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RICARDO ON MACHINERY AND THE
PRESENT UNEMPLOYMENT:
AN UNPUBLISHED MANUSCRIPT BY
KNUT WICKSELL*

Sweden experienced widespread unemployment in the early 1920s, with unemployment rates reaching historically unprecedented levels of around 20-25 % of the trade union membership in 1921 and 1922. True to his consistent concern for social problems, Knut Wicksell contributed to the debate on unemployment, although he had previously not analysed questions concerning unemployment explicitly. His major work on monetary questions and on trade cycles essentially assumed full resource utilisation. In his seventies – several years after retirement from his chair at the University of Lund – Wicksell published three articles in Swedish on unemployment. These articles containing Wicksell's views on the causes and cures of unemployment were published in rather obscure sources and have consequently been ignored until very recently.¹

In these articles Wicksell adopted a basically neo-Malthusian standpoint, arguing that the major cause of the high rate of unemployment was due to too large a stock of workers. Wages, however, could not be further reduced without falling below the subsistence level. Wicksell's policy conclusions were straightforward. As a short-run remedy, workers out of employment should emigrate from Sweden, preferably to the United States. As a long-run solution, he suggested limiting the growth in population and thus the supply of labour by the use of contraceptive methods. In addition, the authorities should allow wages to fall below the subsistence level – as a means of increasing employment – and pay workers the difference between the going wage and the subsistence rate out of public funds. Wicksell firmly rejected the idea of a minimum wage, which in his opinion might prevent a necessary decline in wages.

Wicksell's articles on Swedish unemployment were aimed at lay readers rather than fellow economists. However, he wrote one manuscript in English entitled 'Ricardo on Machinery and the Present Unemployment' which he submitted to this JOURNAL in 1923. At the end of this manuscript he considered

* This paper presents a manuscript by Knut Wicksell rejected in 1924 by Keynes as the editor of this JOURNAL. The manuscript as well as the letters by Keynes and Wicksell belong to the Wicksell archives at the University Library of Lund, Sweden.

My debt goes first of all to Torsten Gårdlund who recommended and encouraged me to look at Wicksell's unpublished manuscript. I am indebted to many of my colleagues at the Department of Economics at the University of Lund, in particular to Kumaraswamy Vellupillai for giving me valuable suggestions. Donald Winch has kindly recommended me a large number of stylistic improvements. I am also grateful to Donald Moggridge at the Marshall Library, Cambridge, for searching the editorial papers of this JOURNAL for the correspondence between Wicksell and Keynes.

The University Library of Lund has offered me generous assistance in locating the manuscript by Wicksell presented here as well as the letters by Wicksell and Keynes.

¹ See Wicksell (1922*a*), (1922*b*) and (1923). Knut Wicksell's views on unemployment in the 1920s are described in detail in Jonung (1979).

some of the ideas that he had tried to make popular in Sweden. This manuscript has not hitherto been made public, although Gårdlund (1958, p. 323) implicitly refers to it when he mentions that Keynes 'refused a long article by Wicksell for the Journal' in the 1920s.^{1,2}

Wicksell was strongly influenced by the English classical economists, especially Malthus and Ricardo. He was drawn to the study of economics through his concern with the population question and he remained a zealous neo-Malthusian throughout his life. Ricardo was another main source of inspiration, and when Wicksell became interested in the problem of unemployment, it is not surprising that he returned to the writings of Malthus and Ricardo.

Ricardo's famous chapter 'On Machinery', which first appeared in the third edition of his *Principles*, attracted Wicksell's interest.³ Here Ricardo argued that the introduction of new machinery would be 'detrimental to the interest of workers'. Wicksell had previously given a critical treatment of this chapter in his *Lectures*.⁴ He now wanted to combine a detailed evaluation of Ricardo's reasoning with a discussion of the applicability of his critique of Ricardo to the then current employment problem. To do this he proceeded in the following way.

First Wicksell described how Ricardo had shown by means of a numerical example that the introduction of new machinery would create unemployment and a lower gross produce by diverting workers from the production of food – that is, circulating capital – into the production of fixed capital. The wages fund, made up of food production, would be reduced in size – in Ricardo's example, from £13,000 to £5,500 as a result of the production of a new machine for £7,500. (See Table 1 summarising Ricardo's and Wicksell's calculations.) According to Ricardo, workers displaced by the new machinery would become redundant. He made some minor qualifications to this conclusion but retained his basic contention that 'the situation of the labouring classes will be that of distress and poverty'.

