

# Unemployment and Trade Liberalisation

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## 1. INTRODUCTION

**P**ROMINENT in most political conflicts over trade liberalisation is fear of job losses. Whether it is street demonstrators in France, US auto workers smashing imported Japanese cars, or even trade economists studying the determinants of congressional voting patterns, effects of trade liberalisation on unemployment always emerges as an issue. Unemployment seems more important to most participants in the debate than effects on wages or government revenue or other issues.

In sharp contrast with its prominence in public debate, trade economists are usually reluctant to deal explicitly with the issue.<sup>1</sup> Stolper and Samuelson's classic paper (1941) opens with an acknowledgement that the argument for tariffs with the greatest political appeal is 'that tariffs increase employment' (p. 333). However, nothing further is said about effects on employment, and in developing their model 'full employment of both factors is assumed' (p. 341). Employment and trade are treated as separate issues.

This view that unemployment and trade policy should be debated separately has been more recently and forcefully expressed by Paul Krugman in a paper presented at the American Economic Association entitled 'What Undergraduates Should Know about Trade'. Krugman (1993, p. 25) writes:

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An earlier version of this paper was presented as a seminar at the Australian Productivity Commission. The author thanks the late Richard Snape, Max Corden, Peter Dixon and the anonymous referees for their comments.

<sup>1</sup> Trade textbooks such as Kemp, Ethier, Markusen-Melvin, Dixit-Norman, Woodland, Krugman-Obstfeld, and Feenstra do not treat linkages between trade and unemployment. The only exception I could find is Bhagwati-Srinivasan who devote a chapter to Brecher's (1974a and 1974b) model. Standard macroeconomics texts such as Dornbusch-Fisher, Sargent, and Mankiw similarly ignore trade as an influence on unemployment.

The level of employment is a macroeconomic issue, depending in the short run on aggregate demand and depending in the long run on the natural rate of unemployment, with microeconomic policies like tariffs having little net effect. Trade policy should be debated in terms of its impact on efficiency, not in terms of phony numbers about jobs created or lost.<sup>2</sup>

Douglas Irwin's (1995) history of free trade restricts discussion of employment to a chapter 'Keynes and the Macroeconomics of Protection' and in a later work asserts that 'the overall effect of trade on the number of jobs in an economy is best approximated as zero' (Irwin, 2002, p. 71) and that efforts to quantify the employment effects of trade are 'futile' (Irwin, 2002, p. 73). Similar comments have been made by other prominent trade economists.<sup>3,4</sup>

As well as being at odds with the public debate, the attempt to separate trade and employment issues neglects the small but growing number of theoretical models of the linkages in the general equilibrium trade literature – including exogenous wage floor unemployment models (e.g. Haberler, 1950; Brecher, 1974a and 1974b; Neary, 1985; Davis, 1998; Oslington, 2002a; and Kreickemeier, 2003), implicit contract models (e.g. Matusz, 1986), search models (e.g. Davidson, Martin and Matusz, 1999), insider-outsider effects (e.g. Oslington, 2002b) or union bargain-ing models (e.g. Kemp, Long and Shimomura, 1991).

What is lacking in the literature is an accessible unified treatment of the linkages between trade and unemployment. The generality of results from the best known model in the literature (Brecher, 1974a) is limited by a knife-edge complete specialisation outcome, and this paper instead examines a specific-factors model where a small open economy remains diversified. Second, the belief that nothing can be said once unemployment is introduced is mistaken, and some new

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<sup>2</sup> Krugman's view that the natural rate is invariant to trade policy is difficult to reconcile with Milton Friedman's (1968) original formulation: 'The natural rate of unemployment is the level which would be ground out by the Walrasian system of general equilibrium equations, provided there is embedded within them the actual structure of labour and commodity markets, including market imperfections'. For Friedman the natural rate is not fixed, but determined within something like an open economy general equilibrium model with a labour market imperfection. If Friedman's natural rate is invariant to anything it is macroeconomic policy not trade policy.

