
CENTRE FOR RESEARCH ON GLOBALISATION AND LABOUR MARKETS



Research Paper 99/5

**Globalisation and Wages:
A Tale of Two Perspectives**

by

Matthew Slaughter

**Centre for Research on Globalisation and Labour Markets, School of Economics,
University of Nottingham**

The Centre acknowledges financial support from The Leverhulme Trust under
Programme Grant F114/BF

The Authors

Matthew Slaughter is Assistant Professor of Economics in the Department of Economics, Dartmouth College, New Hampshire and NBER Faculty Research Fellow.

Acknowledgements

This article is based on the inaugural World Economy Lecture delivered at the University of Nottingham on September 17, 1998. For the invitation to deliver this lecture the author thanks David Greenaway. The author acknowledges financial support from the Russell Sage Foundation. The discussion of trade policy in the paper's penultimate section represent only the author's personal opinions and in no way represent the views of the NBER.

Globalisation and Wages: A Tale of Two Perspectives

by

Matthew Slaughter

Abstract

This paper aims to provide an overview of recent research on the causes of rising wage inequality - particularly the rising skill premium - in the United States and other countries. I argue that most recent research has used one of two methodologies: the "labour" approach or the "trade" approach. These two approaches are distinguished by their modelling of the national labour-demand schedule: from the labour perspective this schedule slopes downward everywhere, but from the trade perspective it has infinitely-elastic segments. These different demand schedules imply very different empirical strategies for analyzing the causes of rising inequality. Finally, I speculate on how likely a "protectionist backlash" is in response to rising inequality. I argue that, unfortunately for proponents of free trade, such a backlash is already underway - particularly with respect to setting the terms of trade-policy debate in the United States and other countries.

Outline

1. Introduction
2. Some Basic Facts About Recent Wage Developments in the US and Other Countries
3. Explaining the Causes of Rising Inequality: A Tale of Two Perspectives
4. Will There be a Protectionist Backlash Against Globalisation?

1 Introduction

In the early 1970's the U.S. labour market experienced a fundamental change that altered the growth in real earnings in two important ways. First, average real earnings began growing much more slowly. Second, earnings started becoming much more unequal across workers. This rise in inequality has occurred both between workers of different skill levels and among workers within the same skill level. Together these trends mean that tens of millions of American workers have experienced stagnation or even absolute declines in their real earnings for over 25 years. For many less-skilled workers, the declines have been staggering and largely unprecedented this century. Wage changes in other developed countries have been more mixed, with some similarities to the U.S. experience but important differences as well.

Rising wage inequality and the slowdown in overall real-wage growth are now undisputed facts, both of which have drawn considerable research interest from economists. Many researchers have tried to link these wage changes--particularly the rising skill premium--to the basic causes of shifts in labour supply, labour demand, and labour-market institutions. Yet there remains a wide range of opinion about the most important causes. There also remains a wide range of opinion about the proper research design to look for various causes. Research has progressed using a wide range of approaches, about which sharp methodological disagreements have emerged which remain largely unresolved.

In this paper I try to clarify some of the methodological debate by offering "a tale of two perspectives." I will argue that almost all research to date has used one of two methodologies: the "labour" approach or the "trade" approach. These two approaches are distinguished by how they model the national labour-demand schedule. From the labour perspective this schedule slopes downward everywhere, but from the trade perspective it has infinitely-elastic segments. These different demand schedules imply very different empirical strategies for analyzing the causes of rising inequality. For each perspective I will try to clarify the link from the underlying labour-demand theory to the appropriate empirical strategies. Overall, the answer to the question of which research approach is "correct" depends at least partly on which theoretical perspective one thinks is "correct." After presenting these two perspectives, I finish by speculating on the likelihood of a "protectionist backlash" in response to rising inequality. I will argue that, unfortunately for free-traders, such a backlash is already underway --

particularly with respect to controlling the terms of trade-policy debate in the United States and other countries.

The paper has four further sections. Section 2 summarizes the key labour-market outcomes that much recent research has tried to explain. Section 3 offers my tale of two perspectives. Section 4 discusses the trade-policy implications of all this. Section 5 concludes.

2 Some Basic Facts About Recent Wage Developments in the United States and Other Countries

Since the early 1970s the U.S. labour market has been changing in two important ways. First, earnings have become much more unequal, both between more-skilled and less-skilled workers and among groups of similarly-skilled workers. Second, real-wage growth has slowed considerably. This Section summarizes these developments both for the United States and for other developed countries¹.

Consider first the rise in the skill premium. This has been going on since the late 1970s across all skill measures such as education, experience, and job classification. For example, in 1979 male college-educated workers earned on average 30% more than male high-school-educated workers. By 1995 this premium had risen to about 70%. Within the class of male high school-educated workers, workers at the 90th percentile of the wage distribution earned 60% more than those at the 50th percentile in 1979. By 1995, this "90/50" gap had reached 83%. Figure 1 shows rising U.S. inequality in terms of job classification. It shows for U.S. manufacturing the average annual wage of a nonproduction worker to the average annual wage of a production worker. This skill premium generally declined from 1958 until around 1979; since then it has risen almost continuously by about 10% per annum. Looking at the overall wage distribution reveals a similar picture of rising inequality. Between 1979 and 1994 the ratio of the earnings of a male worker at the ninth decile compared with one at the median rose from 1.73 to 2.04. At the same time the earnings of that median male worker rose from 1.84 to 2.13 times the earnings of a worker at the first decile².

¹ There are a number of excellent references for more-detailed information on these facts, such as symposia in the Summer 1995 and Spring 1997 issues of the *Journal of Economic Perspectives* for the U.S. experience, and Freeman and Katz, 1995, for international evidence.

² These basic facts on relative earnings come from the 1997 Economic Report of the President, which devotes two

In addition to the rising skill premium, U.S. inequality has risen not only between workers of different skill levels but also among workers within the same skill level. Among workers in the same occupation or with the same years of schooling and age, the higher-paid have had larger increases in earnings than the lower-paid. Moreover, it appears that earnings inequality has risen within virtually all occupations. Inequality within groups, i.e., "residual inequality," is an important part of overall inequality changes³³. U.S. residual inequality has risen steadily since the early 1970s, several years before the skill premium began rising. This accounts for approximately half of the overall rise in wage inequality. Even if the skill premium were to return to its 1979 level, overall U.S. inequality would still have been rising.

