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Trade Liberalisation & the New Zealand Labour Market

Kevin Lang

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AUTHOR: *Kevin Lang is associate professor and deputy chair of economics at Boston University and a faculty research fellow of the National Bureau of Economic Research.*
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Kevin Lang

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Kevin Lang,
Department of Economics, Boston University,
National Bureau of Economic Research

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1. INTRODUCTION

While "traditional" economic theory has been supportive of free-trade, recent developments in "strategic trade theory" have emphasized the importance of supporting the development of industries with significant increasing returns to scale and technological externalities.[1] Drawing on recent developments in labour market theory, a small number of economists (Dickens and Lang, 1988; Katz and Summers, 1989a&b) have argued that interindustry wage differentials justify an activist trade policy. In this paper, I use the New Zealand experience with trade liberalization to assess the usefulness of this new trade/labour economics synthesis as a guide for economic policy. Simultaneously, I consider the wisdom of past and present economic policy.

Put simply, the labour market case for an activist trade policy is that there are large interindustry wage differentials and that these differentials constitute worker rents at least in part, that is workers in high-wage industries earn more than the minimum necessary to attract them to that industry and at least some workers not employed in high-wage industries are qualified for and wish to work in jobs in those industries. As a consequence, it is possible to increase output and economic well-being by shifting workers from low-wage industries to high wage industries. Equivalently, trade which shifts workers from high-wage to low-wage industries can make the country worse off.

In essence the problem arises because shifting a worker from a high-wage industry to a low-wage industry has no effect on profits since workers are hired to the point that firms are just indifferent between having one more or less worker. However, the worker is made worse off. Thus the transfer of the worker from the high-wage to the low-wage

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1. For a review of this literature, see Krugman (1987).

sector constitutes a loss to society which may more than offset any gains from lower prices. In general, countries should favour production of goods by industries which pay high wages.

The argument is **not** that comparative advantage should be ignored. Rather, prices may be a poor signal of comparative advantage. If the price of a good includes worker rents, its price exceeds its true opportunity cost. The free market will therefore not ensure that a country produces the "right" goods, and even if does, it may receive a price for its goods which is less than the true cost of production. Therefore, trade may make the country worse off not better off.

It should also be noted that trade intervention is generally not a first-best policy. Interindustry wage differentials arise because of labour market imperfections. First-best policies require labour market, or in some cases capital market, subsidies. Trade intervention is only justified if the first-best policies are infeasible for political or other reasons.

Finally, even if an activist trade policy is desirable, the optimal policy is not tariff protection but export subsidies for high-wage industries. The labour market imperfections cause the relative price of output in the high-wage sector to be too high, resulting in insufficient consumption of the high-wage good. Raising prices in the high-wage sector exacerbates this problem. Subsidies have the further advantage that they are immune to retaliation in kind. If other countries respond to export subsidies by subsidizing their own high-wage exports, the country which initiated the "trade war" is still made better off by the improved terms of trade. On the other hand, subsidies will not be desirable if other countries respond to subsides by raising tariffs. In this case, the subsidy is a pure transfer to the treasury of the foreign country. Therefore if other countries respond to subsidies by raising tariffs, an activist trade policy using tariffs may be a "third-best" policy.

The benefits of an activist policy depend critically on wages being relatively insensitive to trade and labour market policies. For policy to be desirable, policy must primarily increase employment rather than wages. If not, it becomes expensive to raise employment in high-wage

industries, and the distortionary effects of taxes are likely to outweigh the benefits of the subsidy. The proponents of an activist policy have relied on evidence that interindustry wage differentials are highly persistent in the face of major economic upheavals to justify the assumption that such policies will not induce a large wage response. Formal theoretical analysis with endogenous wages has relied exclusively on models of competitive (albeit imperfect) labour markets where efficiency wages are paid to deter worker shirking (Bulow and Summers, 1986).

Of course, evaluating the effect of protection on employment and wages is interesting in its own right even if the new trade/labour synthesis is incorrect. If we accept the view that an activist trade policy hurts the domestic economy, we will nevertheless be interested to know the magnitude of the damage done.

As a consequence, New Zealand provides an extremely interesting case study. In contrast to the United States, New Zealand resembles many other industrialized countries in having a highly unionized labour force. Moreover, while the U.S. has had a substantial increase in the importance of trade in the economy, its trade policy has been fairly stable. Developments in New Zealand have been much more dramatic with a substantial opening of the economy within the space of a few years.

The principal findings of this study can be summarized briefly. While protectionist policies appear to have increased employment in protected industries somewhat, they also significantly raised wages. As a consequence the effect of protection on employment was small. In contrast with the policy implications of the new trade/labour theory, protection in New Zealand was oriented towards low-wage industries. Consequently, trade liberalization was desirable from the perspective of both the traditional and new trade theories.

The issues addressed here are closely related to the question of "labour market flexibility" which has been central to much of the debate on labour market reform in New Zealand. "Labour market flexibility" has a

number of quite distinct meanings in the New Zealand context. To some it is a codeword for lower real wages, for others it refers to the need to eliminate restrictive workplace practices which appear to lower productivity, but most frequently it refers to whether relative wages are sufficiently flexible to promote the reallocation of labour in the face of large intersectoral shifts in demand.

A major message of this paper is that the concern with insufficient relative wage flexibility is misguided on both theoretical and empirical grounds. On theoretical grounds, we would be concerned with relative wage flexibility if we thought that wage differentials were an important signal which serves to help labour flow from declining sectors to growing sectors. In New Zealand, there is little evidence that for most occupations and industries, employment is limited by supply constraints. Instead employment is limited by demand.

This paper provides evidence of considerable relative wage flexibility, but there is little reason to think of this flexibility as being desirable. When wages respond to demand shifts, they simultaneously slow the shift of production towards the sectors where demand has grown and limit the ability of government to promote high-wage employment.

In part the difference between my perspective on labour market flexibility and that which seems to prevail in the literature reflects a difference in the analysis of how a competitive labour market would work and in part a difference in the analysis of how a unionized labour market like New Zealand's works. If a flexible competitive market is the ideal to which one aspires (and for the moment I take no position on whether one should aspire to this ideal), relative wage flexibility is a poor measure of whether the goal has been achieved. In the textbook competitive labour market, all workers received the same wage after adjusting for skill and working conditions. Reallocation of labour is achieved entirely through separations and hirings with no relative wage adjustment. Of course, real world labour markets, even when they appear to be quite competitive, only approximate the textbook model because of firm-specific skills and mobility costs. We would expect to

find some relative wage adjustment, and this wage adjustment will generally be desirable.

In reality in New Zealand and all other industrialized countries, the wage structure conforms quite poorly to the predictions of the textbook model. There are large interindustry wage differentials which reflect union power and other factors and which are not market-clearing. High-wage sectors have no difficulty recruiting workers regardless of the shifts we observe in the wage structure. With high unemployment, low-wage industries also tend not to have difficulty recruiting workers. Therefore, when wages respond to fluctuations in demand, they do not elicit labour supply responses needed to expand employment in growing industries. Instead they tend primarily to reduce the growth of employment in those industries.

This paper is organized as follows. The next section reviews the case for an activist trade policy based on interindustry wage differentials. The third section provides background information on New Zealand labour market structure and trade policy. The fourth section describes the model and data while the fifth presents the results. The paper concludes with a summary and discussion of policy issues.

2. THE CASE FOR AN ACTIVIST TRADE POLICY[2]

2.1 The Basic Theory.

The economic case for free trade is straight-forward. Consider a world with only two goods, wool and butter. In each country, we can talk about the amount of wool it takes to purchase a pound of butter. In a competitive economy this will also be the cost, measured in units of wool, of producing the butter. Except by the merest accident, differences between the countries will result in the cost of butter (in terms of wool) being lower in one country than the other. Of course, if the relative cost of butter is lower in one country, the relative cost of wool must be higher. For example if in New Zealand it takes a pound of wool to purchase a pound of butter, but in Australia it takes two pounds of wool, butter is relatively less expensive in New Zealand.

However, we can turn things on their heads - it takes a pound of butter to buy a pound of wool in New Zealand, but it only take a half pound of butter in Australia. Wool is relatively cheaper in Australia. If we allow trade, New Zealanders will increase their production of butter and reduce their production of wool, trading some of the increased butter production for wool. In this way, it is possible for consumers in both countries to increase their consumption of both commodities. Free trade will ensure that both countries are, in fact, better off because trade will only occur if the "world" price lies between the relative prices in the two countries.

It should be noted that we are only concerned with the relative prices of the two commodities. It is possible that production in New Zealand is

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2. My debt to Bill Dickens for this section of the paper will be apparent to anyone familiar with Dickens and Lang (1987).

more expensive for both commodities as measured by the amount of inputs of land and labour they require. Trade is justified purely on the grounds of relative not absolute costs or, in technical jargon, comparative advantage. In the above example New Zealand has a comparative advantage in the production of butter since the cost of producing butter, measured in units of wool is lower. The cost measured in terms of factor inputs is irrelevant.

The reader who is not already familiar with economic reasoning may have noticed a subtle leap in the last two paragraphs. I began by arguing that New Zealand would export the good with the lower relative price and ended by arguing it would export the good with the lower relative cost. The critical assumption in the standard economic theory is that competition ensures that (allowing for normal profit) the price of a good equals the cost of producing it. Therefore if New Zealanders are able to sell their butter at a world price which is higher than the domestic price, they effectively make a profit.[3] Which New Zealanders get these profits in the end depends on the availability of additional land, labour and other factors of production. Consequently there may be important distributional effects and questions of equity regarding trade, but New Zealanders as a whole are made better off.

The critical argument by those economists who have maintained that labour market imperfections suggest the need for an activist trade policy is that prices do not reflect true costs. In particular Dickens and Lang (1988) and Katz and Summers (1989a&b) argue that prices reflect, in part, worker rents. They present evidence (discussed below) that apparently similar workers earn very different wages depending on which industry employs them. Prices in the high-wage industry reflect

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3. If the cost of producing additional units (marginal cost) increases as New Zealand produces more butter, butter output will increase until the cost of producing more butter just equals the world price so that there will be no profit on the "last" pound of butter produced. However, there will be profits on other units of butter.

not only the "true" cost of employing these workers which is the "normal" wages they would earn if employed elsewhere but also the excess wages they earn. Since prices do not reflect the true social cost of production, trade may make a country worse off not better off.

To see how socially undesirable trade might arise, let us look back to our example of trans-Tasman trade in wool and butter and simplify the example somewhat. Suppose that in New Zealand, workers in the wool industry had a very effective union so that wool workers earned twice as much as workers in the butter industry. Moreover, let us assume that both goods are produced with labour alone (sheep and cows magically appearing in the country-side whenever needed). Finally assume that it takes half an hour to produce a pound of wool and one hour to produce a pound of butter.

