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# **ECONOMIC THEORY, APPLICATIONS AND ISSUES**

Working Paper No. 10

Reconciling Globalisation and  
Technological Change: Growing Income  
Inequalities and Remedial Policies

by

Serge Svizzero and Clem Tisdell

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October 2001

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# **Reconciling Globalisation and Technological Change: Growing Income Inequalities and Remedial Policies**

*Clem Tisdell and Serge Svizzero*

## **Abstract:**

Since the mid-1970s wage inequality and skills differentials have increased sharply in OECD countries, and the following have been singled out by economists as possible major contributors: (a) economic globalisation processes; (b) skill-biased technological change; and (c) public policy or institutional change. Although these factors are most commonly considered as independent influences, we argue after critically outlining views about the two first mentioned factors, that strong interdependence exists between these influences. The article then examines potential policy responses to this growing inequality. Protectionism, increased provision of education and skill-enhancement, greater compensation via social services for the disadvantaged and negative income-tax systems are examined as possibilities. These policies are all found to have limited ability to address the problem. Ability to implement several of these policies may be severely restricted by international fiscal competitiveness. Furthermore, greater provision of educational services may add to the skill-based type of income inequality currently of concern.

**Keywords:** education, fiscal competition, globalisation, income distribution, labour market, protectionism, technological change.

# **Reconciling Globalisation and Technological Change: Growing Income Inequalities and Remedial Policies**

*Clem Tisdell and Serge Svizzero*

## **1. Introduction**

From the mid-1970s through the 1980s and into the 1990s, wage inequality and skill differentials in earnings and employment increased sharply in OECD countries (Aghion and Williamson, 1998; Atkinson, 1996 ; Slaughter, 1998).

After 1973 and especially in the 1980s, the United States experienced a dismal real wage performance for the less skilled. Real wages of most low-skilled workers fell relative to wage of high-skilled workers. For some low-skilled workers, reported real wages declined. The ratio of weekly wages of the top decile to the lowest decile increased from 2.9 in 1963 to 4.4 in 1989 (Freeman, 1995).

The relative immiseration of low-skilled workers shows up in a number of ways. For instance, this growing inequality may be evidenced by rising differentials between incomes of older and younger workers, between the incomes of those with greater or less education and greater differentials between those in high-skilled and low-skilled occupations.

The same inequality trends were apparent elsewhere in other OECD countries, but the increase in inequality was typically far smaller than in the United States. In OECD-Europe, it took the form of increased unemployment for the less skilled. Therefore, the two observed outcomes are, on the one hand, a rise in joblessness of the less skilled in Europe, and on the other hand, an increase in earnings inequality in the US. However, both outcomes reflect the same phenomenon, namely a relative decline in the demand of less-skilled workers.

Recently, many have assumed that, due to economic growth, income disparities might have stabilised in recent years. As explained by Shapiro (2001) who used new data from the Internal Revenue Service, this is not the case for the US. These data show the extent to which

the benefits of economic growth in the 1990s were shared across the population. It is now clear that growth in income disparities did not end in the late 1980s but continued into the 1990s. Indeed, the data show that from 1989 to 1998:

- the average after-tax income of the top one percent of tax filers rose by a robust 40%,
- for those between the 95<sup>th</sup> and the 99<sup>th</sup> percentiles of the income spectrum, after-tax income climbed by 18%, and rose by 10% for those between the 90<sup>th</sup> and 95<sup>th</sup> percentiles,
- as one moves further down the income spectrum, the average after-tax income gain continues to diminish.

In fact, with economic growth in the 1990s, all income groups experienced gains in after-tax income in 1998. However, this is consistent with the significant widening of income disparities. For instance, in 1998, the after-tax income of most income groups was only modestly equal to its 1989 level. Finally, the available indicators for the years from 1998 to 2000 point towards a further jump in incomes at the top. In other words, the growth in income disparities continues its long-term upward trend.