The large, steady rise in U.S. earnings inequality is far from a global phenomenon. Many OECD countries experienced rising inequality during the 1980s, but most -- the United Kingdom being a notable exception -- by lesser amounts. Table 1 reports average five yearly changes in the ratios of the ninth decile to the median and the median to the first decile. Only the United Kingdom and the United States have continued to experience a rapid rise in inequality into the 1990s. While the tendency towards increased inequality appears to have slackened somewhat, only a few countries, notably Canada, Finland and Germany have actually experienced a decline in earnings dispersion over the last five or ten years. It should also be noted that the rise in U.S. inequality appears to pre-date increases occurring elsewhere. As for residual inequality, in the United Kingdom this declined in the 1970s and then rose while in France it has generally been flat.

Although most OECD countries did not experience as sharp an inequality rise as the United States, many suffered much larger increases in unemployment instead. Table 2 presents unemployment outcomes from 1973 through 1993 for a number of OECD countries. On average, inequality increased less while unemployment increased more in Europe than it did in the United States. However, there are a number of countries that are important exceptions. Of

chapters to labour markets and inequality. Inequality has risen across education, experience and occupational groups as well as within these groups. The exact timing and magnitude of the changes vary somewhat with the measures used, but all standard measures show dramatic changes. For various cuts on the data, see Bound and Johnson (1992), Davis (1992), Katz and Murphy (1992), or Lawrence and Slaughter (1993).

³ Residual inequality is usually estimated from a regression of log hourly wages on a set of education, experience and race dummies with interactions, separately by year and gender.

particular interest is the United Kingdom which experienced both a rise in earnings inequality and a rise in unemployment. Countries with a similar mix (albeit with less inequality) are Australia, New Zealand, and Canada. The unemployment experience of Belgium looks much like that in the United Kingdom despite the fact it experienced a decline in inequality over the period. Unemployment in the Netherlands has been low and declining in the 1990s, alongside only a small rise in earnings inequality. Similar to the Netherlands are Austria, Japan, and Sweden. The experience of other OECD countries has been more mixed. It is widely thought that most European countries have more labour-market rigidities than the United States. This fact could explain the mix of inequality-unemployment changes across the two groups.

The second important change in the U.S. labour market has been sharply slower growth in average real earnings. In the hundred years to 1973, real average hourly earnings rose by 1.9% per year. Since 1973 CPI-deflated real wages have fallen by about 0.4% per year. U.S. workers at the low end of the earnings distribution have suffered the most, particularly those in the lowest decile. For example, the real hourly earnings of male high-school-dropouts fell by 20% from 1979 to 1993⁴. In contrast, there has been considerable growth in real earnings at the top of the earnings distribution. Senior managers and executives have experienced large increases in real earnings over the last couple of decades, and especially so when total compensation including stock options are included. In contrast to the United States, most OECD countries (including the United Kingdom) have enjoyed ongoing real-wage growth across the wage distribution. For only one or two countries (New Zealand and Australia) has a rise in earnings inequality implied weak growth, or even declining real wages for workers at the bottom half of the earnings distribution⁵.

Combined with sluggish growth in real wages of all workers, rising wage inequality has meant *absolute stagnation or even declines in real wages for the majority of the U.S. labour force*. As just discussed, in most other countries rising inequality has not had such adverse real-wage implications thanks to rising real wages at most levels of the skill distribution. In the next section I offer an overview for understanding recent research attempting to explain rising inequality.

⁴ Freeman (1995) and Mishel and Bernstein (1994) report declines of this magnitude.

⁵ For more information on changes in real wages see Freeman and Katz (1995).

3 Explaining the Causes of Rising Inequality: A Tale of Two Perspectives

3.1 The Overall Framework: Demand, Supply, and Institutions

Applying the basic economists' tool kit, there are three main candidates to explain rising inequality: shifts in relative labour demand, relative labour supply, and labour-market institutions. The usual suspects include international trade, technological change, the composition of aggregate demand, demographic trends, immigration, declining real minimum wages, and deunionization.

There have been literally hundreds of academic studies over the past several years exploring the causes of rising inequality, particularly the rising skill premium. And during this time sharp disagreements have arisen about the proper methodology for identifying these causes. I think that this body of research and its disagreements can be best understood as "a tale of two perspectives." Most research to date has used one of two methodologies: the labour approach or the trade approach. These two approaches are distinguished by how they model the national labour-demand schedule: from the labour perspective this schedule slopes downward everywhere, but from the trade perspective this schedule has infinitely-elastic segments. As I explain below, this difference stems largely from different assumptions about the number of products. The labour approach assumes a single output sector, whereas the trade approach assumes multiple output sectors.

Not surprisingly, these different demand schedules imply very different empirical strategies for analyzing rising inequality. To contrast the two, I first present the labour perspective and then the trade perspective. For simplicity, my presentation assumes there are just two factors of production, skilled and unskilled labour. This means the national labour market can be easily described by a national relative-demand schedule and a national relative-supply schedule. Also, to stress differences I do not address labour-market institutions: in both perspectives these can matter.

3.2 The Labour Perspective

Studies from the labour perspective either implicitly or explicitly assume there is a single aggregate-output sector. This makes it easy to derive the national relative-demand schedule for

labour, because the demand schedule for a single profit-maximizing firm can simply be aggregated up for the entire country. As Hamermesh (1993, chapter 2) shows, for a single firm the own-price elasticity of demand for labour is negative, both because of a substitution effect and a scale effect. Thus, relative demand between skilled and unskilled labour is inversely related to the skill premium, conditional on production technology and product prices. To obtain the national labour-demand schedule, simply aggregate this relationship across all firms in the country.

Figure 2 graphs national labour-market equilibrium from the labour perspective. The RD curve is national relative labour demand, sloping downward as just described. The RS curve is the national endowment of skilled labour relative to unskilled labour⁶⁶. National labour-market equilibrium is given by point E where the two curves intersect. How can the skill premium rise? By some combination of a shift right in RD and/or a shift left in RS. I consider each in turn.

First, what can shift RD? The primary culprit is skill-biased technological change (SBTC). In a one-sector world the effect of technological change on RD depends entirely on the factor bias -- i.e., on what factor of production the technological change raises the relative marginal productivity of. SBTC shifts RD to the right, unskill-biased technological change shifts RD to the left, and Hicks-neutral technological change does not shift RD and thus does not affect the skill premium. Accordingly, to see if technology has contributed to rising inequality one needs to establish the existence of widespread SBTC.