<sup>3</sup> An exception, and one of the few accessible discussions of the trade and jobs issue, is Corden (1979). He explains in simple terms the economic mechanisms which create jobs lost as a result of tariff cuts, arguing that more jobs will be created wherever the additional income is spent, whether by domestic or overseas consumers. Jagdish Bhagwati briefly discusses the issue in his recent popular works (e.g. Bhagwati, 2002, pp. 16–17).

<sup>4</sup> If trade and employment are linked, why have economists often kept them separate in the public debate? One explanation might be the entrenched division of labour between macroeconomics and microeconomics. Explaining unemployment is seen as the task of macroeconomists (whose single-good single-factor models cannot capture the type of employment effects considered in this paper) rather than microeconomists, including general equilibrium trade theorists. Another reason trade economists have tried to keep trade and unemployment issues separate might be fear of the employment argument being misused, in the same way as the infant industry and strategic trade policy arguments have been misused in the past. While the politics of trade liberalisation are complex, the damage done to the cause of trade liberalisation by ignoring long-run employment effects seems very great, in the face of variations in employment that are obvious to the public and politicians.

policy-relevant propositions will be derived from this simple model. The third contribution of the paper is to suggest how the results of theoretical modelling can be incorporated into computable general equilibrium models and deployed in policy debates. Overall the paper argues that the separation of trade and employment issues is detrimental to the credibility of the case for trade liberalisation and cannot be justified theoretically. Trade and policy economists can deal with employment issues, and the results of the analysis do not always (or even usually) favour protection.

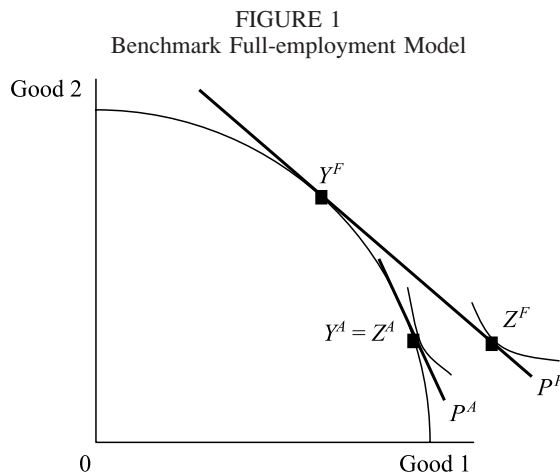
The structure of the paper is as follows. The next section briefly reviews the standard argument for free trade for a benchmark fully employed economy. Unemployment is then introduced through a wage floor which applies to all types of labour and binds for unskilled labour, with a variation that allows Brecher's implausible complete specialisation outcome to be avoided for a small open economy. The impact of unemployment is identified by considering the effects of opening trade with an otherwise identical economy without a wage floor. A wage floor is a source of comparative advantage, but trade based on this comparative advantage may not be gainful. Restricting trade may be welfare improving in some cases but is never first-best policy. Distributional issues are then considered, in particular the concentration of losses associated when trade is liberalised in the presence of a wage floor. We then move on to some particular situations of policy interest where we can be more definite than the existing literature about effects of liberalisation in the presence of unemployment. It is shown that there will always be gains from opening up trade with countries with higher wage floors. Also it is shown that relative abundance of the factor on which the floor binds magnifies gains from liberalisation, to the extent that we can be certain of gains from liberalisation if the good which uses the unemployed factor relatively intensely is exported. The final section links the theoretical results to computable general equilibrium modelling and specifically the Australian ORANI/MONASH simulations which were an important influence on the debate over liberalisation of automobile and textile, clothing and footwear trade. It will be argued that the cause of trade liberalisation would have been better advanced by endogenising long-run employment in policy simulation exercises and discussing the employment effects rather than attempting to deny them by assumption or brush them aside as temporary adjustment problems or regional difficulties.

