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Globalisation and Labour Markets: Implications for Australian Public Policy

by

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Abstract

This paper presents a review of the international literature on globalisation and labour markets and goes on to consider the policy implications especially for wages, taxes, social security and education. It then goes on to review the evidence about the effect of globalisation on the Australian labour market and consider the implications for Australian public policy. In particular, it discusses whether the existing wage setting system and its relationship with the tax and social security system, should be reformed to be more in tune with a world in which globalisation and technological change have been working in favour of high skilled labour and against low skilled labour.

Outline

1. Introduction
2. The International Literature
3. Institutional and Policy Responses to the Widening Wage Distribution?
4. The Evidence for Australia and Policy Implications
5. Policy Implications for Australia
6. Conclusions

Non-Technical Summary

There is now quite extensive evidence of growing inequality of earnings in Australia and many other OECD countries. This raises the question of what has caused this growing inequality. In the literature there are two main candidates: technological change biased in favour of high skilled labour, and globalisation. In this paper we focus mainly on globalisation.

The growing inequality of earnings in many OECD economies appears to be partly due to widening skill differentials in at least some of them. In Australia, however, the process appears to be driven largely by strong growth in employment in high wage occupations. Inter-occupational skill differentials appear to have remained largely rigid. In many countries also, including Australia, unemployment has been a long term problem, and periods where there have been increases in unemployment have impacted more than proportionately on unskilled workers. The evidence suggests that the effects of trade on less skilled workers' wages and employment are not great. It appears that increasing globalisation and international competitiveness (in the sense of more participants in world markets) cannot explain more than a small amount of the increased income inequality between skilled and less skilled labour.

An alternative explanation for recent labour market developments is that technological progress, which is biased against unskilled workers, has increased over the last several decades. Here, there is evidence that suggests that technical change is capable of explaining a large proportion of the widening wage distribution. However, most of the empirical studies of the effects of technological change on wages and employment do not link technological change with trade. It is plausible to believe that increased exposure to international trade will motivate firms to seek out productivity improvements by introducing technological improvements. Theory shows that increased trade openness may enhance the transmission of technical knowledge, and there is some empirical evidence to suggest that this is so. Where studies do mix trade explanations with biased technological change, the evidence is mixed – both trade and technological change have affected the wage structure, but technical change may have contributed more to the change.

The paper concludes with a discussion on whether the existing wage setting system and its relationship with the tax and social security system, should be reformed to be more in tune with a world in which globalisation and technological change have been working in favour of high skilled labour and against low skilled labour. It is argued that a systematic approach to labour market programs, reform of the tax and welfare systems to reduce effective marginal tax rates by moving toward a negative income tax system, and a continual upgrading of the education and training system are the medium- to long-term ingredients in this strategy.

1 Introduction¹

There is now quite extensive evidence of growing inequality of earnings in Australia and many other OECD countries. This raises the question of what has caused this growing inequality. In the literature there are two main candidates: technological change biased in favour of high skilled labour, and globalisation.

In this paper we focus mainly on globalisation. Has the rapid increase in international trade been the cause of this rising inequality? In order to discuss this question, we need first to explain why globalisation might be expected to causing a growing inequality in earnings. In section 2, therefore, we review the international literature on globalisation and the labour market, including a discussion of the empirical evidence from other countries of the effect of globalisation on the labour market.² In section 3 of the paper, we discuss institutional and policy responses to the widening wage distribution and the changing patterns of employment and unemployment.

In the light of this international literature we then go on in section 4 to consider the evidence for Australia, drawing on the limited number of papers on the subject and bringing in additional relevant evidence about the labour market. We then consider the policy implications for Australia, especially concerning wage setting, taxation and social security.

2 The International Literature

2.1 Introduction

One of the more important themes to have emerged in economic policy discussions over the past decade or so is what effect the increased exposure of economies to international trade has had on labour markets and labour market outcomes. Globalisation is the term that has emerged to capture the rapid increase in international trade and capital flows that has occurred in the second half of the twentieth century and particularly during the 1970s, (see Table 1).³

¹ The first three sections of this paper draw on Dawkins and Kenyon (1999, forthcoming)

² In so doing this paper draws heavily on, but extends, Dawkins and Kenyon (forthcoming) Chapter 4 on “International Competitiveness and the Labour Market” in Bloch, H. and Kenyon, P. (forthcoming) *Creating an Internationally Competitive Economy*, Macmillan, London.

³ Although it is salutary to realise that the world volume of international trade did not return to pre-WW1 levels until about 1970 and international factor flows in the Nineteenth century were, if anything, greater than they are now, especially international labour flows (Krugman, 1995; Irwin, 1996). Our Victorian ancestors would, perhaps, be bemused by our fascination with globalisation.

Table 1: Globalisation measured by exports as a share of Output (per cent)

Year	World Exports of Goods and Services/GDP	World Exports of Merchandise/GDP	United States Exports of Merchandise/GDP	United States Exports of Merchandise/Tradeables Production
1820	1.0	-	-	-
1850	2.1	-	-	-
1870	-	5.0	-	14.3
1880	9.8	-	5.6	13.2
1913	11.9	8.7	6.1	13.2
1929	-	9.0	5.2	8.9
1950	7.1	7.0	3.6	8.9
1970	11.7	11.2	4.2	14.1
1985	14.5	-	8.3	29.2
1990	17.1	13.5	7.0	31.4

Source: Slaughter and Swagel (1997) IMF Working Paper

Table 2 presents an alternative measure of globalisation taken from Feenstra (1998), which includes data from Australia.

Table 2: Ratios of Merchandise Trade to Merchandise Value-Added (per cent)

Country	1890	1919	1960	1970	1980	1990
Australia	27.2	35.6	24.4	25.6	32.4	38.7
Canada	29.7	39.4	37.6	50.5	65.6	69.8
Denmark	47.4	66.2	60.2	65.9	90.0	85.9
France	18.5	23.3	16.8	25.7	44.0	53.5
Germany	22.7	29.2	24.6	31.3	48.5	57.8
Italy	14.4	21.9	19.2	26.0	43.1	43.9
Japan	10.2	23.9	15.3	15.7	25.8	18.9
Norway	46.2	55.2	60.0	73.2	70.9	74.8
Sweden	42.5	37.5	39.7	48.8	72.9	73.1
United Kingdom	61.5	76.3	33.8	40.7	52.6	62.8
United States	14.3	13.2	9.6	13.7	30.9	35.8

Source: Feenstra (1998)

Increasing globalisation has come about due to the easing of policy barriers to trade and factor flows and from technical change. These have lowered the costs of trade and factor flows. For example, tariff rates and the coverage of commodities subject to tariff protection and foreign exchange restrictions have progressively been eased in many countries around the world. This has come about partly as a result of concerted multilateral efforts through the various GATT rounds and, subsequently, the WTO, and partly as a result of a shift in the philosophy underlying economic policy, which has favoured economic liberalisation.

The lowering of the costs of trade due to such factors as technical change in transportation and communications has bolstered this move from the supply side. With globalisation has come concern that not everyone is benefiting from the increasing international integration of markets for goods and services, factors and technology.

Has international competition helped or harmed workers? What affect has the enormous increase in world trade had on wages and jobs? Has globalisation contributed to the widening wage dispersion in many countries? Has globalisation affected employment opportunities for some groups of workers? What should be the institutional and policy response?

