THE ASSESSMENT: GLOBALIZATION AND LABOUR-MARKET ADJUSTMENT

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Over the last two decades there has been a significant deterioration in the labour-market outcomes of less-skilled labour in most OECD countries. This has manifested itself either in terms of a decline in wages relative to the most skilled, or in terms of the relative likelihood of being in work. Much recent research has focused on the impact of trade and skill-biased technical change as alternative explanations of the phenomenon; some has also investigated the role of cross-border investment and migration. This paper reviews recent research on globalization and labour-market adjustment and sets the scene for the papers that follow.

I. INTRODUCTION

The globalization of economic activity has accelerated in recent decades, as evidenced by, among other things, the growth in merchandise and services trade and the growth in (both the stock and flow of) cross-border investment. For instance, between 1990 and 1999 merchandise trade grew by 6 per cent per annum, services trade by 10 per cent per annum, and foreign direct investment (FDI) by 12 per cent per annum (all in real terms). The globalization process has been driven by the interaction of a number of factors: declining man-made barriers; steep falls in the costs of transportation and communication; fragmentation of production processes; and economic growth. The fundamental consequence of the process is that individual economies have become more 'joined up'. For the academic/policy-making communities this has stimulated a rich programme of research on a range of issues:

from macro-policy coordination through to the internationalization of non-border measures. At the 'populist' level there is unprecedented interest in the process as the mass demonstrations around the World Trade Organization Ministerial in Seattle in December 1999 and World Bank/IMF Annual Meetings in Prague in September 2000 demonstrate.

One especially rich vein of research has been the links between globalization and labour-market adjustment.[2] For trade economists the issue is not actually a new one. After all, two of the papers which form the bedrock to core trade theory, Stolper and Samuelson (1941) and Mundell (1957), relate to globalization and labour markets. The former sets out the consequences for relative factor rewards of a move from autarky to free trade, the latter demonstrates that factor movements have equivalent consequences for relative factor rewards to arm's-length trade. But of course these are general equilibrium models focusing on the characteristics of pre- and post-trade (or factor movement) equilibria. They have nothing to say about the adjustment process; nothing to say about the interaction of trade and technology; nothing to say about the potential domain (if any) for efficacious policy intervention.

Recent interest in globalization and labour markets has been stimulated by (though not confined to) several observed labour-market outcomes, the most striking being the deteriorating position of low-skilled relative to high-skilled labour. Within almost all OECD countries, the least-qualified section of the labour force lost out in the 1980s and 1990s either in terms of a decline in their wages relative to the most skilled, or in terms of the relative likelihood of their being in work, or both (see Glyn, 2000).

II. TRADE, TECHNOLOGY, AND WAGES

Slaughter (1999) reports that in 1979 male college graduates in the USA earned on average 30 per cent more than their high-school equivalents. By 1995 that had risen to around 70 per cent. Over the same period, the equivalent premium in the UK grew by around 30 per cent. More modest increases were recorded for Australia, Canada, Japan, and Sweden, but little or no change in France and Italy. In the last two countries, however, a significant gap in employment opportunities between skilled and unskilled labour opened up. There is a strong consensus in the literature that the key driver of these patterns has been a shift in relative labour demand from the less skilled towards the more skilled. The key candidates behind this are trade, in particular trade with low-wage economies, and technology, in particular skill-biased technical change.

Lawrence and Slaughter (1993) were among the first to investigate trade and the rising skill premium from a trade-theoretic perspective. They implement a pair of simple exercises to check for Stolper–Samuelson outcomes. First, they check for all industries adopting a more unskilled-intensive production technique; and second for an increase in the relative price of skill-intensive relative to unskilled-intensive products. At several levels of disaggregation, the authors find these tests are inconsistent with Stolper–Samuelson predictions and argue that observed patterns appear consistent with skill-biased technical change across sectors.[3] Bhagwati and Dehejia (1994), pursue a similar strategy, offering evidence on relative trade prices complementary to that in Lawrence and Slaughter.