## 2. BENCHMARK FULL-EMPLOYMENT MODEL

To introduce assumptions and notation, a benchmark model with full employment will be briefly reviewed. It will be kept as simple as possible to focus on the employment issue and assumptions are those of the standard neoclassical trade model:

- Profit-maximising firms operating in competitive markets, earning zero economic profits.
- Given factor endowments, with ownership evenly distributed across individuals.
- Given technology represented by production functions which are non-decreasing, concave and constant returns to scale.
- Maximising individuals with given utility functions which are non-decreasing, concave, homothetic and identical for all individuals.
- No uncertainty, externalities, adjustment costs or distortions in production, consumption or trade.
- Free trade in goods, no trade in factors of production.
- Small open economy taking goods prices as given.

The production side of the full-employment economy is represented by the concave production possibility frontier in Figure 1.<sup>5</sup> There are two goods and either two or three factors of production,<sup>6</sup> which will be interpreted as labour with different levels of skill. Autarky goods prices are  $P^A$  and the autarky production and consumption point is  $Y^A Z^A$ . The given world goods price ratio is  $P^F$ . If the economy is relatively well endowed with factor 2, which is used relatively intensively by good 2 opening up trade reduces the relative price of good 1, shrinks industry 1 and expands industry 2. With free trade, the economy produces at  $Y^F$  and consumes at  $Z^F$ .



<sup>5</sup> Throughout the paper, upper-case variables will be used for the full employment economy, and lower-case for the economy with unemployment.

<sup>6</sup> Models with arbitrary numbers of goods and factors can be constructed, as in Neary (1985) but few unambiguous results can be derived at this level of generality.

Under the assumption that endowments are evenly distributed across individuals, and preferences are identical homothetic, indifference curves in Figure 1 indicate utility of a representative individual, which will be the welfare measure used in the paper.<sup>7</sup> The free trade consumption point  $Z^F$  can be shown always to be on a higher indifference curve, and thus dominate the autarky consumption point  $Z^A$  so the representative individual gains from moving from autarky to free trade. These gains come from production, as resources move into industries where they are more productive, and from expanding consumption opportunities.

There are gains for the representative individual. If endowments are not evenly distributed across individuals the goods price and factor prices change as a result of the opening up of trade will mean gains for individuals who own proportionately more than would a representative individual of the factors whose price rises, and losses for other individuals.

### 3. INTRODUCING UNEMPLOYMENT

Unemployment in the model comes from a labour market distortion, the simplest of which is a wage floor which applies to all industries but which only binds for the type of labour with the lowest marginal product (e.g. unskilled labour).<sup>8</sup>

The floor could represent a legislated minimum wage, unemployment benefits financed through lump-sum taxes, or perhaps an efficiency wage, implicit contract or union bargaining effect. Endogenous wage floor models (including Matusz, 1986; Davidson, Martin and Matusz, 1999; Kemp, Long and Shimomura, 1991) have been an important contribution to the literature but until there is a consensus about the specific efficiency wage, search or union bargaining mechanisms that generate above market-clearing wages and unemployment, it seems wiser for policy analysis not to endogenise the level of the floor. Any of these interpretations of the wage floor are consistent with the results of this paper.

There are various ways of specifying the wage floor. In the literature it is sometimes a real floor, specified in terms of the price of another factor, or price of a particular good or some index of prices (see Brecher, 1974a and 1974b and references therein). The choice of the price or index is somewhat arbitrary and some results in the literature depend on particular specifications. Real floors are also implausible in the absence of mechanisms in economy that continually

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<sup>7</sup> The classic gains from trade proofs use the Pareto criteria together with an assumption that lump-sum transfers between individuals are possible. The alternative approach focusing on utilities of representative individuals is convenient for the purposes of this paper, and assumptions underlying it arguably no less plausible than lump-sum transfers.

<sup>8</sup> The paper does not consider sources of unemployment other than rigid wages. Any other unemployment (perhaps due to effective demand failures linked to money and uncertainty as suggested by Keynes) is assumed to be invariant to trade policy.

adjust the wage floor to maintain its real value defined in one of these ways. For these reasons the wage floor in this paper will not be assumed to adjust to maintain its real value in terms of other wages and prices.