Wicksell objected to this argument on the grounds that unemployed workers would search for employment elsewhere. Competition would lower wages and every worker previously out of work would be re-employed. Those capitalists who did not introduce new machinery as well as those who did would benefit from the fall in wages; their profits would increase and gross produce would rise above its initial level (see Table 1).

According to Wicksell, Ricardo assumed constant returns to scale for labour. Consequently, the gross produce had to increase when the newly re-employed started working at the same time as new machinery was added to the capital

¹ According to Gårdlund (1958, p. 323) 'an undertone of irritation with regards to contemporary English economics is noticeable in several of his (i.e. Wicksell's) letters' in the 1920s. Gårdlund believed that Keynes's rejection of Wicksell's manuscript on Ricardo contributed to this 'rather critical attitude to English economics'.

² There is also an indication that Erik Lindahl once planned to have the manuscript published. This possibility was probably considered when Lindahl was preparing the publication of a volume of essays by Wicksell in the late 1950s.

³ This chapter has been the subject of much discussion. See for example Hollander (1971) and Maital and Haswell (1977) as well as Schumpeter (1954, pp. 679–87).

⁴ See the section 'The influence of technical inventions on rents and wages' in Wicksell (1934).

stock. Even in the more general case of decreasing returns to scale, Wicksell concluded – here referring to his work on distribution and production in his *Lectures* – that the introduction of new techniques would increase the gross produce.

Wicksell's basic objection to Ricardo's analysis was its neglect of the effects of wage reductions induced by the introduction of new machinery; these would bring about an absorption of displaced workers into new employment. Ricardo's analysis may thus be regarded as extremely short run in character.¹ The fall in wages makes it possible to increase both gross produce and profits. This in turn makes it possible to restore the old wage level and even to raise wages above this level. Wicksell, however, did not describe explicitly what the long run equilibrium level of wages would be after the introduction of new machinery. In any event, he pointed to the possibility that both the capitalists and the workers would benefit from technological progress, and he appeared optimistic about the long-run effects of technological change.

Table 1
Ricardo and Wicksell on the Introduction of Machinery

	Before the introduction of machinery (1)	After the introduction: Ricardo's example (2)	Wicksell's example (3)
Circulating capital (wage bill)	£13,000	£5,500	< £13,000
Net produce (profits)	£2,000	£2,000	> £2,000
Gross produce	£15,000	£7,500	> £15,000

Comments. Wicksell argued that the introduction of new machinery would first lower wages so that redundant labour could be re-employed, that is the wage bill will first fall below £13,000. However, as the gross produce is increased, this will 'admit not only a continuation of the old wages but even an increase herein without any loss to the employers of labour'. Thus, the wage bill would probably increase in the long run. The table above depicts the short-run effect on wages according to Wicksell.

At the end of his article Wicksell considered the relevance of his case to the unemployment of the early 1920s. He was not completely convinced that it had much applicability, but 'the bare possibility thereof should perhaps not be rejected without any closer inquiry'. He then suggested that if 'general economic laws' pressed wages below the subsistence level of labour, emigration would provide a short-run solution to unemployment.² If unemployment was a structural problem, the number of births should be restricted. At any rate, no minimum wage rates should be introduced since this would result in persistent unemployment. Instead, the market wage should be allowed to fall below the subsistence level, while workers should be supported by the government to the extent of the difference between the subsistence level and the going wage rate. Wicksell thus reiterated the policy recommendations he had presented in his articles on unemployment in Sweden.

¹ This conclusion is reached for example by Blaug (1978, p. 138).

² It is worth noting that the trade union of the printers in Sweden supported financially members that emigrated from Sweden in the period 1923-9. See Jonung (1979).

Wicksell submitted this manuscript to this JOURNAL. As the editor, John Maynard Keynes politely rejected the manuscript in a letter of 9 January 1924. Keynes's basic argument was 'that any treatment of this topic at the present day ought to bring in various modern conceptions for handling the problem and that the time has gone by for a criticism of Ricardo on purely Ricardian lines'.