In section 2.2, we examine the standard economic theory of the relationship between trade and factor markets. We then examine whether this theory can explain developments in labour markets that have occurred concurrently with increased globalisation, specifically a widening in the wage distribution between workers with different skill levels and, in some countries, changes in the level and pattern of unemployment. First, in section 2.3, we examine the effects of trade on prices and wages and then, in section 2.4, on the factor content of trade and employment. In section 2.5, we turn to an alternative explanation of labour market developments. Here we examine whether the bias of technical change can explain recent labour market trends.

2.2 International Trade Theory and the Labour Market

The standard workhorse model of international trade, Heckscher-Ohlin (H-O) trade theory, suggests that for any country, increased trade increases overall economic welfare (measured as increased consumption possibilities) by increasing specialisation in the production of those goods and services which use relatively abundant factors more intensively. By exporting these goods and importing those goods which use relatively scarce factors intensively, an economy will push its consumption possibilities outside its production possibilities. It follows that, in general, increased trade is ‘a good thing’ and policy ought be designed to assist in increasing, rather than reducing, trade.

However, even basic theory immediately tempers this conclusion with a caveat. The caveat goes something like ‘international trade increases welfare providing that part of the gains from trade are distributed to the country’s relatively scarce factors and, also, that the factors which are displaced by imports can be immediately redeployed into the sectors that expand

as a result of increased trade.’ Thus, in the absence of such compensation and smooth adjustment, it is not a universal truth that everyone is necessarily made better off by increased exposure to international trade.

This is because of the Stolper-Samuelson theorem. Increased trade due to a change in relative prices (brought about, say, by reduced tariffs on imported goods or lower trade transactions costs) will affect relative factor incomes. Assume that a country has two types of labour: skilled labour, which it has in relative abundance and unskilled labour, which is relatively scarce. It produces some goods, for example, computer software and electronics, which are relatively skill intensive, and other goods, such as clothing and footwear, which use unskilled labour relatively intensively. The country will export the relatively skill-intensive goods, like computer software and electronics, and import goods which use unskilled labour relatively intensively, such as clothing and footwear.

Assume that the country reduces the tariff on imported goods. This will lower the price of imports and import competing goods in that country.⁴ Production of import competing products will fall, imports will expand and production of skill intensive goods will expand. Both skilled and unskilled labour will be released on to the labour market from import competing industries. However, because the import competing sector utilises relatively more unskilled than skilled labour, more of the scarce unskilled labour is released from the import competing sector than the exportables sector can absorb at the going relative wage, so this will cause wages to adjust. The relative wage of unskilled labour will fall and that of the relatively abundant factor, skilled labour, will rise. The ratio of unskilled to skilled labour will rise in both industries (which increases the marginal product of the abundant skilled labour and thus their income). Of course, the effects in the trading partners of this country will exactly mirror the effects in the domestic economy. The incomes of their abundant factor – unskilled labour (our scarce factor) – will rise, and the incomes of their scarce factor – skilled labour (our abundant factor) – will fall.

There is a tendency for factor incomes to be equalised across countries as a result of trade, so the standard trade model predicts that some factors will see an increase in their incomes as a result of increased international trade and some will see a decrease. Also, some workers displaced from import-competing industries will have to find new employment in

⁴ Assuming that the country is sufficiently small that the changes in income cannot change spending patterns sufficiently to change its external terms of trade.

the exportables (or non-tradeables) sectors. In actual economies, structural adjustment may not be as smooth and immediate as in the world of the H-O model. It follows that increased exposure to trade may well result in falling living standards for some workers, due to either falling factor incomes or unemployment, as well a widening in the income distribution.⁵

Note that the driving force that leads to changes in relative factor rewards is not increased trade per se, but rather increased trade that comes about because of changes in the relative prices of goods and services. It is not sufficient just to observe a contemporaneous increase in trade and a change in relative wages, and then sheet home the cause of the change in relative wages to globalisation.⁶ Note also, that overall factor intensity in all industries will move in favour of the relatively scarce factor for given factor quantities. (It has to so as to enable the industry intensive in the relatively abundant factor to expand.) These observations are important for assessing the empirical evidence.

The possibility that globalisation has affected wages has been studied mostly in the context of the wages for skilled and unskilled workers, particularly in the United States, although there has been some work done for European and other economies as well. We shall comment mostly on the U.S. debate, but make occasional reference to other countries.

The idea is that the U.S. has a *relative* abundance of skilled workers and exports skill intensive goods and services. Therefore, the wages of its *relatively* scarce unskilled workforce that is concentrated in the import competing sectors, which use such labour relatively intensively, may have been adversely affected with increases in the traded proportion of US GDP. There are two possibilities: either the demand for skill intensive goods has risen, increasing their relative prices and the relative wages of skilled workers and/or the opening of the U.S. market to imports of low skill intensive commodities has caused their (domestic) price to fall and so the wages of low skilled workers to fall as well. Either way, we would expect to see an increase in the skill premium in wages and a widening in wage dispersion between skilled and unskilled labour. Also, if the Stolper-Samuelson theorem is at work, we would expect, for a given skill mix, to see an increase in

⁵ There is another major problem in applying the Stolper-Samuelson theorem to actual economies. In actual economies there are a multitude of factors of production. A clear prediction of the distributional effects of changing product prices then becomes most problematic and depends, among other things, upon relative factor specificity and relative elasticities of factor demands: see Lloyd (1994, p. 228).

⁶ This point is made by Richardson (1995).

the relative intensity of the scarce factor, lower skilled labour, across all industries to allow the expansion in skill intensive industries.

2.3 The Effect of Trade on Prices and Wages

The first point to be made is that, in the US, wages for unskilled workers have fallen relative to the wages of skilled workers (and, indeed may have fallen absolutely over the 1970s and 1980s, see Freeman, 1995). Just about no matter which way the measurement is done, there has been a widening in the wage gap in the U.S. and that this widening appears to be based on skill differentials. Although the studies cover different periods, use different wage measures and use different definitions of skill, the results tend to be the same. For example, between 1979 and 1988, the ratio of the average wage of college graduates to the average wage of a high school graduate increased by 20 per cent (Bound and Johnson, 1992). Over the period 1979 to 1987 the ratio of average weekly earnings of males in their forties to the average weekly earnings of men in their twenties rose by 25 per cent (Davis, 1992). In manufacturing, between 1979 and 1989, the ratio of the average annual earnings of non-production workers to those of production workers rose by about 10 per cent (Lawrence and Slaughter, 1993). Finally, Katz and Murphy (1992), assuming that wages increase with skill over the income distribution, find that the wages of workers at the 90th percentile of the earnings distribution relative to workers at the 10th percentile has increased steadily from the late 1960s to the late 70s, with a sharp increase since about 1980.

Similarly in other countries, there has been a widening of the distribution of earnings some of which has been due to widening skill differentials. However, significantly, the changes were for the most part, not as marked as in the U.S. (The U.K. was the exception, giving results more comparable with the U.S.) It appears that since the 1970s, Canada, Japan, Spain and Sweden have experienced a modest rise earnings differentials relative to those in the U.S. and U.K., while France, Germany and Italy had no increase, and the Netherlands a small fall. (We will examine the evidence for Australia in section 4 below) However, Freeman and Katz also observe that those countries which only experienced modest or no widening in the wage distribution also tended to experience relatively higher increases in unemployment and non-participation among less educated and younger workers. This latter result has been challenged by several researchers who find that unemployment in European countries rose for both skilled and unskilled workers (see Bertola and Inghino, 1995, and

Nickell and Bell, 1996). Part of the dispute seems to be over what is meant by “skilled workers” - see Murphy (1995).