The best known neoclassical trade model of unemployment (Brecher, 1974a and 1974b) introduced a minimum wage into a model with two goods and two factors of production. Under these conditions the industry in a small open economy which uses the factor subject to the minimum wage relatively intensively ceases production, leaving the economy completely specialised in the production of the other good. Specialisation occurs because the minimum wage increases costs, but increases them unevenly across different industries. Falls in the price of the flexible price factor allow the industry which uses the minimum wage factor least intensively to continue producing at zero profits, but at these prices the industry which uses the minimum wage factor relatively intensively will make less than zero profits and will cease production.

To avoid this complete specialisation outcome the minimum wage can be introduced into a model with two goods and three factors.<sup>9</sup> As with the full-employment version in Jones (1971), it will be assumed that industry 1 uses factor 1 which is specific to it plus mobile factor 3, while industry 2 uses factor 2 which is specific to it plus the mobile factor 3. Factor 1 will be interpreted as skilled labour, factor 2 as unskilled labour, for which for wage floor binds, and factor 3 will be intermediate skilled labour. With three factors of production, the specialisation outcome is avoided because while the minimum wage on factor 2 drives down the price of factor 3 to maintain zero profits in industry 2, the price of factor 1 is free adjust to maintain zero profits in industry 1.<sup>10</sup>

#### 4. EFFECTS OF TRADE LIBERALISATION IN THE PRESENCE OF UNEMPLOYMENT

To isolate the impact of the wage floor on resource allocation, employment and welfare it will initially be assumed that the economy is trading with an otherwise identical economy without a wage floor. All other sources of comparative advantage such as endowment differences will be neutralised so as to focus on the impact of the wage floor.

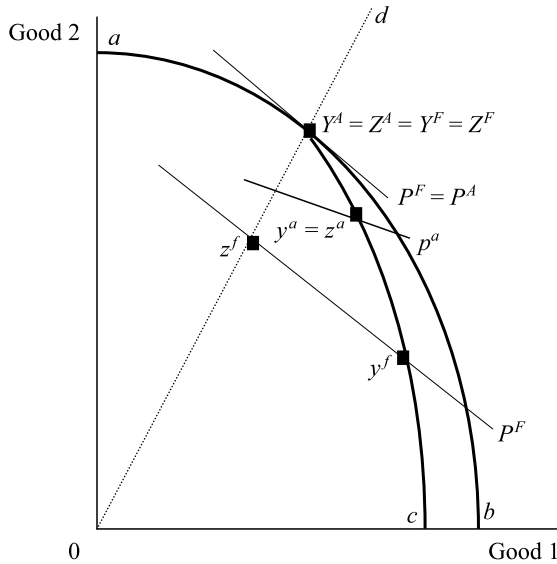
Figure 2 illustrates the model economy. Under full-employment autarky production and consumption is  $Y^A = Z^A$ , and with the identical economies assumption

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<sup>9</sup> A specific factors model with unemployment has been more formally analysed in Oslington (1999). This seems to be the model Haberler (1950) has in mind, and it is also briefly considered in an unpublished working paper version of Neary (1985).

<sup>10</sup> Nothing hinges on the specific factors restriction. Ruffin (1981) showed that any three-factor model will have a middle factor that corresponds to the mobile factor, and two extreme factors that correspond to the specific factors. The important feature for avoiding specialisation when a minimum wage is imposed is that there are more factors of production than goods.

FIGURE 2  
Minimum Wage Economy Trading with Otherwise Identical Economy



this will also be the free trade production and consumption point  $Y^F = Z^F$ . Since the economies are identical, the autarky price ratio  $P^A$  will also be the free trade world price ratio  $P^F$ . There will be no trade.

