Involuntary unemployment: Rehabilitating Keynes' definitions

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Abstract: Keynes' definitions of involuntary unemployment have been criticised by a number of researchers, including Sawyer and Spencer (2008) who argue that the definitions are model specific and can be inconsistent with the presence of unemployment under imperfect competition. This paper argues that their work highlights the problems of retaining an orthodox (real wage) framework to analyse involuntary unemployment. Missing from their analysis is a formal macroeconomic analysis of aggregate demand and supply and a more nuanced treatment of the labour market by treating money wages and prices separately. This paper shows that subject to a small amendment to Keynes' first definition to allow for nonneoclassical specifications of production, the definitions are robust, notwithstanding different configurations of labour demand and supply schedules.

Keywords: aggregate demand, involuntary unemployment, wage flexibility

1 Introduction

For more than 20 years, Keynes' two definitions of involuntary unemployment (IU) which appear in Chapter 2 of the *General Theory* have been subject to scrutiny. For example, McCombie (1987/88) incorporates a downward sloping marginal product of labour schedule but takes capital and labour utilisation into account. Darity and Horn (1983) fail to employ a theory of production and later advocate that the formal treatment of the labour market be discarded, since its operation is derivative of the product market (Darity and Horn, 1987/88).

Sawyer and Spencer (2008), hereafter S&S (2008), define an employment, *real wage* relationship (ERWR) based on the causal relationship running from aggregate demand (and money wages) to employment and, in turn, to the real wage via firms' pricing behaviour under imperfect competition (S&S, 2008, p.719). This schedule is then juxtaposed against different specifications of the labour supply schedule and used to demonstrate that in a number of circumstances, when an excess supply of labour is present, the conditions for Keynes' first definition of IU are not satisfied. S&S (2008) also argue that the two IU definitions are incompatible. S&S attribute the deficiencies of Keynes' definitions of IU to both the orthodox modelling of labour supply and the reliance on a theory of production based on diminishing returns.

Notwithstanding any limitations of Keynes' first definition of IU, the way that S&S frame their analysis of the definition invites ambiguity in the absence of an explicit treatment of aggregate demand and supply, and the derived demand for labour. Further the replication of his definition of IU within an orthodox framework, albeit under imperfect competition, adds further confusion due to the misuse of the ex post relationship between real wages and

employment. Likewise the analysis of the second IU definition using this theoretical framework is also flawed.

A formal analysis of aggregate demand and supply is required to examine Keynes' definitions of IU. The Z/D framework is appropriate. This achieves three objectives. First it is possible to analyse the impact of an exogenous increase in aggregate demand, say via a fiscal stimulus, which may or may not lead to a rise in the price of wage goods, depending on the underlying theory of production. This is important because an increase in aggregate demand is central to both IU definitions. Second, through a formal macroeconomic analysis, it is possible to liberate labour supply from its limited conceptual underpinnings based on labour/leisure choice. Third, within the same framework, it is possible to explore whether money wage inflexibility is indeed a possible explanation of involuntary unemployment. We conclude that, with a minor amendment to the first definition, Keynes' definitions of IU can be rehabilitated. This requires that reference to the rising price of wage goods is replaced by consideration of an increase in effective demand.

In the next section we outline Keynes' first definition of involuntary unemployment and critically evaluate the approach taken by S&S (2008) to assess whether this definition is satisfactory under imperfect product market competition. In Section 3, we outline the Z/D model of aggregate demand and supply and discuss the factors influencing labour supply and demand. Taking labour market stability into account, we then consider six possible configurations of labour supply and demand and examine the robustness of Keynes' two definitions of IU. Concluding remarks complete the paper.

2 Involuntary unemployment under (im)perfect competition

Keynes argued that the first classical postulate held, namely that the real wage equalled the marginal product of labour, but under involuntary unemployment the second classical postulate, namely that the marginal disutility of labour equalled the real wage did not hold.

His first IU definition is: 'Men (sic) are involuntarily unemployed if, in the event of a small rise in the price of wage-goods relatively to the money wage, both the aggregate supply of labour willing to work for the current money wage and the aggregate demand for it at that wage would be greater than the existing volume of employment' (Keynes, 1936, p.15).