There is a now very large empirical literature documenting this, primarily for the United States but also for other countries. Some key references here include Autor, Katz, and Krueger (1998); Berman, Bound, and Griliches (1994); Berman, Bound, and Machin (1998); Bound and Johnson (1992); and Katz and Murphy (1992);. A lot of the empirical evidence is broadly based on skill upgrading, i.e., the fact that within industries the relative employment of skilled workers has been rising. The ongoing rise in the skill premium should induce a reduction in the relative quantity of skilled labour demanded, *ceteris paribus*. Skill upgrading in the face of

⁶⁶ The RS curve is vertical under the assumption that all workers are sufficiently willing to work that they price themselves into employment regardless of the going relative wage. If workers make some explicit labor-leisure trade-off then RS slopes upward but is not vertical.

the rising skill premium is thus prima facie evidence of SBTC. For example, Figure 3 shows skill upgrading for U.S. manufacturing as a whole. When set against the rising manufacturing skill premium in Figure 1, Figure 3 looks suspiciously like SBTC. In addition to evidence on skill upgrading, studies have also linked SBTC to plausible driving forces such as computerization and R&D expenditures.

What shifts the RS curve? From the labour perspective, international trade is one possibility. The reason is that internationally traded goods embody the services of factors of production. For example, because the United States is well endowed with skilled labour relative to the rest of the world, it exports lots of skilled-labour services (in products like aircraft and software) and imports lots of unskilled-labour services (in products like textiles and toys). This intuition of trade in factor services has led some labour researchers to calculate the effect of trade on wages as follows. First, use input-output tables to translate observed trade flows into the quantity of embodied factor services. Then treat these factor-service quantities as shifts in the "effective" U.S. labour supply (i.e., supply of people plus supply of factor services embodied in trade flows) which, when interacted with the appropriate labour-demand elasticity, can quantify the effect of international trade on wages. Thus, trade is treated as a force shifting the RS schedule. Trade tends to increase U.S. inequality by shifting RS leftward thanks to the flow of factor services described above. Researchers including Wood (1995) and Borjas, Freeman, and Katz (1992, 1996, 1997) have used this "factor content" approach. But these studies find rather small trade effects, particularly for sample years beyond 1985 when the U.S. trade deficit was declining.

Another important RS shifter can be immigration. In recent decades rising immigration into the United States has steadily increased the share of immigrants in the total population. Borjas, Freeman, and Katz (1997) report that this share rose from 4.8% in 1970 to 6.2% in 1980 and to 7.9% in 1990. And recent immigrants tend to have much lower education levels than the typical U.S. worker (Borjas, 1994), so they tend to shift RS back. Borjas, Freeman, and Katz quantify immigration's RS shifts; they find evidence that U.S. high-school dropouts in particular have experienced downward wage pressure from immigration inflows⁷.

⁷ Within this literature on immigration's wage effects there is a debate about whether immigration inflows have

Beyond immigration, domestic demographics can drive RS shifts. For the U.S. case, many researchers have focused on the baby-boom generation. This swell in the U.S. population increased college enrollments and skilled entrants into the labour force during the 1970s; since then this swell has slackened (see, for example, Katz and Murphy, 1992). The overall U.S. labour-supply mix is depicted in Table 3, which reports the share of the total U.S. labour force accounted by each of four education groups and then an overall summary statistic of the skill mix. The ongoing shift towards a higher skill mix is apparent in Table 3. The last column, however, shows that the rate of this shift has varied over time. As just described, the shift accelerated in the 1970s and has since then decelerated.

Can the labour perspective tell a coherent story for the fall and subsequent rise in the U.S. skill premium? Yes. On the demand side, a large body of evidence has documented that SBTC has been going on for decades. This has been raising the relative demand for skilled workers. On the supply side, immigration and trade have been working to reduce the relative supply of skilled workers. The combination of trade, technology, and immigration all work to increase the skill premium. But Table 3 shows that the net skilled labour supply has been increasing for decades, the contribution of immigration and trade notwithstanding. Thus, in terms of Figure 2 both RD and RS have been shifting right over time. Inequality changes are thus accounted for by different shift rates. During the 1970s the baby-boom surge in RS dominated the RD shift and the skill premium fell. During the 1980s the shift in RS slackened (thanks to some combination of the baby-boom passage, immigration, and trade) and RD dominated such that the skill premium rose.

3.3 The Trade Perspective

The key contrast between the labour and trade perspectives is that the latter assumes there are many sectors, not just one. Many fundamental ideas in trade theory, e.g., comparative advantage, require multiple sectors distinguished by their factor intensity. In addition, empirical work on SBTC has documented its pervasiveness across many disaggregated sectors.

Why do multiple sectors matter for labour demand? Consider an increase in skilled-labour

local wage effects or national wage effects, in turn based on a debate about whether the United States should be considered one national labor market or many segmented local labor markets.

supply to the economy. In a one-sector model, the economy can absorb the extra skilled labour only through wage changes. But in a multi-sector model, sectoral outputs can change as well. A combination of higher output in the skill-intensive sector and lower output in the unskilled-intensive sector can potentially absorb the rise in skilled supply. Therefore, in a multi-sector model the national labour-demand schedule reflects both output-mix changes and wage changes.

Among the various trade models, most research on wages from the trade perspective has worked from the Heckscher-Ohlin (HO) model. As I explain below, for deriving the baseline HO demand schedule two other key assumptions are that factors are perfectly mobile across sectors and that the country is open and small, i.e., that it trades freely with the rest of the world in which product prices are exogenously determined. The HO equilibrium obtained by the domestic decentralized optimization of all profit-maximizing firms is equivalent to the country choosing the national output mix that maximizes GNP subject to the constraints of world product prices, national factor supplies, and national production technology (see, e.g., Dixit and Norman, 1980). This optimal output mix consists of both which sectors are produced and production quantities. To derive the national labour-demand schedule, simply vary national factor supplies and see how the optimization problem is resolved as supplies vary.