Explanations of the growing wage gap have focused on three principal possible causes : globalisation (especially trade and immigration), skill-biased technological change, and institutional factors. In this paper, we concentrate on two former explanations but the latter should not be dismissed. When compared with the two former influences, the institutional explanation mainly differs because it considers that relative wages are much less a matter of markets and more a matter of politics involving macroeconomic policy, industrial relations policy, international economic policy and the role of the State. While most economists do not believe that institutional factors are the critical determinants of the increasing wage gap, they do believe that the push to deregulate various markets has created downward pressures on wages. They also believe that intense competitive pressures have led to a change in the implicit « social contract » between northern firms and workers. The

decline in union power has also contributed to the growing gap, because unions had often generated unsustainably high wages for some unskilled workers in heavily-organized and protected industries.

The fact that international trade and investment rose substantially at about the same time during the late twentieth century as wage inequality does not prove that one caused the other. Many other things changed as well during this period. Nevertheless, changes in international trade and in technology are singled out here for consideration.

Increasing economic globalisation and skill-biased technological change, have been casted as opposing explanations in the economic literature and this has resulted in a considerable controversy.

On the one hand, some economists (Wood, 1994, 1998) suggest that globalisation (i.e. North-South trade and immigration from the South) has significantly contributed to a large pool of low-wage, low-skill workers thereby widening the wage gap. On the other hand, (Lawrence and Slaughter, 1993) argue that a major share of the changing wage structure is explained by industry demand shifts favouring higher-technology products and services that require higher worker skills. It is assumed that skill-biased technological change implies at the same time a decrease in demand for unskilled workers and a large increase of wage premiums for higher levels of education.

The conflict in explanations may mainly arises because proponents of the second explanation fear that neo-protectionists will use arguments about the effect of trade on labour demand to raise trade barriers and thereby, reduce global productivity.

Our aim in this paper is first to show that neither globalisation nor technological change can be rejected as a partial – but presumably large – explanation of growing income inequality. Secondly, we argue that globalisation and technological change are interdependent and therefore, that both explanations should be reconciled rather than opposed.



The paper is organized as follows: The globalisation and technological change explanations of growing income inequality – and their associated critiques – are presented respectively in Section 2 and Section 3. Section 4 supports our hypothesis that there is interdependence between globalisation and technological change. Section 5 examines proposals intended to redress growing income disparities.

## **2. Growing Wage Income Inequality and Globalisation**

There is widespread agreement that globalisation is a major contributor to growing international and intra-nation inequality. In fact, a common set of forces is unleashed by rapid liberalisation that makes for greater inequality by favouring certain income groups over other. Three sources of income inequalities can be identified. First, capital has gained in comparison to labour because profit shares have increased everywhere. Secondly, public as well as private debt have risen rapidly in response to financial liberalisation. This has led to the worldwide emergence of a new rentier class resulting in large increases in interest payments that redistribute wealth from the poor to the rich. Thirdly, growing wage inequality between skilled and unskilled workers has occurred.

The latter inequality development clearly coincides with globalisation, both in the form of rising international trade and immigrant to the North. As shown by Borjas (1994), there has been a rise of the US rate of immigration and also a decline of the « average quality » of immigration workers. At the same time, the relative size of international trade has risen. Lawrence and Slaughter (1993) showed that US trade shares increased from 12% of GNP in 1970 to 25% in 1990. Although most trade is among developed countries, trade with developing countries increased greatly in the 1980s and the 1990s. The increase in North-South trade is a part of globalisation and it reflects the conjoint working of several forces such as the reduction in trade barriers promoted by GATT and thereafter WTO, the shift in

developing countries' strategies from import substitution to export promotion, and the increase of less-developed countries' competitiveness as a result of investment from advanced countries. By 1990, 35% of US imports were from developing countries, compared with 14% in 1970. In the EC, 12% of imports were from the South, compared with 5% in 1970. Not only has the volume of trade between advanced countries and the Third World has increased, its nature has also changed. Wood (1994) estimated that in 1992, 58% of exports to Western countries consisted of light manufacturing goods, compared with 5% in 1955.