Since labour costs twice as much in the wool industry and it takes half the time to produce a unit of output, a pound of wool costs as much as a pound of butter. However, if we were to transfer an hour of worker-time from the wool industry to the butter industry, it would produce only an additional pound of butter at the cost of two pounds of wool. The "true" cost (adjusted for worker rents) of butter is twice that of wool. In the example above, the "world" price of butter was somewhere between the pound of wool which prevailed in New Zealand and the two pounds of wool which prevailed in Australia in the absence of trade. When New Zealand sells butter to Australia, it sells it below its true cost. As a consequence, when a worker is shifted from producing wool to producing butter, the butter he produces buys less wool than he would have produced had he remained in the wool industry, and the average New Zealander is made worse off.

The reason is that the price in the market includes the rents received by wool workers. When trade causes a worker to be shifted from the wool industry to the butter industry, the worker loses the higher wage, but society does not gain all of the savings in worker wages.

It is too simplistic to jump from this example to the conclusion that trade is undesirable. There are a number of factors which must be considered. The first is that even in the simple example above, there is a trade-off between efficiency and equity. Opening up the economy to trade in effect reduces the price level by giving New Zealand consumers access to low-cost Australian wool. The relatively low-wage workers in the butter industry benefit from the lower cost of wool as do those workers who are sufficiently fortunate to keep their jobs in the wool industry. However, those workers who are displaced from the wool industry are very badly hurt. The monetized cost to the displaced workers exceeds the benefits to the other workers. However, on equity grounds we may weight the gains to the low-wage workers more heavily.

Even if we limit ourselves to efficiency considerations, there are some critical issues which have to be addressed. The first is that I have implicitly assumed that wage rates are not responsive to trade or at least not sufficiently responsive that New Zealand becomes a wool exporter. One effect of trade which some observers regard as beneficial is its impact on unions. Opening the economy to trade may reduce the power of the wool union to maintain artificially high wages. In the United States there is mixed evidence about the effect of increasing trade on unionization (Abowd, 1987; Kahn, 1986). To the extent that trade diminishes the union/nonunion wage differential in the above example, it may be desirable. More generally, the responsiveness of wages to trade has been insufficiently addressed in the literature regarding the responsiveness of wages to trade.

A further point which has been insufficiently stressed in the literature is that the appropriate policies in the above example and related cases are not trade policies but labour market policies. Trade is problematic because labour is misallocated between sectors. If policies were implemented which ensured the proper allocation of labour, trade would be desirable. Ignoring the costs associated with taxation and the possible effect on the union/nonunion wage differential, one such policy would be to subsidize employment in the wool industry since its private cost exceeds its social cost. Alternatively, legislation could be introduced to reduce the power of the wool workers union.

Finally, if labour market policies are not feasible, the best trade policy is **not** to prevent trade but to promote the export of wool, the high-wage good. Since the world price exceeds the true cost of wool to New Zealand, the country will be made better off by subsidizing its export. Moreover, this has the further desirable attribute that it is immune to retaliation in kind by Australia. If Australia responds by subsidizing its wool exports, the price to New Zealanders is lowered, and they are made better off than they would be with free trade. Of course, if instead Australia responds by placing a tariff on New Zealand wool, the combined policies will succeed only in transferring money from New Zealand taxpayers to the Australian treasury. In this case, tariff protection may be a third-best policy.

In discussing policies aimed at labour market imperfections, I have abstracted from consideration of the product market. As mentioned in the introduction, a number of authors have argued for trade intervention designed to protect and promote monopoly rents in the product market. Since product market rents can represent only a small fraction of national income (capital's share of national income is typically around 30% and much of that must be a "normal" return on capital), as a general policy this is unlikely to be desirable. There may be some industries which should be supported on the grounds that there are substantial product market rents to be captured. However, since the potential gains are small while the potential losses from the misallocation of resources are large, there appears to be a compelling political economy argument that the probability that political pressures will lead to support for the wrong industries should preclude deviations from free trade based on product market considerations.[4]

This argument raises a natural concern that intervening in order to pursue labour market rents will lead to undesirable product market

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4. I take no strong position on the importance of technological externalities.

consequences. In particular, even if wages do not respond to protection, prices may, thereby eliminating the labour market benefits while costing consumers a great deal. This concern provides an additional reason for favouring targeted subsidies over tariff protection. Subsidies do not protect the domestic industry from international competition and hence will not tend to generate monopoly power in the domestic market. Indeed there is no reason that more than one domestic producer cannot be subsidized.

To summarize the argument so far, we have seen that if similar workers are paid different wages for equally skilled and arduous work, trade which displaces workers from high-wage industries may be undesirable. Equivalently, trade which increases employment in high-wage industries is even more desirable than in the standard analysis. For this argument to be empirically relevant, there must be significantly different wages for similar workers in different industries and these wages must not be too responsive to trade policies. In order to cast light on these questions, I turn first to a discussion of the basic theory and then to a review of the existing literature.

2.2 Theories of Interindustry Wage Differentials.

In the previous sub-section, it was assumed that the interindustry wage differential arose because of the presence of a strong union in the wool industry. In fact, large interindustry wage differentials are observed in countries like Chile, the Soviet Union and the United States where unions are weak to nonexistent (Lang, Marquez and Romaguera, 1987; Krueger and Summers, 1987). As a consequence, a number of models have been developed which explain how such differentials may arise in a competitive market. Such models generally fall under the rubric of "efficiency wage models.

A fundamental assumption of the standard competitive model is that firms would always like to lower wages. As a consequence, they pay the lowest possible wage consistent with being able to hire workers. However, the last decade has seen the development of a large number of models which do not have this property. In such "efficiency wage"

models, raising wages over some range can increase profits.[5] As a consequence, there is an optimal wage for firms to pay. Lowering the wage below this level lowers profits. Even if there is an excess supply of labour at this wage, firms will nevertheless refrain from reducing wages.

In the basic efficiency wage model, output depends not only on the usual inputs (capital, labour, etc.), but also on the wage. In particular, the productivity of labour is a positive function of the wage rate. Under this assumption, it is possible to draw a "pseudo-demand" function for labour as a function of the wage rate. I refer to it as a pseudo-demand function because a true demand function shows how much labour is demanded at each market-determined wage rate. However, in an efficiency wage framework, the firm is an active wage-setter and does not take the wage rate as given.

The pseudo-demand curve is backward-bending. Up to some critical value labour demand **increases** as wages increase. The reason is that labour productivity rises faster than the wage. The efficiency wage will lie on the downward sloping part of the demand curve. If supply and demand intersect below this wage, the firm will nevertheless choose to pay the efficiency wage. Supply will exceed demand, but firms will not be willing to lower the wage because the productivity losses would exceed the wage savings. If the supply and demand curves intersect above the efficiency wage, the usual competitive analysis applies. Wages are driven to the level which just clears the market.

While efficiency wage models were originally developed to explain unemployment, they may, in fact, provide a better explanation for interindustry wage differentials. The effect of wages on productivity may vary across industries. As a consequence, the efficiency wage will vary, and some industries will pay higher wages than others.

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5. For a more complete review of the efficiency wage literature see the exchange between Carmichael (1989) and Lang and Kahn (1989).

There are five principal explanations for a positive relation between productivity and wages:

(i) High wages deter workers from shirking, stealing or cheating by making it costly for them to be fired.

(ii) High wages deter resignations.

(iii) High wages make it cheaper to recruit workers.

(iv) High wages attract high quality workers even when it is not easy to determine which workers are high quality.

(v) High wages increase output by increasing morale.

I review these models briefly.

The shirking model (Shapiro and Stiglitz, 1984; Bulow and Summers, 1986; Manove, 1989) has received the most attention but is theoretically and empirically the most deficient. In essence, the reasoning behind the model is the following. In the standard competitive model wages adjust to clear the market, and all equivalent workers earn the same wage for equivalent work. Consequently, a worker who is fired immediately obtains a new job at the same wage. Since there is no cost to being fired, workers can shirk without fear of reprisal. As a consequence, firms will find that they can increase output by raising the wage relative to other firms. Of course, all firms will raise their wages, but as they do, the demand for labour falls and unemployment ensues. Workers who are fired will experience unemployment. In equilibrium, the threat of unemployment acts as a "worker-discipline device."

The primary theoretical objection to the shirking model is that it implies that workers should buy their jobs (Carmichael 1985, 1989). Since more workers want jobs than actually have them and since workers cannot bid down wages on the job, they should offer to purchase the job. In effect, workers should post a bond which is returned to them in the form of

higher wages as in Lazear (1979, 1981). There is nothing in the model which precludes the sale of jobs. Yet instances in which individuals purchase their jobs or post bonds are relatively rare.

There are three reasons that we might not observe workers posting bonds. First, worker shirking may not be a problem. This argument can be dismissed fairly easily in the light of evidence to the contrary (Burroway, 1977; Mars, 1982; Dickens, Katz, Lang and Summers, 1989). The second is that although shirking is a problem, efficiency wages may not be a useful way to combat it. Either workers' reputations are significantly affected by being fired for cause or the incidence of shirking is not responsive to levels of remuneration. Finally, there may be factors outside of the model which preclude the payment of bonds. Dickens, Katz, Lang and Summers (1989) conclude that social norms preclude bonding. Lang and Kahn (1989) show how combining the hiring quality model and shirking efficiency wage models posts limits on bonds and predicts that firms will be unwilling to hire over-qualified as well as under-qualified workers. In sum, the absence of bonds casts doubt on but does not completely demonstrate the absence of efficiency wages generated by the desire to deter worker shirking.

The quit model (Salop, 1979; Beaudry, 1988) is essentially isomorphic to the shirking model. Instead of paying higher wages to deter shirking, firms pay higher wages to deter quits. As firms compete with each other to pay higher wages, unemployment ensues, and workers who quit are likely to spend some time unemployed. As in the case of the shirking model, the quit model implies that workers should purchase their jobs or post bonds. The absence of bonds is therefore somewhat problematic for this model.[6]

The recruiting models (Lang, 1990; Montgomery, 1990; Weitzman, 1989) generate efficiency wage payments by assuming that higher wages

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6. Beaudry's model avoids this problem by assuming that the quit rate is based on the present period wage.

reduce the vacancy rate. The recruiting model has a number of advantages. First, it is immune to the bonding critique since making workers buy their jobs would, in effect, reduce compensation on the job, and make it more difficult to fill the position. In addition, the Lang and Weitzman versions of the model are consistent with intra as well as interindustry wage differentials. Since there is substantial evidence not only of wage differentials among industries but also within industries (Groshen 1987, 1988; Leonard 1988), this is a significant strength. However, it remains to be determined whether recruiting considerations are sufficient to generate wage differentials of the magnitude that we observe. On the one hand, firms expend considerable resources testing and recruiting workers. On the other hand, vacancy durations are on the order of one month and vacancy rates are typically quite low.