Taken at face value, Keynes' definition is incomplete because the source of the rise in the price of wage goods is not specified. Both S&S (2008, p.721, 725-726) and Spencer (2006, p.464) view the real wage reduction as a consequence of an increase in aggregate demand under rising marginal costs, whereas, in the absence of a theory of production, Darity and Horn (1983, p.730) assert that price inflation occurs, following an expansion of effective demand. Thus an analysis of an increase in aggregate demand under different assumptions about product market competition is necessary to establish whether Keynes' first definition of IU is robust.

S&S (2008, pp.725-726) review the first IU definition, given a downward sloping marginal product of labour (MPL) schedule and an upward sloping labour supply schedule (reflecting the marginal disutility of labour), both expressed as functions of the real wage (see Figure 1). S&S acknowledge that the MPL schedule is not the demand for labour, so it is somewhat surprising that they constrain their analysis within this orthodox depiction of IU, incorporating the ambiguous use of the MPL schedule.





If the level of aggregate demand yields an employment level below that associated with the intersection of the two schedules, say L*, then at the profit maximising real wage (W₁) there would be unemployment. 'Although unemployment is perceived to be generated by a lack of demand (in the sense that demand is less than the equivalent of L⁺), full employment could be restored by a drop in the real wage to W₂ (leaving aside issues such as the effect of real wages on demand and issues concerned with declining wages rather than lower wages).' (my emphasis).

This is the crux of the issue. Whichever product market scenario (ie perfect or imperfect competition) and specification of labour supply are chosen, unless aggregate demand is formally modeled, no conclusions can be drawn as to whether unemployment is the outcome of insufficient aggregate demand or inadequate real wage flexibility.¹ In Chapter 19 of The General Theory, Keynes is quite clear that 'the effect of a reduction in money-wages on effective demand (and therefore on employment) cannot be determined a priori, its effect on the marginal product of labour and real wages cannot be determined either' (Boianovsky, 2005, p.74).

Curiously the labour market analysis of S&S is conducted in terms of the real wage, which firstly ignores Keynes' strictures about how workers respond differently to real wage cuts initiated by money wage cuts, as compared to higher wage good prices (Keynes, 1936, pp.8-9). If a money wage cut would address unemployment then its persistence could possibly be explained by inadequate money wage flexibility due to this worker resistance, which is more akin to a New-Keynesian explanation (De Vroey, 2004, p.73, quoted by Spencer, 2006, p.464). Second, the failure to unpack the real wage into its two components assumes that money wage adjustments unproblematically translate into equivalent real wage changes, which is not guaranteed, as noted above. Returning to Figure 1, S&S (2008, p.725) acknowledge that 'in Keynes (1936) there is no mechanism by which the real wage would fall'

¹ S&S (2008, p.722) support the claim by Darity and Young (1997) that if either labour demand or supply is sensitive to any endogenous variable other than real wages then Keynes' first definition of IU is undermined. 'We would endorse that view since we would argue that the demand for labour schedule is sensitive to the level of aggregate demand.' If the level of aggregate demand cannot be considered exogenous, then it must be formally modeled.

(see also Keynes, 1936, p.13). This is certainly true if the first classical postulate continues to hold

S&S extend the analysis of IU to encompass imperfect competition by considering a profit maximising monopolist, whose product demand is subject to shifts according to the level of aggregate demand.² For a given level of aggregate demand and prevailing money wage, there is a corresponding profit maximising level of output and real wage. While under perfect competition there is an inverse ex post relationship between real wages and employment, under imperfect competition, profit maximisation can occur when returns are increasing. Consequently, S&S argue that the ERWR schedule is inverse U shaped.

The authors juxtapose the ERWR against various specifications of labour supply, with both schedules expressed as functions of the real wage. The presence of an upward sloping segment of the ERWR enables the authors to demonstrate the model specific nature of Keynes' first IU definition.

Four configurations of the two schedules are considered with two being associated with negative (positive) slopes for each schedule of differing relative magnitudes. It is sufficient to note that the analysis of each configuration is based on the consideration of an aggregate demand determined level of employment below that corresponding to the market clearing equilibrium level of employment and one lying above this level of employment.