Introducing a wage floor which binds on factor 2 into the autarkic economy will generate unemployment of factor 2, raise costs relatively more in industry 2, and push up the autarky relative price of good 2 to  $p^a$ . It is assumed that the floor binds for one and only one of the factors, which means that the floor must be above the value of marginal product of labour of the least productive type of labour and below the value of marginal product of the other types of labour.

As a consequence of the wage floor the economy no longer produces on its production possibility frontier  $ab$ , and instead produces inside it along the locus  $ac$ . The locus and non-tangency is discussed by Haberler (1950) and Brecher (1974a), although because there are three factors in the present paper the locus in Figure 2 is not linear. Distortionary effects of the wage floor means the slope of this locus will not be equal to world prices at the production equilibrium. Output of good 2 falls and output of good 1 rises so that production is  $y^a$  and consumption  $z^a$ .

Now open the economy to trade, based on the comparative advantage in good 1 created by the wage floor, recalling that other sources of comparative advantage have been neutralised. Production of good 1 increases further and that of good 2 falls further to  $y^f$ , and unemployment of factor 2 rises. As it is a small open economy, goods prices are not changed by the opening up of trade and are denoted  $P^F$ . With identical homothetic preferences and unchanged prices, the

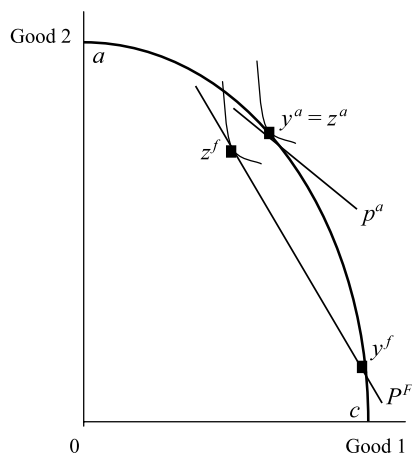
consumption ratio is unchanged so that the consumption point is  $z^f$  on the ray  $Od$ . The country exports good 1 and imports good 2.

*Proposition 1:* A wage floor is a source of comparative advantage, leading an economy to import the good which uses the factor on which the floor binds, and export the other good.

The trade-creating effects of a minimum wage have been previously noted by Haberler (1950), Brecher (1974a) and others.

As well as influencing the pattern of trade the wage floor impacts welfare. The relevant comparison is between autarky with unemployment and free trade with unemployment.<sup>11</sup> In the benchmark full-employment case trade liberalisation pushes resources out of low productivity industries into more productive ones – but when there is unemployment it may push resources out of employment, so that they have zero productivity. Such an increase in unemployment may lead to losses from trade, as illustrated in Figure 3, where the autarky consumption point  $z^a$  dominates free trade consumption point with unemployment  $z^f$ . However, even if unemployment rises there may still be gains from trade if the usual resource allocation and consumption gains outweigh the employment losses, as in Figure 4.<sup>12</sup>

FIGURE 3  
Losses from Trade with Otherwise Identical Economy

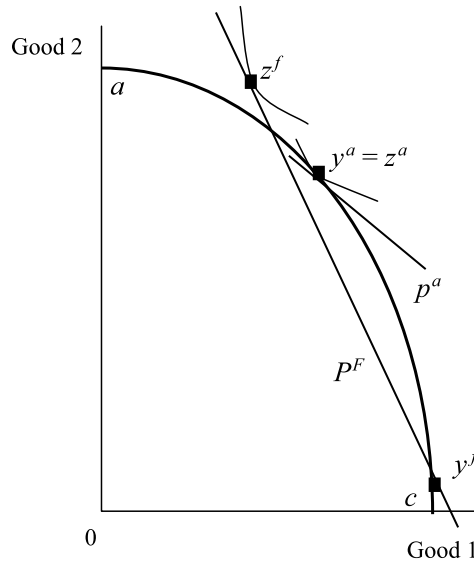


<sup>11</sup> Some of the literature muddies the issue by assuming the minimum wage just binds in autarky, so that in Figure 2 the autarky equilibrium with the minimum wage  $y^a = z^a$  corresponds to the full employment autarky point  $Y^A = Z^A$ . When this assumption is made the effects of the minimum wage and the opening up of trade cannot be distinguished.