In order for Stolper-Samuelson effects to be present, it is essential that the change in relative wages does not arise from an increase in the relative supply of unskilled workers. However, Katz and Murphy show that this could not be the case, as the relative supply of skilled workers increased in the U.S. over this period and so demand effects must outweigh supply effects. So far so good for the Stolper-Samuelson effect. What about relative product price changes? Have the prices of skill intensive commodities risen relative to the prices of commodities which use less skilled labour intensively? If so, can these price effects be sheeted home to international trade rather than purely domestic factors?

Here the evidence is not very compelling. Lawrence and Slaughter (1993) examine U.S. manufacturing prices, adjusting for changes in total factor productivity, from 1979 to 1989 and find little evidence of larger price rises in skill intensive products relative to products which are intensive in less skilled labour. They find evidence of the opposite, namely that the relative price of products which are intensive in less skilled labour rose. The authors conclude on the basis of this evidence that trade did not contribute to falling wages for less skilled labour in the U.S. Further analysis by Sachs and Shatz (1994) notes that some adjustment needs to be made for computer prices, given problems in accounting for quality changes in computers. After taking into account the effects of technical change on prices and adjusting for the computer quality problem, Sachs and Shartz find that the relative prices of skill intensive products increased for some products and for some periods of time, but for other specifications their findings were similar to Lawrence and Slaughter’s results.

Finally, using a computable general equilibrium model of the U.S., Krugman (1995, 1996) takes the observed increase in imports from developing countries and calculates the changes in product prices and relative wages that are consistent with the increase in these imports.⁷ He finds that the small volume of U.S. imports from developing countries could have led to only small changes in prices and wages and therefore concludes that trade has contributed only marginally, if at all, to a widening of the income distribution.

⁷ Imports from developing countries accounted for about 30 per cent of total U.S. imports in 1995 and about four per cent of U.S. GDP.

There is another important anomaly that weighs against a Stolper-Samuelson effect accounting substantially for the relative decline in the incomes of less skilled U.S. workers. Overall U.S. production did not increase in the intensity with which less skilled labour is employed over the 1980s (as it would have, if the Stolper-Samuelson theorem was at work, less skilled labour being the relatively scarce factor). Indeed, the opposite was the case. Berman, Bound and Griliches (1994) find that there was an increase in skill intensity across manufacturing and that when this is decomposed into that part due to a shift in labour demand towards more skill intensive industries and that part due to a shift towards greater skill intensity within all industries, over 70 per cent of the increase in skill intensity is explained by within industry effects rather than across industry effects. Similarly, Lawrence and Slaughter (1993) find that across all industries, the majority of industries employed a greater proportion of skilled to lesser skilled workers in the 1980s compared with the 1970s, even though the relative wage of skilled workers had risen (see, also Krugman, 1994a). Of course, the mix between skilled and unskilled workers did not remain fixed over this period, and so there is some scope for slippage from the strict requirement of the Stolper-Samuelson theorem for less skilled labour intensity to rise. Nevertheless, if trade were driving down the wages of the less skilled in traded goods sectors and displacing workers from the importables sectors, there would be some overflow into exportables and the non-traded goods sectors. Thus, the ratio of less skilled to skilled workers would be rising or at least be steady in some industries.

It is not surprising, then, that many economists discount the effects of increased international trade as the major cause of the relative (absolute?) decline in the wages of less skilled workers in the United States over the past two decades or more. It also appears that trade is not the culprit in explaining the somewhat lesser relative decline in the wages of the less skilled in Europe and elsewhere in the OECD. However, there is less compelling evidence outside the U.S. In part, this is simply because there appear to be far fewer studies of the effects of trade on prices and wages (see Slaughter and Swagel, 1997).

2.4 Trade, Factor Content and Wages and Employment

There is a second set of studies using a different methodology which attempt to ascertain the effects of trade on the labour market. These studies use the so-called “factor content” method. The idea is simple. When a country imports a commodity, it is implicitly importing the factors which went in to the production of that commodity. Thus, effectively, imports

add to a country's endowment of factors in proportion to the factor content of those imports. Exports have the opposite effect. As a result, by affecting effective factor supplies, trade will have an effect on factor prices and on subsequent factor use. If, for example, the U. S. imports goods with a high proportion of low skilled labour relative to skilled labour, it is effectively increasing the relative supply of low skilled labour in the U.S. through the low skilled labour embodied in those imports. This would be expected to put pressure on low skilled workers' wages to fall.

So, using input-output relationships which give the estimates of labour skills used in various sectors, researchers can ascertain how changing trade patterns alter the balance between supply and demand for labour with different skills. Then using wage elasticities estimated from other studies, they can estimate the wage effects of the changes in exports and imports.

Using this methodology, Borjas, Freeman and Katz (1992) find that trade accounted for a modest fall in the employment of low skilled U.S. workers and about 15 per cent of the increase in wage inequality between 1980 and 1985, but that this effect diminished thereafter. Sachs and Shatz (1994) analysed trade flows between the U.S. and less-developed countries and also concluded that imports from these countries had only a modest impact on employment. These and other factor content studies indicate that trade can account for only 10 to 20 per cent of the overall decrease in labour demand by domestic firms necessary to explain rising wage skill differentials in the U.S. or unemployment in Europe (see Freeman, 1995).

The exception is Wood (1994, 1995) who uses factor content analysis to show a far greater impact on less skilled workers. Wood disputes some of the assumptions of the factor content studies referred to above, asserting that they underestimate the effect of imports on employment of less skilled workers (for a summary, see Wood, 1995, pp.64-68). Having made adjustments based on new assumptions, Wood estimates that the demand for unskilled labour in manufacturing in the industrialised countries has fallen by at least 20 per cent. (For critical assessments of Wood's methods, see Freeman, 1995, and Slaughter and Swagel, 1997).

A major criticism of factor content analysis, in general, is that it supposedly assumes that wages and prices do not adjust to the changing pattern of trade. There is feedback from

trade flows to prices - both commodity and factor prices (see Freeman, 1995). However, Krugman (1996) has shown that this is a misunderstanding of the thought experiment that lies behind the general equilibrium analysis of the effects of changing trade flows on product and factor prices. The question is: what is being compared with what? Krugman's answer is that the correct interpretation is: what is the (comparative static) change in trade volume from, say, the Newly Industrialising Countries necessary to produce the relative changes in product and factor prices that have been observed? He also notes that this trade in goods can just as logically be interpreted as a change in embedded factor content. His answer is that the change in trade volumes (and in embedded factor content) from the NICs is just too small to account for changes in the relative wages of skilled to unskilled workers in the OECD. Nevertheless, he also acknowledges that ultimately, this is an empirical issue – “in the end, of course, one must return to the data.”

The fact is that with the exception of Wood's work, the evidence suggests that the effects of trade on less skilled workers wages and employment are not great. It appears that increasing globalisation and international competitiveness (in the sense of more participants in world markets) cannot explain more than a small amount of the increased income inequality between skilled and less skilled labour. If increased international trade is not the major, let alone a complete explanation for increased wage inequality, what is?

2.5 Technology, Wages and Employment

The favoured explanation for the rising ratio of skilled to less skilled workers and the fall in the rise in the ratio of the wages of skilled labour to those of less skilled labour is technological progress biased against unskilled workers (see Lawrence and Slaughter, 1993, Krugman, 1994b). Assume, for the moment, that technical innovation is biased against unskilled labour. (We will address shortly why this might be so.) Such technical change increases the desired ratio of skilled to unskilled workers, both in industries which are relatively intensive in skilled workers and in industries which are relatively intensive in unskilled workers. However, the ratio of skilled to unskilled workers will rise by more in the skill intensive sectors compared with those sectors which use less skilled labour intensively. As a result, the ratio of wages for skilled labour to the wages of less skilled labour will rise.