Factor-content analysis emerges more from the labour theorists' traditional approach. In an effort to produce a straightforward estimating framework, labour economists often rely on a partial equilibrium framework. One convenient approach involves assuming a downward-sloping demand for labour and a vertical supply curve. The labour content of trade can then be added to domestic supply, thus shifting the supply curve and permitting identification of the effect of trade on the wage. The initial response by trade economists to this approach was overwhelmingly negative as, in a competitive environment (at least of the Heckscher–Ohlin–Samuelson (HOS) type), factor-prices can change only if commodity prices change. An endowment change that does not affect commodity prices cannot change factor prices. None the less, factor-content studies figure promi-

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[2] Most of the key papers published thus far in this literature can be found in Greenaway and Nelson (2001).

[3] The role of skill-biased technical change continues to be a theme of research on contemporary wage inequality. For representative recent empirical work, see papers in the symposium in the *Quarterly Journal of Economics* (1998, **113**(4)).

nently in empirical research.[4] One of the most prominent proponents of the method is Wood, whose 1994 book, *North–South Trade, Employment and Inequality: Changing Fortunes in a Skill-driven World*, has been a primary stimulus to research. This rich volume covers a wide variety of issues, but the core is a factor-content analysis adjusted for the presence of non-competing goods between northern and southern economies (see also Wood, 1991). The effect of such goods is to make the implicit import of labour even greater, resulting in some of the largest estimates of labour-market impacts of trade in the literature. Sachs and Shatz (1994) present one of the most detailed factor-content studies of trade, disaggregating by sector and trading partner. They conclude that trade had a statistically significant, but quantitatively small effect on the skill premium.

Overall, while the findings of factor-content studies may be suggestive, their foundations are sufficiently controversial that their ultimate effect on professional priors has been limited. In this respect, the mandated wage methodology, because of its closer relationship to underlying theory, has probably had a considerably larger impact. This approach builds on Jones's (1971), demonstration that the proportional change in a commodity price will be equal to a weighted average of proportional change in factor prices. Baldwin and Hilton (1984) and Hilton (1984) developed related methods, based on Jones's decomposition, for determining production-cost differences between countries. Specifically, a regression of changes in commodity prices on factor shares provides an estimate of the change in factor-price mandated by the price change. Finding only relatively small effects, the authors consider a number of alternative causes via control variables, ultimately concluding that technological change is a more likely cause of the rising skill premium than trade.[5]

The overall conclusion from the work cited thus far is that both trade and technology have a role to play, but, with the important exception of Wood (1991, 1994), the consensus is that technology is more important than trade. All of this work refers to the trade of industrialized countries, whether with each other or with developing countries. The paper by Eli Berman and Stephen Machin in this issue extends the analysis to increasing demands for skills in developing (primarily middle income) countries. They argue that the relationship is an especially important one in developing countries because of a tendency to higher initial inequality. They conclude that in developing countries, especially in the 1980s, shifts in skill demand greatly resemble those observed in developed countries and that this is driven by the adoption of similar technologies.

An interesting complement to econometric analysis is computational analysis, and, here, there are two distinct strategies: simple (i.e. low-dimensional) computational general equilibrium (CGE) models to generate 'back of the envelope' estimates of relevant magnitudes; and large-scale CGE models, developed for other purposes, to simulate the relationship between trade shocks and labour-market outcomes.[6] Krugman (1995) presents an archetypal example of the first. He develops a simple, computational model of a 2×2 OECD economy in an effort to determine plausible orders of magnitude for labour-market effects. After choosing a set of basic parameters that characterize the macro-economy, Krugman considers two sets of labour-market clearing conditions: a European case with a fixed relative wage/skill premium and a US case with a variable relative wage. With the OECD economy large in the North–South market being modelled, growing trade affects the world price and, thus, the labour market. In the European case, however, relative wages, and thus relative prices, are institutionally fixed, so the economy adjusts on

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[4] Prominent examples of the factor-content methodology can be found in: Katz and Murphy (1992); Bound and Johnson (1992); Johnson and Stafford (1993); and Berman *et al.* (1994).

[5] See Slaughter (2000) for a survey of empirical findings in this area. Papers not included here that implement the mandated wage methodology include: Schmitt and Mishel (1996); Courakis *et al.* (1997); Krueger (1997); Desjonquères *et al.* (1999); Lücke (1999); and Minondo (1999).