Therefore, it is quite natural that economists should explore the linkages between growing international trade and immigration, on the one hand, and wage inequality, on the other. Adrian Wood (1994) has always strongly claimed that globalisation did cause the rise in wage inequality and unskilled unemployment in developed countries over the past two decades. Of course, Wood knows that the decline in the share of manufacturing in total employment in developed countries accelerated from about 1970, and most of the lost manufacturing jobs were unskilled. But, he also observes that this disindustrialisation is clearly correlated – both over time and across countries – with the rise in imports of manufactures from developing countries. In fact, Wood considers that the acceleration of the downward trend in demand for unskilled workers is mainly caused by changes in the pattern of world trade, that involve the relocation of most unskilled manufacturing activities from developed to developing countries.

Wood bases his conclusions on insights derived from classical Heckscher and Ohlin theory (denoted HO hereafter). He concludes that the decline in the relative wages of less-skilled northern workers is due to the elimination of trade barriers and increasing relative abundance of southern workers with a basic education. In fact, HO theory makes unambiguous predictions. Every country exports those products which intensively use abundant and cheap factors of production. Thus, a trade boom (induced for instance by

declining tariffs) will cause the labour-intensive exports of less developed countries to grow and the demand for the cheap factor to boom too. Globalisation in poor countries (the South) should favour unskilled labour and disfavour skilled labour; globalisation in rich countries (the North) should favour skilled labour and disfavour unskilled labour.

In the HO approach, the factors of production are assumed not to be mobile across countries. Therefore, the conclusions of this approach rely on the evolution of different supplies of labour by skill in different countries. However, Wood's conclusion still holds if the analysis considers the impact of globalisation on labour supply via immigration. Borjas, Freeman and Katz (1992) and also Borjas (1994) study how trade and immigration served to augment US labour supply. For that purpose, they first note that imports embody labour thus serving to augment effective domestic labour supply and therefore the huge US trade deficit of the 1980s implied a 15% increase in the labour supply. Since most of the imports were unskilled-labour intensive, it also implied an increasing ratio of unskilled to skilled effective labour supplies. Second, they show that from the 1960s to the 1980s, an increasing proportion of immigrants were from developing countries and thus relatively less skilled. It follows that both trade and immigration increased the supply of unskilled labour relative to skilled workers in the 1980s.

The prediction of HO model is that, in the long-term, factor prices are equalised throughout the world. This factor price equalisation argument (Stolper-Samuelson theorem) seems at first sight to be supported in reality because, on the one hand advanced countries export commodities to less-developed countries made with relatively skilled labour, and on the other hand they import commodities from less-developed countries produced by unskilled labour. In other words, the flows of goods between advanced countries and less-developed countries seem to accord with the HO model well enough. Therefore, the increased wage inequality might be explained by North-South trade and its theoretical associated factor price

equalisation. However, two main criticisms have been levelled against this view. First, as pointed out by Bhagwati and Dehejia (1994), economic reality differs from the underlying assumptions of Stolper-Samuelson theorem. For instance, it is not reasonable to assume, especially when one deals with North-South trade, that tastes and technology are identical, that there are no scale effects, and that countries are incompletely specialised. Moreover, as far as wages are concerned, factor price equalisation means that there exists a single global market. There is considerable evidence that domestic market developments have effects on wages and consequently, that the argument for complete wage equalisation is an extreme one.

Secondly, several predictions from HO theory have failed to be met in practice. For instance, the standard Stolper-Samuelson prediction would be that unskilled-labour-abundant poor countries would display egalitarian income trends in the face of globalisation. Many studies report no such egalitarian trends. In southern countries, wage inequality did not fall after trade liberalisation, but rather rose.

Concerning developed countries, the prediction of HO theory that growing international trade has contributed significantly to the growing immiseration of low-skilled workers has been subjected to two sets of empirical tests. One set of studies concentrates on the « factor content » of import and export industries in order to estimate the implicit change in factor endowments in advanced countries due to trade. Standard factor-content analysis (Borjas *et al.*, 1992; Sachs and Shatz, 1994) indicates that trade accounts only for 10 to 20% of the overall fall in demand for unskilled labour needed to explain rising wage differentials or rising joblessness. Even Wood's (1994) adjusted factor content analysis concludes that trade accounts for about half of the requisite fall in demand for labour.