Figure 4 does this derivation for the case of two factors, skilled and unskilled labour, and three sectors: an unskilled-labour-intensive good, a "middle" factor-intensity good, and a skilled-labour-intensive good (see also Leamer, 1998 and Wood, 1995 for a similar diagram). Start with the leftmost downward-sloping branch, where the relative supply of skilled labour is very low. Given this endowment, the country maximizes GNP by producing only one product, the unskilled-labour-intensive good. A relatively high quantity of unskilled labour is demanded and since skilled labour is relatively scarce, it earns a high relative wage. Now increase the relative supply of skilled labour, but by a small enough amount that GNP is still maximized by producing only the one product. Since only one product is made, there is no scope for output-mix effects and the one-sector intuition holds: to price themselves into full employment, skilled workers' relative wages must fall. The relevant "zero-profit condition" in this endowment range is given by equation (1).

$$P_1 = a_{s1}W_S + a_{u1}W_u \quad (1)$$

Equation (1) says that domestic production costs just cover the exogenously determined world price for good 1, p_1 ; the HO model assumes perfect competition and thus zero profits in all domestically produced sectors. In (1) each coefficient a_{ij} tells the quantity of factor i used to produce one unit of good j (the a_{ij} are optimally chosen by profit-maximizing firms and so depend on production technology and (assuming substitutability in production, wages); and subscripts s and u denote skilled and unskilled labour, respectively. Note that in (1) there are two endogenously determined national wages, w_s and w_u , but only one equation relating these wages to exogenous product prices and production technology. Prices and technology alone cannot determine wages, so labour supplies matter as well.

Now increase the supply of skilled labour until the first perfectly-elastic portion is reached. Here, the country maximizes GNP by producing both the unskilled-labour-intensive product and the middle product. With two products there is now scope for output-mix effects as predicted by the Rybczynski theorem from HO trade theory. Additional skilled labour can be completely absorbed with no change in wages by increasing output of the middle good and reducing output of the unskill-intensive good. Thanks to perfect interindustry factor mobility, the new skilled labour can be employed in middle sector in combination with some skilled and unskilled labour moved from the unskill-intensive sector. Thanks to being open, the country can export to international markets whatever part of this new output mix it doesn't consume. And thanks to being small, the change in outputs going to world markets does not affect world product prices and thus does not induce Stolper-Samuelson wage effects. Thus, the RD schedule has a flat portion where the same relative wage is consistent with a range of quantities of relative labour demanded. This result can be seen algebraically by writing the two zero-profit conditions in equation (2).

$$P_1 = a_{s1}W_S + a_{u1}W_u \quad (2)$$

$$P_2 = a_{s2}W_S + a_{u2}W_u$$

In (2) there are two equations and two unknowns (w_s and w_u). Hence w_s and w_u are completely determined by the prices (p_1 and p_2) and technology (the a_{ij} 's)⁸. For any change in labour

⁸ With Leontief technology the a_{ij} 's are constants. With substitutability, they depend on relative wages as well.

supply, so long as the country continues to make these two products, wages do not change thanks to the process just described. This insensitivity of national wages to national factor supplies Leamer and Levinsohn (1995) call the Factor Price Insensitivity (FPI) theorem.

The remaining portions of RD follow the same intuition. Beyond the first perfectly-elastic portion the country switches to producing just the middle good; on the next perfectly-elastic portion it produces both that good and the skill-intensive good; and on the last downward-sloping branch it produces just the skill-intensive good. Note that because a different set of products is made on each elastic part, each has different relative wages.

This derivation of Figure 4 used an example with 3 goods and 2 factors. But Figure 4 can be reinterpreted for the more general case of M factors and N tradable sectors. With N tradable sectors in the output mix there are N zero-profit equations with M endogenously determined factor prices. If $N > M$, then FPI holds: national factor supplies do not influence wages, only exogenous product prices and technology do. If $M > N$ factor supplies do matter because prices and technology are not sufficient to determine wages. Thus in Figure 4, the infinitely-elastic parts of RD are where $N > M$ while the downward-sloping parts are where $M > N$ ⁹.

Completing the HO labour-market model just requires adding a relative supply schedule to Figure 4. This gives Figure 5, where national labour-market equilibrium is given by point E at the intersection of the two curves. I have assumed that equilibrium holds for a region with FPI: HO trade theory usually assumes more traded sectors than primary factors of production. To see how the skill premium can rise in Figure 5, I first consider shifts in RD and then shifts in RS.

Given the intuition described above for the shape of RD, it is important to emphasize that its

The algebra is more involved, but the results still stands: the two wages are determined by the two output prices and technology parameters.

⁹ Two final comments on Figure 4. First, note that when the number of sectors exceeds the number of factors, output mixes are usually indeterminate. That is, there is no unique optimal output mix that can fully employ all factors in a given endowment. Instead, the range of optimal outputs usually lies in an $(N-M)$ dimensional space. In deriving the RD schedule, for simplicity I focused on output mixes whose relation to the underlying endowments seems most intuitive. Second, the downward-sloping portions of RD assume flexible production technologies which allow substitutability among factors. If technology were Leontief these portions would become vertical.

position depends on product prices and production technology. Hence, changes in prices or technology shift the position of the relevant parts of RD, and wages change to restore zero profits in all sectors. At initial factor prices, any change in product prices or technology means zero profits no longer hold in one or more sectors. Producers respond by trying to expand output in now-profitable sectors and reduce output in unprofitable sectors. Relative labour demand increases for the factors employed relatively intensively in expanding sectors and reduces for the factors intensive in the contracting sectors. To restore equilibrium, at fixed labour supply, relative wages must adjust in response to the demand shifts until all profit opportunities are arbitrated away.

The key empirical implication of this intuition is that the wage effects of changes in product prices and technology tend to depend on their sector bias. Any change which initially increases profits in a particular sector tends to raise the economy-wide wage for factor(s) employed relatively intensively in that sector. In terms of Figure 5, RD tends to shift up when price growth and/or technological progress is concentrated in skill-intensive sectors. Conversely, RD tends to shift down when these changes are concentrated in unskill-intensive sectors.

An important shifter of RD is international trade working through product prices. The Stolper-Samuelson theorem describes how wages tend to rise for factors employed intensively in sectors enjoying rising relative product prices. Deardorff (1994) provides a comprehensive overview of the many different theoretical statements of this theorem. Empirically, many researchers analyzing the rising U.S. skill premium have followed this theorem by examining whether the United States has experienced falling prices for unskill-intensive products relative to the prices of skill-intensive products. Studies here include Baldwin and Cain (1997), Bhagwati (1991), Deardorff and Haikura (1994), Feenstra and Hanson (1995, 1998), Krueger (1997), Lawrence and Slaughter (1993), Leamer (1998), and Sachs and Shatz (1994). Leamer (1998) and Baldwin and Cain (1997) find that U.S. relative product prices fell for unskill-intensive sectors during the 1970s, but these two studies plus Lawrence and Slaughter (1993) and Bhagwati (1991) find no clear trend in relative prices during the 1980s. Thus, changes in U.S. product prices do not clearly match up with changes in the skill premium (see Slaughter (1999) for survey of these product-price studies).