<sup>12</sup> To avoid a clutter of lines in these diagrams production possibility frontier  $ab$  from Figure 2 has been suppressed, and only the transformation locus with minimum wage  $ac$  is shown.



FIGURE 4  
Gains from Trade with Otherwise Identical Economy



*Proposition 2:* Opening up trade when there is a wage floor can lead to gains or losses.

This ambiguity was previously demonstrated by Haberler (1950, p. 230) and Brecher (1974a, p. 110).

In a case like Figure 3, where there are losses from trade, welfare can be improved by protecting the good which uses the unemployed factor, perhaps through an import tariff on good 2 or an export tax on good 1. Such assistance to industry 2 though, while welfare improving as it offsets the labour market distortion, also distorts trade and is not the optimal policy which would be to subsidise employment of factor 2.

*Proposition 3:* Restricting trade in the presence of a wage floor may be welfare improving. However, restricting trade is not the optimal policy which would be subsidising employment of the factor subject to the floor.

This is well known (e.g. Haberler, 1950, p. 229; and Brecher, 1974a, p. 115) and the non-optimality of restricting trade when there is a labour market distortion has been emphasised by many authors (e.g. Corden, 1997).

In the discussion of the benchmark full-employment model it was noted that if endowments are not evenly spread across individuals, some individuals gain and some lose as a result of trade liberalisation. Further distributional issues arise when there is unemployment even if endowments are evenly distributed, because of the lumpiness of jobs. Ten per cent unemployment typically does not usually

mean that all labour is unemployed ten per cent of the time, but that ten per cent of individuals have none of their endowment employed. If in a situation like Figure 3 unemployment is unevenly spread across owners of labour then:

*Proposition 4:* Trade liberalisation that increases unemployment will concentrate losses on a few individuals, even if it increases aggregate income.

Distributional issues created by the wage floor and associated unemployment have received little attention in the literature. They are significant for the politics of trade liberalisation, as concentration of losses creates incentives for lobbying. The concentration of losses from trade when there are wage floors (compared to full employment where wage falls from trade are spread across all owners of a particular factor) may be a large part of the reason why liberalisation that increases unemployment generates so much political heat.

#### 5. TRADE WITH LOW WAGE COUNTRIES

Consider the effects of liberalising trade with different types of countries.<sup>13</sup> If trade is solely based on comparative advantage created by a wage floor, as in Figure 2, then opening up trade will contract the industry which uses relatively intensively the factor for which the wage floor binds, and increase unemployment. Thus:

*Proposition 5:* Trade based on comparative advantage created by a wage floor will always increase unemployment.

This does not seem to have been recognised in the literature, but emerges from isolating the impact of the wage floor by considering otherwise identical economies.

Looking at the overall welfare effects, losses are only possible if unemployment rises, which will only occur if the relative world price of good 1 is greater than the autarky price of good 1. What do these relative prices imply about the structure of the rest of the world? If there are two countries in the world and they are identical apart from the levels of their wage floors, then the foreign country must have a lower minimum wage. The reasoning is as follows. We know from the previous discussion that imposing or increasing a wage floor which binds on factor 2 will increase the relative price of good 2. This implies that a country with a lower wage floor on good 2 will have a higher relative autarky price of good 1. Since we are considering a small open economy, world prices are the other country's autarky prices. Under the assumptions of the analysis:

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<sup>13</sup> In the literature, trade liberalisation has sometimes been considered as opening up an autarkic economy to trade, and sometimes as varying some particular protective instrument such as a tariff. In this paper most of the analysis is of opening up trade, as this gives sharper results, bypassing issues about the particular form of liberalisation.

*Proposition 6:* There will always be gains from liberalising trade with an otherwise identical economy with a higher minimum wage. Losses are only possible when trade is liberalised with an otherwise identical economy with a lower minimum wage.