The second set of studies exploits price data to see if increased imports from less-developed countries have induced major drops in the prices of goods produced by low-skilled-northern workers. This would reduce demand for the labour of the latter and lower their pay

or disemploy them. Lawrence and Slaughter (1993) and Sachs and Shatz (1994) conclude that relative prices exerted some pressure on the pay of the less-skilled, but not by enough to account for a significant widening of wage inequality. Moreover, Berman, Bound and Griliches (1994) point out that the ratio of unskilled workers relative to skilled workers fell in the 1980s in all sectors (tradeable and non-tradeable), a result that supports the view that trade is not the prime cause of the decline in demand for the less skilled. This result also suggested that a more general explanation of rising wage inequality should be found.

Given the previous results from two sets of studies, many authors concluded that trade was not an important source of rising wage inequality that has occurred since the 1970s. It was however obvious that import from developing countries have risen since 1970 but remained significantly low accounting for less than 2.5% of the GDP of developed countries in 1990.

It appears that growing trade with South is not a sufficient explanation for growing wage inequality. Trade globalisation does not seem sufficient to explain that lower pay for low-skilled workers in Northern countries. Indeed, another feature of the globalisation process have contributed to erosion of the incomes of the less skilled workers is increasing global movement of capital. The threat of relocation of industries offshore and demands for quick, high returns from the owners of highly mobile capital have eroded wages, particularly among unskilled workers. In other words, the threat to import cheap goods from the South or to move plants to developing countries to produce at a lower cost suffice to force low-skilled-northern workers to take a cut in pay to maintain employment. Such phenomenon is not taken into account by the « factor content » analysis nor by the studies based on prices of goods produced by low-skilled-northern workers. This is obvious for the former while for the latter, prices could remain stable or relatively stable even with cheaper labour because markups by firms involved in this process are increased.

### **3. Growing Wage Income Inequality and Skill-Biased Technological Change**

There is a wide agreement about the fact that new technologies are changing the face and the nature of today's workplace. The introduction of these new technologies has, among other, widened the skill gap between two groups of workers. Gaining ground in the new labour market are more-skilled, better-educated workers who are capable of embracing technological change in their jobs. Falling out of favour and lagging behind in wages are workers lacking the education and skills needed to master new technologies. This phenomenon is referred as « skill-biased » technological change.

Many economists such as Bound and Johnson (1992), Machin (1996), believe that a main cause of rising wage inequality lies in the spread of technologies (particularly computers), and that this has led to a transformation of the world of work. As pointed out many years ago by Schumpeter (1954), technological change is a force of « creative destruction » and it generates new jobs and industries as it destroys existing ones. These economists argue that the rapid adoption of new technologies has driven up demand for workers skilled in the use and development of new technologies, and since such workers are in short supply, market forces have driven up their wages. At the same time, demand for unskilled labour drops and the wages of the unskilled therefore fall, widening the income gap still further.

In his study, Siegel (1999) directly examines the labour market implications associated with the implementation of new manufacturing technologies. One of his conclusions is that new technologies lead to greater empowerment for skilled workers. Therefore, it seems that the adoption of skill-biased new technologies implies a firm-level endogenous process which reinforces the bias against unskilled workers. The existence of this bias clearly suggests that technological change rather than globalisation could be the main culprit of growing income inequalities and that the pervasiveness of this technological change is also important. The

more pervasive is skill-biased technological change, the greater is the decrease in embodied supply of less-skilled work in products, and the greater the depressing effect on their relative wages through world goods prices. Several empirical studies confirm the implications of pervasive skill-biased technological change. First, across OECD countries, most industries have increased their proportion of skilled-workers employed despite rising or stable relative wages. Secondly, in developed countries increases in demand for skills are concentrated in the same manufacturing industries.