The same intuition for shifts in RD applies to technology: wages tend to rise for factors employed intensively in sectors enjoying relatively large technology gains. This is unambiguously the case when product prices are fixed; if innovation changes product prices as well, wage effects are harder to determine but sector bias still matters in many circumstances. A number of studies have addressed the theory of technology's wage effects in the HO model: Baldwin and Cain (1997), Berman, et al (1998), Bhagwati and Dehejia (1994), Davis (1997), Haskel and Slaughter (1998), Krugman (1995), Leamer (1998), Richardson (1995), and Wood (1995). There is some disagreement among these studies, mainly involving the net wage effects of technological change when product prices are affected as well (Haskel and Slaughter, 1998 try to resolve some of these disagreements). It is important to stress that the wage effects of technological change's sector bias tends to be independent of any factor bias involved as well. For example, in a two-good model with fixed product prices any innovation in the unskill-intensive sector unambiguously lowers the skill premium. This is true even for SBTC, the exact opposite result from what obtains in the one-sector model where factor bias is central.

There have been a few empirical studies of the sector bias of U.S. technological change. Leamer (1998) estimates that the sector bias of total-factor productivity (TFP) raised skill differentials during the 1970s but slightly lowered them during the 1980s. Focusing on SBTC only, for a sample of 10 countries over the 1970s and 1980s Haskel and Slaughter (1998) find a strong correlation between SBTC's sector bias and changes in the skill premium. For example, both the United States and United Kingdom had SBTC concentrated in unskill-intensive sectors during the 1970s but then skill-intensive sectors during the 1980s -- sector biases which match both countries' skill-premium changes. And Feenstra and Hanson (1998) decompose U.S. TFP over the 1980s into parts attributable to computerization (measured several ways) and outsourcing. They find that the sector bias of both these underlying forces were helping raise the skill premium.

What about shifts in RS? Figure 5 shows that if endowment changes are not big enough to change the set of goods produced, then they have no wage effects. Instead, with FPI endowment changes are completely absorbed through Rybczynski output-mix effects. Sufficiently large shifts in RS do change wages by inducing a new set of products to be made and thus dictating a new set of zero-profit conditions for the economy. Again, Table 3 shows

that the U.S. RS schedule has been shifting rightward; if the shifts have been large enough to change wages they would be lowering inequality, not raising it. It is important to note that almost all trade and technology studies cited in the preceding paragraphs assume (either explicitly or implicitly) that any shifts in RS have not been large enough to move the economy to a different flat section of RD with a different set of products. Because this has been assumed rather than demonstrated empirically, it would help to know empirically the relative sizes of the flat and downward-sloping parts of the RD curve. But there is very little empirical evidence on changes in product mix across countries (the United States or other countries as well) and/or time. Accordingly, research from the HO perspective has ruled out any role for RS shifts largely by assumption.

Can the trade perspective tell a coherent story for the fall and subsequent rise in the U.S. skill premium? Yes. During the 1970s the skill premium fell because of a combination of price growth and/or technological progress concentrated in the unskill-intensive sectors; since then the skill premium has risen because these forces were concentrated in the skill-intensive sectors. In terms of Figure 5, the relevant flat portion of the RD schedule shifted down during the 1970s and then shifted back up during the 1980s. Throughout both decades the RS schedule was generally shifting right thanks to domestic demographics and immigration, but these supply shifts had only output-mix effects, not wage effects.

3.4 Reconciling the Two Perspectives

These two different perspectives offer very different views on what empirical evidence is relevant for explaining inequality changes. For example, in the labour model technological change requires the appropriate factor bias whereas in the trade model it often requires the appropriate sector bias. In the labour model trade acts as a supply shifter; in the trade model a demand shifter. In the labour model supply shifts always affect wages; not so in the trade model. At least some of the methodological tension in this literature stems from these differences. For example, many trade economists have been very critical of "factor content" studies.

Despite these rather stark differences, it is important to note that empirical work from both perspectives has, on balance, found that international trade has played only a small role in

rising inequality. The factor-content studies generally find that trade's shifts in effective labour supplies explain, at most, about 20% of the rise in the skill premium -- with this share declining when calculations are done ending in years with relatively small trade deficits. And the Stolper-Samuelson studies have not found clear declines in the relative price of unskill-intensive products since the onset of the rising skill premium. These price declines occurred during the 1970s, but the skill premium was falling in this decade; only with some appeal to lags can 1970s price movements be linked to 1980s wage movements. This conclusion about trade's role seems widespread. For example, the 1997 Economic Report of the President reports results of a poll taken at a Federal Reserve Bank of New York colloquium on inequality attended by many of the important researchers in this area. The average respondent assigned 45% of the increase in inequality to technology, about 10% to international trade, and less than 10% to various other factors.

Is one of these perspectives "right" and the other "wrong?" They cannot be judged based on explanatory power alone because both offer an internally consistent story for recent movements in the U.S. skill premium. At some basic level, judgement depends on preferences about theory. For example, by training most trade economists are probably partial to the trade perspective's central role for multiple sectors. Beyond this, there clearly is a role for additional empirical work aimed at distinguishing the two perspectives' labour-demand schedules. For example, do national labour-demand schedules have empirically-relevant infinitely-elastic portions? A growing body of research in recent years has generated evidence supporting the production side of a generalized HO model (e.g., Davis and Weinstein, 1998; Harrigan, 1995, 1997; and Trefler, 1995). More specifically, more evidence is needed on the shape of labour-demand schedules. For example, Hanson and Slaughter (1999) present evidence that immigration has triggered output-mix effects across U.S. states, not relative-wage effects, because relative FPE holds across states.

4 Will There Be A Protectionist Backlash Against Globalization?

Based on research to date, there would seem to be little reason to worry about a protectionist backlash against globalization in response to rising inequality. If the "average" economist thinks that technology's role has been four times as important as that of trade, surely policy discussion is focusing on how to even out the gains from technology, not on how to erect new

trade barriers? Unfortunately, this is not the case. My reading of the current U.S. policy debate is that such a backlash is already underway. This is particularly so with respect to setting the terms of trade-policy debate.