The adverse selection model (Weiss, 1980) emphasizes the importance of not just filling positions but of filling them with high quality workers. It stresses the difficulty of screening workers on the basis of interviews or tests. Even after careful screening, the firm will be uncertain about the quality of a job applicant. If high quality workers tend to have better alternative opportunities, either because they can earn more in self-employment or because they are likely to get better wage offers from other employers, the quality of the workers who are actually hired by the firm will increase as the wage offered increases. Like the recruiting model, the adverse selection model is capable of explaining intra as well as interindustry wage differentials (Weiss, 1989). While the adverse selection model is important for drawing our attention to the role of "selection" and worker quality differences, it is hard to believe that unobserved worker quality varies that significantly in response to wage changes.

The final efficiency wage model is really a collection of models which are referred to as sociological (Solow, 1979; Akerlof, 1982, 1984). In essence these models emphasize the importance of norms and customs in regulating economic exchange. In its simplest version, this model suggests that higher wages increase worker morale and that morale raises output. In general, the higher the wage relative to some norm, the higher the level of output. If tradition, wages earned by other workers,

profitability, etc., affect wage norms, they will also affect the efficiency wage. In this way, the model is able to "explain" a number of institutional features of the labour market but at the cost of much predictive power. Without a model of how norms are generated, the model does not say a great deal more than that wages are high in some industries because they are high.

These efficiency wage models should not be viewed as being in competition with each other. The factors they underscore may all be operative. As Lang and Kahn (1989) point out, combining the shirking and adverse selection model suggests that firms will not want over-qualified workers because wages which are low relative to reservation wages will induce quits and shirking. On the other hand, workers willing to work at a low wage will tend to be under-qualified. The optimal solution may be a small bond. Similarly, it should be relatively easy to combine the recruiting and adverse selection models so that the quality of workers hired as well as the speed with which they are hired depends on the wage. The sociological model can be combined with any of the other models to explain the maintenance of pay relativities.

As we will see, the empirical evidence on interindustry wage differentials poses problems for most of the efficiency wage and competitive explanations. As a consequence, a number of authors have alluded to the potential importance of rent-sharing as an explanation for wage differentials. Unfortunately, aside from including the availability of rents as a determinant of wage norms, this area remains under-developed. There is little in the literature except a vague notion that in some way or other workers may be able to appropriate a share of the firm's profits or return on capital even in the absence of formal unionization.

The major exception is the union threat model (Dickens, 1986) in which firms pay high wages in order to deter entry by unions. In essence, union organizing is costly. Workers will only bear the cost of unionization if they can raise the wage sufficiently to recover the cost of organizing the union. By raising wages to a level somewhat below the level which

would be negotiated in a union setting, firms can prevent unionization by making the cost of union organizing outweigh the benefits. The high wages are profitable for the firm since they deter union entry and thus prevent even higher wages being extracted by the workers.

A related literature is the insider-outsider model developed by Lindbeck and Snower (1986). In this literature, workers are assumed to be able to set the wage level to the benefit of the existing work force. The types of factors which generate efficiency wages in the models above, increase the power of insiders in the insider-outsider models. The primary difficulty with this model is that it is not clear by what mechanism workers influence wages in the absence of formal unions.

In the New Zealand context, the presence of formal unions makes it natural to explain interindustry wage differentials by the relative power of unions.[7] There are two caveats which must be applied. The first is that modelling union wage determination is quite difficult. Wages are the outcome of negotiation between two or more parties. The result depends crucially on institutional factors and apparently minor differences in modelling strategy can sometimes produce quite different results. Even if we were willing to ignore bargaining and assume that the union sets the wage, it is not clear what the union's objectives should be.

The second caveat is that we observe quite similar interindustry wage differentials in countries with very different levels of unionization and apparent union power (Krueger and Summers, 1987). Consequently, it seems likely that some of the same factors which determine wages in the absence of unions affect wages in their presence. Either informal mechanisms allow workers in nonunion settings to raise their wages in a

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7. As discussed below, unions in New Zealand are primarily organized along craft not industry lines. Awards and agreements frequently although not always apply to all workers in the craft regardless of industry. However, even when the wage crosses industry boundaries, second-tier bargaining may produce interindustry differentials.

manner analogous to wage-setting in the presence of unions, or efficiency-wage or other considerations greatly affect union power.

2.3 Should Trade Protection Affect Wages: Theory

As discussed above, a critical assumption underlying the argument that countries should promote exports from high-wage industries is that wages are not very responsive to such policies. In this section I consider the effect of a tariff (price increase) on wages using three canonical models - an efficiency wage model, a monopoly union model and a monopoly union model with efficiency wage attributes.Before doing so, it will be useful to review the effect of protection on wages when the labour market is competitive.

With no mobility costs, workers will move immediately to whichever firm offers them the highest wage. Each firm therefore faces an unlimited supply of labour at the going wage. There is no need to raise relative wages in order to attract workers. Similarly firms experiencing downturns would not lower wages, because all their employees would then quit. Consequently, we would not expect any relative wage adjustment whatsoever in a perfectly competitive labour market. Of course, the perfectly competitive labour market is an unrealistic simplification. In reality, there are likely to be some costs of moving between jobs. In this case, firms will be able to lower the wages they pay their employees somewhat without inducing them to quit. Similarly employers seeking to attract workers from other firms may have to raise wages. However, the extent of the adjustment is not likely to be large unless firms are in isolated labour markets (which by definition are not competitive).

Consider next the most common efficiency wage model in which the number of effective labour units each worker provides depends on the wage and output depends on the number of effective labour units. The majority of published efficiency wage models take this form. Firms are assumed to maximize profits which are given by

(1) $\text{profits} = q\, f(e(w)L) - wL$

where q is the price of output, e is the number of effective labour units each worker provides and f is the quantity of output which for simplicity is assumed to depend only on labour and not on capital. This last assumption could be relaxed with no effect on the conclusions.

The firm maximizes (1) with respect to both the amount of labour it employs and the wage level. Taking the first order conditions and rearranging terms gives the well known result (Solow, 1979) that the wage is set according to the relation

(2) $we'/e = 1$

so that the elasticity of effective units of labour with respect to the wage equals one.

The important point to note about this relation is that the wage is independent of price. Tariff protection or export subsidies will not raise the wage.

The significance of this result should not be exaggerated. It depends on, among other factors, the assumption that the number of effective labour units depends only on the wage. If for example, we allow the number of effective units to depend on the size of the high-wage sector because the probability of getting another high-wage job rises as the size of the sector increases as in Bulow and Summers (1986), the increased employment resulting from the tariff may result in a higher wage. Nevertheless, the critical point that the trade policy will increase employment remains unaltered. The result may also differ if there are

labour costs which are independent of the wage or if the probability that the worker provides an effective unit of labour depends on the wage.

The efficiency wage models treat workers as price-takers in the labour market. In the New Zealand labour market, the majority of workers are covered by collective bargaining agreements. I therefore consider the wage responsiveness of a monopoly union. There is much debate in the labour economics literature as to whether collective bargaining agreements should be modelled as determining the wage rate and leaving the employment decision to the firm or as determining both wages and employment. New Zealand industrial relations law appears to have precluded bargaining over employment at least until passage of the 1987 law. Although it is possible that there is implicit or explicit bargaining over employment, for reasons discussed below this appears to be unlikely. Consequently, I consider the wage which a union would desire if it were able to choose the wage subject to the understanding that the firm would then choose employment. Of course, in practice the actual wage will be a compromise between the objectives of the union and firm.

There is much debate over what union objectives are or even over whether unions as political institutions can be treated as having an objective function. I sidestep this issue by specifying a broad objective function which depends on the wage level and employment. The value of employment to the union may depend on its membership, a point stressed in models of hysteresis (Blanchard and Summers, 1986). The union will place more value on the employment of its members than on the employment of its members friends and relatives and even less on the employment of other workers.

Formally, the monopoly union maximizes an objective function subject to the constraint that the firm chooses employment so that the value of marginal product just equals the wage:

$$\text{(3)} \qquad \text{Max } u(w,L,N) + \lambda[qf_L(w,L) - w]$$

where N denotes membership or previous employment. It should be noted that equation (3) allows the productivity of workers to depend on the wage so that it can include efficiency wage considerations.

Maximizing with respect to w, L and λ and rearranging terms gives the first order conditions

(4) $$u_w = u_L(qf_{Lw}-1)/(qf_{LL})$$

(5) $$w = qf_L.$$

Conditions (4) and (5) give us relatively little insight into the impact of a price increase on wages. An indication of the range of possible responses can be obtained by considering a couple of special cases. Suppose first that the union seeks to maximize the wage bill. In addition, assume that there are no efficiency wage considerations. Then (4) reduces to

(6) $$L = -f_L/f_{LL}$$

or, in other words, employment is independent of the price of output. All the benefits of the price increase are captured in the form of higher wages.

At the other extreme, suppose that the union maximizes the wage bill but that efficiency wages take the form given in equation (1). Then (4) and (5) are solved by setting the wage equal to the efficiency wage which would be chosen by the firm. The union has no effect on the wage. The wage is independent of price.

Grossman (1984) shows that taking into account the endogeneity of union membership can also produce perverse results. He considers the case of a monopoly union with no efficiency wage considerations and where the wage is set by the median vote who seeks to maximize his

expected utility. Under a seniority-based layoff rule, he shows that wages may either rise or fall in response to a price decrease. Holding the median worker fixed, the union would lower the wage, but the decline in employment shifts the decision-making authority to a more senior worker who desires a higher wage. Which effect dominates is indeterminate. Grossman also shows that the seniority-based layoff rule is not a prerequisite for wage-rigidity in such a model.

The analysis in this section serves primarily to demonstrate two points. First even in the presence of unions, efficiency wage considerations may make it desirable to raise the price of output in high-wage sectors. Secondly, the desirability of such policies depends not only on whether or not efficiency wage theory is correct but also on which model of wage-setting is correct.

2.4 Interindustry Wage Differentials: The Evidence.

It is well-established that interindustry wage differentials are large and pervasive. For the United States, Katz and Summers (1989b) report a standard deviation of industry wage differentials of 9% for secretaries after controlling for a large number of personal characteristics such as education and experience. Roughly speaking this means that a randomly chosen secretary would earn about 20% more in an industry at the 67 percentile in terms of wages than in one at the 33 percentile. The difference for janitors was even larger, implying a difference of about 35%.

Large differences are by no means limited to the United States. Lang, Marquez and Romaguera (1988) find standard deviations of wage differentials on the order of 11% to 14% for Chile and Venezuela after controlling for a large number of personal characteristics. For fourteen countries, Krueger and Summers (1987) report standard deviations of

log manufacturing wages ranging from .08 for Sweden to .31 for Korea.[8]

As should by now be clear, there are a large variety of potential explanations for interindustry wage differentials. All the explanations discussed so far are equilibrium explanations, that is they explain differentials as long-term. An alternative explanation is that they are merely temporary disequilibrium phenomena. As different industries expand and decline they raise or lower wages according to their need for workers.