Skill-biased technical progress, for example the rapid development of digital technologies for computing and telecommunications, may have increased the demand for skilled workers

relative to unskilled workers. There are two possible reasons, which are not mutually exclusive and may well be working in concert. First, the specific technical change may have increased the relative productivity of skilled workers and so the relative demand for them. Second, the demand for unskilled labour might have fallen due to its inability to adopt and use technologically advanced methods. For example, Bartel and Lichtenberg (1987) show that as new technology is adopted the demand for highly educated workers increases relative to the demand for less educated workers. They argue that this is due to the better problem-solving abilities and flexibility of better educated workers in responding to technical change. Another (and simpler) explanation is that digital technologies are simply unskilled labour-saving, thus replacing less skilled labour in the performance of many routine tasks (e.g. the disappearance of typing pools, telephonists and so on).

What is the evidence for the biased-technological change story? Again, the data for the U.S. suggests that there is some evidence for this explanation. As we have seen, there is a huge amount of evidence that shows that virtually no matter how measured, there has been a widening of the skill differential in wages in the U.S. and that this has come about due to an increase in the relative demand for skilled workers. The evidence for other countries is not quite as compelling. However, in countries where wage inequality based on skill did not rise, there is some evidence that this led to a widening in unemployment experience based on skill (Freeman and Katz, 1996, p.4), although this remains controversial (see above, section 3).

Other studies, for example, Bound and Johnson (1992, 1995) argue that the relative increase in the demand for skilled labour triggered by technological change could explain most of the observed change in wage differentials based on skill differentials in the U.S. during the 1980s. Berman, Bound and Griliches (1994) find that the increased relative demand for skilled labour within U.S. manufacturing over roughly the same period could be linked to investment in computing technology and research and development in general. Krueger (1993) shows that for the second half of the 1980s workers who used computers earned a 10 to 15 per cent wage premium compared with observationally equivalent workers who did not. Autor, Katz, and Krueger (1998) examine the effect of skill-biased technological change as measured by computerization on the widening of U.S. educational wage differentials. They find that rapid skill upgrading within industries accounts for most of the growth in the demand for college graduates, particularly since 1970 and that the rate

of skill upgrading has been greater in more computer-intensive industries. Similar results are found by Machin and Van Reenen (1998) for seven OECD countries (the U.S.A., Denmark, France, Germany, Japan, Sweden and the U.K.) except that the measure of technical change is R&D intensity. These authors conclude that skill-biased technical change is a global phenomenon and that it has increased the relative demand for skilled workers.

However, most of the empirical studies on the effects of technological change on wages and employment do not link technological change with trade. Where studies do mix trade explanations with biased technological change, the evidence is mixed – both trade factors and technological change have affected the wage structure, but that technical change may have contributed more to the change. This is the conclusion of Brauer and Hickok (1995) for the U.S based on both descriptive and econometric analysis.⁸

Feenstra (1998) adds another twist to the “trade versus technology” debate. He argues that outsourcing of intermediate production from the industrialised to the industrialising countries will also have the effect of reducing the relative demand for unskilled labour in the industrialised countries, with implications for relative wages of unskilled workers in these countries. Thus, globalisation may affect the wage structure in the developed economies indirectly through the “outsourcing” of unskilled jobs. He argues that this is observationally equivalent to skill-biased technical change and, indeed, skill-biased technical change and outsourcing may be complementary in that rapid communications and computerisation are necessary for outsourcing to be viable (e.g. through “just-in-time” inventory control and the like). Although he finds in another paper, (Feenstra and Hanson, 1997), that outsourcing accounts for 20 per cent of the shift in relative employment towards skilled workers in U.S. manufacturing between 1979 and 1990 (with the increased use of computers and other high-technology equipment accounting for a further 30 per cent), the results remain controversial. For example, Autor, Katz and Krueger (1998) find an insignificant role for outsourcing.

In many ways, the biased technological change explanation begs the question, what determines the pattern of technical change? If the skill-biased technical change explanation is to account for recent labour market developments, then it has to be shown that there has

⁸ These authors also find a role for an increase in the capital stock, which represents capital deepening as well as technical change.

been an increase in such technical change in recent decades and that this is linked to international trade.

It is plausible to believe that increased exposure to international trade will motivate firms to seek out productivity improvements by introducing technological improvements. Several models exist which show that increased trade openness enhances the transmission of technical knowledge (e.g. Grossman and Helpman, 1991). And there is some empirical evidence to suggest that this is so (Coe and Helpman, 1995, Eaton and Kortum, 1996 and Coe, Helpman and Hoffmaister, 1997).

It is feasible that such technical change could be biased towards one segment of the labour force, such as skilled workers, such that the interaction of trade and technical change would lead to increasing wage dispersion between skilled and unskilled workers. For example, if changes in the terms of trade allow skilled workers to augment human capital at a greater rate than less skilled workers, because skilled workers are more mobile between sectors (and therefore suffer fewer interruptions to human capital accumulation), then increased exposure to international trade will affect wage differentials based on skill.

The question that arises here, is whether labour market policy is pivotal in producing these different outcomes. If effective real wages are rigid through policy intervention, for example, through wage fixing institutions or the interaction of wage fixing with the social security system or through binding minimum wages for particular workers (e.g. unskilled workers) then it might be the case that policy choices result either in greater wage income inequality or fewer employment opportunities and greater unemployment exposure for specific workers (e.g. the less skilled). This leads to the question of whether government policy towards vocational education and training can ameliorate these effects.

2.6 Trade, Technology and the Labour Market: GE Modelling

Another approach to analysing the effect of globalisation on the labour market, which has developed in the last two or three years, is the use of general equilibrium modelling (Tyers and Yang, 1997). Tyers and Yang emphasise that the link between wages in the North and rapid growth in developing countries, extends beyond the confines of the Heckscher Ohlin trade model, and go on to explore it in a global computable general equilibrium framework, using the GTAP data base and the corresponding global model (Hertel 1997).

They conduct two experiments. First, they examine the effects of increased East Asian openness and growth on developed-country factor markets and compare these effects with those of observed skill upgrading in the same period. Second, they examine the use of trade policy to address the perceived political problem of wage dispersion and associated unemployment, looking forward in time and assuming continued expansion of imports from Asia and continued skill upgrading in the two decades to 2010. They then compare the effects of general trade reforms with quantitative restrictions on imports from Asia.

The study divides the older industrialised economies (OIE) into three regions: North America, European Union and Australasia.

Table 3 presents their results from the first experiment for the impact of East Asian openness and growth on North America. Thus while total GDP growth in North America is explained entirely by technological change, the composition of GDP growth is found to be influenced by trade and growth in recently developed economies (RDEs). In particular, crops are found to have benefited substantially and capital intensive and production labour intensive manufacturing is found to have declined significantly for this reason.

Table 3: Changes in Sectoral Output Volume and Real Unit Factor Rewards in the Older Industrial Economies (OIEs) (percent) – North America

	North America		
	RDE trade & growth	OIE tech change	Combined trade and tech change
	<i>Sectoral output volume</i>		
Crops	8.6	16.5	27.3
Other agriculture, forestry and fishing	0.8	18.7	20.1
Mining and energy	0.2	15.1	16.2
Manufacturing intensive in capital	-1.3	18.6	17.4
in production labour	-3.9	35.4	32.0
in professional labour	0.3	29.1	28.6
Services intensive in capital	0.6	30.5	31.4
in production labour	0.0	25.2	25.4
in professional labour	0.1	30.8	31.2
GDP	0.0	28.6	28.5
	<i>Real Unit factor rewards</i>		
Professional labour	0.2	47.0	47.3
Production labour	0.0	21.3	21.3
Farm labour	10.4	12.7	25.7
Land	18.2	-1.7	18.6
Capital	0.2	29.7	30.2

Source: Tyers and Yang (1997)

Both factor rewards for farm labour and land are found to have been significantly enhanced by RDE trade and growth. The effect on professional labour and production labour is found to be small but with a slightly larger benefit to professional labour, thus explaining some of the widening of earnings between professional and production labour. Technological change, however, is found to cause a much larger growth in the reward to professional labour relative to production labour, thus explaining most of the widening wage dispersion. Further, the effects of technological change more than offset the trade-induced gains to farm workers from RDE trade and openness.