There is strong evidence that technological change has caused most of the fall in demand for unskilled workers over the past two decades. Murphy and Welch (1993) showed that the demand for skill increased significantly over the 1940-1990 period. Over the full period and for each of the five decades, they found that employment shifted from less-educated and lower-paid occupations towards more-educated and higher-paid occupations. So, the downward trend in demand for unskilled workers has been happening for many decades, and was formerly more or less matched by the long-term downward trend in the supply of unskilled workers caused by the expansion of education. Furthermore, Murphy and Welch did not find that the demand for skill grew particularly rapidly during the 1970s and 1980s, a period when wage inequality expanded in comparison to the three earlier decades. In the last two decades, it is obvious that the fall in demand for unskilled workers suddenly accelerated. However, as noted by Wood (1998), despite the diffusion of computers, there is little hard evidence that the speed of technical change, or its bias against unskilled workers, increased in this period.

All these observations lead some economists such as Wood to dismiss skill-biased technological change as a potential explanation of the decline in the relative wage of less-skilled-northern workers. These authors also support their point of view by pointing out that labour and total factor productivity growth both slowed during the period when inequality was

rising. In addition, the pattern of increasing wage inequality in the North favours a trade explanation since there are no cross-country associations between inequality trends and technological progress rates.

One could also note that after twenty years into the computer revolution so many (most in developed countries) have acquired the appropriate skills and, therefore, differentials in computer skills could hardly be a major explanation for growing income inequality. While educational differentials narrowed in OECD countries, wage differentials increased sharply.

Another criticism of this approach is based on the fractal nature of the rise in inequality. For instance, Juhn, Murphy and Pierce (1993) showed that whilst the educational premium fell in the 1970s and rose in the 1980s, within-group inequality has risen steadily since the early 1970s. More generally, no matter how narrowly groups are defined through different variables (such as experience, education, gender, race, occupation, industry and so on), the increase in wage income inequality does not disappear.

This criticism has been countered to some extent by Aghion, Howitt and Violante (1999). They claim that rising within-group inequality may be explained, on the one hand, by the existence of unobserved skills, and on the other hand, by the complementarity of innate ability with the new technologies. More specifically, they assume that the speed and nature of technical change interact with the dynamics of workers' knowledge to determine the returns to unmeasured skills, and to shape wage inequality within educational cohorts. Nevertheless, even if the notion that « equalising formal skills will equalise incomes » is dismissed because within-group inequality occurs, the hypothesis that skill-biased technological change has been the main cause of growing wage income inequality in recent decades is not rejected.



#### **4. Interdependence between Globalisation and Technological Change**

The two previous sections have shown that both explanations of the widening wage gap are subject to criticism but that neither the significance of the influence of globalisation nor technological change on this gap can be wholly rejected. In fact, both explanations have substance. Moreover, it is somewhat dubious to pretend, via empirical work, to attribute to each explanation its share of responsibility.

Our purpose in this section is to demonstrate that globalisation and technological change are not independent and that they positively interact. In other words, globalisation promotes technological change and the latter helps the growth of the global economy. This interdependence is better understood if accept that we do not live in the type of world as imagined by Ricardo or Hecksher and Ohlin.

Today, most factors of production are mobile across countries and multinationals, able to locate plants and hire workers almost anywhere in the world, have replaced national companies as the cutting edge capitalist organization. Product cycles, especially international product-cycles, are the staples of modern international exchange and outsourcing is also well developed. Dealing with the latter by considering intermediary goods rather than international trade based only on final goods, as most empirical studies have done, Feenstra (1998) obtained an interesting result. He found that globalisation contributed to the decline in demand for unskilled-labour demand in all sectors, including the non-traded sector.

In our current economic world, it is not so much factor endowments but intellectual property that is the basis of much international exchange. Consequently, globalisation and innovation are clearly linked. As noted by Wood (1998), the increased pressure of competition coming from the South has provided an incentive for northern firms to innovate. It is well known that greater competition is likely to provide an incentive for firms to increase their economic performance through cost-saving innovations and to enhance the quality of

their products. However, this innovative-defense of firms from higher-income countries is only a part of the story. In fact, offensive technology-based competition can be important. As a result of globalisation, the market size of any product is enhanced. Firms that produce technology-intensive commodities try to enlarge their market share and therefore, to increase their profits. In fact, this is true for any commodity embodying intellectual property that can be protected. The best way for achieving that purpose is, for the firm, to have a technological monopoly. It should be noted that this innovative-offensive strategy is favourable to the economic interest of global technological leaders, such as the US at this time in its history.

