"Decomposing Wage Inequality Change into Trade and Technology Components Using General Equilibrium Models"

John Whalley
Universities of Warwick and Western Ontario and NBER

Economists have long been interested in decomposing observed economic outcomes drive by multiple factors into parts attributable to each. This is the case in both the growth accounting literature (Solow, 1957), and the economic history literature (Fogel, (1964), for instance). The majority of these exercises focus on identifying the separate role played by a few key factors presumed to be the main sources behind the outcome, typically leaving a residual as attributed to factors not explicitly modelled. How to decompose observed economic outcomes has been little studied in the applied general equilibrium literature (see Shoven and Whalley, 1992). Models have, instead, largely been used for ex-ante counterfactual exercises of anticipated policy changes, whose outcome has not been observed.

In this paper, I discuss an ex-post general-equilibrium calibration methodology developed in Abrego and Whalley (2000) which is used to decompose observed economic outcomes generated by multiple sources into components attributed to each source, and apply it to the trade-technology debate on the causes of increased OECD wage inequality (Leamer, 2000; Krugman, 2000). Observed (ex-post) economic outcomes are decomposed into portions attributed to component influences, rather than computing ex-ante counterfactual equilibria, recognizing that these influences need not be and typically will not be additive. The analysis is based on multiple-period rather than single period calibration, since model parameterisations need to be consistent with changes over time, not just a base year observation. Calibration to initial- and terminal-year data may be either exact or inexact (see Dawkins, Srinivasan, and Whalley, 2000), depending on the restrictions imposed.

The model structure used is a specific-factors (or Ricardo-Viner) trade model, which differs from a more standard Heckscher-Ohlin-type structure through the presence of specific factors that are immobile across sectors, and hence yields decreasing returns to scale to the mobile factors. The traditional Heckscher-Ohlin model with fully mobile factors and constant returns to scale, when used with conventional functional forms (such as CES), cannot accommodate relative product-price changes of the magnitude that have been observed along with increased wage inequality in countries such as the US or the UK (see OECD, 1997; Abrego and Whalley, 2000). This is due to the near linearity of the transformation frontier associated with this model structure and the ensuing problems of full specialisation documented some years ago by Johnson (1966). For the small open economy case, the standard Heckscher-Ohlin model is also unable to accommodate factor-biased technical change as a source of relative wage change (Leamer, 1998; Krugman, 2000). This is unsatisfactory since the available empirical evidence seems to support the hypothesis that factor-biased technical change

has been a major source of increased OECD wage inequality. A fixed-factors model eliminates the full specialisation problems, produces relative wage changes under factor-biased technical change, and hence can be used for decomposition of inequality change.

These techniques are applied to a component decomposition of increased wage inequality over the 1980s and 1990s as has occurred for a number of OECD countries such as the US and the UK (e.g. Gottschalk and Smeeding, 1997; Slaughter, 1999). The literature on recent increases in wage inequality has concentrated on two main contributing factors—trade with low-wage countries, and technological change. Most literature concludes that technological change is the main source of this increased inequality, rather than trade (Bound and Johnson, 1992; Baldwin and Cain, 1997; Feenstra and Hanson, 1999). The model and the techniques presented here suggest that, within a general equilibrium setting, other factors, such as changes in endowments and a wider variety of technical change, also enter the picture and can play a significant role.