(It should be noted that corresponding changes in factor supply are not included in these experiments. Thus where factor supply of high skilled labour has grown strongly, this ameliorates the effect on earnings).

In the second experiment, Tyers and Yang (1997) seek to compare a continuation of the global trend towards trade liberalisation on the one hand and a rise of protection on the other, in a forward looking analysis. Each scenario is combined with a flexible or sticky wage assumption. In these simulations continued trade liberalisation is found to be beneficial to all factors of production except for farm labour and land in Europe, although farm labour in Europe is unaffected in the flexible wage variant. A rise in protection, in the form of voluntary export restraints against imports from RDEs is found to have negative effects.

In a largely theoretical paper, Davis (1998) uses a framework in which America and Europe replicate an integrated equilibrium with factor price equalisation. He considers the effect of trade on wage dispersion and unemployment in a “flexible wage America and rigid wage Europe”, and the effect of this trade and the different wage setting arrangements on wage dispersion and unemployment. Davis claims that the paper has an over-arching message. That is that “even when factor markets are strictly national with idiosyncratic institutional features, they cannot be considered in isolation when goods markets are global,” (Davis, 1998, p490).

An example of this is that Davis finds that if the US and Europe were both “flexible wage economies” then the entry of newly industrialising countries may depress wages in each. But with a biting minimum wage in Europe, Europe absorbs the full impact of the shock on the US, wholly insulating the US from the effects.

Davis (1998) concedes that as his is a “stylised model”, care should be taken in reading these results into actual historical experience. His point that there can be powerful interactions between local factor market institutions and global goods markets, such that the former may not be very powerful in explaining differences in the evolution of relative wages, is one well worth exploring further.

3 Institutional and Policy Responses to the Widening Wage Distribution?

3.1 Introduction

In this section we present a general discussion of possible institutional responses to the widening wage distribution, making reference to international evidence. The focus is especially on wage setting, tax and social security.

3.2 The Wage Setting System, Tax and Social Security

The widening earnings distribution as a response to technological change and globalisation raises important policy questions. Should the tendency for such widening be facilitated or resisted? If it is to be resisted how should this be done?

In some countries there has not been a strong attempt to resist this widening distribution of earnings associated with the increasing differentiation in the labour market. The U.S.A. is a classic case. The largely unregulated labour market has facilitated the widening distribution of earnings. While inequality has been a cost of this approach, low unemployment by international standards is another outcome of their system.

Most European countries have responded differently. They have resisted labour market deregulation, but have tended to put more effort into raising the education and skill attainment of those who are vulnerable to labour market change. Thus the earnings distribution has not widened as much. Higher unemployment, however, is a common experience.⁹

That is not to say, however, that the unemployment is a direct consequence of regulated or centralised wage setting. There are examples of where a more centralised approach has also

⁹ This dichotomy should not be taken too far, as there is considerable labour market policy diversity within Europe as well as considerable diversity in labour market outcomes there. Nevertheless, the contrast is still useful as a way of organising policy ideas.

produced low unemployment. Austria is a good example. It must be noted, however, that Austria does have a widely dispersed earnings distribution.

If the deregulated and decentralised United States labour market is such a good model and is the cause of its relatively low unemployment, why did it display higher unemployment than its more regulated European counterparts in the 1960s and 1970s? While the US unemployment rate has been particularly low in the recent past, it has displayed remarkable stability over a forty year period. In contrast the OECD average unemployment rate was about 3 per cent in the 1950s and 1960s and 7 to 8 per cent in the 1980s and 1990s. Is it so clear that the U.S. has a better system?

Katz (1998) outlines an explanation for this that relies heavily on the proposition that the US economy through the more flexible US labour market responded to international shocks better than other OECD countries. In the US, a greatly widening wages distribution and avoidance of macro wages problems of the kind experienced, for example, in Australia in 1974-75, helped to keep unemployment down.

Again, decentralised and deregulated wage setting is not necessarily the only approach to such successful adjustment to shocks. Austria is a good example of an economy that showed good micro and macro wage flexibility, in a more corporatist and centralised system. Austria also has managed the relationship between wage dispersion and income dispersion by using its social security system successfully to support family incomes.

Thus Austria has used its social security system to support family incomes in the face of the widening distribution of earnings. Interestingly the US, with its more deregulated labour market has also used the government budget to affect the income distribution, with a special focus on poverty alleviation through earned income tax credits. Evidence presented by Ellwood (1998), suggests that these earned income tax credits have not only helped to alleviate poverty but have also increased the incentive to work amongst those for whom the tax credits bolster their wage income.

4 The Evidence for Australia and Policy Implications

4.1 Introduction

In this section of the paper we examine empirical evidence as it relates to Australia and then go on to discuss some policy implications.

4.2 Evidence relating to the Stolper-Samuelson Theorem

Wage Differentials for Skill

We saw in section 3.2 above, that consistent with the Stolper-Samuelson theorem, there has been a widening of skill differential in the United States. Is this also true for Australia?

When considering what has happened to the overall distribution of earnings, at first sight it seems plausible that the same is true for Australia. Table 4 provides evidence on the widening distribution of earnings presented in Norris and McLean (1999). This shows that over the last twenty five years the earnings of the lowest decile and quartile of the earnings distribution, has declined markedly relative to median earnings. Also, the earnings of the upper quartile and decile of the earnings distribution have risen markedly relative to median earnings. This is true for both males and females.

Table 4: Distribution of earning for full-time non-managerial workers (earnings as a percentage of median earnings)

	Lowest decile	Lower quartile	Upper quartile	Highest decile
<i>Males</i>				
1975	76.0	85.6	121.1	141.2
1980	73.8	84.0	123.2	150.4
1985	72.5	80.7	125.7	154.1
1990	69.5	80.6	126.0	156.3
1995	67.7	79.4	127.8	160.7
1998	65.5	78.4	128.7	162.6
<i>Females</i>				
1975	80.2	88.8	115.3	136.5
1980	81.8	88.0	119.3	142.8
1985	78.6	87.3	121.2	147.9
1990	74.9	84.1	123.1	147.6
1995	73.4	84.1	125.3	152.0
1998	71.8	82.3	127.5	150.4

Source: Norris and Mclean (1999)

When examining the reasons why there has been such a widening of the earnings distribution, however, Norris and McLean point out that to a large extent the explanation lies in the strong growth in employment of high wage workers rather than changes in the relative wage of high wage and low wage workers. They reproduce evidence from EPAC (1996) as evidence of this, (see Table 5). This demonstrates that there was a very strong growth in employment in high wage and high skill jobs between 1986 and 1995, but not in

low skill and low wage jobs. Meanwhile there was no significant difference between the growth in wages of high wage and low wage employees.