For example, in reference to Figure 2a (which is reproduced below), 'the ERWR is shallower than the upwards sloping labour supply schedule. If the adjustment process here were one of real wage changes, then this would be an unstable situation in that when the real wage is above the market clearing level, employment offered exceeds supply, and real wages would be presumed to rise. Consider though the determination of the level of employment by



Figure 2: ERWR & Labour Supply (S&S, Figure 2a)

² There is a conceptual problem in that it is necessary to reconcile the downward sloping demand for output, facing the monopoly producer with an unspecified, exogenously determined level of aggregate demand which underpins this demand curve.

aggregate demand. When employment is at L_1 , then there would be overfull employment, and a reduction in real wage would be associated with a decline in employment, and a decline in the extent of overfull employment' (S&S, 2008, p.723). Overfull employment is never formally defined.

The authors have conflated both possible interpretations of Keynes' definition of IU. On the one hand, at L_2 , which is characterised by an excess supply of labour, an increase in (exogenous) aggregate demand reduces unemployment, but raises the real wage, which fails Keynes' IU definition, as noted by S&S. On the other hand, they consider the impact of labour market disequilibrium on real wages and so they explore the possibility that IU is the outcome of the real wage inflexibility. They acknowledge that with an unstable equilibrium, real wage adjustment at RW_1 would not lead to market clearing.

S&S (2008, p.721) make clear that the ERWR is not an ex ante demand for labour. Each point on this schedule represents a *different level of aggregate demand*. Thus it cannot be used in an operational manner, following a change in the real wage, since there is just a single point from the ERWR associated with a particular exogenous level of aggregate demand. Thus it is not possible to consider whether the demand for labour increases or declines when the real wage changes, because the latter is the outcome not the cause of demand changes. However in their summary of the results, S&S (2008, p.723) state that 'In two cases of unemployment (L2, L3) a decline in real wages would be associated with a **decline in the demand for labour**, and in two cases (L6, L7) a decline in real wages would be associated with demand for labour and supply of labour exceeding the initial level of employment.' (my emphasis).

Hence S&S (2008) appear to have reversed the direction of causation, so that the ERWR is now being interpreted as depicting the impact on labour demand of real wage changes, rather than an ex post locus of real wage and employment combinations associated with different exogenously determined levels of aggregate demand. Perhaps these quotes merely reflect inaccurate drafting, but it is curious to use the term 'associated with', if the intent is to signal a causal relationship between the demand for labour, employment and the real wage.

The fundamental problems with their analysis of Keynes' first definition of IU is their failure to model aggregate demand formally and to separate the determination of money wages from price determination and thus unpack the two components of real wages. Money wages, not real wages, are set in the labour market.

Reynolds (1987, pp.124-125) is quite clear: 'Post Keynesian economists have followed both Keynes and Kalecki in recognizing the importance of the distinction between moneywages and real-wages.(T)he money-wage rate is determined as the outcome of various bargaining processes, taking expected prices changes into account but also being influenced by the various dimensions of conflict.... The price level on the other hand is determined in the product market as a mark-up on (some measure) of costs'.

If the rise in wage good prices in Keynes' IU definition is interpreted as signifying a rise in aggregate demand, (so IU is conceptualised as being associated with a Marshallian rather than Walrasian equilibrium) then a formal treatment is only possible if the demand for labour is considered as a function of the prevailing money wage. Thus, by framing their analysis in terms of real wages, S&S suppress the analysis of wage price adjustment. On the other hand, an investigation of the disequilibrium interpretation of IU should not be based on unproblematic changes in real wages in response to market forces.³

Keynes (1936, p. 26) provides a second definition of IU based on the responsiveness of employment to an increase in effective demand, which entails defining IU in terms of its opposite, namely full employment. '(A)n alternative, though equivalent criterion (for full employment) is that at which we have now arrived, namely a situation in which aggregate employment is inelastic in response to an increase in effective demand for its output'. This definition also justifies a formal analysis of aggregate supply and demand within a Z/D framework, yet S&S (2008, pp.726-30) again juxtapose their ERWR schedule against labour supply which is expressed as a function of the real wage.