This explanation can readily be discarded. Industry wage differentials are highly persistent. Murphy and Topel (1987) report a correlation of .82 between industry wage differentials in 1971 and 1982. Krueger and Summers report a correlation of .6 for nine U.S. industries between 1900 and 1984 and of .56 for twenty-three industries between 1923 and 1984. Helwege (1987) finds a high correlation between 1940 and 1970 even after controlling for personal characteristics. Nor is persistence limited to the United States. Lang, Marquez and Romaguera report correlations of .84 for Chile between 1957 and 1979 and for Venezuela between 1961 and 1986. In the latter case, this covers almost the entire industrial period.

A second competitive explanation for interindustry wage differentials, that workers in high-wage industries earn compensating differentials for undesirable working conditions, is also inconsistent with the data. Krueger and Summers (1987, 1988) report that including fringe benefits and working conditions raises rather than lowers the extent of the wage differentials. Katz and Summers (1989b) find that industries which pay high wages to workers in one occupation tend to pay high wages to workers in all occupations. They find correlations ranging from .49 for

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8. Roughly speaking the proportional wage difference between being in a 67 percentile and 33 percentile industry is about twice the standard deviation of the log wage or roughly 100 times that in percent. These figures do not correct for personal characteristics.

managers and caretakers to .85 for labourers and caretakers. There is no obvious reason why firms having to pay high compensating differentials to janitors would also have to pay them to managers.

The final competitive explanation for interindustry wage differentials is that they represent differences in unmeasured ability or skill mix. The persistence of large differentials even within very narrowly defined unskilled occupations casts doubt on this explanation. Furthermore the correlations between the interindustry wage differentials of managers and janitors casts doubt on this explanation. It is doubtful that the complementarity between janitors and labourers is sufficient to cause such a high correlation in the skill requirement.

It is tempting at this point to conclude that since wages do not appear to be determined by the standard competitive model that they must be determined by efficiency wage considerations. As a matter of logic, if firms are not paying the lowest possible wages, then either wages must not be determined by profit maximizing firms or it must not be profitable to lower wages. In the United States, there are no obvious government regulations that would cause the interindustry wage differentials, unions are weak, and wage differentials are similar among union and nonunion workers. Moreover wage differentials are quite similar in very different countries (Krueger and Summers, 1987; Lang, Marquez and Romaguera, 1988). The similarity of wage differentials among countries casts doubt on institutionally based explanations.

Nevertheless, some of the empirical findings reported above are problematic for efficiency wage explanations of the wage structure. In particular, there is no obvious reason why the efficiency wage payments made to different types of workers should be related. If it is necessary to pay high wages to managers in order to deter shirking or decrease recruiting costs, why should it also be necessary to pay high wages to janitors.

The only efficiency wage model which is immune to this criticism is the sociological model. If workers' conceptions of justice depend on what other workers earn or on the "profitability" of the company, their wages

will be interrelated. For this reason I conclude that either wage differentials reflect the shared ability of workers to appropriate quasi-rents and rents or the need to pay high wages to some workers for competitive or efficiency wage reasons combined with normative considerations which raise wages in other occupations as well.

The major difficulty with this conclusion is that in nonunion settings, we lack an adequate explanation of how workers appropriate rents or quasi-rents, and the sociological story does little more than to assume the answer.

2.5 Concluding Remarks

While I have concentrated on interindustry wage differentials, the argument developed above can be applied to moving workers from unemployment to employment. Home production or unemployment can just be treated as a particularly low-wage industry. Nevertheless, it may be clearer how incentives can be used to shift resources among industries than to reduce unemployment. Consequently, I concentrate on interindustry differentials.

Since workers' wages vary persistently across industries, there is at least a plausible case that shifting employment to high-wage industries will increase some measures of social well-being. It should be noted that the conditions for such a shift to be desirable are somewhat restrictive.

First, the argument in the preceding sections breaks down if employment is not "on the demand curve" so that the wage and value of marginal product are not equal. If firms do not choose employment to equate wage and the value of marginal product, wage dispersion does not necessarily imply productivity dispersion.

Second, subsidizing employment in high-wage industries requires raising tax revenues which is itself costly. Any practical application of the theory requires weighing the gains and losses.

Third, the tax costs become particularly important to consider if there are large wage responses to subsidizing the high-wage industries since this will imply that a large subsidy is required to effect a relatively small change in employment. In particular, in the New Zealand context there will be concern that tariff protection will create domestic monopolies and increase wages and prices rather than employment. It should be noted that the potential for creating domestic monopolies suggests that tariff protection is inferior to employment or export subsidies.[9] However, employment or export subsidies may be viewed as partially the "property" of the workers, and hence may also tend to raise wages and have a limited impact on employment.

Unfortunately we have relatively little information with which to answer these questions. There is a growing literature in the United States on the efficiency of wage bargains between firms and unions. If bargains are efficient, employment is not determined by equating the wage and the value of marginal product but by equating the shadow value of time and the value of marginal product. To test this Brown and Ashenfelter (1986) ask whether employment is independent of the alternative wage. However, in a model with efficiency wage considerations, the alternative wage will affect employment even if employment is determined by the firm's labour demand curve. The reason is that the alternative wage affects worker productivity. Nevertheless, they find little evidence of the expected effect of the alternative wage on employment. On the other hand, Abowd (1989) finds that he cannot reject that the value of the firm falls one for one with wage payments as it would if bargains were efficient and there were no efficiency wage considerations. However, his estimates are insufficiently precise to allow him to reject fairly large effects as well.

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9. As discussed above, the inferiority of tariffs also follows from the fact that the relative price of high-wage goods is "too high." Tariff protection increases this distortion while subsidies reduce it.

We also know quite little about the effect of demand or price increases on wages. There is a moderate-sized literature on labour demand which is reviewed in Hamermesh (1986). However, either the quantity of labour or the wage must be treated as exogenous in such studies. Since we are concerned with the effect of demand changes on both wages and quantity, such studies are not particularly useful. There is also a small literature (reviewed in Dickens, 1988) which looks at the effect of international trade on employment. Much of this literature treats wages as constant. The general conclusion is that the employment impact of international trade and changes in protection is small even in the absence of wage adjustments.

Deardorff, Stern and Baum (1977) using a computable general equilibrium model conclude that if all the industrialized countries reduced their tariffs by 50%, the effect on employment in individual New Zealand manufacturing industries would be negligible. With floating exchange rates, the largest effects would be a 1.6% increase in employment in textiles and a 1.7 decrease in employment in wearing apparel excluding footwear. These results cannot be applied directly to the New Zealand experiment with a unilateral reduction in tariffs. To the extent that countries tend to protect similar industries, this would tend to lead to an underestimate of the interindustry shifts. On the other hand, the model assumes that wages are perfectly rigid which would tend to lead to overestimates of industry shifts. Nevertheless, a fair summary of the literature based on simulations is that we are unlikely to uncover large employment effects.

Grossman (1986) examines the impact of trade on employment on the U.S. steel industry. He finds that although the appreciation of the U.S. dollar substantially reduced employment in the U.S. steel industry during the 1979-1983 period, the effect of the Tokyo round tariff reductions were quite small. Unfortunately, he did not seek to determine whether this was because the product demand effects were small or because wages fell although the evolution of wages in the steel industry during this period makes the latter unlikely. In a related paper, Grossman (1987) found that for nine U.S. industries, import

competition had little effect on wages while the effect on employment varied among the industries.

The work of Freeman and Katz (1990) looks most directly at the experience of the United States using an approach similar to that used later in this paper. They find evidence that demand increases had a small but clear effect on wages and that this effect was greater in the long run than in the short run, a fact which they note is inconsistent with competitive wage theory. In addition, they find that wages are more responsive in highly unionized industries, a fact which is consistent with our argument that we would expect relatively little wage adjustment in a standard competitive market.

Revenga (1989) uses a time-series cross-section of U.S. industries to assess the impact of trade on wages and employment. She finds that in nonunion sectors employment was responsive to trade competition but wages were not. The opposite was true in the union sector.

3. STRUCTURE OF THE NEW ZEALAND LABOUR MARKET AND TRADE POLICY

One of the advantages of using New Zealand to study the effects of trade policy on the labour market is that it has seen substantial recent changes in trade policy. Yet it is important to note that these changes did not occur in isolation. New Zealand entered the post-war period as a highly prosperous agriculture-based economy. As discussed below, particularly, after around 1960, it followed a policy of development through import substitution which in many ways appeared to be successful and which was associated with substantial industrialization of the economy. Both international trade and the internal market were highly regulated with considerable price and non-price regulation. By the 1980s GNP and productivity growth were slow, and New Zealand had slipped substantially in the world "income" rankings. The Labour government, elected in 1984, decided to take action to radically transform the regulation of the economy. To oversimplify somewhat, the government was guided by a strong commitment to free market economics. It deregulated product markets, liberalized trade, privatized government-owned industries, reduced the public sector deficit and took some small steps towards labour market reform. This section does not attempt a thorough review of the economic situation and the reforms which were undertaken, but instead concentrates on two key aspects which are important for the present project. The first is the industrial relations system; the second is the evolution of trade policy.

3.1: The Industrial Relations System.[10]

The level of unionization in New Zealand is relatively high. In 1986, the labour force consisted of about 1.6 million individuals, including about

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10. This section draws heavily on the *New Zealand Official Handbook 1987-88*, Geare (1989) and Easton (1987).

1.2 million wage and salary workers of whom about 63% belong to unions. In manufacturing, the subject of the empirical work in this paper, the level of unionization appears to be substantially higher. Unions are organized along craft lines, most of which have fewer than 1000 members. However, the great majority of unionized workers in the private sector (about 70%) belong to twenty-nine unions with more than five thousand members each. Recent legislation requires that registered unions must have at least 1000 members after an interim period. At the same time that there has been a move to larger unions, there has also been an effort to shift organization from craft to industry lines.

The structure is somewhat haphazard since until recently the first union to organize a group of workers and register as their representative maintained exclusive bargaining rights in perpetuity. Registration could extend the union's coverage to all workers in the category of workers they had organized by a majority vote of the workers. Recent legislation allows workers to challenge their coverage by a given union and makes universal coverage a topic subject to bargaining between the union and firms. The result is that while most unions are organized along craft lines, some of the largest unions (seven of the fourteen largest) are essentially industrial unions. There is a central organization, the New Zealand Council of Trade Unions, which is a confederation including the majority of trade union members but which appears to have little power.

In New Zealand there is a distinction between "awards" and "agreements." Awards refer to settlements reached through conciliation or arbitration. Agreements are settlements reached through negotiation. These settlements are registered and legally enforceable. An award applies to all workers and employers in the industry/occupation group. This includes any employers not actively involved in the negotiation and any which enter the industry after the award takes effect. Thus collective bargaining coverage is 100 percent in any industry/occupation group which has been organized.

Wages are determined in annual "wage rounds" with key settlements being reached early and establishing a pattern which is followed closely

in other settlements. While departures from the settlement pattern are small in any given year, there is disagreement about whether deviations cumulate sufficiently to allow significant changes in the wage structure over a longer period.