Table 5: Wages and Employment Growth by Occupational Group (percentage)

	Wages 1986 – 1995	Employment 1986 – 1994
<i>By 1986 wage of occupation</i>		
High	58	22
Middle	50	16
Low	57	-4
<i>By skill level of occupation</i>		
High	58	24
Middle	52	0
Low	55	2

Source: EPAC (1996)

This is consistent with the evidence on occupational wage differentials uncovered by Fahrner and Pease (1994), who were specifically looking for evidence on Stolper-Samuelson effects in Australia. They found no evidence of a systematic widening of occupational wage differentials between 1987 and 1993. They focussed on the wage differentials between unskilled machinists and high skilled managers, administrators and professionals, which showed now obvious signs of an upward trend.

In view of the changes to the wage setting system since 1993, it might be expected that there has been such a widening since then. It seems plausible that with enterprise bargains and individual contracts providing for higher wage increases than awards, such occupational wage differentials may have widened. To test this we have obtained similar data from the ABS as those presented by Fahrner and Pease (1994), but updated to 1998. These data are presented in Table 6. Perhaps a little surprisingly there is still no obvious sign of a widening of these occupational wage differentials.

The Industry Commission's study of the trade liberalisation and earnings distribution (Murtough, Pearson and Wreford, 1998) also found no general evidence of the changes in wage relativities (or relative producer prices) that would be predicted in accordance with Stolper-Samuelson effects.

Table 6: Occupational Wage Differentials in Australia

Low-skilled Occupation	Ratio of hourly wage to skilled hourly wage (as at May)						
	1991	1992	1993	1994	1995	1996	1998
<i>Machine Operators</i>							
Food processing	0.63	0.65	0.65	0.69	0.66	0.70	na
Textile sewing	0.55	0.54	0.53	0.53	0.52	0.52	0.49
Shoemaking	0.60	0.59	na	0.57	0.53	0.55	0.62
Wood processing	0.63	0.60	0.61	0.61	0.61	0.60	0.59
Paper and paper products	0.77	0.79	0.77	0.77	0.68	0.77	0.66
Chemical production	0.84	0.73	0.71	0.68	0.75	0.75	0.76
Clay and stone processing	0.68	0.62	0.61	0.64	0.66	0.60	0.56
Basic metal product	0.67	0.66	0.70	0.73	0.67	0.72	na
Other metal products	0.62	0.67	0.62	0.65	0.68	0.59	na
Photographic products	0.62	0.66	0.78	0.60	0.64	0.63	0.55
Plastics production	0.61	0.62	0.66	0.66	0.63	0.72	0.62

Constructed from ABS data

The evidence appears to be that unemployment has increased among workers with less education, for new entrants to the labour market (youth) and for older males displaced from tariff adjusting industries. Some economists argue that wage rigidity, due to institutional factors, has prevented full wage adjustment to occur, thus shifting the burden to unemployment (see Fahrer and Pease, 1994).

It is certainly the case that unemployment is much higher for low skilled than for high skilled workers (see Table 7) and appears to have increased (see Borland and Kennedy, 1998).

Table 7: Employment, Unemployment and Wages by Broad Skill Categories, 1995

Category of member of Workforce	Employed	Unemployed		Share of total unemployment	Average Week
	('000)	('000)	(%)	(%)	(\$/week)
Skilled ¹	3724	122	3.2	15.1	717
Unskilled ²	4606	225	4.7	27.9	436
Looking for first job		206		25.6	
Former worker		246		30.5	
Total	8330	806	8.8	100.0	551

¹ Managers and administrators, professionals, para-professionals, tradespersons

² Clerks, salespersons and personal service workers, plant and machine operators, drivers and labourers and related

Source: Dawkins and Freebairn (1997)

Skill Intensity

The Australian evidence, also, is not consistent with Stolper-Samuelson effects in that skill intensity appears to have risen rather than fallen across industry sectors (see Fahrer and Pease, 1994, p. 198).

Factor Content Approach

Further shift-share analysis, which decomposes changes in employment by industry sector into the respective contributions of trade and productivity effects (and where the trade effects are further decomposed into imports from “low wage countries” and “high wage countries”) suggests that productivity effects have been the dominant force behind the decline in manufacturing employment between 1981-82 and 1991-92, except for one industry – clothing textiles and footwear. The latter industry is the only one that tends to fit the Stolper-Samuelson stylised facts.

Fahrer and Pease (1994) interpreted their results as support for an explanation for changed employment patterns based on skill-biased technological change in the presence of wage rigidities.

GE Modelling of the Effect of Trade Liberalisation

Murtough, Pearson and Wreford (1998) used the Monash Model (in historic mode) to analyse the effects of trade liberalisation versus technology. Note that in the Monash Model, rigid wage relativities between occupations are assumed, which appears to be consistent with the evidence presented above.

Their results indicated that between 1986-87 and 1993-94, the number of hours worked in manufacturing would have fallen by 12.7 per cent if total Australian labour supply and employment had not grown over that period. Of this about one tenth, that is, 1.4 per cent, of the fall in hours worked was estimated to have been caused by changes in industry assistance (including tariffs). About a quarter, that is, 3.2 per cent was estimated to have resulted from technological change across the economy which reduced the use of manufactured inputs and labour per unit of output. About one third, that is, 4.4 per cent, of the estimated employment decline was linked to shifts in preferences between imports and domestic products not attributable to changes in relative prices. They suggest that “it is possible that some of this change was associated with the removal of quantitative import restrictions.” (Murtough, Pearson and Wreford, 1998, pxii)

In section above, we discussed the findings of Tyers and Yang (1997) from their use of a global computable general equilibrium model to examine the effect of trade versus technology on output and factor rewards. One of the three regions of older industrialised economies was Australasia. In Table 8, we reproduce their findings for Australia, analogous to those reported for North America in Table 3 above.

Table 8: Changes in Sectoral Output Volume and Real Unit Factor Rewards in the Older Industrial Economics (OIEs) (percent) – Australasia

	Australasia		
	RDE trade & growth	OIE tech change	Combined trade and tech change
<i>Sectoral output volume</i>			
Crops	6.8	54.4	61.1
Other agriculture, forestry and fishing	3.7	42.2	47.8
Mining and energy	0.6	18.1	19.3
Manufacturing intensive in capital	-0.3	20.1	20.6
in production labour	-6.7	54.7	44.3
in professional labour	-0.8	37.6	39.6
Services intensive in capital	0.8	37.6	39.6
in production labour	-0.5	30.8	30.3
in professional labour	0.4	38.4	39.5
GDP	0.3	36.4	37.0
<i>Real Unit factor rewards</i>			
Professional labour	1.1	103.7	107.6
Production labour	0.2	18.0	18.5
Farm labour	11.1	-33.5	-26.3
Land	17.4	20.3	39.6
Capital	0.5	39.4	40.4

Source: Tyers and Yang (1997)

Just as for the US the findings support the view that technological change has been the main driving force in the widening of factor rewards, benefiting professional labour most, production labour next and farm labour least. Indeed farm labour in Australia is found to have been affected negatively.

It is interesting to note, however, that the structural change which stems from RDE openness and growth is largest for Australasia.

“This is because resistances to trade are comparatively low between Australasia and Asian exporters and hence the intensity of Australia’s trade with the populous Asian economies is greater than for either North America or the European Union.” (Tyers and Yang, 1997, p.403).

5 Policy Implications for Australia

5.1 Introduction

In Australia, then, there has been a widening of the distribution of earnings, resulting primarily, it appears, from strong growth in employment in high wage jobs, rather than from a widening of inter-occupational wage differentials; (although there has been a widening of intra-occupational differentials). Indeed inter-occupation wage differentials appear to be rather rigid in Australia, and one plausible argument is that this may have raised the unemployment rate amongst unskilled workers.