Z/D Analysis

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We analyse aggregate supply and demand by adopting the Z/D framework which has its origins in the work of Weintraub (1956, 1957, 1958) and appeared in the textbook by Davidson and Smolensky (1964). Reynolds (1987) provides a detailed discussion, albeit with some errors and this framework is summarised by Setterfield (2005).

The derivation of the aggregate supply schedule, Z, has micro-theoretic foundations. The level of proceeds corresponding to a particular level of employment must cover the anticipated labour costs, inclusive of payments for other factor inputs (Keynes, 1936, p. 23). The expected proceeds 'will just make it worth the while of entrepreneurs to give that employment' (Keynes, 1936, p. 24). Reynolds (1987, p.98) notes that Weintraub initially assumed profit maximisation, perfect competition and the diminishing marginal productivity of labour. The higher are expected receipts, the greater will be the number of employees that firms are prepared to hire.

As noted, there is conceptual ambiguity in considering a single monopoly producer in the context of a given, but unexplained, level of aggregate demand. Thus we initially confine our attention to a simple pricing model, which under a constant mark-up, money wage and labour productivity, yields a linear upward sloping Z schedule up until full capacity utilisation. If raw materials are included, then real wages remain constant under constant mark-ups if per unit raw material costs change at the same rate as per unit wage costs.

If wages are the main source of income to fund consumption expenditure, then, assuming that the autonomous components of total expenditure are fixed in real terms, nominal aggregate demand (D) would rise with employment. The intersection of the two schedules identifies the point of effective demand associated with a level of employment and nominal receipts from the sale of output (Asimakopulos, 1982). For stability the D schedule must cut the Z schedule from above. Equilibrium employment may or may not correspond to full employment. An increase in autonomous expenditure, say a fiscal stimulus, would lead to an upward shift of the D schedule and higher employment.

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³ 'The real-wage' thus becomes a concept verging on the metaphysical. It must certainly be dubious to consider that the demand for labour and the supply of labour are functions of the real-wage in the same way that the demand and supply of strawberries are functions of the price of strawberries (Reynolds (1987, p.125).

Figure 3: Z/D Analysis



If labour were the sole variable factor of production, then a reduction in the nominal wage by say 5% would decrease the desired level of proceeds proportionately by 5% at each level of employment. Likewise, under the assumptions made about aggregate demand, nominal expenditure would also fall proportionately at each level of employment. Thus there is the logical possibility that the locus of points defined by the money wage and corresponding level of employment (the aggregate demand for labour) would be inelastic (vertical) with respect to the nominal wage (see Keynes, 1936, pp.9-13, p.262 and Kalecki, 1969, p.49 in reference to a competitive economy; and Reynolds, 1987, pp.129-130). A classical (downward sloping) demand for labour could be achieved by falling nominal wages and prices yielding higher net exports in the absence of a sufficient exchange rate adjustment.

Also a fall in the nominal wage could lead to mark-ups being effectively raised, due to prices declining more slowly. The resulting shift in the distribution of income would, under a higher propensity to consume out of wages than profit, lead to a cut in consumption expenditure. Under an exhilarationist regime, the rise in investment brought about by the rise in the profit share would offset the fall in real consumption, so that the demand for labour, expressed as a function of the money wage would assume the classical (downward sloping) form (Bhaduri and Marglin, 1987; see also, Taylor, 2004, Chapter 4).

In the absence of a major impact on investment, the fall in consumption will dominate thereby yielding a positive relationship between the nominal wage and labour demand. This has been defined as a stagnationist regime (Bhaduri and Marglin, 1987). The demand for labour can be represented in money wage and employment space along with the supply of labour.

Reynolds (1987, pp.134-35) argues that the labour supply forthcoming at a particular money wage is dependent on the prevailing levels of aggregate demand and aggregate supply, which underpin the demand for labour. He defines a labour offer schedule which consists of a

locus of points, each corresponding to a particular money wage, corresponding labour demand and the associated price level and aggregate level of money income.

The assumption of constant or rising real wages under markup pricing puts the IU analysis at odds with Keynes' first definition, which assumes that the price of wage goods rises when aggregate demand and hence output increases. If per unit raw material costs increase faster, as output rises, ceteris paribus, then the effective markup over labour costs increases, so that rising employment is associated with falling real wages, irrespective of the prevailing level of the money wage.