Some flexibility is built in to the system by the use of "second-tier" settlements. Prior to 1987, workers could be subject to both an award and an agreement so that workers in relatively strong positions could negotiate more favourable settlements. Under 1987 legislation, workers must be covered by a single award or agreement. Unions must state in advance which employers are to be excluded from the award. In effect, unions must anticipate where they will have greater bargaining strength which will presumably reduce their use of firm or establishment-based agreements. Second-tier agreements will not be legally enforceable.

In practice this is unlikely to have much effect. Under the old system, only 17% of workers were covered by second-tier agreements registered with the Arbitration Court and of these almost 40% were meat workers. It is difficult to assess the extent of unregistered second-tier agreements, but it appears that while most such agreements are not registered most workers who are covered by second-tier agreements are covered by registered second-tier agreements (Harbridge, 1986). Similarly, while over half of workers are paid above award rates, the deviations are generally not large and less than 10% of firms paid above-award rates because of a union claim (New Zealand Employers Federation, 1986 cited in Easton, 1987).

The universal coverage ensured by industrial relations legislation means that firms do not face a competitive disadvantage from domestic producers as the result of failing to resist union demands. At the same time, since the domestic market has been heavily protected from foreign competition, cheap overseas labour also fails to put much pressure on firms to keep wages low.

Despite these factors which would tend to give unions considerable strength, there is reason to doubt that unions were all that powerful. Under legislation prior to 1987, either party had the right to invoke

arbitration. Given that wage settlements tended to follow closely the pattern of earlier settlements in the wage round, both parties should have had a fairly clear understanding of the outcome of going to arbitration. Under such circumstances, whether or not the parties actually go to arbitration, the settlement is determined by either the outcome of arbitration itself or the expectation of that outcome. Accounts of arbitration decisions suggest that they were heavily determined by precedent and only slightly influenced by "economic" considerations. The 1987 legislation requires both parties to agree to go to arbitration before the dispute is referred to the Arbitration Court and should therefore invoke more true bargaining.

The strength of unions was further limited by narrow limits on the issues which were legally subject to bargaining. The courts used a strict interpretation of "industrial matter" so that little beyond wages was subject to the dispute resolution procedures established by law. Such issues as staffing, the introduction of new technology and the provision of pensions were not industrial matters and hence were excluded from bargaining. Under the 1987 legislation there are no such restrictions on the topics which may be used to invoke the settlement machinery.

Union strength was further limited by prohibitions on strikes. While the legislation was somewhat unclear, it appears that, in effect, all strikes could be construed as illegal. The 1987 legislation explicitly legalized a limited range of strikes, essentially those related to negotiations over new contracts. Despite these limitations, New Zealand does not appear to be particularly strike free. In the second half of the 1970s, the level of working days lost per employee was comparable to that in the United States. In the 1980s, as strike levels fell in much of the OECD, New Zealand came to look relatively strike-prone. Indeed in 1985, it was the most strike prone of any OECD country.

The high level of strike activity in 1985 may reflect another limit on union power, the wage freeze of 1982-1984. Strikes in 1985 may have occurred because of the need for more dramatic changes in relative and real wage levels after the end of the freeze.

In sum, it is clear that wages in New Zealand should not be modelled as being determined wholly by a competitive labour market. It is less clear to what extent wages were determined by negotiation or by arbitration and what changes have occurred as a result of the new industrial relations legislation. Nevertheless, the level of strike activity suggests that the parties believed they were involved in genuine negotiation. Under these circumstances the universal coverage aspects of the industrial relations system would tend to make New Zealand unions quite powerful.

Two other aspects of the New Zealand labour market, the minimum wage and social welfare benefits are worthy of brief discussion. In the early 1980s, the minimum wage did not keep up with nominal wage growth and had fallen to about 30% of the average wage. At regular intervals, the Labour government raised the minimum wage so that by 1988 it was about half the average wage. While still sufficiently low to have no impact on most workers, the increase in the minimum wage might have caused some compression of industry wage differentials.

For many workers, the minimum wage is irrelevant because it is only slightly above or is even less than the unemployment benefit. The unemployment benefit is not conditioned on employment experience, but instead, after a brief waiting period is paid on the basis of family size to all those who are available for work. The unemployment benefit can be quite high for a worker with several dependents. Further until reaching retirement age, an individual can receive the unemployment benefit indefinitely.

3.2 Trade Liberalization.[11]

By the 1960s New Zealand was following a clear policy of growth through import substitution. Despite some efforts at promoting exports through export subsidies, the principal element of trade policy was

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11. This section draws heavily on Wooding (1987) as well as conversations with a number of individuals.

clearly the protection of domestic industry through a system of import licensing initiated in 1938 and modified in a variety of ways in the intervening years. The precise functioning of the system varied over the years, but it appears that at least by the 1970s, import restrictions were invoked almost automatically in response to the lobbying efforts of anyone interested in manufacturing a product in New Zeal
and. Producers received licenses to import inputs not produced in New Zealand. In some cases, producers were given the license to import limited quantities of the good produced by their overseas competitors.

While steps at trade liberalization began in the late 1970s and early 1980s, major changes were introduced with the signing in 1983 of the Australia New Zealand Closer Economic Relations Trade Agreement (ANZCERTA) and with the election of the Labour government in 1984. ANZCERTA called for the elimination of export incentives by 1987, tariffs by 1990 and import licensing by 1995. The Labour government accelerated the pace of change, Export incentives were to be eliminated over a six year period. mostly within the first three years. It vastly expanded a policy, introduced by the previous government, of offering increased import licenses for tender. Its approach was to expand the availability of import licenses until their value fell to zero and then exempt the commodity from import licensing so that by 1988 almost all import licenses had been abolished. The results of license tendering were used to calculate tariff equivalents. Tariffs were reduced towards a maximum of 25%.

Prior to trade liberalization, exporters were eligible for export subsidies. These appear to have been readily available and uniform across the manufacturing industries. Although, precise information on their value does not appear to be available, it appears to have been small relative to the value of trade barriers.

4. MEASURING THE EFFECT OF PROTECTION ON WAGES AND EMPLOYMENT

4.1 The Model.

While it seems self-evident that it is inappropriate to model wages and employment in the New Zealand labour market as being set by the competitive mechanism, a simple supply and demand model serves as a useful baseline for developing more realistic models. In the competitive model, wages in each industry are set by the supply of and demand for labour. The supply of labour in industry i in year t depends on the wage, factors which are specific to the industry, general labour market conditions and effects which are specific to the industry in that year. If there are mobility costs, the supply of labour will also depend on the previous period's employment level. Consequently, I write the inverse labour supply function as:

$$(7) \qquad \ln w_{it} = a + b\ln L_{it} + c \ln L_{it-1} + \alpha_i + \nu_t + u_{it}$$

where the terms α, ν and u represent unmeasured industry, year and industry/year effects (error terms).

Similarly, the demand for labour depends on the wage, product demand factors including protection and a set of unmeasured effects:

$$(8) \qquad \ln L_{it} = d + f\ln w_{it} + gP_{it} + \delta_i + \lambda_t + \varepsilon_{it}$$

The system of equations given by (7) and (8) cannot be estimated by ordinary least squares. The simultaneity of supply and demand ensures that the wage is correlated with the error terms and that lagged employment is correlated with α and δ. If protection levels did not depend on the wage, it would be possible to estimate the equations by two-stage least squares using present and past levels of protection as first-stage regressors. However, the negative correlation between wages

and protection suggests that in the long-run protection may be affected in part by the desire to help low-wage workers. Consequently, P is correlated with α and δ, and there are no legitimate instruments.

To solve this problem I first difference the equations to get

(9) $$\Delta \ln w_{itl} = b\, \Delta \ln L_{it} + c\, \Delta \ln L_{it-1} + \Delta \nu_t + \Delta u_{it}$$

and

(10) $$\Delta \ln L_{it} = f \Delta \ln w_{it} + g \Delta P_{it} + \Delta \lambda_t + \Delta \epsilon_{it}.$$

This eliminates the industry effects, α and δ, from the equations so that past and present levels of protection are uncorrelated with the error terms under the assumption that protection levels do not respond to transient changes in wages. This is a reasonable assumption for the period being studied since government does not appear to have modified its policies in response to sector-specific changes in employment or wages. Because of the simultaneity of the system, both w and lagged ln L are correlated with the error term. Employment lagged two periods is uncorrelated with the error term provided that the year and industry/year effects are not serially correlated. If these effects are somewhat serially correlated, the only legitimate instruments are the protection variables.

The validity of the use of changes in protection as instruments depends critically on these changes being uncorrelated with other industry specific changes taking place in the economy. Since the government was pursuing a number of liberalization policies simultaneously, there is some cause for concern that these might be correlated with the changes in protection. However, price controls and entry restrictions appear to have been mostly absent from manufacturing so that trade liberalization was by far the most important liberalization affecting that sector.

In principle, therefore, it is possible to estimate the competitive model by using two-stage least squares. However, identification of the system depends critically on the assumption that levels of protection have no

direct impact on the wage other than through their effect on labour demand. Yet, this proposition is one which I am unwilling to maintain. If the wage depends directly on levels of protection through some noncompetitive mechanism, the wage equation is unidentified. Similarly, demand is identified solely by the exclusion of lagged employment change from the equation. However, if there are costs of adjusting, labour demand may depend on past employment.

Consequently, I limit myself to estimating the quasi-reduced form of the system:

$$(11) \qquad \Delta \ln w_{it} = \beta_0 + \beta_1 \Delta \ln L_{it-1} + \beta_2 \Delta P_{it} + e_{it}$$

$$(12) \qquad \Delta \ln L_{it} = \lambda_0 + \lambda_1 \Delta \ln L_{it-1} + \lambda_2 \Delta P_{it} + v_{it}$$

where the error terms have at least an MA(1) correlation.

Estimation of the system of equations (11) and (12) cannot proceed by ordinary least squares for two reasons. First, since the error terms are serially correlated, the lagged change in employment will be correlated with the errors. This problem will be exacerbated in the employment change equation if there is any measurement error in the data. Secondly, in some cases I measure per worker protection. If there is any measurement error in the employment variable, protection per worker will also be measured with error and this measurement error will be correlated with the measurement error in the dependent variable in the employment equation. Since the employment variable is endogenous, there is also a risk that protection per worker will be correlated with the error term in the wage equation. I therefore used measures of protection per 1982 worker as first-stage regressors in the employment equation. Using protection per 1982 worker in the wage equation reduced the significance but did not change the magnitude of the estimates. Therefore I treated protection per worker as exogenous in the wage equation results reported here.

I altered equation (11) in one final way, by not imposing the constraint that the coefficient on the lagged wage equal 1. Instead of regressing the

change in the log wage on the set of regressors in equation (11), I regress the log wage on these regressors and the log wage lagged one period. This allows the estimates to capture the wage compression which appears to have taken place as a result of the 1982-84 wage controls.

Although I have used the competitive (supply and demand) framework to develop the equations used in the estimation, it is important to note that their interpretation need not be limited to this approach. The system of equations to be estimated could be derived from either an efficiency wage or a monopoly union framework.