This assessment is based on a few broad observations. First, in the United States there has not been a concerted policy effort -- at either the federal level or the state level -- to ameliorate the recent wage problems of the less skilled. Whether this is good or bad is open to debate on various philosophical and ethical grounds. But regardless of this, inaction has an important political implication: the median U.S. voter has experienced disappointing wage performance for more than 20 years. Labour economists often distinguish the more-skilled and less-skilled by the college-graduate / high-school graduate distinction. Table 3 shows that by this convention about 75% of the U.S. labour force is less-skilled. The wage problems of the less-skilled affect the majority of the U.S. population, not just a small minority of it. Has this voting bloc made its political might felt? Maybe.

My second observation is that several recent political events in the United States suggest a marked turn away from policies aimed at freer trade. The events include Ross Perot's strong electoral performance in 1992; the NAFTA (North American Free Trade Agreement) debate and close Congressional vote in 1993; Pat Buchanan's strong electoral performance in 1996; and the failure by Congress to renew "fast-track" negotiating authority for the President in 1997; and the House of Republicans' reluctance to renew funding for the International Monetary Fund in 1998. Clearly, all these events involved other issues in addition to trade. But the consensus analysis of them factored in sentiment for greater protectionism. Based on events like these one can argue that a protectionist backlash is already underway.

These events lead to my final observation. In the United States, supporters of free trade have ceded the terms of debate to their opponents, making it very hard to argue the true merits of free trade. Trade supporters, knowingly or not, are increasingly making specious arguments that are prone to fail and thereby lend support to opponents. Consider, for example, the argument that "freer trade creates jobs." No: on net trade neither creates nor destroys jobs -- it is about the kinds of jobs in an economy, not the number of jobs. Similarly, consider "freer trade raises exports." Maybe, at best: the overall level of U.S. exports depends mainly on

macroeconomic considerations like the exchange rate and the level of foreign aggregate demand.

A good example of this problem was the 1993 national debate over NAFTA, the most vivid point of which was the nationally televised prime-time debate on November 9 between Vice President Al Gore and Ross Perot on "Larry King Live." Here is an excerpt from Gore's opening statement¹⁰.

The reason why this is so important can be illustrated by the story of a good friend of mine that I grew up with, named Gordon Thompson ... He makes tires for a living. He's a member of the United Rubber Workers, and he's for this [agreement] because he's taken the time to look at how it affects his job ... [barriers] will be eliminated by NAFTA. We'll sell 60,000 cars, not 1,000, in the first year after NAFTA. Every one of those cars has four new tires and one spare. We'll create more jobs with NAFTA.

Later in the debate Gore reiterated his main themes with the following.

Over the last five years, Mexico's tariffs have begun to come down ... and, as a result, there has been a surge of exports from the United States into Mexico, creating an additional 400,000 jobs, and we can create hundreds of thousands more if we continue. We know this works.

These quotes accurately reflect the main theme of the Clinton administration's argument for NAFTA: more trade means more exports which means more jobs. Conversely, most of the opponents in this debate argued the flip side: more trade means more imports which means fewer jobs. Debate never focused on more appropriate issues such as comparative advantage. Supporters carried the day and the treaty was ratified by Congress. But the terms of debate rebounded badly starting in late 1994 with the Mexican peso devaluation and subsequent recession. These two macroeconomic events sharply cut U.S. exports to Mexico and raised U.S. imports from Mexico, a combination which NAFTA opponents seized upon to

¹⁰ These excerpts are taken from the Lexis-Nexus information service, copyright 1993 Cable News Network, Inc.

demonstrate how NAFTA had destroyed U.S. jobs. In hindsight, Gore may have scored a rather Pyrrhic victory over Perot.

These are still the terms of debate today. The 1998 U.S. overall trade imbalance rose sharply to an all-time high of \$168.6 billion. As with Mexico, macroeconomic factors largely explain this rise: in 1998 the U.S. economy grew smartly while much of the rest of the world was in recession. Yet opponents of freer trade cite this rising deficit -- and surging imports in particular industries like steel -- as a force destroying U.S. jobs which must be stopped by trade protection. All this focus on jobs is at a time when U.S. unemployment, at well under 5.0%, is near historical lows. If calls for protection to "save" U.S. jobs are this strong during times of full employment, how bad will it be during the next recession?

To reverse the trend towards greater trade protection, I think that the key change needs to be with the terms of debate. The proponents of free trade need to make the correct arguments about trade's benefits: comparative advantage, greater product varieties, greater product-market competition, and so on. This recommendation is probably not new, but it still seems timely. To solidify support for freer trade, debate needs to move away from trade balances and jobs -- if for no other reason that business cycles and recessions will always drive these numbers the "wrong" way. In particular, successful arguments might develop the "trade is a form of technological change" analogy. In the United States the baseline assumption tends to be that technology's aggregate gains outweigh any redistributive costs; public-policy and media discussions of technology often get at its general-equilibrium gains. But discussions of trade almost always get stuck in the partial-equilibrium issue of job creation and job destruction. Maybe this can change with a change in the terms of debate.