If a classical demand for labour schedule is assumed, rising employment and real income are associated with a falling real wage under rising markups. If the substitution effect dominates the income effect, then a high real wage corresponding to low demand for labour will attract a high level of labour supply and conversely, so that the labour supply schedule is upward sloping function of the money wage. On the other hand if income effects dominate, so that lower real wages and higher employment attract a higher level of labour supply, which can also reflect higher participation rates (discouraged worker effect), then labour supply has a negative slope.

Thus labour supply is no longer necessarily reliant on the real opportunity cost of leisure, which should address concerns about its neo-classical specification (Spencer, 2006). in There is no role for the labour/leisure choice if real wages are constant, irrespective of employment. On the other hand, if the labour demand schedule is upward sloping and the substitution effect dominates, then the labour supply schedule is downward sloping with low money wages, but high real wages, due to the low level of employment implying a high level of labour supply. If income effects dominate then at low money (and high real) wages at low levels of employment, labour supply will be relatively low, and conversely. The joint outcome of money wage and price setting, namely the expost relationship between real wages and employment is plotted in the fourth quadrant (Wells, 1987). Hereicher als Arman and Arman and mostly at maney wave W, issing disave the insist subana of mo-planatati, notwithstanding the decline in the real week, roll-will the increase in economic company. The new morest 4 and Anvoluntary unemployment reconsidered: history is analytican subsolu yderenterin annend. Tehnet diseranda an der han halle and er han hardele star harde er hande er hande er harde We first reconsider both interpretations of Keynes' first IU definition in the context of different configurations of labour demand and supply, where both schedules are expressed as functions of the money wage. We initially assume rising mark-ups, so that real wages fall as employment increases. heny ic nationalities are sel thuch villar and search

4.1 Classical demand for labour interest visitilies of the approximate of the second state of the second s

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At money wage W_1 there is excess labour supply. A fiscal stimulus would shift the demand curve for labour to the right, yielding employment at L_2 at money wage W_1 . In the absence of any money illusion, the supply of labour schedule would shift to the left, because the unchanged money wage is associated with a lower real wage at the higher employment level, L_2 . Since the original demand for labour D^L corresponding to employment L_2 was associated with labour supply at L_3 , the new labour supply schedule corresponds to L_3 at wage

 W_1 . A sufficient condition for the planned level of labour supply to remain above the original demand determined level of employment, L_1 , is that employment L_2 , following the increase in effective demand, is lower than or equal to the market clearing employment level L*.



Figure 4: Classical Demand for Labour, Upward Sloping Labour Supply

Thus, Figure 4 is consistent with Keynes' first IU definition with both labour demand and supply at money wage W_1 being above the initial volume of employment, notwithstanding the decline in the real wage, following the increase in aggregate demand. The new market clearing equilibrium is associated with the same level of employment (L* in Figure 4), but a higher money wage (see Appendix). This can be easily shown by considering an increase in effective demand to L*, corresponding to money wage W_1 . Further if labour productivity declines with employment then the new labour demand curve will be flatter.

We now consider the case in which income effects dominate, so that labour supply increases as employment rises and the real wage falls. The stable case is shown in Figure 5. Thus again money wage inflexibility could be an explanation of unemployment. A fiscal stimulus again shifts labour demand to the right, thereby raising employment, but lowering the real wage at money wage W_1 . It is relatively straightforward to show that in this case the labour supply shifts to the right (not shown), irrespective of the increase in aggregate demand. So again this configuration is consistent with Keynes first definition of IU, when treating unemployment as being associated with Marshallian equilibrium. Also the new market clearing equilibrium is associated with the same employment level, but again with higher wages and prices.

Consider now the unstable scenario, so that the demand for labour is steeper than the downward sloping supply of labour. Excess labour supply cannot be addressed via flexible money wages. Below the equilibrium money wage, there is an excess supply of labour but demand determined employment exceeds its market clearing level. An increase in aggregate demand will shift both schedules to the right, so that Keynes' first IU definition is again

satisfied, and the real wage has fallen, but demand determined employment has diverged further from its market clearing equilibrium level and the excess supply of labour has increased. Again the new market clearing equilibrium corresponds to the same level of employment but a higher money wage. However, to secure market clearing equilibrium, when money wages are relatively inflexible, a cut in aggregate demand is warranted.



