 1/(1 + i) \) is, or may be affected by the magnitude of the quantity of wage-goods that is set aside for engaging labour in future production \( [Z] \), let us write

\[
\frac{1}{1 + i} = f(Z)
\]  

[Pigou’s \( x \) is replaced here by \( Z \)] (p. 78). Chapter VIII of Part II discusses the form of \( f \) and, in the simplest case, for the capitalist who ‘invests in hiring labour’ an increase in the wages bill means a reduction in his present level of consumption and \( i \) has to increase to compensate him for this loss. This relation is complicated by the introduction of storage, for the extra wage-goods could be found out of stocks. Unemployment benefit has an even more drastic effect, for the increased employment associated with the increased wages fund may actually make the capitalists better off because they no longer have to support the unemployed”.

The other discussion is in Part III which treats ‘factors other than money’ that affect the level and variations in the level of the real demand for labour and so in concerned with shifts in the demand function rather than movements along it. Pigou discusses four ways in which changes in the rate of interest are brought about. First, change ‘may result from changes in the productivity of the factors of production in respect of wage-goods. Obviously, other things being equal, the larger the annual output of wage-goods, the smaller will be the rate of interest associated with the withdrawal of a given quantity from consumption’. This type of change can be regarded as filling

\[22\] This section contains Pigou’s first attempt to assess the quantitative significance of storage and capitalists’ consumption as possible sources for extra wage goods (the data came from Keynes’ Treatise). He was not encouraged and the argument from WW given on p. 6 above is not repeated.

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out the WW analysis of the effect of changes in the level of the national
dividend on the size of the wages fund. The second change comes about if
non-wage earners want goods that require 'the prior building up of a struc-
ture' of capital. Thirdly changes 'may result from changes in people's attitude
to the future' and the fourth type of change is due to any of the previous
changes occurring in the rest of the world (pp. 178-80). The second type of
change cannot be fitted into the model as it has been developed here but the
first type of change can be accommodated by inserting $\Phi(x)$ into equation (5)
as an additional argument of $f$.

If we may judge from the use of a similar phrase in IF2, (p. 26) 'peoples'
attitude to the future' does not refer to entrepreneurial expectations but to
time — preference which 'from the short-period standpoint relevant to in-
dustrial fluctuations' 'may legitimately be left out of account'. We have seen
that in WW (and in IF as well) business confidence is extremely important
and in IF2 expectations are incorporated into the marginal analysis : 'the real
demand price for n-th unit of labour is equal to the difference which it is
anticipated that this unit will make to the total product, discounted [for the
period that must elapse between the payment made for the labour and the
emergence of its fruit]. Thus there are two ways in which changes in the
demand for labour may come about : (1) through changes, whether warran-
ted or not, in expectations about yield, and (2) through changes in the rate of
discounting'. (p. 26). In terms of equations (1) to (3) expectations about yield
could only enter by assuming that $p$ is an expectational variable; there is no
evidence that Pigou took this view in TU and working with an effectively
exogenous $p$ would destroy the 'priority' of the wages good industry. An
alternative way of introducing expectations is to return to the WW formula-
tion — that the demand for investible wage-goods depends on businessmen's
expectations — and regard the marginal conditions as merely allocating this
wage fund between industries. Again there is no evidence that Pigou took this
view and it is cruder than the IF2 treatment. Expectations, then, are treated in
a very unsatisfactory way, being totally ignored in the real part of TU but
seemingly quite important in the monetary part. It may be suggested that
expectations belong in the monetary analysis and that expectations is one of
those issues on which IF and TU are 'complementary to one another' for IF is
largely a book about expectations. The difficulty with this suggestion is that
expectations were at the centre of the real analysis of IF2 and it is the real
analysis that is developed most fully in TU. It may be worth noting that
expectations play no role in the equilibrium analysis of Pigou's next book
_Employment and Equilibrium_; expectations are discussed in the dise-
quilibrium section. This procedure is thus apparently foreshadowed in the
treatment in the _Theory of Unemployment_.