There is much empirical evidence that technological change has also promoted globalisation. The reduction of costs associated with transport or with communication have extended the number of internationally tradeable goods and services.

In some cases, the link between technological change and rising inequality is direct. As shown by Tang and Wood (2000) and Anderson (2001), the reductions in travel and communication costs increase wage inequality in developed countries, by raising the productivity and earnings of a small group of highly-skilled workers. The latter are a small class of managers, designers, engineers and other top business professionals whose services are needed for the production of high-quality goods, particularly new ones, which command a premium price on world markets. For various reasons, such people live mainly in the North, which has therefore long had a near-monopoly of the production of high-quality goods. Recently however, it has become profitable to move part of the production of these goods to the South because northern-based workers can now co-operate with southern workers more cheaply, through frequent short visits bridged by telecommunication, as a result of improvements in travel and communications facilities. Technological change has therefore, on the one hand, increased the earnings of highly-skilled workers by widening the market for their services, but, on the other hand has tended to lower the wages of other northern workers

by eroding their privileged access to joint production with highly-skilled workers. The lowering in complementarity is initially greatest for unskilled workers but then spreads to medium-skilled workers.

## **5. Policy Responses**

There is a broad agreement on policy responses between those who attribute the rise in labour market inequalities to globalisation and those who attribute it to new technology. All favour better education and training, using taxes and public spending to raise the demand for unskilled labour, and redistribution of income.

As we will see below, each of these policy responses is not fully effective. However, let first us deal with the most intensely debated policy response, namely protectionism.

It is widely agreed that blanket or widespread protectionism is not desirable. However, North-South trade often consists of inter-industry trade, i.e. the trade of different products from different industries. This type of trade can require that adjustment be made by an entire northern industry. Indeed, the entire workforce of an industry could face change due to new, low-cost producers. This type of industry adjustment prompts demands from the industry and employees to remove the threat from foreign producers. Selective protectionism on the ground of national interest can still have some validity. However this validity holds only in the short-run and is different from the one associated with List's infant industry argument. It should be noted that while List's theory is quite powerful, it is not suited for solving the income inequality problem we consider. Indeed, infant industries are likely to be skill-intensive ones. Therefore, the protection of infant industries would not help unskilled labour much.

The demand for protection does not come only from unskilled workers and declining industries. Indeed, this demand is much more important in Western countries because political power and economics can hardly be divorced. The global power of the North has enjoyed

until now has been based on its superior technologies. Once the North loses its superiority, its global political power will diminish relatively. To some extent, retention of national power and globalisation are in conflict. Through globalisation, the quest for profits internationally spreads new technologies at a rapid rate, a process which may contribute to the reduced political power of Western nations.

Protection may also be justified on income distribution grounds. For instance, in 1929, the Bridgen Committee (Brigden *et al.*, 1929) noticed that in Australia tariffs for protection of secondary industries (which were labour-intensive) was the cornerstone of the Australian « social contract ». Protection was a mean of redistributing rents from primary industries (in which Australia had international competitive advantages) to other industries and ultimately to labour. With higher wages in all industries, it is difficult to say, even now, whether or not this protection, which lasted until the early 1980s, imperilled long-term living standards. This confusion is reinforced by the fact that higher wages were also a mean for Australia to attract immigrant workers possibly thereby to ensure its economic prosperity.

It should also be noted that currently the threat of protectionism may inadvertently play a socially useful role. It may reduce the reluctance of the skilled gainers from globalisation to pay the taxes needed to finance assistance to unskilled losers. The political alternative might be a return to protectionism.