Figure 5: Classical demand for labour, downward sloping labour supply

In this unstable scenario, an expansion of effective demand even at the market clearing money wage, W*, yields an outcome consistent with Keynes' first IU definition. Both the demand and supply schedules move to the right, but excess supply is created. Thus it would appear that involuntary unemployment can also be associated with market clearing (see also Robinson, 1937, p.172n, reported in Spencer, 2006, p.465). However it is important to note that the level of employment associated with full employment (market clearing) remains unchanged, notwithstanding the increase in effective demand, so Robinson's critique is largely neutralised.

4.2 Upward sloping labour demand

If the supply schedule is orthodox (i.e. a positive function of the real wage), then in money wage, employment space the supply curve of labour is downward sloping, so the labour market is unstable. At wage W_1 , below the market clearing money wage, there is an excess supply of labour. A fiscal stimulus shifts the labour demand schedule to the right and in this case labour supply shifts to the right, which satisfies the IU definition, again subject to the stimulus not pushing employment beyond L* at money wage, W_1 .



Figure 6: Upward sloping demand for labour, downward sloping labour supply

Figure 7: Upward Sloping Demand for Labour, Upward Sloping Labour Supply



On the other hand, if income effects dominate, then the supply curve of labour is upward sloping. Figure 7 shows the stable configuration, so that at money wage, W_1 , above the equilibrium money wage, there is an excess supply of labour, which could be addressed by

a fall in money wages. An increase in aggregate demand shifts D^L to the right and it can be readily shown that the supply of labour also shifts to the right, so the conditions for Keynes' first IU definition are satisfied. Again IU is present at the market clearing equilibrium level of employment, but following the shifts of the supply and demand for labour, a new market clearing equilibrium is defined corresponding to the same market clearing level of employment and lower money wage.

Under the unstable configuration, an excess supply of labour is manifested at a money wage below the equilibrium wage. A fiscal stimulus will shift the demand for labour to the right and will again shift the supply of labour to the right. Thus Keynes IU conditions are satisfied.

4.3 Summary

We have assumed that there are falling real wages associated with rising employment, based on production conditions. There are six different scenarios associated with positive and negative slopes of the demand for and supply of labour schedules, and taking the stability of the market clearing equilibrium into account (see Table 1). All these scenarios satisfy Keynes' first IU definition (in the presence of excess labour supply) as long as a fiscal stimulus does not increase the demand for labour above its market clearing level from below at the prevailing money wage.

	Upward Sloping S ^L Stable (Labour/Leisure)		Downward Sloping S ^L	
Downward			Stable (Income)	Unstable (Income)
Sloping D ^L	1		✓	X
Upward	Stable (Income)	Unstable (Income)	Unstable (Labour/Leisure)	
Sloping D ^L	X	1	1	

Table 1: Different Configurations of Labour Supply and Demand

Notes: (Un)stable equilibrium refers to demand and supply of labour.

Bracketed term denotes whether the labour supply is based on the labour/leisure choice or driven by income and participation effects.

 \checkmark Fiscal stimulus required which will reduce excess labour supply.

Х Fiscal cut required which will reduce excess labour supply.

Further the capacity to expand employment in the presence of excess labour supply confirms that the second definition of involuntary unemployment is also satisfied. However there are a number of qualifications. First, there are two scenarios denoted by X in Table 1 in which excess supply is associated with above full employment $(L_1 > L^*)$, so that a cut in government expenditure would be warranted to achieve market clearing full employment at the going money wage. In both instances these scenarios are associated with a rising excess supply of labour in the event of a fiscal stimulus. Both these configurations also reveal that IU can coincide with market clearing equilibrium, which would appear to contradict the second definition of IU. However in all 6 cases following a fiscal stimulus or contraction, market clearing equilibrium is still associated with the same level of employment in the absence of money illusion. In normal circumstances, it would be expected that market clearing equilibrium at the same or higher money wage would be more desirable. All the stable configurations could be construed as illustrating sticky money wages in the presence of unemployment.