Wicksell drafted a letter in response to Keynes. To judge from the open and lively style, it was probably written immediately upon receipt of Keynes's letter of rejection. Wicksell stated frankly that he did not understand Keynes's remarks: 'How can it be a fault to criticise Ricardo on "purely Ricardian lines"? Ricardo may be right on his own lines and still be wrong; but if he is shown to be wrong on his own lines this, I think, will be conclusive'. Wicksell then went on to explain in greater detail his views on Ricardo and the practical application of his arguments to the contemporary unemployment question. Finally, Wicksell suggested that he could shorten his paper in order to make it more acceptable for publication. It is not clear whether or not he actually mailed this letter to Keynes.¹ There is no correspondence in the Wicksell archives between the two men after 9 January 1924 that might throw light upon this question. It seems likely that Wicksell, on second thoughts, resigned himself to Keynes's rejection and decided to keep the draft with his personal papers.

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¹ The editorial papers of this *Journal* do not contain any exchange of letters between Keynes and Wicksell in 1923-4 on Wicksell's manuscript. (I am obliged to Donald Moggridge on this point.)

ROYAL ECONOMIC SOCIETY

From Mr J. M. Keynes,
Editor of the
ECONOMIC JOURNAL.

Kings College,
Cambridge.
9th January 1924.

DEAR PROFESSOR WICKSELL,

I must apologise for not having dealt sooner with your proffered contribution to the Economic Journal. I wished, however, to obtain another judgment on it besides my own.

I am sorry to have to reply that we cannot accept it for publication in the Economic Journal. Apart from the fact that our space in the near future is already filled, the editors feel that any treatment of this topic at the present day ought to bring in various modern conceptions for handling the problem and that the time has gone by for a criticism of Ricardo on purely Ricardian lines. Nor is it quite correct that the problem in question was not taken up by Ricardo's contemporaries. Ricardo himself discusses it in his letter to MacCulloch (Hollander, pp. 107-8) 18 June 1821. The question was also discussed in the Political Economy Club on the 8 February 1822. I am indebted for these references to Dr Bonar.

Yours sincerely,
J. M. KEYNES

Professor Knut Wicksell,
Stocksund,
Sweden

(No date)

DEAR PROFESSOR KEYNES,

I thank you for your letter of the 9 January. I was not very glad to have my paper returned, but of course you are the best judge of what will suit your readers.

However, I do not quite understand your remarks. How can it be a fault to criticise Ricardo on purely 'Ricardian lines'? Ricardo may be right on his own lines and still be wrong; but if he is shown to be wrong on his own lines, this, I think, will be conclusive. Moreover, in my printed lectures, to which I referred, I have examined his *second* case from the more modern conception of marginal productivity with the same result.

I ought perhaps to have mentioned MacCulloch - in fact I did it in the original manuscript. But it is clear as well from Ricardo's letters to him as from MacCulloch's own reflections in his *Principles of Pol. Econ.* (1825, p. II, Sect. IV) that he never did hit the weak point of Ricardo's reasoning. When he there says that the case supposed by Mr Ricardo is 'possible but exceedingly unlikely ever to occur', he turns the true argument upside down: in fact Ricardo's *suppositions* are not at all unlikely to occur but the *conclusions* drawn from them by him are impossible. Ricardo did not see that the introduction of

machinery in the case supposed could never be universal, only partial, and that when a new point of equilibrium was reached the total gross product would have been increased and not diminished.

At the same time the true refutation of Ricardo's doctrine shows that he was *right* in believing that the introduction of machinery would cause the wages to fall; and indeed this falling of the wages would in this case be a necessary condition for the gross product reaching its greatest possible amount. In other words the *total* product will increase but the *marginal* product will diminish, and if this latter goes far enough, unemployment will be the unavoidable consequence *unless labour is partly supported from other sources than wages*.

It was stated in the papers not long ago (but perhaps wrongly) that the British government was to give the farmers a premium in order that they might keep up the wages of their labourers to a certain minimum. This then would be a direct application of the theoretical results above. No doubt the question of unemployment has many other aspects, but in a thorough discussion of it this possible cause of it should not, I think, be totally overseen.