References

- Autor, David H., Lawrence F. Katz, and Alan B. Krueger (1998) "Computing Inequality: Have Computers Changed the Labour Market?", *Quarterly Journal of Economics*.
- Baldwin, Robert E. and Glen G. Cain (1997) "Shifts in U.S. Relative Wages: The Role of Trade, Technology, and Factor Endowments," NBER Working Paper #5934.
- Berman, Eli, John Bound, and Zvi Griliches (1994) "Changes in the Demand for Skilled Labour within U.S. Manufacturing: Evidence from the Annual Survey of Manufactures", *Quarterly Journal of Economics*, pp. 367-397.
- Berman, Eli, John Bound, and Steve Machin (1998) "Implications of Skill-Biased Technological Change: International Evidence", *Quarterly Journal of Economics*.
- Bhagwati, Jagdish (1991) "Free Traders and Free Immigration: Strangers or Friends?", Russell Sage Foundation Working Paper.
- Bhagwati, Jagdish and Vivek Dehejia (1994) "Free Trade and Wages of the Unskilled: Is Marx Striking Again," in Bhagwati, J. and Marvin Kosters (eds) *Trade and Wages*, Washington, D.C.: American Enterprise Institute, pp. 36-75.
- Borjas, George J. (1994) "The Economics of Immigration", *Journal of Economic Literature*, pp. 1667-1717.
- Borjas, George J., Richard B. Freeman, and Lawrence F. Katz (1992) "On the Labour-Market Effects of Immigration and Trade," in George Borjas and Richard Freeman (eds) *Immigration and the Work Force*, Chicago: University of Chicago Press, pp. 213-244.
- Borjas, George J., Richard B. Freeman, and Lawrence F. Katz (1996) "Searching for the Effect of Immigration on the Labour Market", *American Economic Review*, May, pp. 247-251.
- Borjas, George J., Richard B. Freeman, and Lawrence F. Katz (1997) "How Much Do Immigration and Trade Affect Labour Market Outcomes?", *Brookings Papers on Economic Activity*.
- Bound, John and George Johnson (1992) "Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations", *American Economic Review*, pp. 371-392.
- Davis, Donald R. (1997) "Technology, Unemployment and Relative Wages in a Global Economy", *European Economic Review*.
- Davis, Donald R., and David E. Weinstein (1998) "An Account of Global Factor Trade", National Bureau of Economic Research Working Paper #6785.
- Davis, Steven J. (1992) "Cross-Country Patterns of Change in Relative Wages," in Olivier J. Blanchard and Stanley Fischer (eds) 1992 *Macroeconomics Annual*, New York: NBER.
- Deardorff, Alan V. (1994) "Overview of the Stolper-Samuelson Theorem," in Alan V.

- Deardorff and Robert M. Stern (eds) *The Stolper-Samuelson Theorem: A Golden Jubilee*, Ann Arbor: The University of Michigan Press, pp. 7-34.
- Deardorff, Alan, and Dalia Haikura (1994) "Trade and Wages: What Are the Questions?" in Bhagwati, J. and Marvin Kosters (eds) *Trade and Wages*, Washington, D.C.: American Enterprise Institute, pp. 76-107.
- Dixit, Avinash K., and Victor Norman (1980) *Theory of International Trade*, Cambridge: Cambridge University Press.
- Feenstra, Robert C. and Gordon Hanson (1995) "Foreign Investment, Outsourcing, and Relative Wages," in Robert C. Feenstra and Gene M. Grossman (eds) *Political Economy of Trade Policy: Essays in Honor of Jagdish Bhagwati*, Cambridge: MIT Press.
- Feenstra, Robert C., and Gordon H. Hanson (1998) "Productivity Measurement and the Impact of Trade and Technology on Wages: Estimates for the U.S., 1972-1990," *Quarterly Journal of Economics*, Forthcoming.
- Freeman, Richard B. (1995) "Are Your Wages Set in Beijing?" *Journal of Economic Perspectives*, pp. 15-32.
- Freeman, Richard B., and Lawrence F. Katz (Eds) (1995) *Differences and Changes in Wage Structures*, University of Chicago Press and NBER.
- Hamermesh, Daniel S. (1993) *Labour Demand*, Princeton: Princeton University Press.
- Hanson, Gordon H., and Matthew J. Slaughter (1999) "Factor-Price Insensitivity to Immigration and the Rybczynski Theorem: Evidence From U.S. States," mimeograph, February.
- Harrigan, James (1995) "Factor Endowments and the International Location of Production: Econometric Evidence For the OECD, 1970-1985", *Journal of International Economics*, 39, pp. 123-141.
- Harrigan, James (1995) "Technology, Factor Supplies, and International Specialization: Estimating the Neoclassical Model", *American Economic Review*, pp. 475-494.
- Haskel, Jonathan E., and Matthew J. Slaughter (1998) "Does the Sector Bias of Skill-Biased Technical Change Explain Changing Skill Differentials?", NBER Working Paper #6565.
- Johnson, George (1997) "Changes in Earnings Inequality: The Role of Demand Shifts", *Journal of Economic Perspectives*, 11, pp. 41-54.
- Katz, Lawrence F. and Kevin M. Murphy (1992) "Changes in Relative Wages, 1963-1987: Supply and Demand Factors", *Quarterly Journal of Economics*, pp. 35-78.
- Krueger, Alan B. (1997) "Labour Market Shifts and The Price Puzzle Revisited", NBER Working Paper.

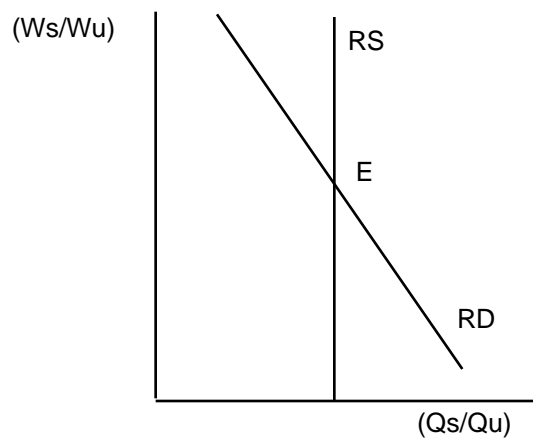
- Krugman, Paul R. (1995) "Growing World Trade: Causes and Consequences", *Brookings Papers on Economic Activity*, pp. 327-377.
- Lawrence, Robert Z. and Matthew J. Slaughter (1993) "International Trade and American Wages in the 1980s: Giant Sucking Sound or Small Hiccup?", in Martin Neil Baily and Clifford Winston (eds) *Brookings Papers on Economic Activity: Microeconomics 2*, pp. 161-211.
- Leamer, Edward E. (1998) "In Search of Stolper-Samuelson Effects On U.S. Wages", in Susan Collins (ed) *Exports, Imports, and the American Worker*, Washington, D.C.: The Brookings Institution.
- Leamer, Edward E., and James Levinsohn (1995) "International Trade Theory: The Evidence," in Gene M. Grossman and Kenneth Rogoff (eds) *Handbook on International Economics Volume 3*, Amsterdam: North Holland Press, pp. 1339-1394.
- Mishel, Lawrence, and Aaron Bernstein (1994) *The State of Working America, 1994-95*, New York: Economic Policy Institute, M.E. Sharpe.
- National Bureau of Economic Research (1997) Manufacturing Productivity Data Base, available on-line at <http://www.nber.org>.
- Organization for Economic Cooperation and Development (1995) *OECD Labour Force Statistics, 1973-1993*.
- Organization for Economic Cooperation and Development (1996) *OECD Employment Outlook*, July.
- Richardson, J. David (1995) "Income Inequality and Trade: How to Think, What to Conclude", *Journal of Economic Perspectives*, pp. 33-55.
- Sachs, Jeffrey D., and Howard Shatz (1994) "Trade and Jobs in U.S. Manufacturing", *Brookings Papers on Economic Activity*, pp. 1-84.
- Slaughter, Matthew J. (1999) "What Are the Results of Product-Price Studies and What Can We Learn From Their Differences?", in Robert C. Feenstra (ed), *International Trade and Wages*, National Bureau of Economic Research Conference Volume, forthcoming.
- Trefler, Daniel (1995) "The Case of Missing Trade and Other Mysteries", *American Economic Review*, pp. 1029-1047.
- Wood, Adrian (1995) "How Trade Hurt Unskilled Workers", *Journal of Economic Perspectives*, pp. 57-80.