If under either scenario the schedules do not intersect at a positive money wage so that there is excess supply, then IU is unambiguously driven by inadequate aggregate demand,

so that a fiscal stimulus is required, but, in the absence of an extant market clearing equilibrium, it is impossible to establish the impact on the labour supply schedule.

Finally, it is possible to repeat the above modelling, under the assumption of rising employment being associated with higher real wages. Table 1 will change in the designation of the supply curves, associated with the different configurations, so that those based on the Income Effect will now correspond to supply curves based on the Labour/Leisure choice and vice versa. Keynes' first IU definition is sustained if the reference to the rising price of wage goods is replaced by an increase in effective demand.

5 Conclusion

The principle argument in this paper is that most writers about involuntary unemployment have failed to escape from a neo-classical conception of the labour market in which the ex post employment to real wage relationship plays an ambiguous role and the real wage is the equilibrating variable.⁴ The formal analysis of aggregate demand and supply is necessarily suppressed. The author disagrees with Darity and Horn (1987/88) who argue that a labour market analysis is redundant. A more nuanced analysis can be undertaken in which money and real wages can be analysed separately and labour supply theory can be developed within a macroeconomic framework. Both demand deficient (Marshallian equilibrium) and wage inflexibility (Walrasian disequilibrium) explanations of IU can be illustrated.

Finally the paper has shown that both Keynes' definitions of IU are more robust than is claimed in the literature, particularly when the reference to a 'small rise in the price of wage-goods' in the first definition is replaced by a 'modest increase in effective demand'.

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⁴ Keynes can be criticized for limiting his discussion to perfect competition and diminishing marginal productivity, but he cannot be criticized for the labour market representation of his definition of IU with real wages on the vertical axis.

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Appendix:

Consider, for simplicity, aggregate labour demand and supply schedules which are linear functions of the money wage:

 $D = a_D + b_D w$

 $S = a_s + b_s w$

We do not impose signs on the coefficients so that all possible configurations of labour supply and demand can be considered. The equilibrium money wage can be derived as $W^* = (a_D - a_S)/(b_S - b_D)$ and equilibrium employment is $(a_D b_S - a_S b_D)/(b_S - b_D)$ should equilibrium exist.

An increase in aggregate demand which shifts the demand for labour to the right can be represented as follows

 $D' = a_D + b_D w + \gamma$

where $\gamma > 0$.

If W_1 denotes a money wage at which there is excess labour supply, then D'(W_1) is equal to employment corresponding to the original labour demand function, D at wage W_2 (and the same real wage) where

 $a_D + b_D W_1 + \gamma a_D + b_D W_2$

so that

 $W_2 = (W_1 + \gamma/b_D)$

At this wage, labour supply is

 $S = a_s + b_s W_2 = a_s + b_s (W_1 + \gamma/b_D)$

Then the new supply schedule induced by the increased activity after the stimulus satisfies

$$S = a_{s} + b_{s} W_{1} = a_{s} + b_{s} (W_{1} + \gamma/b_{0})$$

so that

 $S' = a_s + b_{s\gamma}/b_D + b_s w$

Following the fiscal stimulus, excess supply at wage W₁ can now be written as:

$$S'(W_1) - D'(W_1) = a_s + b_s(W_1 + \gamma/b_D) - (a_D + b_DW_1 + \gamma)$$

$$= S(W_1) - D(W_1) - \gamma b_s/b_D)$$

If the slopes of the schedules have opposing signs, then excess supply diminishes. On the other hand, if the absolute slope of the supply function is greater than the demand function, noting that the wage is on the vertical rather than horizontal axis, then excess supply actually increases, but these circumstances can be identified with a fiscal cut being justified rather than a fiscal expansion.

It can be readily shown that the market clearing equilibrium money wage is now

$$W^* = (a_D - a_S)/(b_S - b_D) - \gamma/b_D$$

but equilibrium employment and hence the real wage remain unchanged. Thus the formal macroeconomic treatment of both labour demand and supply yields a market clearing equilibrium which is invariant to changes in effective demand.