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If we review equations (1) to (5) we find that we have 5 equations in the following 7 unknowns $x, x', Z, p, i, K$ and $S$; but we could write $S$ as a function of $i$ and devise a consumption function to take care of $K$. Thus the short-period real model is (or can be) closed (the very short period model does not have equation (4)) and furthermore there is support from the text for each equation. But is there support for the system as a whole? The system is never assembled and Pigou certainly did not talk of the determinacy of the model nor carry out comparative static analyses in the manner of Value and Capital. His method of analysis is to ‘freeze’ all the variables except the pair he is interested in and use single variable calculus to calculate elasticities — a procedure condemned by Keynes, as a ‘completely bogus use of the mathematics of a single variable’\(^\text{24}\). But in 1933, there was no available methodology for the construction and analysis of a system of macro-economic relationships; TU is closer to having such a system than the earlier works we have discussed but Pigou does not adopt explicit equilibrium modelling until after the General Theory. When Pigou re-enters the field with Employment and Equilibrium (a much more ‘classical’ work judged by its qualities of orderly development and technical mastery) it is with an analysis organised around macro-static analysis. Many of the ideas from his earlier works are retained, but the organising principle is static equilibrium. Putting macro-economics into this framework gave Pigou the opportunity (which he took) of applying the familiar techniques (from microeconomics) of comparative static analysis and stability analysis to macroeconomic problems. The General Theory and the associated writings marked a methodological revolution in macroeconomics; judged by the new standards, none of the pre-General Theory macroeconomic writings of the Cambridge School actually contained a mo-

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\(^{24}\) As with the treatment of induced demand (See note 20), the course of Pigou’s thinking on expectations contrasts strongly with that of Keynes’. For the former, expectations became progressively less important but for the latter they became more important. An advantage of the macrostatic model that Pigou learned from Keynes was its expulsion of expectations from the central (equilibrium) analysis. If Keynes’ message was that expectations mattered then this was surely an ironical outcome.

\(^{21}\) The most eloquent critique of this procedure is Schumpeter’s discussion of the ‘Ricardian Vice’ (Ricardo) he cut that general system to pieces, bundled up as large parts of it as possible, and put them in cold storage — so that as many things as possible should be frozen and ‘given’. He then piled one simplifying assumption upon another until, having really settled everything by these assumptions, he was left with only a few aggregative variables between which, given these assumptions, he set up simple one-way relations so that, in the end the desired results emerged almost as tautologies’. (1954, p. 472). Ironically Schumpeter’s target amongst contemporary economists was Keynes and not Pigou although the latter was a much worse offender. Keynes appeared to have had TU in mind in his criticism of mathematical economics in the General Theory (p. 297) which is similar to the Schumpeter passage that has just been quoted.
This methodological revolution is usually taken for granted because it now seems entirely natural that the methodology that had been used for so long in microeconomics should be applied to macroeconomics. The Theory of Unemployment was written before the revolution.

TU proved to be a transitional work in other respects for Employment and Equilibrium not only adopted a macro-static framework, it also contained a severely rationalised analysis. The wages fund disappeared and with it the very short period and the storage option; the wage-good/non wage good dichotomy was replaced by consumption/investment; the real and monetary sectors were much more successfully integrated; the confusion about prices was dispelled by the assumption that they are constant. Some of these changes reflect the influence of the General Theory but others are logical developments of Pigou's own thought. Although — or perhaps because — the wage good method was most fully worked out in TU, it appears there at its most vulnerable. With the movement towards short-period equilibrium theorising, the wages fund, the goods dichotomy and storage option lost their analytical centrality.

IV

Hicks has described the wages fund theory as ‘a theory which was by no means killed by John Stuart Mill’s ‘recantation’ but which has reappeared more or less surreptitiously, in the work of later economists’. He cites the Theory of Unemployment as an instance and although its appearance in this work is no surprise, when taken in the context of Pigou's earlier work, there is an underlying puzzle: why should Pigou have reinstated the approach after

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25 For example Robertson's Money or Keynes' Treatise. In his 1950 lectures 'The General Theory: A retrospective view Pigou argued that the book's significance was in its methodological contribution rather than in its substantive content. In this perspective, the Econometrica school would deserve more credit than Keynes.