[6] Not surprisingly, given increasing availability of CGE software and dramatic drops in cost and increases in speed of computers, there is a substantial body of CGE research on trade and labour markets. Further examples of simple models can be found in: Falvey *et al.* (1997) and Abrego and Whalley (2000). For large-scale models, see: Burfisher *et al.* (1994); Cline (1997, chs 3 and 4); and Tyers *et al.* (1999).

the employment/output margin, with North–South trade accounting for a significant share of observed unemployment. In the US case full-employment is ensured by a flexible relative wage. The model implies that trade with NIEs (newly industrialized economies) of the order of magnitude observed in the OECD would have only a very small effect on relative commodity prices and, thus, on relative factor prices. Francois and Nelson (1999), use an equally simple computational framework to evaluate the quantitative significance of alternative assumptions about the production structure of the economy. Specifically, the authors consider: a baseline HOS model; a model with inter-industry flows; a model with Armington-type product differentiation; and one with Ethier-type product differentiation. In both homogeneous goods cases, the standard Stolper–Samuelson relationship goes through; while in the heterogeneous goods cases both factors can gain in welfare terms.

An interesting example of the application of a large-scale CGE model is Tyers and Yang's (1998), (5 factors × 37 sectors × 6 regions). The authors consider the effects of trade and skill-biased technical change on factor returns, finding that the latter was the predominant cause of the increased skill premium. The paper by Rod Tyers and Yongzheng Yang in this issue takes the analysis a stage further by estimating the extent of factor bias required to explain observed increases in skill premia since 1975, controlling for the effects of trade liberalization. Two alternative bias patterns emerge as possible explanations: skill enhancement with capital and skill as substitutes, and capital enhancement with capital and skill as complements. They conclude that the evidence is more supportive of capital enhancement with capital and skill as complements.

III. TRADE EXPANSION, LABOUR-MARKET ADJUSTMENT, AND ADJUSTMENT COSTS

The process of adjustment from one equilibrium to another has received relatively little attention from trade economists, largely one suspects because of their preoccupation with long-run gains from trade and the assumption that, even if adjustment costs are positive, they are short run and trivial by comparison with long-run gains. This relative disinterest contrasts sharply with the attention labour economists devote to frictional unemployment, and development economists to structural adjustment. In a Heckscher–Ohlin (H–O) context, adjustment is costless because the economy simply moves from one equilibrium to another on its production frontier. In practice, of course, adjustment would normally involve a shift within the production frontier. The magnitude of any adjustment problem and related adjustment costs then depends upon how far inside the production frontier we go and how long we stay there. In turn, this will depend on the sectoral and geographical mobility of factors, especially labour. The specific factors model developed by Jones (1971) and Neary (1978) is a powerful extension to the basic H–O framework which facilitates the analysis of short-run labour-market disequilibrium.

Although limited, the trade literature on adjustment has addressed two issues more than others. First, if there are labour-market rigidities due, for example, to labour specificity, what are the costs of sticky adjustment? Second, is adjustment likely to be smoother in a setting where intra-industry trade rather than inter-industry trade is important? With regard to the first, few trade economists would take the view that adjustment to trade expansion is perfectly smooth. Equally, however, most would take the view that, compared to long-run benefits, the costs of adjusting to more trade are modest. For many this is an act of faith: gains accrue into the infinite future and to a large number of agents. By contrast, adjustment costs are incurred over some short-run period and concentrated on a smaller number of agents. But the belief is also informed by empirical estimates of benefit: cost ratios of liberalization. As long ago as the early 1970s, Magee (1973) calculated adjustment cost–benefit ratios for complete liberalization in the USA, reaching the conclusion that after 15 years benefits exceed costs by a factor of 19.

Subsequent work by Baldwin (1976) who focused on a 50 per cent US tariff cut, Morkre and Tarr (1980) and Morkre (1984) on a series of industry case studies in the USA, and Takacs and Winters (1991) for the UK all reach the same conclusion, though with varying orders of magnitude. Recently, attention has switched to developing and transitional economies, where dramatic and broadly based ad-

justment programmes have been implemented in many countries over the last 20 years. The influential multi-country/multi-liberalization study of Papageorgiou *et al.* (1991) concluded that the labour-market effects of liberalization were modest, even in the short run. However, Harrison and Revenga (1995) reported rather more mixed results, especially for the transitional economies of Eastern Europe, suggesting that the degree of pre-existing distortions might have an impact on the benefits of liberalization relative to the costs of achieving it.