I could shorten the paper very much leaving out f.i. the long verbal quotation from Ricardo, or even compress it into a single paragraph containing only the head argument, just as stated in this letter. Then perhaps your space would admit its insertion? If not, pray, do not trouble yourself with an answer and believe me, with the greatest respect.

Yours,

KNUT WICKSELL

RICARDO ON MACHINERY AND THE PRESENT UNEMPLOYMENT

In the third edition of his *Principles* Ricardo inserted the well-known chapter xxxi 'On Machinery' in which he tried to show that, contrary to the opinions which he confesses himself to have held before, 'the discovery and useful application of machinery', if it 'always leads to the increase of the net produce of the country' sometimes may lead to 'a diminution of the gross produce'¹ and that therefore 'the opinion entertained by the labouring class, that the employment of machinery is frequently detrimental to their interests, is not founded on prejudice and error, but is conformable to the current principles of political economy'.

This remarkable chapter, however, as far as I know has hardly met with quite the attention it deserves. One reason may be that it was not included in Baumstark's German translation, which although printed in 1837 apparently was made from one of the first two editions of the *Principles*. Only in 1877 was it duly inserted in a new edition of that translation; in the meantime it may very likely have been unknown to a good many of Ricardo's foreign readers. But even in English writings I cannot remember to have seen it much dis-

¹ Wicksell's note: It is to be observed that Ricardo does not use the term 'net produce' in the same sense as does Adam Smith, but rather in that of the Physiocrate's 'produit net'. His 'gross produce' on the other hand coincides with Adam Smith's 'net produce', i.e. the whole produce after deduction of the costs for maintaining the capital of the country undiminished.

cussed. Senior indeed in his *Political Economy* opposes Ricardo's views but 'as we shall see' only partially and without catching, so far as I can see, the very weak point of his reasoning. Marshall does not mention it at all. I may be mistaken but as far as I know I am myself the first who has pointed out that Ricardo's conclusion as to a possible diminution of the gross product is actually *wrong*, and that although the introduction of machinery may very often be detrimental to labourers, as a matter of fact it is never *necessarily* so. On the contrary, the machinery will always have the effect of raising the gross produce of the country to its greatest possible amount, and in so far it will provide the *means* for bettering the economic conditions of the working men as well as of their employers.

It would be easy to restate Ricardo's views in a somewhat simpler way so as to give more emphasis to the main point of his reasoning; but in order to avoid the suspicion of having omitted something of importance I may be allowed to quote him verbally. He says:

'A capitalist, we will suppose, employs a capital of the value of 20,000 l., and with that he carries on the joint business of a farmer and a manufacturer of necessaries. We will further suppose, that 7,000 l. of his capital is invested in fixed capital, viz. in buildings, implements etc. etc., and that the remaining 13,000 l. is employed as circulating capital in the support of labour. Let us suppose, too, that profits are 10% and consequently that the capitalist's capital is every year put into its original state of efficiency, and yields a profit of 2,000 l.

Each year the capitalist begins his operations by having food and necessaries in his possession of the value of 13,000 l., all of which he sells in the course of the year to his own workmen for that sum of money, and, during the same period he pays them the like amount of money for wages: at the end of the year they replace in his possession food and necessaries of the value of 15,000 l., 2,000 l. of which he consumes himself, or disposes of as may best suit his pleasure and gratification. As far as these products are concerned the gross produce for that year is 15,000 l. and the net produce 2,000 l. Suppose now that the following year the capitalist employs half his men in constructing a machine, and the other half in producing food and necessaries as usual. During that year he would pay the sum of 13,000 l. in wages as usual, and would sell food and necessaries of the same amount to his workmen: but what would be the case the following year?

While the machine was being made only one-half of the usual quantity of food and necessaries would be obtained, and they would be only one half of the value of the quantity which was produced before. The machine would be worth 7,500 l., and the food and necessaries 7,500 l. and, therefore, the capital of the capitalist would be as great as before, for he would have beside these two values his fixed capital worth 7,000 l. making the whole 20,000 l. capital, and 2,000 l. profit. After deducting this latter sum for his own expenses, he would have no greater circulating capital than 5,000 l. with which to carry on his subsequent operations; and, therefore,

his means of employing labour would be reduced in the proportions of 13,000 l. to 5,500 l. and, consequently, all the labour which was before employed by 7,500 l. would become redundant.