One important question is whether any of this evidence should lead us to resist the process of trade liberalisation. To some extent this has to be a matter of judgment rather than one which can be solved purely scientifically, but our judgement would be that it should not lead us along that path.

First, it is widely understood that fundamentally, especially in the long run, trade liberalisation raises national income. It is possible in principle, however, that it could have some adverse distributional consequences, especially in the short run. The evidence reviewed in this paper, however, suggests that it has probably not been the major cause of the widening distribution of earnings in Australia (or elsewhere). Although especially when combined with rigid wage differentials, trade liberalisation may have raised unemployment especially amongst certain low-skilled groups. It is our judgement that the solution to this problem is not to resist trade liberalisation which is a fundamentally a good process. Rather we should adopt policies to make trade liberalisation, along with other microeconomic reforms, work to the benefit of a larger proportion of Australians than would otherwise be the case. The kind of policies we have got in mind are also relevant to achieving improved distributional outcomes, when technological change is the driver of greater earnings inequality as well.

5.2 Wages, Tax, Social Security, Education, Training, Research and Development: Some Policy Ideas

Equity is under threat both because of sustained high unemployment, and because of the widening of pre-tax earnings resulting, it seems, primarily from technological change, although globalisation may be responsible for part of the process.

It is possible that rigid occupational differentials also take some of the blame for unemployment of low skilled workers. While further deregulating and decentralising wage setting and cutting unemployment benefits might be one policy setting to reduce unemployment in this environment, these policies are unlikely to do much to reduce wage inequality in the labour market. They would be more likely to lead to a widening distribution of wages.

There is, however, a strong argument that this “diabolical trade-off” between unemployment and wage inequality can be avoided. Greater labour market flexibility to encourage employment might be combined with changes to taxation and social security in a way that improves the distribution of income. This would need to be done in a way that does not have a detrimental effect on work incentives and, ideally, improves them. It is also important to place a strong emphasis on education and training and, arguably, research and development, if full employment and rising productivity and living standards are to be achieved in the long run.

A central feature of this alternative policy is to allow the pre-tax wage distribution to widen (say, by not increasing award wage rates) but institute a system of tax credits at the lower end of the wage distribution for low wage earners in low income families. This is a type of wage-tax trade-off. While allowing flexibility in relative wages, so that wages faced by employers adjust, employment for low income earners is preserved. However, tax credits ensure that after-tax wages for low income workers would not be reduced (and, indeed, would increase). The tax credits are more valuable to low wage earners than a wage increase because of the avoidance of tax paid on extra wage income and the withdrawal of social security benefits that would result from a straight pay increase. The tax credits would reduce effective marginal tax rates for many people (and increase them for none), thereby increasing the reward to the unemployed who seek out and accept job offers. (For a full discussion of this, see Dawkins, 1999)

Such a policy might be accompanied by a systematic approach to labour market programs, reform of the tax and welfare systems to reduce effective marginal tax rates by moving toward a negative income tax system, and a continual upgrading of the education and training system as a medium- to long-term ingredients in the overall strategy. This is the kind of policy package proposed by the so-called five economists (Dawkins, Freebairn,

Garnaut, Keating and Richardson, 1998) and also advocated by the Business Council of Australia (1999)

A feature of the policy is that it would involve greater integration of public policy across the areas of tax, social security, wage setting and human resource development. In the long run, there is a strong case for full integration of tax with social security payments in the form of a negative income tax system (see Dawkins et al., 1998). There is also a case for recognising that the concept of “social security” should not only involve income transfers. Put another way, passive assistance should increasingly be replaced by active labour market assistance so that as well as a safety net, individuals find that they also have the opportunity to use “springboards” to help launch them into a more successful participation in the labour market. Training programs and the continual up-grading of the education system are important features of this.

Similarly, income transfers can be used for human capital investment, recognising the life cycle dynamics of successful labour market participation and the likely need for lifelong learning. The idea of “flexible learning accounts” to support lifelong learning is well worth examining and is canvassed in the recent West Report on Higher Education in Australia, as well as in Mark Latham’s book, *Civilising Global Capital* (Latham, 1998).

In the long run, increased knowledge embodied in labour, capital or the way in which factors of production are brought together, is the source of productivity growth. Education, research and development and policies promoting the openness of the economy, which encourages the acquisition of new knowledge, are the things that raise productivity in the long run (Rogers, 1997). In a free market, individuals might under-invest in education and training because of capital market imperfections and because of risk aversion especially by those from low income families. Thus the state has an important role in subsidising education for efficiency as well as equity reasons.

6 Conclusions

Over the last two decades labour market outcomes appear to have altered dramatically in many countries. Although patterns differ between countries, and some countries remain atypical, the wage distribution has widened in many OECD economies, and this appears to be partly due to widening skill differentials in at least some of them. In Australia, however,

the process appears to be driven largely by strong growth in employment in high wage occupations. Inter-occupational skill differentials appear to have remained largely rigid.

In many countries also, including Australia, unemployment has been a long term problem, and periods where there have been increases in unemployment have impacted more than proportionately on unskilled workers. In this paper we have examined whether the standard Heckscher-Ohlin trade model working through the Stolper-Samuelson effect can explain these developments in labour markets in recent times.

The evidence suggests that the effects of trade on less skilled workers' wages and employment are not great. It appears that increasing globalisation and international competitiveness (in the sense of more participants in world markets) cannot explain more than a small amount of the increased income inequality between skilled and less skilled labour.

An alternative explanation for recent labour market developments is that technological progress, which is biased against unskilled workers, has increased over the last several decades. Here, there is evidence that suggests that technical change is capable of explaining a large proportion of the widening wage distribution.

However, most of the empirical studies of the effects of technological change on wages and employment do not link technological change with trade. It is plausible to believe that increased exposure to international trade will motivate firms to seek out productivity improvements by introducing technological improvements. Theory shows that increased trade openness may enhance the transmission of technical knowledge, and there is some empirical evidence to suggest that this is so. Where studies do mix trade explanations with biased technological change, the evidence is mixed – both trade and technological change have affected the wage structure, but technical change may have contributed more to the change.

The final issue considered is whether labour market policy and institutions can ameliorate these effects and what is the role for tax and social security. This, obviously, is a complex issue. An important factor is the ability of government to manage the relationship between wage dispersion and income dispersion by using its social security system successfully to support family incomes in the face of changes in the external environment, whether these changes are due to trade effects or technology effects.

The paper concludes with some policy ideas relating to the interface of wages, taxes, social security, education and training, in responding to recent labour market developments. These policy ideas attempt to circumvent the “diabolical trade-off” between increasing income inequality and persistent unemployment. It is argued that a systematic approach to labour market programs, reform of the tax and welfare systems to reduce effective marginal tax rates by moving toward a negative income tax system, and a continual upgrading of the education and training system are the medium- to long-term ingredients in this strategy.