Nevertheless, it is often believed that protectionism will not redress the growing income inequality problem in OECD countries and that it is not a viable long-term strategy for improving living-standards. Attempting to maintain a status quo industrial structure in the face of global change is a short-sighted strategy. High tariffs and levels of protection insulate domestic producers from overseas competition, but over time, as international competitors increase productivity, the gap between domestic and foreign producers grows. So, too, will the gap in living standards. Also, the longer protection lasts, the more difficult it becomes

politically to liberalise as the adjustment shock to domestic producers will become that much greater.

Even if higher degree of widespread protection is not a suitable strategy for improving living standards in the long-term, free trade is not necessarily desirable. Indeed, without protection, competition may be too intense. As pointed out by Schumpeter (1954), some degree of moderation of intense market competition can stimulate long-term development. The present trend in globalisation may be towards the situation where some markets are becoming too competitive to provide maximum long-term benefits.

Broad globalisation involving intense competition may leave firms with insufficient profits to innovate (Svizzero and Tisdell, 2001) or create so much uncertainty that innovation is imperilled. Consequently, protection for a period of time, especially of market niches (Tisdell and Seidl, 2001), may be important for technological progress to occur at a sustainable rate of growth. It may also be possible that, due to competitive pressure, some markets become too industry-concentrated globally to provide long-term economic benefits (Tisdell, 1999). Therefore, too much protection as well as too much competition is not optimal from an economic point of view.

Finally, we consider the view of Lustig (1997) about protectionism that even if trade protection may bring small, short-term relief for unskilled workers, this will be at the expense of lower growth and living standards – including those of less-skilled workers – in the future. However, this familiar conclusion is not necessarily true. Indeed, sometimes income distribution consequences can favour protection. For instance, if the reduction in growth due to protection is small and living standards are a little lower than otherwise, these disadvantages could be out-weighted by the income distributional advantages. Dynamic efficiency arguments (related to innovation) can also justify protection. So, trade protection

should not be ruled out entirely as a policy option even if it is probably undesirable to use it as a long-term income support for an industry or sector.

A more fruitful alternative may be to pursue policies designed to upgrade the education and skills of the working population. However, several critics may be addressed to this policy. First, subsidising education is more or less a kind of protectionism. Secondly, it is not necessarily effective, i.e. not everyone has the same ability to learn. Moreover, the research evidence on workers training suggests that existing public programs are expensive and that correcting deficiencies in basic schooling is difficult, costly, and sometimes impossible, once a person enters the workforce. Thirdly, it is possible for Governments to hold out an educational program and to support new chances for individuals but it is only a promise to say that the educational and career ladders will become shorter and wider as result of an increase in the numbers crowding their way up the rungs of the ladder.

In depth analysis of the role and performance of educational systems is required to determine the likely effectiveness of the policy of increasing the amount of education in order to reduce income inequality. While greater access to education and supply of education might be favoured in Western countries because this can promote social justice and economic growth, analysis suggests that is unlikely to be an effective vehicle to promote greater equality of income. In fact, it may very well do the opposite.

First, it should be observed that education in itself does not reduce inequality in a market economy. For example, Juhn *et al.* (1993) found a sharp rise in income inequality among all sets of individuals in Western countries, including those with similar levels of education. The reasons could be varied. These may include the possibility that the education of some was inappropriate for commercial needs or became obsolete with the development of new technologies. Secondly, different individuals can have very divergent abilities to absorb and utilize the same amount of education, and this divergency may become more apparent as

the amount of information and education imparted to individuals increases. Thus, production capabilities of individuals become more divergent with rising but equal exposure to education. When these differences can be detected (e.g. are appropriately signalled), they will be reflected in the market systems in diverging incomes for those with the same level of formal education. If the signalling of the education systems is imperfect (as seems likely), further inequality within a group with the same formal education might, up to a point, be explained by the presence of unmeasured skills as suggested by Aghion, Howitt and Violante (1999), see above.

In summary, two important functions of educational systems are (1) to act as means to embody human capital in individuals and provide an economic return from such capital (Weisbrod, 1962; Blaug, 1965); and (2) to select the able from the less able individuals in relation to their expected future performance in the economy and society (Riley, 1979; Spence, 1974). It is contended here that increasing equally the amount of investment in education of all individuals (in order to raise the amount of human capital embodied in individuals) can be expected to increase the extent of inequality of the value of their productivity. The inequality will be even greater if the more able obtain relatively more of this investment (cf. Tisdell, 1982, section 14.7).

