

THE IMPACT OF TRADE ON UK WAGES: A COMPUTABLE GENERAL EQUILIBRIUM (CGE) ANALYSIS

INTRODUCTION

- In recent decades almost all OECD countries have experienced rising wage inequality.
- In the UK this has been witnessed by a 21 percent increase in the ratio of non-manual to manual wages between 1980 and 1995.
- These relative wage changes have coincided with the emergence of rapidly developing countries on the global market.
- If the 2x2 Heckscher-Ohlin model is reformulated in terms of skilled and unskilled labour, the Stolper-Samuelson theorem identifies a link between increasing wage inequality and globalisation.
 - The SS theorem: an increase in the relative price of the skilled labour-intensive good ($\hat{p}_{s-int} / \hat{p}_{u-int}$) increases the return to skilled labour (w_s), in terms of both goods, and lowers the return to unskilled labour (w_u), also in terms of both goods.
 - The proportional changes in factor prices are, therefore, necessarily greater than the proportional changes in product prices. This is commonly referred to as the magnification effect (where “ $\hat{}$ ” denotes a proportional change):
$$\hat{w}_u < \hat{p}_{u-int} < \hat{p}_{s-int} < \hat{w}_s.$$
- Technical change has also been identified as a cause of increasing wage inequality.
- Like the majority of studies seeking to explain the recent advent of wage inequality, this project attempts to evaluate the individual impacts of trade and technology.
- Because of the many interrelationships between product and factor markets general equilibrium analysis is applied.

TRADE SHOCKS

- A number of modifications are commonly made to the Heckscher-Ohlin (HO) model to mould it into a more appropriately detailed representation of complex economies.
- The traceability of trade shocks from product prices to factor prices inherent in the Stolper-Samuelson (SS) theorem is, however, obscured when such modifications are made.
- Consequently, I have explored how modifications to the HO model affect the impact of price shocks on factor prices.
- To broadly represent increased trade flows between the UK and labour-abundant developing countries, I have modelled a price shock involving a reduction in the world price of the good that uses unskilled labour relatively intensively.
- Different modifications have different effects on the SS theorem: some strengthen the magnification effect, some reverse it, whilst others have no affect (see Table 1).

TABLE 1 THE IMPACT OF PRICE SHOCKS IN THE HECKSCHER-OHLIN AND MODIFIED HECKSCHER-OHLIN MODELS

MODIFICATION	HOW MODELLED	RESULTS
The Armington Assumption with no cross-hauling	A constant elasticity of substitution aggregation function of domestic and imported varieties of the importable good is nested in the upper level of the household's utility function.	The introduction of the Armington Assumption dilutes the strength of the magnification effect. Furthermore, when the value of the Armington elasticity is less than one, the signs of the relationships between international product prices and factor returns are altered (i.e. $\hat{w}_s < \hat{p}_{u-int} < \hat{p}_{s-int} < \hat{w}_u$).
The Armington Assumption with cross-hauling	In addition to the modification above, domestic producers are permitted to export the importable good. Production in the importable sector is allocated between the home and export markets according to a constant elasticity of transformation (CET) function.	The magnification effect is disturbed by a smaller amount when cross-hauling modifications are used to extend the Armington Assumption, and reversals in signs of the predicted changes in factors rewards are less likely.
A non-traded sector	Elasticity parameter values in the above modification are adjusted to create a three-sector model (two traded and one non-traded).	The size, or even the existence, of a non-traded sector does not alter the relationship between international product prices and factor prices. Factor prices are always determined by the zero profit equations from the two traded sectors.
Labour Mobility	The adjustment processes from the Fixed Factors model to the Ricardo-Viner model (skilled labour mobile, unskilled labour immobile), and from the Ricardo-Viner model to the HO model are mapped out.	Increasing the mobility of unskilled labour does not reduce wage inequality if skilled labour is the more mobile of the two factors.
Labour Transformability	Unskilled labour is able to transform itself into skilled labour in response to changes in relative wages according to a CET function.	Labour transformability is unable to alter factor returns in a small open economy model. However, when the terms of trade are endogenous, labour transformability is able to reduce wage inequality by decreasing the relative supply of the disadvantaged factor.
Intermediate Inputs	Intermediate inputs are used in fixed proportions to the level of output.	The magnification effect is amplified when intermediate inputs are included and the magnitude of this amplification increases as intermediate input requirements increase relative to value added. This result is independent of the sector(s) requiring intermediate inputs.



TECHNOLOGY SHOCKS

- Technical change has undoubtedly had a large impact on wage inequality.
- Skill-biased technical change is the type of technical change most commonly considered by empirical studies.
- However, other types of technical change may have been influential.
- The interdependencies between trade and technology shocks in causing wage inequality have not been clearly identified.
 - Example 1: defensive innovation –the adoption of new, more efficient, unskilled labour saving production processes by producers of unskilled labour-intensive products in developed countries to deter or compete with imports –is a form of skill-biased technical change that is driven by trade.
 - Example 2: factor neutral technical change in developing countries will result in increased wage inequality in developed countries if there is trade between the two regions.
- In both examples wage inequality would not increase without the presence of both trade and technical change.
- In the first example the impact of trade manifests itself through technical change.
- In example 2 technology is the catalyst of increased wage inequality and trade is the vehicle.

IDENTIFICATION OF LABOUR TYPES

- The majority of studies examining trade and wage inequality use one of two techniques to distinguish different types of labour.
 - The first of these uses educational characteristics to differentiate one type of labour from another. Commonly, a distinction is made between college/university graduates and non-graduates to approximate skill levels.
 - The second technique categorises non-production and production workers as skilled and unskilled employees respectively.
- I have improved on the identification of labour types by determining both the number of labour types and groupings of differently skilled labour in an optimal fashion.
 - The Labour Force Survey identifies average wages and educational characteristics by occupation.
 - Applying cluster analysis, according to the characteristics above, allowed similar occupations to be grouped together and the optimal number of groupings to be determined.
 - Three types of labour have been identified:
 - Professional (e.g. corporate managers and administrators)
 - Skilled (e.g. skilled engineering trades)
 - Unskilled (e.g. personal service occupations)

THE IMPACT OF TRADE ON UK WAGES

- In the final stage of my research I intend to build a CGE model of the UK that:
 - Adequately captures product differentiation.
 - Incorporates restricted intersectoral mobility of labour.
 - Distinguishes between technology effects that independently lead to wage inequality and those that are driven by or rely on trade.
 - Captures the diversity of labour types present in the UK economy.
- This model will then be used to decompose the increase in UK wage inequality into trade and technology effects.