References

- Autor, David H., Katz, Lawrence F. and Krueger, Alan B. (1998), "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics*, **113**, 1169-1213.
- Bartel, Anne P. and Lichtenberg, Frank (1987), "The Comparative Advantage of Educated Workers in Implementing New Technology," *Review of Economics and Statistics*, **69**, 1-11.
- Berman, E., Bound, J. and Griliches, Z. (1994), "Changes in the Demand for Skilled Labour within U.S. Manufacturing: Evidence from the Annual Survey of Manufactures," *Quarterly Journal of Economics*, **109**, 363-679.
- Bertola, G. and Ichino, A. (1995), "Wage Inequality and Unemployment: the United States versus Europe," *1995 NBER Macroeconomics Annual*, (Cambridge, Mass.: MIT Press).
- Borjas, G.J., Freeman, R.B. and Katz, L.F. (1992), "On the Labor Market Effects of Immigration and Trade" in Borjas, G.J. and Freeman, R.B. (eds) *Immigration and the Workforce* (Chicago: University of Chicago Press and the NBER).
- Borland, J. and Kennedy, S. (1998), "Dimensions Structure and History of Australian Unemployment" , in Debelle and Borland (eds), *Unemployment and the Australian Labour Market*, Proceedings of a Conference, Reserve Bank of Australia and the ANU.
- Bound, J. and Johnson, G. (1992), "Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations," *American Economic Review*, **82**, 371-92.
- Bound, J. and Johnson, G. (1995), "What Are the Causes of Rising Wage Inequality in the U.S.?" *Federal Reserve Bank of New York Economic Policy Review*, January.
- Brauer, David A. and Hickok, Susan (1995), "'Explaining the Growing Inequality in Wages Across Skill Levels," *Economic Policy Review*, **1**, 61-84.
- Coe, D. and Helpman, E., (1995), "International R&D Spillovers," *European Economic Review*, 39 (May), 134-149.
- Coe, D., Helpman, E. and Hoffmaister, A. (1997), "North-South R&D Spillovers," *Economic Journal*, **107** (January), 859-887.
- Davis, S.J. (1992), "Cross-Country Patterns of Changes in Relative Wages," in Blanchard, O. and Fischer, S. (eds), *1992 NBER Macroeconomics Annual*, (Cambridge, Mass.: MIT Press).
- Dawkins, P and Freebairn, J, (1997), "Towards Full Employment", *Australian Economic Review*, **30**, 4, pp. 405-17,
- Dawkins, P. (1999) " A Plan to Cut Unemployment in Australia: An Elaboration on the Five Economists' Letter to the Prime Minister, 28th October 1998," *Mercer-Melbourne Institute Quarterly Bulletin of Economic Trends*, 1.99, pp.48-53
- Dawkins, P., Freebairn, J. Garnaut, R., Keating, M., Richardson, C., (1998) , "Dear John, How to Create More Jobs", The "Five Economists" Letter to the Prime Minister, *The Australian* October 26th,
- Eaton, J. and Kortum, S. (1996), "Trade in Ideas: Patenting and Productivity in the OECD," *Journal of International Economics*, **36** May, 251-278.

- Ellwood, D., (1999) "The Impact of the Earned Income Tax Credit and other Social Policy Changes on Work and Marriage in the United States," *Australian Social Policy*, 1999/1, 75-114.
- Fahrer, J. and Pease, A. (1994), "International Trade and the Australian Labour Market," in Lowe, P. and Dwyer, J. (eds) *International Integration of the Australian Economy: Proceedings of a Conference* (Sydney: Reserve Bank of Australia).
- Feenstra, Robert C. (1998), "Integration of Trade and Disintegration of Production in the Global Economy," *Journal of Economic Perspectives*, **12**, 31-50.
- Feenstra, Robert C. and Hanson, Gordon H. (1997), "Productivity Measurement and the Impact of Trade and Technology on Wages: Evidence for the U.S., 1972-90," *NBER Working Paper*, No. 6052, June.
- Freeman, R. and Medoff, J.L. (1984), *What Do Unions Do?* (New York: Basic Books).
- Freeman, R.B. (1995), "Are Your Wages Set in Beijing?" *Journal of Economic Perspectives*, **9**, 15-32.
- Grossman, G.M. and Helpman, E. (1991), *Innovation and Growth in the Global Economy*, (Cambridge, Mass.: MIT Press).
- Irwin, D.A. (1996), "The United States in a New Global Economy? A Century's Perspective," *American Economic Review*, **86**, 41-46.
- Katz, L.F. (1998), "Reflections on U.S. Labour Market Performance" in DeBelle, G. and Borland, J. (eds) *Unemployment and the Australian Labour Market: Proceedings of a Conference* (Sydney: Reserve Bank of Australia)
- Katz, L.F. and Murphy, K.M. (1992), "Changes in Relative Wages, 1963-1987: Supply and Demand Factors," *Quarterly Journal of Economics*, **107**, 35-78.
- Krueger, Alan B. (1993), "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984-89," *Quarterly Journal of Economics*, **108**, 33-60.
- Krugman, P.R. (1994a), "Trade, Jobs and Wages," in Krugman, P. (1996), *Pop Internationalism*, (Cambridge, Mass.: MIT Press)
- Krugman, P.R. (1994b), "Technology's Revenge," in Krugman, P. (1996), *Pop Internationalism*, (Cambridge, Mass.: MIT Press)
- Krugman, P.R. (1995), "Growing World Trade: Causes and Consequences," *Brookings Papers on Economic Activity*, 1, 327-77.
- Krugman, P.R. (1996), "But For, As If, and So What: Thought Experiments on Trade and Factor Prices", Krugman's web page at <http://web.mit.edu/krugman/www/whatsnew.html>.
- Latham, M. (1998), *Civilising Global Capital*, (Sydney: Allen and Unwin).
- Lawrence, R.Z. and Slaughter, M.J. (1993), "International Trade and U.S. Wages: Great Sucking Sound or Small Hiccup?" *Brookings Papers on Economic Activity*, 2, 161-226.
- Lloyd, P. (1994), "Discussion" in Lowe, P. and Dwyer, J. (eds) *International Integration of the Australian Economy: Proceedings of a Conference* (Sydney: Reserve Bank of Australia).
- Machin, S. and Van Reenen, J. (1998) "Technology and Changes in Structure: Evidence from Seven OECD Countries," *Quarterly Journal of Economics*, **113**, 1215-1244

- Murphy, K. (1995), "Comment on Bertola and Ichino," *1995 NBER Macroeconomics Annual*, (Cambridge, Mass.: MIT Press).
- Murtough, G., Pearson, K., and Wreford, P., (1998), *Trade Liberalisation and Earnings Distribution in Australia*, Industry Commission, Staff Research Paper.
- Nickell, S. and Bell, B. (1996), "Changes in the Distribution of Wages and Unemployment in OECD Countries," *American Economic Review: Papers and Proceedings*, **86**, 302-08.
- Norris, K. and Mclean, (1999), "Changes in Earnings Inequality 1975-1998", *Australian Bulletin of Labour*, Vol. 25 No. 1, 23-31.
- Olsen, M (1982), *The Rise and Decline of Nations*, (Yale University Press, New Haven).
- Richardson, J.D. (1995), "Income Inequality and Trade: How to Think, What to Conclude," *Journal of Economic Perspectives*, **9**, 33-55.
- Rogers, M. (1997), "Knowledge, Technology and Productivity in Australia: Lessons from Overseas," *Mercer-Melbourne Institute Quarterly Bulletin of Economic Trends*, 3,97, 38-57.
- Sachs, J.D. and Shatz, H. (1994), "Trade and Jobs in U.S. Manufacturing", *Brookings Papers on Economic Activity*, 1, 1-84.
- Slaughter, M.J. and Swagel, P. (1997), "The Effects of Globalisation on Wages in the Advanced Economies", IMF Working Paper, 9743, April 1997.
- Tyers, R and Yang, Y. (1997), "Trade with Asia and Skill Upgrading: Effects on labor Markets in the Older Industrial Countries" *Weltwirtschaftliches Archiv* 1997, Vol 133 (3), 383-417.
- Wood, A. (1994), *North-South Trade, Employment and Inequality: Changing Fortunes in a Skill Driven World*, (Oxford University Press: Oxford)
- Wood, A. (1995), "How Trade Hurt Unskilled Workers", *Journal of Economic Perspectives*, **9**, 57-80.