Consider first the case of a monopoly union. As discussed above the union maximizes an objective function which depends on the wage, employment and lagged employment. Maximization proceeds subject to the constraint that the firm is on the labour demand curve. We can therefore continue to write the labour demand curve as before. The wage will depend on all the factors which influence labour demand and also on lagged employment. Consequently, the wage equation cannot be identified, but the reduced form can be written as in equations (11) and (12).

It is somewhat more difficult to establish the appropriate set of equations if the wage is determined by efficiency wage considerations. In models in which the wage influences the probability of a worker supplying an effective unit of labour, anything which affects price will affect the wage so that the wage and labour demand can be modelled as determined by the usual reduced form determinants of labour demand, in this case the measures of protection. It is less obvious why past employment should affect the wage and employment although it appears that this could be justified by reference to the costs and benefits of recruiting.

It is important to step back for a minute to think about what we are trying to achieve with the estimation of this system of equations. The objective is **not** to explain employment levels in different manufacturing industries or even to explain changes in these levels. Instead, the goal is

to achieve efficient and consistent estimates of the impact of protection on wages and employment. In order to achieve consistency it is sufficient to choose a set of instruments which are orthogonal to the error term. In practice, then we must ask are the instruments (the changes and lagged changes in protection) orthogonal to any left out variables. The fact that other variables may explain changes in relative employment levels does not affect the consistency of the estimates unless the left out variables are correlated with the changes in protection (the instruments).

The political economy of the trade liberalization process in New Zealand makes it unlikely that anything else except other liberalization measures was correlated with the protection changes, and fortunately, changes in other forms of government intervention in manufacturing appear to have been minor over this period. Of course, it is possible that including other variables which can explain movements in relative employment might increase the efficiency of the estimates, but in practice, it does not appear that the efficiency of the estimates is a matter of great concern in this case.

4.2 The Data.

In order to study the effect of trade protection on the labour market, we require accurate information on levels of effective protection. Since import licenses constituted an important element of the protective barriers in New Zealand, calculating rates of protection is particularly difficult. The situation is considerably eased by the fact that as part of the liberalization process, a fraction of the licenses in each industry were typically sold by auction which, in an efficient market, should provide an estimate of the value of licenses at the margin. In addition to assessing the value of licenses, difficulties arise because it is necessary to concord tariffs or licenses with industries. Frequently the products covered by a tariff or license cut across industrial classifications.

Fortunately, for the years 1981-1982, 1985-1986 and 1987-1988 estimates of effective rates of protection by New Zealand SIC code have been calculated as part of a study conducted by Syntec Economic Services for

the New Zealand government. The Syntec study appears to have been a careful analysis of the value of trade protection. It relied heavily on input from relevant individuals in government departments.

The Syntec data provide information for five-digit (NZSIC code) manufacturing industries. For each industry there is an estimate of the subsidy equivalent value of tariff protection and of license protection of outputs, and of the tax equivalent value of tariff and license protection of imported inputs as well as the value of any tariff concessions on imported inputs. The Syntec data also provide an estimate of the value-added produced by each industry and of the employment in each industry. The employment data appear to have been drawn from the Quarterly Employment Survey, but no precise explanation of the figures is provided. Although the protection data cover three different years, value added was calculated only for the 1981-82 year and only one employment figure is provided, presumably for February 1982.

From these data Syntec has calculated what it terms "effective rates of assistance". It appears, however, that they are limited to measures of the value of protection and do not include other forms of industry assistance such as export subsidies, entry barriers or price controls. In manufacturing these appear to have been of minor importance so that although the calculated effective rates of assistance are, in fact, effective rates of protection, they are not very different from the true effective rates of assistance.

A summary of this study is provided in Syntec (1988). The actual data used in this study were provided by the Treasury in electronic form. Unfortunately, data are limited to these three years and to the manufacturing sector.

The Syntec data were matched to data on employment from the Quarterly Employment Survey for February 1982, 1986 and 1988. The QES is a survey of employers and provides information on hourly and weekly straight-time and over-time wages and on full-time and part-time employment levels. While data are available for five-digit industries in the last two surveys used and in the Syntec data, they are available for

four-digit industries only in the February 1982 survey. Consequently, it was necessary to aggregate the remaining data up to the four-digit level. Data from the QES were aggregated using full-time employment estimates from the survey to "weight" the industries. The Syntec data were aggregated using the employment figures from that survey. This approach was used for consistency but should be of only minor significance since employment levels in all four surveys are highly correlated.

This process left us with data on seventy-four manufacturing industries. For each industry, we have estimates of net protection divided by value-added (the effective rate of protection), and assistance per worker. Assistance is divided into five categories: the subsidy equivalent of tariffs and licenses and the tax equivalent of input tariffs, licenses and concessionary imports. Assistance per worker is obtained by dividing the Syntec assistance estimates by the QES employment estimates. The measure of employment used is the number of full-time workers. Wages are average hourly straight-time wages.

Three industries require special consideration. Effective rates of assistance in the wine industry far exceed those in any other industry except motor vehicles. The reason is that value-added is estimated to be negative (and hence the rate of protection infinite) in automobile assembly plants and small in the wine industry. These industries are therefore dropped from discussion of effective rates of protection. Assistance per worker was generally much higher in transport equipment than in other industries and tended to have an excessive influence on regression results. It is therefore dropped from regression equations using estimates of assistance per worker.

5. RESULTS

5.1 Interindustry Wage Differentials in New Zealand

Table 1 summarizes information about the extent of interindustry wage differentials in New Zealand manufacturing. In all three years used in this study, there was significant variation in the wages paid in different manufacturing industries. The highest paying industry has an average wage which is more that twice that in the lowest paying industry. The coefficient of variation in all three years is .16, suggesting that the difference between an industry about one-third of the way from the top of the wage distribution and one about one-third of the way from the bottom is about 32%.

Despite the sweeping changes in the regulation of the New Zealand economy, these wage differentials appear to have been highly persistent. The correlation between average wages in 1982 and 1988 is .89, comparable to results reported for similar periods in the United States (Murphy and Topel, 1987) and Venezuela (Lang, Marquez and Romaguera, 1988).

While the period 1982 to 1988 did see some large changes in relative wages, there is evidence that many of the changes which occurred between 1982 and 1986 were at least partially reversed between 1986 and 1988. Such reversion may reflect a tendency forwage differentials to revert to their "normal" level or transitory measurement error in the data. Transitory changes may be particularly important during this period because of the wage freeze which was in effect from 1982 to 1984. Whatever the explanation, it is difficult to discern obvious patterns in the changes. Between 1982 and 1986 "containers and boxes of paper" saw a very large wage rise which was largely reversed between 1986 and 1988. At the same time that relative wages were declining in this industry, wages in "pulp, paper, and paper board" rose significantly. While some wage changes are transitory, there are some lasting

TABLE 1

INTERINDUSTRY WAGE DIFFERENTIALS IN NEW ZEALAND
(selected years)

	Mean Wage	Standard Deviation	Max	Min
1982	6.51	1.07	10.38	4.95
1986	9.05	1.44	13.02	6.61
1988	11.12	1.73	17.43	7.99

Correlation of Interindustry Wage Differentials
(selected years)

	1982	1986
1982	-	.93
1988	.89	.89

Note: All figures are weighted by employment in the year.
Correlations use employment weights from the earlier year in the comparison.
Based on 74 NZSIC four-digit industries.

changes in relative wages. Wages in "rubber products NEC" experienced a decline between 1982 and 1986 which was not noticeably reversed between 1986 and 1988.

5.2 Protection Patterns and Interindustry Wage Differentials

Table 2 summarizes estimates of levels of protection derived from the Syntec data. These estimates indicate that levels of protection were quite high with an employment-weighted average of 62% of value-added

TABLE 2

TRADE PROTECTION IN NEW ZEALAND
(means and standard deviations)

	1982	1986	1988
Effective rate of protection*	0.62 (0.64)	0.61 (0.89)	0.39 (0.44)
Subsidy Equivalent Per Worker (1982 $000)**			
Tariff	8.74 (7.31)	8.60 (7.73)	9.38 (8.30)
License	2.41 (3.79)	2.03 (7.63)	0.13 (0.36)
Tax Equivalent Per Worker, Materials Costs (1982 $000)**			
Tariff	3.52 (4.37)	3.42 (4.08)	3.89 (4.85)
License	0.25 (0.39)	0.16 (0.34)	0.04 (0.15)
Concessionary Imports	-0.73 (1.27)	-0.74 (1.39)	-1.12 (1.94)
Net Subsidy Equivalent Per Worker (1982 $000)**			
Net subsidy	8.11 (7.45)	7.79 (10.32)	6.35 (6.86)

*Excludes wine industries and motor vehicles.
**Excludes transport equipment.
All figures are weighted by employment.

in 1982, equivalent to a net subsidy of over $8,000 per worker in manufacturing. This level of protection had been reduced by over 20% by 1988. Import licensing was almost totally eliminated during this period. While tariff protection declined between 1982 and 1986, it rose between 1986 and 1988 as tariff protection was substituted for license protection. While the effective rate of protection figures suggest that almost all of the trade liberalisation occurred during the later period, the data on tax and subsidy equivalents indicate some reduction between 1982 and 1986.

As discussed above, depending on the source of interindustry wage differentials, it may be socially desirable to promote employment in high-wage industries. If other mechanisms are not available, it may be worth promoting employment by using policies aimed at promoting exports in high-wage industries or, possibly, limiting imports in these industries.

Table 3 shows that New Zealand followed exactly the opposite policy. Effective rates of protection and net subsidies per worker were directed towards low-wage industries. For each form of protection, table 3 shows the effect of a $1/hour increase in the average wage on the level of protection, the standard error of that estimated effect, and the squared correlation coefficient. In 1982, a $1/hour increase in the average hourly wage was associated with a $2,250 decrease in the net subsidy per worker. It is striking that the tax equivalent effect of protection of material inputs tended to hurt low-wage industries while protection in export markets tended to treat them more favourably. One suspects that the full impact of such import barriers was not fully recognized by those who initiated them.