26 There are curious traces of the wage good method in the account of the supply of labour for investment, given in Employment and Equilibrium. The 'quantity of labour supplied for investment depends partly on the money rate of interest and partly on the community's current, say, annual income of consumption goods'. In symbols \( f'(x) \) but Pigou continues 'since by far the predominant part of investment is performed by non-wage-earners some might prefer to write \( f(x) - xF'(x) \). There is no point at present in doing this in view of the fact that \( xF'(x) \) is obviously a function of \( f(x) \). (pp. 55-56). Effectively, then, this expression described the wages fund for investment workers but if Pigou's system in read in Keynes' manner it would be described as a savings function.

27 Capital and Time p. 58. This work contains illuminating discussion of several of the points treated in this paper.
Marshall had deliberately rejected it? In fact Marshall’s criticisms of the wages fund theory, his grounds for rejecting it, became the basis of Pigou’s reconstruction. A brief review of Marshall’s thought establishes this point. In the *Economics of Industry* (1879) Marshall had used the formula from the ‘older English tradition’ that capital is to ‘support and aid’ labour and despite moving towards marginal productivity analysis, he had followed Mill in his treatment of the machinery issue (cf. above p. 328) and endorsed the ‘fundamental truth that the employment of labour cannot in general be increased by any device that does not increase the supply of capital’ (p. 18). By 1890, and with the appearance of the *Principles of Economics*, Marshall had given up this approach; ‘remuneratory capital’ (or wages capital) had been replaced by ‘consumption capital’ consisting of goods which are ‘in a form to satisfy wants directly’ but these play no part in the analysis of employment and wages. The transition is clearly marked in the following passage from an article of 1886: ‘I regard the wages fund doctrine not as false, but as pretentious and misleading. As explained by careless writers, it is, I think, false. As explained by Cairnes and others, it is so far explained away that there is very little left in it to justify its title, and nothing at all which cannot be expressed in other ways. Its form is objectionable, because while not calling attention to the real differences which there are between markets for labour and markets for goods, it implies differences which do not exist; and, after all, it is but a fragment, isolated, discontinuous with the rest of economics and a hindrance to a scientific conception of the whole subject’.28 Marshall goes on to discuss the effects of an increase in the supply of labour on the size of the wages fund (Cairnes had argued that the fund would contract because there would be a need for more fixed capital). Marshall replies that the increase of wages bill would be met out of stocks. ‘Though the spinner cannot get as his wage today the carpet that will be made of the yarn which he spins today, there are pretty sure to be enough carpets in store to meet the increased demand due to the increased aggregate of wages, in my belief there would be; and manufacturers and dealers, knowing that larger supplies than before are being made, will not hesitate to sell freely from their stocks’ (Vol. 2, p. 824) Pigou took to heart the argument about stocks. The substance of this article was incorporated into the *Principles* with other discussion of the wages fund theory. Two other criticisms, made by Marshall, were taken up by Pigou: concerning the fixity of the fund: ‘The older economists, however, went on to say that the amount of wages was limited by the amount of capital, and this statement cannot be defended; at best it is but a slovenly way of talking. It

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28 This 1886 reference is not meant to pin-point Marshall’s recantation of the wages fund approach for already in 1879 much of his analysis was free of wages fund associations. (cf. Whitaker’s introduction to Marshall (1975)).
has suggested to some people the notion that the total amount of wages that could be paid in a country in the course of, say a year, was a fixed sum' (Vol. 1, p. 823); concerning the nature of production: 'it (the theory) suggested a correlation between the stock of capital and the flow of wages, instead of the true correlation between the flow of the products of labour aided by capital and the flow of wages'. Thus Pigou accepted the main criticisms of the wages fund approach but incorporated them into a modified system; for Marshall, Hawtrey or Keynes this was pointless.