Figure 1



Notes: Skill premium is measured as the ratio of average annual wages of non-production workers to average annual wages of production workers in U.S. manufacturing.
 Source: National Bureau of Economic Research Manufacturing Productivity Database.

Figure 2
 Labor-Market Equilibrium:
 The Labor Perspective



Notes: Skilled labor is subscripted "s" and unskilled labor "u". The RS schedule is relative supply and the RD schedule is relative demand.

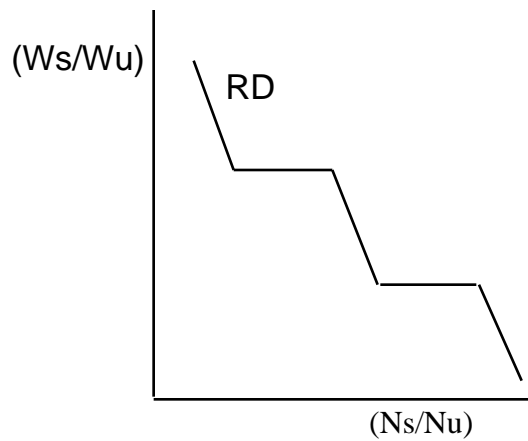
Figure 3



Notes: Relative employment is measured as the ratio total manufacturing employment of non-production workers to total manufacturing employment production workers.

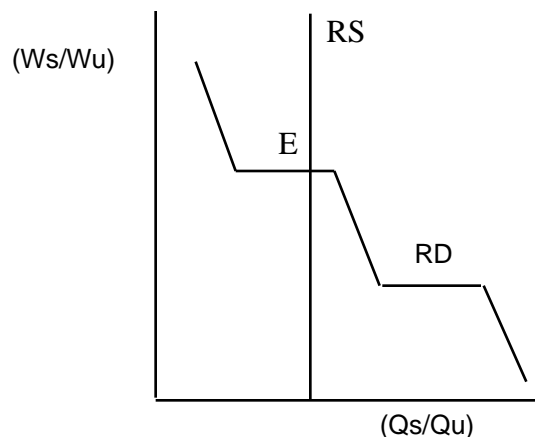
Source: National Bureau of Economic Research Manufacturing Productivity Database.

Figure 4
National Relative Labour Demand
in the Heckscher-Ohlin Trade Model



Notes: Skilled labor is subscripted "s" and unskilled labor "u".

Figure 5
Labor-Market Equilibrium:
The Trade Perspective



Notes: Skilled labor is subscripted "s" and unskilled labor "u". The RS schedule is relative supply and the RD schedule is relative demand.

Table 1:
Wage-Inequality Changes in the OECD

	1979-1989		1989 -1994/5	
	D9/D5	D5/D1	D9/D5	D5/D1
Australia	.02	.02	.06	-.04
Austria	.02	.00	.00	.07
Belgium	-.01	-.02	-.02	-.02
Canada	.03	.08	-.01	-.13
Finland	.03	.00	-.02	-.10
France	.02	-.01	.01	.00
Germany	.01	-.12	-.03	-.08
Italy	-.03	-.23	.19	.32
Japan	.05	.00	-.02	-.07
Netherlands	.03	.00	.02	.01
New Zealand	.04	.05	.02	-.03
Sweden	.02	.01	.03	.00
U.K.	.09	.05	.03	.02
U.S.A.	.12	.11	.06	.07

Notes: (D9/D5) is the value of the ninth decile over the first; (D5/D1) is the value of the fifth decile over the first decile.

Source: *OECD Employment Outlook*, July 1996, Table 3.1.

Table 2:
Unemployment Rates in the OECD

	1973	1979	1985	1989	1993
OECD	3.3	5.1	7.8	6.4	8.0
OECD Europe	3.0	5.6	9.9	8.5	10.4
of which EU	2.7	5.4	10.5	8.7	11.0
Australia	2.3	6.1	8.1	6.1	10.8
Austria	1.0	2.1	3.6	3.1	4.2
Belgium	2.4	7.5	12.3	9.3	10.3
Canada	5.5	7.4	10.4	7.5	11.2
Finland	2.3	5.9	5.0	3.4	17.7
France	2.7	5.9	10.2	9.4	11.5
Germany	1.0	3.2	8.0	6.8	8.8
Italy	6.2	7.6	10.1	11.8	10.8
Japan	1.3	2.1	2.6	2.3	2.5
Netherlands	2.2	5.4	10.9	8.3	6.2
New Zealand	0.2	1.9	4.1	7.1	9.4
Sweden	2.5	2.1	2.8	1.3	8.2
U.K.	2.2	4.6	11.5	6.1	10.2
U.S.A	4.8	5.8	7.1	5.2	6.7

Notes: Table entries are unemployment rates in percent.
Source: *OECD Labour Force Statistics, 1973-1993, 1995.*

Table 3:
U.S. Labor Supply

Year	High-School Dropouts	High-School Graduates	Some College	College Graduates	Relative Supply
1940	76	14	5	5	0.105
1950	66	21	7	6	0.137
1963	52	30	9	9	0.185
1970	45	34	10	11	0.217
1979	32	37	15	16	0.333
1989	23	39	17	21	0.435
1993	20	35	23	22	0.496

Notes: Each cell reports the share of the total U.S. labor force accounted by that labor group in that year. The last column entitled "relative supply" is a summary statistic of the U.S. skill mix across all labor types.

Source: Johnson (1997).