As might be expected on the basis of the government's decision to liberalize trade, the relation between wages and subsidy equivalents fell significantly between 1982 and 1988. By 1988, a $1/hour increase in the average hourly wage was associated with only a $1280 decrease in the subsidy equivalent per worker. Equally important, the role of average wages in directly or indirectly influencing the level of protection also

TABLE 3

TRADE PROTECTION AND INTERINDUSTRY WAGE DIFFERENTIALS
(Regression coefficients [effect of average hourly wage on protection], standard error, squared correlation coefficient)

	1982	1986	1988
Effective rate of protection*	-0.27 (0.04) [0.38]	-0.35 (0.09) [0.21]	-0.23 (0.04) [0.27]
Subsidy Equivalent Per Worker ($000)**			
Tariff	-1.83 (0.56) [0.13]	-1.45 (0.80) [0.04]	-1.65 (1.00) [0.04]
License	-0.92 (0.29) [0.12]	-1.46 (0.78) [0.05]	-0.04 (0.04) [0.01]
Tax Equivalent Per Worker, Materials Costs ($000)**			
Tariff	-0.67 (0.35) [0.04]	-0.31 (0.43) [0.01]	-0.52 (0.59) [0.01]
License	-0.06 (0.03) [0.05]	-0.06 (0.03) [0.03]	-0.04 (0.02) [0.03]
Concessionary Imports	0.23 (0.10) [0.07]	0.22 (0.15) [0.03]	0.17 (0.19) [0.01]
Net Subsidy Equivalent Per Worker ($000)**			
Net subsidy	-2.25 (0.55) [0.19]	-2.78 (1.03) [0.09]	-1.28 (0.82) [0.02]

*Excludes wine industries and motor vehicles.
**Excludes transport equipment.
All figures are weighted by employment.

declined. In 1982, the average wage in the industry explained 19% of the variation in net subsidies per worker. By 1988, average hourly wages explained only 2% of this variation so that the policy of using trade protection to support low-wage industries had been virtually eliminated.

5.3 The Effect of Protection on Wages

As discussed above, a critical issue which must be addressed is the impact of trade protection on wages. If trade protection serves to raise wages rather than employment, then protection is unlikely to be desirable as a means of increasing national output. On the other hand, if workers are able to capture much of the subsidy, there may be some justification for supporting low-wage industries if other means for helping low-wage workers are not readily available.

To cast light on this issue, I examine the relation between wage changes and protection changes. As noted above, the simple relation between wages and protection is negative. This is unlikely to reflect a depressing effect of protection on wages, but rather a tendency for government to protect low-wage industries. In order to eliminate the effect of wages on protection, I consider the effect of changes in protection on wages. Provided that the policy changes were not greatly affected by wage changes in the industries studied (and accounts of the liberalization process suggest that they were not), this approach eliminates the problem of reverse causality.

Because overall nominal wage levels were rising in this period, we would expect the wage increase to depend on the level of wages at the beginning of the period, or equivalently that the level of wages realized at the end of the period would depend on the level at the beginning.

As discussed above previous changes in employment must be included in either a competitive model or in a "hysteresis" model of union objectives. In the competitive model, industries have to raise wages in order to attract additional labour in the short run. The position of the short-run labour supply curve depends on the level of employment in the previous period. When we first difference, we must include the

change in employment lagged on period as an explanatory variable. In the hysteresis model, the trade-off between employment and wages in the union objective function depends on the level of union membership. To the extent that this is proxied by employment, when employment is high, union members will want a lower wage to avoid the disemployment of members. Consequently, I include a control for the change in the logarithm of employment.

Table 4 gives the results of this estimation measuring protection both by the effective rate of protection and by the net subsidy equivalent per worker. Experimentation revealed that while we cannot reject the hypothesis that tariff and license "subsidies" and that import tariffs and licenses and concessionary imports for materials have similar effects, we can easily reject the hypothesis that protection of materials and protection of products have similar effects. I suspect that this reflects differences in the quality of the data but cannot rule out the possibility that barriers which raise the price of inputs have different effects from those which raise the price of output. As a consequence, I include a separate variable for the gross tax equivalent of restrictions on the import of inputs.

Table 4 shows that as predicted by almost all models with the exception of certain versions of the efficiency wage model, protection raises wages. Columns (1) and (3) differ from columns (2) and (4) only in that the latter constrain the coefficient on the lagged wage to equal 1.

Using the unconstrained estimates, we find that a $10,000 per year increase in the net subsidy per worker raises wages by about 1.6% per year or about $200 at sample mean wages for 1986 measured in 1982 dollars while a $10,000 increase in taxes on materials lowers wages by 15% or about $1890 per year, assuming that workers are employed for 2000 hours per year. Similarly, a 1 percentage point increase in the effective rate of protection, raises wages by about 3% or about $380 per year.

TABLE 4

EFFECT OF PROTECTION ON WAGES
(Dependent variable: Log[wage in 1988])

	(1)*	(2)*	(3)**	(4)**
Change net subsidy/ worker ($10000)	(0.008)	0.016 (0.009)	0.010	
Change gross materials tax/ worker	-0.134 (0.043)	-0.123 (0.045)		
Change effective rate of protection			0.030 (0.013)	0.003 (0.010)
1982-86 Change in log (employment)	-0.125 (0.043)	-0.180 (0.039)	-0.211 (0.047)	-0.185 (0.044)
log(Wage 1986)	0.676 (0.131)	1.	0.639 (0.098)	1.
R^2	0.437	0.399	0.632	0.203

Standard errors are in parentheses. Observations are weighted by employment in 1986.
*Excludes transport equipment. Two-stage least squares estimates. Exogenous variables are change in net subsidy per worker and gross tax on materials per worker and these variables lagged.
**Excludes motor vehicles and wine. Exogenous variables include those used in column (1) plus change in effective rate of protection 1986-88.

These three estimates are unfortunately quite different in their implications for the effect of protection on employment. The estimated impact of a $10,000 per worker net subsidy is relatively small and that using the effective rate of protection almost as small although without a measure of the effect of the subsidy on output, we cannot be sure whether the output effect on employment demand outweighs the employment loss from the wage increase. The estimated impact of protection of inputs on wages is quite large suggesting that unless there is a large output response to protection, protection is unlikely to increase employment very much if at all.

Using the constrained estimates, we tend to find a somewhat smaller impact of protection, particularly when protection is measured by the effective rate of protection. However, the data reject the constraint.

Finally, it is worth noting that, as expected, previous increases in employment levels are associated with smaller wage increases. The elasticity of the wage with respect to previous levels of employment appears to be around -.17.

5.4 The Effect of Protection on Employment

Since protection raises wages, it is possible that any beneficial effects of higher prices on employment are offset by wage increases. We have seen that this outcome is quite possible in an environment such as New Zealand's which has powerful unions. As in the case of the effect of protection on wages, the reduced form includes the lagged change in employment. Because lagged employment reduces the wage increase, it is expected to increase employment.

Table 5 gives estimates of the effect of protection on employment rates using both the effective rate of protection and assistance per worker to measure protection. The results suggest a small positive effect of protection on employment. As we would expect, the magnitude of the wage increase associated with protection is insufficient to eliminate its positive impact on employment. Nevertheless, the impact is relatively small. A product subsidy equivalent of $10,000 per worker generates

TABLE 5

THE EFFECT OF PROTECTION ON EMPLOYMENT
(Dependent variable: Change in log(employment) 1986-88)

	(1)*	(2)**
Net subsidy/ worker ($10000)	0.014	
	(0.036)	
Gross materials tax/ worker	-0.662	
	(0.359)	
Effective rate of protection		0.028
		(0.050)
1982-86 Change in log (employment)	-0.084	-0.131
	(0.214)	(0.252)
R^2	0.054	0.007

Standard errors are in parentheses. Observations are weighted by employment in 1986.
*Excludes transport equipment. Two-stage least squares estimates. Exogenous variables are net subsidy per 1982 worker and gross tax on materials per 1982 worker for 1982, 1986 and 1988.
**Excludes motor vehicles and wine. Exogenous variables include those used in column (1) plus change in effective rate of protection 1986-88.

about a 1.4% increase in employment. Equivalently, it takes about $700,000 of net subsidy equivalent to generate a single job. While this estimate is quite imprecise so that no great credence should be given to the exact dollar estimate, even if the estimate is off by a factor of ten, it suggests that trade protection has been a very expensive mechanism for generating employment in particular industries.

As with the effect of protection on wages, protection of material inputs appears to have a much greater impact on employment than does protection in the product market. A $10,000 per worker tax equivalent is estimated to lower employment by about half. Again, the estimated impact is measured very imprecisely. Indeed, we can reject the hypothesis of no impact at only the .1 significance level. Nevertheless, the results suggest that the tax on inputs which is implicit in their protection may have had a substantial impact on their level of production and consequently their use of labour.

It should be noted that while the effect of protection of inputs is significant at only the .1 level using two-tailed test and that the joint effect of subsidy and tax equivalents is significant at only the .16 level using a two-tailed test, this is not the appropriate test. The alternative hypothesis should not be that protection has an effect on employment but that it has the impact on employment that most economists would expect. The null hypothesis of no effect can be rejected against this alternative hypothesis at conventional levels.

It is worth noting that as in the case of the wage equation estimates, the impact of factor market protection is estimated to exceed that of product market protection by an order of magnitude. This is the opposite of what would be expected if the wage coefficient reflected "true" differences rather than some form of measurement problem. The greater responsiveness of wages to factor market protection would suggest a smaller employment increase. Instead, the coefficients suggest the opposite. This discrepancy suggests the need to treat the magnitudes of the coefficients with some caution. Nevertheless, there is nothing in the results which suggests that the impact of protection on employment is large.

The results using the effective rate of protection are similar. They suggest that protection has a small positive impact on employment. However a 1% effective rate of protection raises employment by only about one-quarter of one percent. The estimated impact falls far short of statistical significance at conventional levels.

Because the equation had low explanatory power, I experimented with including dummy variables for each two-digit industry to see if these variables would capture some effect which was being missed. The F-test for the hypothesis that the coefficients were all zero was below its expected value, and hence the hypothesis could not be rejected.

Finally, while we would expect past employment increases to be positively correlated with employment increases in the present period. We find no evidence of this relation. In both cases, the estimated relation between past and present employment increases falls well short of statistical significance.

In sum, we find only weak evidence of any impact of protection on employment. Our results suggest that, at best, the usefulness of protection for promoting employment in particular industries is small.

5.5 Caveats and Further Results: Measurement Error and Lags

As noted above, there is an inconsistency in the fact that factor market protection has a bigger impact on both wages and employment than does product market protection. If taxing inputs lowered wages by more than subsidizing output raised them, we would expect the positive employment effects of product market subsidies to be larger in magnitude than the negative employment effects of factor market taxes. In fact, in both sets of estimates, it appears that the impact of factor market protection exceeds that of product market protection by roughly an order of magnitude. This suggests that the measured changes in product market protection may be badly affected by measurement error. Since measurement error biases the coefficients towards zero, it is not surprising to find that protection has only small effects when the signal to noise ratio is small in the data.

Further evidence of the importance of measurement error comes from the correlations between changes in protection between 1982 and 1986 and changes between 1986 and 1988. If the estimated changes were pure measurement error, the correlation would be -.5. In the absence of

measurement error, the sign and magnitude of the correlation would depend on whether government first attacked one industry and then moved on to another, in which case the correlation would be negative, or if industries with considerable protection had their protection cut substantially in both periods. My reading of the process of liberalization suggests that the latter is more accurate than the former. In either case, it seems safe to argue that we would not expect the correlation to be strongly negative. In fact, the employment weighted correlations between 1982-86 changes and 1986-88 changes are -.80 for net subsidy equivalent per worker, -.90 for the effective rate of protection and -.29 for the gross materials tax equivalent per worker. It is striking that the measured effects of protection are much larger using the variables which has the least negative correlation and hence the least evidence of measurement error.