Either way, inequality of income in market economies will tend to increase. Secondly, if the educational system becomes more efficient in sorting the able from the less able in relation to their future economic potential, the incomes of the former can be expected to diverge more sharply from the latter due to improved signalling (cf. Spence, 1974; Varian, 1996, pp.636-641). Whether or not educational systems will become better or worse signalling devices in the future is unclear. In democratic societies, there is a possibility of the latter occurring, in which case extra economic inefficiency is introduced into the system.

In any case, it is abundantly clear that the educational policy response to growing inequality should be subjected to deeper and more critical analysis. While greater expenditure on education in Western societies may be justified, more expenditure on education in order to counteract the growing income inequalities of recent years may prove to be counterproductive in reducing relative income inequality. Increased investment in education or a more effective educational system may need to be combined with greater income and social support of losers in the system. But the Western world is faced with a dilemma in this respect.

The policy response consisting in greater compensation via more provision of social services for the losers is not easy to implement. Freedom in capital movements has put pressure on tax rates because multinational firms have become more sensitive to tax considerations when deciding where to locate their operations. Consequently, Government revenues are upper bounded and often Governments are engaged in international fiscal competition. Unfortunately, this policy, when adopted by several countries, may lead to a Paretian inferior outcome which constitutes a Nash equilibrium (Tisdell and Svizzero, 2001). Furthermore, in a fiscal competitive situation, social welfare services will be cut, resulting in sharp increases in inequality. Finally, some Governments (for instance those of European countries that have adopted the Amsterdam Stability Pact) are required to keep their public deficit close to zero. For that purpose and given the fact that low tax rates on mobile factors are necessary to attract foreign direct investment, higher tax rates on less-mobile factors must be implemented in order to maintain the level of Government revenues. Given the fact that unskilled labour may be one of the less-mobile factors internationally, it may not be possible to provide income-compensating social services to unskilled labour and indeed, it is possible that tax rates on such labour might increase and further erode their incomes. The increased use of regressive-type taxes points to the latter effect.



The third policy tries to combine greater labour market flexibility to encourage employment with changes to taxation and social security in a way that specifically improves the distribution of income. As shown by Dawkins and Kenyon (2000), a central feature of such a policy is to allow the pre-tax wage distribution to widen but institute a system of tax credits at the lower end of the wage distribution for low-wage earners. This is equivalent to the Earned Income Tax Credit implemented in the US in 1975 and strengthened since 1993. Since 1996, its largest tax credit corresponds to 40% of any annual income less than 9.000 dollars. While allowing flexibility in relative wages, so that wages faced by employers adjust, employment for low income earners is preserved. Tax credits ensure that after-tax wages for low-income workers would not be reduced. A long-run extension of this policy is the full integration of tax with social security payments in the form of negative income tax system, i.e. a policy identical to the one suggested many years ago by Friedman (1962).

As for the previous policy, a possible obstacle appears to be the problem linked with international fiscal competition (cf. Tisdell and Svizzero, 2001). Indeed, the reduction of wage inequality is possible via income distribution based on tax schemes if Governments have enough revenues, that is, if they are not engaged in excessive international fiscal competition. It should be observed that differences in tax rates between countries on mobile but also less-mobile resources (such as unskilled labour) can cause severe misallocation of resources globally.

## **6. Concluding Comments**

Globalisation as well as skill-biased technological change has contributed to the growing wage income inequality problem in OECD countries. Both phenomena are not independent but are linked, each one reinforcing the other. Once both explanations are reconciled, it remains unfortunately that there does not seem to be a quick policy mix for solving the

problem. Any solution seems to require international agreement to limit fiscal competition, and such agreement will be difficult to achieve if not impossible.

Solutions by individual nations to the growing income inequality problem in northern countries seem now to be hardly possible. International cooperation (especially to limit fiscal competition) is needed to ensure adequate welfare benefits and public good provision.

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