Available online at www.sciencedirect.com

ScienceDirect

Journal of Economic Theory 163 (2016) 365–409

JOURNAL OF Economic Theory

www.elsevier.com/locate/jet

# Assignment reversals: Trade, skill allocation and wage inequality ☆

Thomas Sampson

*Centre for Economic Performance, Department of Economics, London School of Economics, United Kingdom*

Received 15 July 2014; final version received 13 October 2015; accepted 10 February 2016

Available online 17 February 2016

**Abstract**

The allocation of skilled labor across industries shapes inter-industry wage differences and wage inequality. This paper shows the ranking of industries by workforce skill differs between developed and developing countries and develops a multi-sector assignment model to understand the causes and consequences of this fact. Heterogeneous agents leverage their ability through their span of control over an homogeneous input. In equilibrium, higher skill agents sort into sectors where the cost per efficiency unit of input is lower. Consequently, skill allocation is endogenous to country-sector specific variation in input productivity and costs and when the ranking of sectors by effective input costs differs across countries there is an assignment reversal. Assignment reversals between North and South have novel implications for how trade affects wages because they imply the Stolper–Samuelson theorem does not hold. Instead, each country has a comparative advantage in its high skill sector and output trade integration causes the relative wage of high skill workers, and wage inequality within the high skill sector, to increase in both countries.


*JEL classification:* F11; F16; J24; J31

*Keywords:* International trade; Wage inequality; Labor assignment

☆ I am grateful to Pol Antràs, Arnaud Costinot, Elhanan Helpman, Isabelle Méjean, Marc Melitz, Nathan Nunn and seminar participants at Cambridge, CREI, Harvard, LSE, Stockholm IIES, Toronto Rotman, Warwick, the World Bank, the CREST workshop on Economic Integration and Labor Markets, the European Economic Association meetings in Oslo and the SNF Sinergia-CEPR conference on Economic Inequality, Labor Markets and International Trade for helpful comments and suggestions.

*E-mail address:* t.a.sampson@lse.ac.uk.

http://dx.doi.org/10.1016/j.jet.2016.02.001

## 1. Introduction

For over half a century the Stolper and Samuelson (1941) theorem dominated analysis of the effects of trade on wage inequality. In a Stolper–Samuelson world inter-industry trade raises wage inequality between skilled and unskilled workers in relatively skill abundant countries and lowers inequality in relatively unskilled abundant countries.[1] Contrary to this prediction many developing countries that liberalized trade in the 1980s and 1990s experienced increases in wage inequality (Goldberg and Pavcnik, 2007). This observation has cast doubt on the empirical relevance of the Stolper–Samuelson theorem and led to the emergence of a literature documenting alternative channels through which trade may affect wage inequality.[2] The mechanisms identified in this literature are not driven by inter-industry output trade and could, in principle, co-exist with Stolper–Samuelson effects. For example, Burstein and Vogel (2015) quantify the effects of international trade on the skill premium in a model where trade induces both Stolper–Samuelson effects and increased demand for skill within industries. By contrast, this paper challenges the logic underlying the Stolper–Samuelson theorem and shows why North–South trade between developed and developing countries does not necessarily cause Stolper–Samuelson effects.

The Stolper–Samuelson theorem relies on the assumption that the ranking of sectors by skill intensity is the same in all countries. In the two country, two sector model this assumption guarantees that if one country has a comparative advantage in the skill intensive sector, then the other country's comparative advantage must lie in unskilled labor intensive production. Variation in workforce skill across sectors is usually explained by invoking cross-sector differences in production technologies that affect the demand for skill. Both traditional multi-sector models, such as the Heckscher–Ohlin model, and the more recent comparative advantage assignment literature (Sattinger, 1975; Ohnsorge and Trefler, 2007; Costinot and Vogel, 2010; Acemoglu and Autor, 2011) follow this approach. Open economy applications of these models further assume there is no cross-country technology variation, at least in those parts of the technology that affect the demand for skill. Consequently, the ranking of sectors by workforce skill is constant across countries.

However, industry level data implies the ranking of sectors by workforce skill varies systematically across countries. Define the "wage rank correlation" to be the rank correlation of a country's industry wages with industry wages in the US. Fig. 1 shows wage rank correlations plotted against per capita income.[3] Although the correlation is always positive, it is strongly increasing in income per capita. While industrialized countries have similar industry wage structures to the US, the industry wage ranking varies substantially between low and high income countries. Section 2.1 shows that the correlation observed in Fig. 1 is a robust feature of industry wage data sets. Under the assumption that inter-industry wage differences primarily reflect

[1] Although originally derived in a canonical two country, two sector, two factor Heckscher–Ohlin model, variants of the Stolper–Samuelson theorem have been obtained in many different environments. See Costinot and Vogel (2010) for a recent example.

[2] Channels that have been highlighted in the literature include: intra-industry trade (Manasse and Turrini, 2001; Yeaple, 2005; Sampson, 2014); offshoring (Feenstra and Hanson, 1996); capital trade (Csillag and Koren, 2009; Parro, 2013; Burstein et al., 2013), and; trade-induced expansion of skill intensive R&D activity (Dinopoulos and Segerstrom, 1999).

[3] The wage data is from the UNIDO Industrial Statistics database and covers 42 countries and 127 ISIC 4 digit manufacturing industries in 2000. Income per capita is from the Penn World Tables 6.3. See Section 2.1 and Appendix C for a complete description of the data.