To try to eliminate the effect of measurement error, I examined a scatter plot of protection changes for 1982-86 versus 1986-88. In each case there were a small number of industries which were measured as having large increases in protection between 1982 and 1986 which were reversed in the second period. I experimented with dropping these industries from the analysis. Note that since the selection of the observations to be dropped is based strictly on the characteristics of exogenous variables, the revised estimates are consistent although they are less efficient than the estimates based on the full sample if there is no measurement error.

This process resulted in a substantial increase in the estimated effect on wages using the measures of protection per worker while the effect on employment was, if anything, reduced.[12] Moreover, there were very

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12. The effect of net subsidy per worker on wages increased by a factor of three, while the effect of gross materials tax per workers increased by about 50%. The change for the latter variable was trivial in the employment equation, while the estimated impact of the net subsidy per worker became negative.

substantial differences using the effective rate of protection. When carpets and rugs and footwear are dropped from the sample, the effect of the effective rate of protection on wages becomes large (see table 6). A one percent increase in the effective rate of protection raises wages by almost one-fifth. Since value-added is about one-third of price and since labour's share of value-added is typically about seventy percent, this means that wages eat up about 40% of the price increase. Under these circumstances, it is not surprising that the effect on employment remains small even with this correction for measurement error. This provides further evidence that protection in New Zealand serves primarily to raise wages rather than to increase employment.

A second concern with the results presented so far is that the estimates assume that all adjustment takes place within no more than two years. This assumption is necessary for identification unless we are willing to assume that lagged employment change is exogenous or unless we are willing to use the difference between the change in the per worker equivalents and the effective rate of protection. Treating lagged employment as exogenous in the wage equation has little effect (not shown) although it has a somewhat larger effect in the employment equation. To get some sense of the lag structure, I experimented with including lagged changes in protection per worker in the equations. Coefficients were poorly determined and never significant.

However, using the restricted sample designed to reduce measurement error, it was possible to get precise estimates of the lag structure for the effective rate of protection. As can be seen in table 4, including the lagged change in the effective rate of protection in the wage equation has almost no effect on the other coefficients. Moreover, the coefficient on the lag itself is small, statistically insignificant and fairly precisely estimates. We can reject the hypothesis that the lagged effect is large relative to the contemporaneous effect. On the other hand, if we were to take the results for the employment equation at face value, they would suggest that protection has perverse effects on employment in the long run. While this result is not entirely inconsistent with either theory of the results for the wage equation, it is probably more appropriate to

TABLE 6

EFFECT OF ERP USING RESTRICTED SAMPLE

	Wage		Employment	
	(1)	(2)	(3)	(4)
Change effective rate of protection 86-88	0.189 (0.064)	0.171 (0.061)	0.010 (0.207)	0.096 (0.212)
Change effective rate of protection 82-86	*	-0.020 (0.033)	*	-0.244 (0.149)
1982-86 Change in log (employment)	-0.169 (0.041)	-0.162 (0.036)	-0.417 (0.343)	-0.358 (0.341)
log(Wage 1986)	(0.108)	0.606 (0.114)	0.661	*
R^2	0.733	0.765	0.022	0.059

Standard errors are in parentheses. Observations are weighted by employment in 1986. Two-stage least squares estimates. For list of exogenous variables see tables 4 and 5.

view the results as indicating no lagged impact of protection changes on employment.

A final point which should be discussed is the dynamic structure implied by the equations. If we take the estimated dynamic structure of the model literally, employment is close to a random walk while there is strong mean reversion in the wage. Thus in the long run, whatever small effect changes in protection have on employment would persist while there would be no long-run effect on wages. However, it is equally plausible that the period 1986 to 1988 saw some wage compression under the policies of the Labour government. Alternatively, any

measurement error in the wage would bias the coefficient away from one towards zero. As noted above, if we impose that the coefficient on the lagged wage equals one, the effect of the protection variables tends to fall somewhat, but the substance of the results does not change.

6. SUMMARY AND CONCLUSION

While in standard economic models free trade is desirable, both the Japanese experience and economic theory emphasizing market imperfections suggest that there may be a role for promoting the export of goods in certain industries. In particular, these theories suggest that countries should, within limits set by "natural" comparative advantage, seek to export in industries with high monopoly rents, significant technological externalities or high wages.

Monopoly rents appear to be a relatively insignificant factor so that it appears unlikely that they would substantially blur the usefulness of prices as a signal of technological advantage. The argument for intervening in international markets because of the presence of product market rents is therefore weak as a general rule although there may be exceptions.

However, there are very significant differences in the wages workers earn in different industries. In New Zealand, the difference in wages between manufacturing industries about one-third of the way from the top of the wage distribution and those about one-third of the way from the bottom is about 32%. Shifting employment from low-wage to high-wage industries would therefore have a very significant impact on the value of output and worker well-being.

While the theories which are used to advocate limitations on free trade imply that output is increased by promoting high-wage industries, New Zealand has traditionally followed the opposite policy. At least within manufacturing, with some exceptions, protection was greatest in relatively low-wage industries. This means that New Zealand's trade policies not only worked against its natural comparative advantage but reduced worker rents as well.

Free trade is a substantial improvement over the prior policy. Since political pressures and considerations of fairness seem to push government towards protecting low-wage industries, it may well be the

most desirable policy in practice, but it seems that other policies aimed more directly at low-wage workers would be preferable. Moreover, in principle, it may be possible to obtain a further improvement by shifting trade policy in the direction of subsidizing the export of products from high-wage industries.

Past experience in New Zealand suggests that this intervention would probably not be desirable. In manufacturing, license and tariff protection raised wages somewhat and, consequently, had at most a small impact on employment. Any positive impact was diminished by the impact on other industries using the protected outputs as inputs.

There are, as always, a number of caveats which should be applied to this conclusion. First, it is possible that the effect of export subsidies would be different. Since they do not close the domestic market to competition, export subsidies are less likely to generate monopoly rents which can be captured by unions.

Second, the impact of the removal of trade barriers may take a long time. Freeman and Katz (1989) found evidence that the effect of trade on wages was greater in the long-run than in the short-run. On the other hand the trade liberalization measures in New Zealand were announced well in advance and the government's claim that it would carry them out was credible.

Third, New Zealand is experiencing some changes in its industrial relations system. It is likely that the impact of trade protection or export subsidies would be different if New Zealand's unions were less powerful.

Finally, there are undoubtedly measurement problems associated with measuring trade protection. First-differencing the data increases the noise-to-signal ratio. As a result, the coefficients may be quite significantly biased towards zero. However, this problem would affect both the wage equation and the employment equation estimates. Since the wage equation estimates suggest that the wage effects of protection and large and that, consequently, effect of protection on employment

should be small, this point would be even stronger if any bias due to measurement error could be removed. There is a consistency between the wage and employment results which gives reason to think that measurement error is not a significant problem.

Despite these caveats, the results of this study cast doubt on the usefulness of trade policies for promoting employment in high-wage industries. As a consequence, the appropriate policies, if any, for directing employment towards high-wage industries appear to be labour market policies not trade policies. While the discussion of labour market policies is well beyond the scope of this essay, a few comments arise naturally from this study.

There has been considerable public debate over "labour market flexibility" in New Zealand. While flexibility may be a code word for lower wages, it appears more generally to refer to the need to have better price (wage) signals for allocating workers among sectors. There is little evidence that wages are less flexible across industries than in other comparable countries. The inter-year correlation of industry wage differentials are similar to those found in other studies, a point made more carefully by the New Zealand Planning Council Economic Monitoring Group (1986).

What is more important is that there is little evidence that such price signals are either necessary or desirable for reallocating labour across industries. Since this point seems to be heretical in the context of the present policy debate in New Zealand, it is worth making at some length. Let us begin by considering what would happen in the simple competitive framework. In that framework, firms are only able to attract workers if they pay the competitive wage. Knowing this, firms experiencing a reduction in demand do not lower the wage since all their workers would quit. Instead, they layoff excess workers. Firms wishing to hire workers are able to hire all the workers they wish at the going wage. The going wage, of course, adjusts until the demand for workers just equals the supply. The important point is that there is no **relative** wage adjustment whatsoever. The signals required for labour market reallocation are all achieved through hiring and layoffs.

Of course, this competitive model of the labour market is much too simple. If there are costs of moving from one industry to another or industry-specific skills, we would expect to see some short-run wage movements to induce labour flows. How large these movements are depends on the elasticity of labour supply to individual industries. There is little reason to expect that most industries face relatively inelastic labour supply. Unless we think it is very costly for workers to move from the garment industry to automobile assembly, there is little reason to expect or desire a large wage change when the garment industry declines and auto assembly booms. A large wage increase in auto assembly would serve primarily to "choke-off" the growth in employment in that industry.[13]

This argument becomes particularly important in the New Zealand context because wages in the labour market are not set by the "competitive" mechanism. As in other countries, there are good jobs and bad jobs. These reflect both the impact of unions and whatever factors cause certain technological processes and high wages to be associated throughout the developed economies. Even when a high-wage industry is in relative decline, we would generally like to expand employment in that industry, and we would certainly like to expand employment when the industry is expected to experience continued growth. Because the industry is high-wage, there is no shortage of workers willing to join the industry. Employment is not "supply-constrained." "Labour market flexibility" which favours higher wages in the booming sector serves primarily to reduce the growth of employment, not to increase it. There is a real risk that labour market flexibility will increase relative wage

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13. Wage signals may be more important for motivating workers to enter certain occupations and develop certain skills. The discussion of labour market flexibility and labour market deregulation does not seem to have focussed on this issue. However, a similar point applies although with somewhat less strength. Unless employment is on the supply curve, it is not obvious that greater wage flexibility increases allocative efficiency.

dispersion and not promote the reallocation of labour. The evidence that workers capture some of the benefits of protection in the form of wage increases suggests that this is a practical not just a theoretical issue.

The real issue is how to promote "good jobs at good wages", to use the slogan of the recent U.S. presidential campaign. The benefits of employment programs aimed at high-wage industries can be diminished by the wage increases they generate. Government may have to be more not less active in the labour market if it wishes to promote employment. Wage restraint should be a quid pro quo of any industry-based employment program. Overall employment programs will also be effective only if they do not generate wage increases. The potential for the system of unemployment compensation to affect greatly the overall wage level has been given insufficient attention.

Perhaps the most general point that can be made is that in the past policy has been aimed primarily at protecting employment in low-wage jobs. Yet there is little reason to think that raising employment in low-wage jobs is a desirable policy on efficiency grounds although a case can be made on equity grounds. On the other hand, there are plausible efficiency grounds for promoting employment in high-wage industries. These issues do not appear to have been consciously addressed in New Zealand labour market policy. The failure to address them, in at least the case of past trade policy, has sometimes generated the wrong polices.

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