Carl Davidson and Steven Matusz in this issue focus on that very question. The core of the paper is a simulation exercise building on the Davidson and Matusz (2001) model, where workers differ in terms of ability, and jobs vary in terms of skill requirements. Since workers acquire skills to get jobs, job search involves time and employed workers face risk. Workers, therefore, shift between unemployment, training, and employment. In this issue Davidson and Matusz simulate their model to investigate whether costs and benefits of trade expansion vary as the degree of labour-market flexibility varies. Although they find that long-run benefits always exceed short-run adjustment costs, the relative magnitude of the two varies according to labour-market flexibility. Specifically, the benefit–cost ratio is highest for economies with very dynamic or very sluggish labour markets, and lowest for those in between. The intuition behind this is that if the labour market is dynamic, adjustment takes place rapidly and adjustment costs are minimized. At the other extreme, although adjustment costs are higher because of a sluggish labour market, potential gains are greater because the economy is more distorted prior to liberalization. The insight from the model is an important one, given the differing experiences of 'country types' with liberalization.

The possibility that different forms of trade expansion could have different adjustment consequences goes back at least as far as Balassa (1966). The motivation for the proposition that adjustment to intra-industry trade was smoother than adjustment to inter-industry trade was based on the casual observation that adjustment to the creation of the (original) EEC seemed to be smoother than expected. Put alongside the high prevalence of intra-industry trade, this suggested a causal connection. Although there has been some work since then to lay theoretical foundations (e.g. Krugman 1981), empirical justification for the hypothesis is limited. Its validity relies on greater similarity in capital labour ratios within, compared with between, sectors. There has been some empirical investigation of this. On the one hand Finger (1975) and Rayment (1976) point to greater differences in factor ratios within than between sectors; on the other hand Elliott *et al.* (2000) find the opposite. The paper by David Greenaway, Richard Upward, and Peter Wright in this issue comes at the question from a different perspective, focusing on the relative magnitude of reallocation of labour between, as opposed to within, sectors. For the UK they find that intra-sectoral mobility dominates inter-sectoral mobility.

IV. FOREIGN DIRECT INVESTMENT AND LABOUR-MARKET ADJUSTMENT

As noted at the outset, FDI is just as important a driver of globalization as arm's-length trade. Broadly speaking, research on FDI is organized in terms of one of three theoretical frameworks: real capital arbitrage models; market power/industrial organization models; and firm-theoretic models. While the first have long found general equilibrium representation, it is only recently that the other two have been systematically analysed in such a framework.[7] At least since Hymer (1960) it has been clear that the capital arbitrage model lacks something essential. Specifically, to the extent that doing business in another country entails costs not borne by local firms, multinationals must possess some form of competitive advantage to permit them to function in foreign markets. Where early developments, including Hymer's own work, emphasized essentially monopolistic elements, current work has stressed oligopolistic and monopolistically competitive elements. Building on work in the Coase (1937)–Arrow (1964)–Williamson (1975) tradition, a number of international business researchers began to develop a model of the international firm built on internalization considerations.[8]

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[7] See Ruffin (1984) for a clear review of real factor arbitrage models of international factor mobility.

[8] Rugman (1981) and Casson (1987) are good examples of the first generation of this literature.

All of this early work was based on partial equilibrium reasoning. A more substantial step toward integrating Hymer's insight into a general equilibrium framework was taken by Helpman (1984, 1985), Markusen (1984), and Ethier (1986). These defined an important agenda for theoretical research which is continuing to generate results. Here it is useful to distinguish between horizontal and vertical multinational firms. The former produce the same product in many markets, the latter engage in different activities in different markets. In either case, the first task is to explain the existence of a single firm with economic activity in more than one country rather than arm's-length contracting. Thus, much of this work is primarily concerned with characterizing the patterns of trade and production that emerge in economies characterized by FDI. However, Markusen and Venables (1998) directly address a labour-market adjustment issue. Like HOS models, the Markusen–Venables (MV) model is a $2 \times 2 \times 2$ model. One sector is characterized by competitive firms producing under constant returns, while the other produces homogeneous goods under a production structure involving both firm- and plant-level fixed costs. Four types of firm can emerge. A national firm produces entirely in a given country and serves foreign markets by exports, and a multinational firm produces in both countries. Since each can be headquartered in the home and foreign countries, there are four types. The firms compete in Cournot–Nash (quantities) fashion. Thinking of the two factors as skilled and unskilled labour, the authors show that investment liberalization raises the real wage of skilled labour and the wage ratio in the skilled-labour abundant country, and falling trade costs tend to put downward pressure on the wage of skilled labour.