This general result is new, although Davis's (1998) discussion of opening up trade between a flexible wage America and a rigid wage Europe is an example of the proposition.

This proposition lends some support to the popular suspicion of opening up trade with low wage countries, but it must be emphasised that Proposition 6 does not state there will inevitably be losses, just that this is the only situation where losses are possible.

Propositions 5 and 6 suggest why developed economies tend to be keener to open trade with similar economies with higher wage floors (such as European countries) and less keen on opening trade with lower wage countries (such as the developing economies of Asia).

## 6. INTERACTIONS BETWEEN WAGE FLOORS AND ENDOWMENTS

So far we have been assuming that the economy is identical to the rest of the world apart from the wage floor, so as to isolate the impact of the wage floor. Relaxing this assumption and introducing other sources of comparative advantage, such as endowment differences, allows analysis of interactions between these and wage floors.

Consider the situation in Figure 5. The full-employment and unemployment autarky points, as well as the free trade equilibrium  $y^f z^f$  for trade with otherwise identical economies are reproduced for comparison from Figure 2. Just as in Figure 2, autarky prices  $P^A$  correspond to free trade prices  $P^F$  for opening up trade with otherwise identical economies. Assume now that factor 2 (for which the minimum wage binds) is relatively scarce, so under full employment good 1 is exported and good 2 imported. We can isolate the impact of the scarcity of factor by comparing the equilibrium for trade with the otherwise identical economy with the equilibrium for trade with the economy with different endowments. In Figure 5 the relative scarcity of factor 2 pushes the free trade production point further down the locus  $ac$  from  $y^f$  to a point like  $y^{f*}$ . Note that the price line  $P^{F*}$  is steeper than  $P^F = P^A$  because the different world endowments generate a different world price ratio. Comparing consumption points  $z^{f*}$  with  $z^f$  gives:<sup>14</sup>

<sup>14</sup> A referee pointed out (in a manner similar to Bhagwati's immiserising growth argument) that minimum-wage-induced unemployment of a factor could trigger feedback effects on welfare through the terms of trade which outweigh the direct effect of withdrawal of the factor from production.





models need to capture the essential elements of the issue under consideration while abstracting from issues of secondary importance (Appendix O, p. 24),

but the impact of trade on employment is in the second category. The treatment of employment is similar in many of the Commission's recent reports and worth quoting in full:

In its analysis of the effects of reducing the automobile tariff the Commission believes that in the long run, the aggregate supply of labour is determined by factors unaffected by tariff policy changes. This assumption . . . is consistent with the macroeconomic concept of the non-accelerating-inflation rate of unemployment (NAIRU) (Appendix O, p. 19).

They add:

Imposing a NAIRU results in wages becoming more flexible over time as agents become accustomed to the disturbance. Initially when the response of real wages is assumed to be sluggish, disturbances in the labour market are accommodated mainly by adjustments in aggregate employment. Concomitant with the gradual increase in flexibility of real wages is a gradual erosion of the initial employment gains or losses. Eventually the adjustment in real wages will be sufficient to eliminate all employment gains or losses (Appendix O, p. 19).

In contrast with the usual careful specification of mechanisms in the models the Commission uses there is no discussion of the mechanisms by which the job gains or losses from tariff changes adjust to zero in the long run. A great deal of faith is being placed in the existence of an invariant long-run NAIRU.

The possibility of the real wage being fixed is mentioned in the report (see Industry Commission, 1997a, Appendix P, pp. 6–7) but discarded because the magnitudes of the gains from trade liberalisation with a fixed real wage in simulations conducted for the earlier draft report were very large. This approach of fixing the real wage is not the only way of introducing employment effects. More plausibly, and consistent with the theoretical model of this paper, the wage of the low-paid unskilled workers could be fixed while their employment and the wages of higher paid skilled workers was allowed to vary. Such an approach would require a model with more than one type of labour.