The reduced quantity of labour which the capitalist can employ, must indeed, with the assistance of the machine, and after deductions for its repairs, produce a value equal to 7,500 l., it must replace the circulating capital with a profit of 2,000 l. on the whole capital; but if this be done, if the net income be not diminished, of what importance is it to the capitalist, whether the gross income be of the value of 3,000 l., of 10,000 l. or of 15,000 l?

In this case, then, although the net produce will not be diminished in value... the gross produce will have fallen from a value of 15,000 l. to a value of 7,500 l., and as the power of supporting a population and employing labour depends always on the gross produce of a nation and not on its net produce, there will necessarily be a diminution in the demand for labour, population will become redundant, and the situation of the labouring classes will be that of distress and poverty'.

Ricardo then proceeds, but hardly with success, to mitigate somewhat his own conclusions. He argues *inter alia* as indeed he had done already in some phrases in the text which I have suppressed, that under such circumstances, the same net revenue would give its owner 'increased means of saving' because of the 'reduction in the price of the commodities consequent on the introductions of machinery'. It is difficult, however, to see how this could be done. At any rate the true objection to his reasoning lies in quite another quarter.

Ricardo tacitly supposes that all or most of the employers of labour in the same trade would follow the example set by the employer mentioned above; *but that cannot possibly be the case*. Suppose, in order to fix the ideas, that the yearly wage of one labourer is £100 and that our capitalist originally employed 130 labourers, after having introduced the machine he will keep only 55 of these and dismiss the rest. These 75 men will of course try to find employment somewhere else. We will suppose that there are 75 other 'capitalists' with precisely the same business as the one mentioned. The competition among the labourers no doubt will lower wages all along the line and as soon as they have diminished by only 1% or even somewhat less, there will be room, i.e. capital enough, for one labourer more in each of those businesses, so that the redundancy of labourers will cease. By means of this diminution of wages all the capitalists are benefited, but the employer in the new fashioned business will only be benefited to the extent of, say, £50 whereas the employers in the old fashioned businesses will gain more than £100 each. Their profit, therefore will be greater than his, and consequently they have no temptation to follow the example set by him.

Very likely, however, he would not have changed his methods of business, if he had not had a substantial extra profit in view, say of one or two hundred pounds. If so, no doubt his example will be followed *by some* of the other capitalists, but as at each transition of this kind wages will fall and the profit therefrom to the old fashioned farmers will be more than double that of the

new fashioned, a point of equilibrium will soon be reached where no further transition will take place, all the capitalists having secured the same net revenue.

But what about the gross produce? It will be diminished no doubt in the new fashioned businesses but it will be *increased* in the old fashioned. Will the diminution outweigh the increase or the reverse? This of course is a somewhat complicated question; we may be content with solving it in a few simple cases. In Ricardo's reasoning there is no question of diminishing return or the like, he rather supposes that the product *ceteris paribus* will alter proportionately with the number of men, just as if the business in question were carried on with the help of 'rent-free land'. We may follow him in this, and then the thing is self-evident: the 75 disengaged labourers will, in their new engagements produce about the same amount as they did before, the 55 remaining men, however, will by his own supposition produce *much more* than they did before – the total amount of produce therefore, will be *increased* and not diminished.

The same event of course, will be repeated at every transition from the old to the new methods so that when the point of equilibrium is reached, the total gross produce in that branch of manufacture, far from being diminished, will in fact have reached its greatest possible value.

An important and most remarkable thing is that the fall of wages in this case becomes a necessary condition for the production of the maximum of the aggregate. Of course it may well be that the discharged labourers, in order to avoid competition with their comrades, turn to other branches of industry. If so, perhaps all the farmers will adopt the new methods, and the point of equilibrium will then, as it were, be situated not in that particular branch of business, but in some other, but even then our general conclusion remains intact, at any rate so long as the country itself can be regarded as an isolated community.