Considered against the background of Marshall’s writings, Pigou’s short-run macroeconomic theorising was quite an achievement. Although most of the elements can be found in Marshall, the degree of integration is novel and impressive. In Marshall’s work as a whole the closest he came to a real macroeconomics is in the wages fund theorising of the Economics of Industry for in Marshall’s later scheme of work, which included the Principles as a first stage instalment, employment was to be dealt with in the Money volume. Despite this absence of a structure, there are fragments of analysis that Pigou seems to have collected and reworked. The argument from Unemployment that restrictions cannot increase employment (above section II) is adapted from the Principles where it is deployed against similar attempts to raise wages (Vol. 1, p. 687); but, of course, a demand for labour theory can be read as a theory of wages or as a theory of employment. The issue of restrictions also provides the stimulus for a rare treatment of aggregate employment — in Marshall’s reformulation of the principle that the employment of labour cannot be increased by ‘any artificial device that does not increase the supply of capital’. ‘Such legislation’ Marshall argues ‘does not prima facie increase either the national dividend or the share of that dividend that goes to labour. For it does not increase the supply of capital; nor does it, in any other way, cause the marginal efficiency of labour to rise relatively to that of capital. The rate which has to be paid for the use of capital is therefore not lowered; the national dividend is not increased (in fact it is almost sure to be diminished): and as neither labour nor capital gets any new advantage over the other in bargaining for the distribution of the dividend, neither can benefit by such legislation’. (Vol. 1, p. 826) Pigou’s arguments of around 1930 are very much in the spirit of this passage. (cf. above p. 327).

Because Marshall did not write a Theory of Unemployment it is hard to be sure of the differences in approach that separated the two men but Pigou’s preference for the ‘real’ approach, for the introduction of money at a ‘later stage of the argument’ does not seem to have been shared by Marshall. A suggestive terminological detail in Pigou’s use of the phrase ‘real demand for labour’. Their accounts of a downward movement in the price level are subtly different for whilst both take money wages to be sticky, Pigou described the
process of growing unemployment in terms of an increase of real wages while Marshall talks of a reduction in money profits discouraging production. (Vol. 1, p. 709). In Pigou's work the wages fund approach is emphatically physical or concrete and this emphasis is not met with in Marshall's work; Pigou's writing conveys an impression of physical goods each labelled with its destination, streaming in and out of warehouses with him, the economist, keeping a tally of all these movements. Or put slightly differently, Pigou regarded the acceptable part of the wages fund inheritance as a system of physical accounts and, as such, in no need of defence; the contentious assumptions about behaviour had been eliminated.

In his discussion of the wages fund theory, Hicks suggests that Marshall and Keynes were simply not interested in the 'ultra short period' which is the proper domain of that theory. Of Marshall we might argue that we was not concerned with short term industrial fluctuations but such an explanation will not do for Keynes. Hicks is thinking of the Keynes of the General Theory but behind that book was a great deal of conceptual experimentation and one of the unsuccessful 'experiments' seems to have been the theory of working capital and the credit cycle developed in his Treatise on Money. In a sense this theory is antipathetical to Pigou's wages fund analysis because Keynes — and Robertson as well — stress working capital interpreted as work in progress and criticise the classical notion of a stock of wage goods. But there is a family resemblance between these 'Austrian' theories in their handling of time; both theories inhabit a short-run defined in terms of the period of production. Pigou writing to Keynes in 1925 about some draft chapters of the Treatise commented 'Your point about working capital is off my lines... As far as I can see it is additive to, not in conflict with my stuff' (Keynes 1973a, p. 28).

The puzzle — why should there be such a contrast between Marshall and Pigou — is more beguiling than it ought to be because it is partly based on an illusion. For two reasons we have come to expect Pigou to be more Marshallian than he really was: Pigou’s loyalty to Marshall and especially his defence of Marshall in the controversy with Keynes has encouraged the view that their views were essentially the same; and the secondary literature has emphasised the monetary theory of the Cambridge School in which Pigou's role has been confined to his early formulation of the cash balance approach — work which is very close to Marshall's. It is easy to slip into thinking that the chronological span 'from Marshall to Keynes' also marks out an interval in conceptual space — and that Pigou is close to the Marshall end of this interval. As this paper has shown, in at least one dimension of his macroeconomic thinking Pigou is very far from Marshall — further away than Keynes29.
Pigou's 1949 paper on 'Mill and the Wages Fund' provides a curious coda to his programme of modern wages fund theorising for he subjects Mill to strict Marshallian criticism and nowhere mentions his own use of Millian arguments. He attributes to Mill that argument which he had long attributed to Tugan-Baranovsky (above p. 324) and his own struggles with these ideas are apparently completely forgotten.

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This paragraph is not a criticism of the secondary literature for its concentration on Pigou's monetary theory for in the context of the development of macro-economic theory the wage-good method proved to be a dead end.

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