In another controversial report, on tariff levels for the Textile, Clothing and Footwear (TCF) industries, the Commission (1997b) treats employment in a similar way. Although it is not the focus of the present paper, there is an excellent extended discussion of prospects and adjustment assistance for displaced workers. A new labour market disruption index LILI prepared in conjunction with the main modelling done for the report (see Dixon and Rimmer, 1998) is an important contribution to the debate over these adjustment issues. However, because the main modelling is always done with a fixed NAIRU, employment effects of trade policy changes can only be transitory.

More recent reports are similar in their treatment of unemployment, which is fixed in the long run at the NAIRU. The latest review of Automotive Assistance (Productivity Commission, 2002, especially Appendix F) gives some attention to short-run adjustment issues, while remaining firm in its view that the long-run

rate of unemployment is independent of trade policy and hence fixing it in the modelling exercises. Again the Commission and its modellers were left unable to deal with concerns in the public hearings about overall job losses. The latest TCF report (Productivity Commission, 2003) at least mentions concerns about unemployment, but like its predecessors bases recommendation on modelling where only short-run deviations in unemployment are allowed and in the long run unemployment is fixed at the NAIRU (Productivity Commission, 2003, pp. 29–30, of the appended Monash Centre of Policy Studies Consulting Report) or where:

in the long run the labour market is assumed to attain equilibrium, so that economic shocks, such as changes in TCF industry assistance have no lasting effect on total employment (Productivity Commission, 2003, p. 15, of the appended ECONTECH Consulting Report).

Based on the theoretical propositions in the paper, what difference might we expect in the computable general equilibrium simulation results and Commission recommendations if the unemployment rate was endogenised through a wage floor which binds for unskilled labour? An argument for a tariff on employment grounds might reasonably be mounted for TCF, especially the parts of TCF that employ low wage workers relatively intensively. However, relaxing the assumption that supplies of the various types of labour are fixed would undermine such an argument. If liberalising TCF trade did reduce unemployment of unskilled workers, this reduces incentives for education, training and skill upgrading, increasing supply of unskilled workers and decreasing that of skilled workers. These long-run labour supply responses flowing from liberalisation are difficult to quantify, but if strong would greatly undermine in the long run any argument for continued TCF tariffs. The other industry that has been resisting tariff cuts, automobile manufacture, would seem to have no argument at all for a tariff on employment grounds as it does not use minimum-wage workers particularly intensively. Overall, considering employment effects would probably strengthen the case for liberalisation for TCF and strengthen it greatly for automobiles.

In summary, including a wage floor which binds for unskilled labour in computable general equilibrium models used to simulate the impact of trade liberalisation could tell us the impact on aggregate employment of a trade policy change, and specify exactly where jobs are created and lost. At the moment we do not know much about the magnitudes of employment effects, but a reasonable expectation would be that they will be many times larger than the resource reallocation effects identified in the full employment or fixed NAIRU simulations. When a job is lost or created the impact on national income is the entire wage, whereas the gains from resource reallocation are the difference between the marginal products of labour in the industries. Results from such a model would strengthen the case for trade liberalisation where this is appropriate, as well as helping to identify the limited number of cases where liberalisation might be harmful. At the very least, incorporating long-run employment issues would help the credibility of the economic models used in trade policy debates.

## 8. CONCLUSIONS

The main conclusion of the paper is that unemployment is influenced by trade policy, and that we can say quite a bit about the relationship using simple models. Existing results were consolidated, such as that trade is not always gainful when there is unemployment, and that restricting trade can be welfare improving although not optimal policy. Some new results were that there will always be gains from opening up trade with countries with higher wage floors, that relative abundance of the factor on which the floor binds magnifies gains from liberalisation, so that we can be certain of gains from liberalisation if the good which uses the unemployed factor relatively intensively is exported. These results could be useful in arguing the case for trade liberalisation, and even more so if quantified using the computable general equilibrium models which influence policy makers. Continuing to ignore or brush aside employment effects of trade liberalisation can only undermine politically the cause of trade liberalisation.

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