Further on in the chapter, Ricardo mentions still another case, where, according to him, the same pessimistic views as to the influence on gross produce and therefore on wages, are to be held, namely, 'when the horse-labour is substituted for that of men'. I have dealt with this case in my printed *Lectures on political economy*¹ on the simple supposition that the interest on capital might be neglected, so that wages would be regulated solely by the marginal productivity of labour. The result there arrived at is substantially the same as that stated above. The transition to horse-labour, causing a diminished demand for man-labour, will theoretically – and, if agriculture were the sole industry of the country, even in fact – be only partial; as soon as wages have gone sufficiently low the old-fashioned husbandry, without much horse-labour, will be just as profitable as the new-fashioned, and further transition will cease; at the same time, on the supposition that the new methods in themselves have caused a greater *net* revenue, the total gross produce will have reached its *greatest possible amount*. (In this amount of course the food for the horses is *not* included, but reckoned solely among the costs.)

¹ Wicksell's note: German translation V.I. (Jena G. Fischer 1913) p. 195 et seq.

According to Senior indeed a distinction is to be made here between *inanimate* and *animate* machinery and he says himself that the introduction of horse-farming in *Ireland* has 'occasioned much of the distress of that country' (*Political Economy* p. 164). This may be true, but the great question is whether the gross produce of the country really was diminished by that transformation or not. If not, the *means* for supporting the labourers were still at hand only they were not used for that purpose.

The objection which we have made to Ricardo's reasoning will thus be valid in both cases, and as they represent, each for itself, the two elements by which in reality the amount of produce and its distribution among the factors of production is determined, namely, the relative amount of capital and the diminishing return of the natural agencies there is little doubt that the result reached will hold true even in the more complicated cases of real economic life.

We are therefore brought face to face with that social paradox: the fall of the wages of labour being a necessary condition for gross production to reach its maximum amount, and at the same time that amount being large enough to admit not only of a continuation of the old wages but even an increase therein without any loss to the employers of labour or to anybody else. If, for instance, as under the old Gilbert law the parishes were bound to make up by allowances the difference between the old and the new wages to the labourers, the farmers, notwithstanding their having to pay those parish rates, would nevertheless have a somewhat greater net profit for themselves. If, on the other hand, the original wages were regarded by law as *minimum* wages and were not permitted to be diminished by the employers, the consequences would be most unhappy, for in that case there would apparently be a general transition on the part of the farmers to the new-fashioned 'labour saving' methods. By that means their net income would be *nominally* (i.e., exclusive of the parish rates) increased (not so much, however, as in the case just mentioned!), but as perhaps half the number of labourers would now be without employment the parish rates would be so high as very likely to deprive the employers of *all* their profit.

Of course I do not assert that this purely theoretical discussion has any real bearing on the social questions of the day, but the bare possibility thereof should perhaps not be rejected without any closer enquiry. Among social reformers there is an almost universal opinion that an able-bodied man must always, or at any rate under 'normal' conditions, be capable of supporting himself and family in a proper way. Industries where that is notoriously not the case are stigmatised as 'parasitical', and their closing by the authorities is recommended. It is difficult, however, to understand on what facts this opinion is founded. If each man had his proper share of the capital wealth of the country, he would, of course, be able to provide for his family, just as the country on the whole is able to support its actual population within its own boundaries. But labour, even skilled labour, is only one of the elements of production. As such it stands under the general economic laws, especially the law of marginal productivity, and those laws may under given circumstances press it down to any point, perhaps far below the mark of a 'living wage'.

Practically no doubt under such circumstances the safest way – if it can be

followed at all – would be emigration to other countries, and if the calamity is not of a transient character the limitation of births. Theoretically, however, those ways *might* not be needed. There is no logical impossibility in the resources of production being so large as to enable the country very comfortably to support its whole population – why then, should it be diminished? – but at the same time the said law of marginal productivity working in such a way that under free competition half the population or more must come below the mark of a living wage. If this be the case a certain resistance on the part of the working men or of the authorities against labour-saving machinery would no doubt prevent wages from going down, but, at the price of confining the amount of produce within narrower limits than necessary. The very worst thing, however, would be to enforce a minimum wage thereby perpetuating the state of unemployment. The true solution, strange as the idea may seem to most people, would rather lie in an application – in some modernised form – of the old Gilbert's Law, letting wages go down to their natural limit and supplementing the deficiency from public resources.

Stocksund Sweden

KNUT WICKSELL