Where early work on the income-distribution effects of FDI took an aggregate approach, recent empirical research, like the theoretical research we have just discussed, has begun to incorporate firm-theoretic considerations. One approach is to examine the relationship between employment in parent and foreign production. Blomström et al. (1997)[9] use firm-level data from US and Swedish multinationals, finding a negative relationship for US multinationals and a positive one for Swedish firms. The authors conclude that, where US multinationals have outsourced a considerable amount of their labour-intensive manufacturing to developing countries, Swedish multinationals do most of their manufacturing in other industrial countries where increased production leads to increased blue-collar employment in the national market.

Brainard and Riker (1997) adopt a more structural approach by estimating a translog production function for multinationals. The key finding is that, while there is evidence of substitution between labour at home and abroad, the substitution is far greater between affiliates in countries at similar levels of development.[10] Feenstra and Hanson (1998) extend the mandated wage regression methodology to incorporate outsourcing and technical change. Within this framework, technical change explains about 35 per cent of the change in the skill premium, outsourcing explains another 15 per cent.[11] Feenstra et al. (2000), use production under the Offshore Assembly Provision of the US tariff as a direct measure of outsourcing, finding that this is intensive in unskilled labour, relative to production in the USA. Furthermore, they find that outsourcing responds positively to relative cost of production in the USA. These results seem broadly consistent with the notion that outsourcing reduces relative demand for unskilled labour.[12]

Two papers in this issue are focused on FDI and wages/jobs—those by Nigel Driffield and Karl Taylor and by Magnus Blomström and Ari Kokko. The former presents a series of results for work on the

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[9] Similar work, focusing on US multinationals can be found in Kravis and Lipsey (1993), Lipsey (1994, 1995, 1999), and Feliciano and Lipsey (1999).

[10] Braconier and Ekholm (1999) carry out a similar analysis for data on Swedish multinationals, but find a more complementary relationship between FDI and home employment. Morrison-Paul and Siegel (2000) study the effect of FDI on UK employment.

[11] Also see Feenstra and Hanson (1996).

[12] Other research on the link between FDI, outsourcing, and wages includes: Anderton and Brenton (1999) for the UK; Hatzius (2000) for the USA; Blomström and Kokko (2000) for Sweden; and Head and Ries (2000) for Japan. Another area of concern has been the effect of inward investment on relative wages. For work on this topic see: Blonigen and Slaughter (2000) for the USA; and Conyon et al. (1999), Girma et al. (2001), and Taylor and Driffield (2000) for the UK.

labour-market effects of FDI in the UK. Because foreign firms make greater use of skilled labour than domestic firms, it appears that their presence increases earnings dispersion. This seems to be due to a combination of multinational enterprises (MNEs)' increased demand for skilled labour, and technology spillovers to indigenous firms further increasing that demand. Blomström and Kokko concentrate on Swedish experience. They identify very large gross changes in employment, with some 80 per cent of domestic jobs disappearing every year from the largest Swedish MNEs, but an almost equivalent number reappearing via acquisitions of new plants. What is particularly interesting is that the jobs lost in Swedish plants paid higher wages than the jobs created, suggesting that not only may the home activities of Swedish MNEs be contributing to a lowering of wage dispersion, but higher-skill jobs may be being exported to plants overseas.

V. MIGRATION AND LABOUR-MARKET ADJUSTMENT

There are substantial theoretical contributions on the relationship between immigration and labour-market outcomes. Arguably the one essential theoretical contribution is the factor-price insensitivity theorem of Jones and Scheinkman (1977). They suggest that, if there are more traded final consumption goods than internationally immobile factors of production, increases in factor endowments that do not cause any commodities to become non-produced will have no effect on factor-returns. Since, as we shall see, empirical research on the relationship between immigration and labour markets has produced little systematic evidence of wage or employment effects, factor-price insensitivity would seem to be a useful baseline result. We can identify three broad methodologies for empirically studying links between immigration and labour markets: structural econometric analyses; reduced form regression analyses; and natural experiments.[13]

The most direct approach involves assuming that GNP is produced according to a production function with a specific functional form, and using the restrictions implied by that, along with those implied by competition and cost minimization, to estimate a structural model.[14] Grossman (1984) estimates a translog function of native labour, first-generation immigrants, second-generation immigrants, natives, and capital on individual-level data for 1970, and finds a complementary relationship between capital and all three labour groups, and a substitutive relationship between any pair of labour groups. The key finding is that increases in immigration have an effect on other first-generation immigrants, but virtually no effect on natives. Borjas (1987) used a Generalized Leontief production function and a more detailed breakdown of immigrant and native labour, with results that are qualitatively similar. In what is surely the most sophisticated application of this methodology to date, Greenwood *et al.* (1997) marry human capital theory with the production-theoretic approach by sorting immigrant and domestic labour into four skill categories and then estimating a symmetric normalized quadratic (semi-flexible) functional form in those four labour factors and capital. Variants of the production-function methodology have been applied to a substantial number of datasets in the USA and in a small number of other countries with a surprising consistency of results: immigration has no significant effect on natives, with the exception of the least skilled, but does have a significant effect on other immigrants of the same origin and vintage. LaLonde and Topel (1991) evaluate claims about deteriorating educational levels of immigrants, and the implication for labour-market outcomes of natives, as do Borjas *et al.* (1997), who carry out regression analyses. Once again, as with the production-theoretic methods, most end up concluding that there is little evidence of sizable labour-market effects.[15]

One of the most interesting, and certainly one of the highest impact, papers in this literature is Card's

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[13] There is a substantial literature that applies CGE methods, but we do not pursue these here for the same reason that we do not attempt to cover the theoretical literature.

[14] For a particularly clear presentation of the general theory that underlies virtually all research by labour economists on the link between immigration and labour markets, see Johnson (1998).

[15] For the US case, see: Schoeni (1997), Butcher (1998), and Reimers (1998). Applications to Germany are Hatzius (1994), DeNew and Zimmerman (1994), and Zimmerman and DeNew (1994). For an application to Italy see Gavosto *et al.* (1999).

(1990) study of the Mariel Boatlift. On 20 April 1980, 125,000 Cuban nationals exited Cuba for the USA through the port of Mariel. In less than 6 months the Miami labour force grew by about 7 per cent. Interestingly, Card finds no labour-market effect of even such a large shock. This striking result was the stimulus to much of the research by labour economists in the following years.[16] Perhaps even more surprisingly, however, Friedberg (1996) examines what may be the largest proportional immigration shock in modern history—the emigration of 670,000 Russian Jews to Israel (a staggering 11 per cent of the population and 14 per cent of the labour force from 1989 to 1996), once again with essentially no impact.

Noel Gaston and Douglas Nelson, in their contribution to this issue, review this literature in some detail, as well as the differing perspectives on interpretation of the evidence by trade and labour economists. They then go on to ask why, if the labour-market effects do appear to be of such a small order of magnitude, immigration generates such major public policy issues. They conclude that it is not because of the politics of distribution, contrary to what Borjas (1999) argues, and much more to do with the politics of nationhood and governance.

VI. CONCLUSIONS

As noted at the outset, the potential impact of globalization on labour-market outcomes in general, and the relative position of the less skilled has stimulated a rich research agenda. It has also stimulated much debate on appropriate policy responses, as it should have done, given that there are major public-policy issues at stake.

Compared to a decade ago, the literature has certainly moved forward, especially on the 'trade or technology' front—indeed, for some, so far that they are willing to settle on skill-biased technical change as the only explanation worth worrying about. That is too firm a conclusion, too soon, for three reasons. First, the evidence available thus far is overwhelmingly, though not exclusively, for the USA—a broader evidence base is required. Second, trade and technology interact—endogenous technical change in the wake of increased trade with low-wage economies is widely recognized but not extensively modelled. Third, trade is just one dimension of globalization and the impact of factor movements on labour-market outcomes is not yet well understood. A rich research agenda remains!

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[16] Other papers seeking to exploit natural experiments are Hunt's (1992) study of Algerian repatriates to France, and Carrington and de Lima's (1996) study of repatriates from Angola and Mozambique to Portugal.

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