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International factor mobility, elasticity of substitution in production and the skilled–unskilled wage gap



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ABSTRACT

The existing studies have shown that the skilled–unskilled wage gap is affected by the size of elasticity of substitution in consumption. This paper focuses on the role of elasticity of substitution in production. Within the context of this paper, elasticity of substitution in production measures the degree of substitutability between capital and labour. By making use of a two-sector (low-tech and high-tech) general equilibrium model, this paper argues that differences in the degree of substitutability between capital and labour can also affect the size of factor inflow induced skilled–unskilled wage gap. Inflow of capital increases the skilled–unskilled wage gap as long as capital and labour can be relatively easily substituted in the low-tech sector. On the other hand, under the same scenario, inflow of either type of labour decreases the skilled–unskilled wage gap.

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1. Introduction

Rapid globalisation and technological progress during the past few decades has contributed to economic growth experienced by the world economy in recent decades. While economic growth has resulted in a general improvement in standards of living in a number of countries, not all groups within each country have equally benefited. It is widely believed that technological progress, among other things, led to a significant decrease in the cost of communication and transportation. Technological progress combined with economic reforms in a number of countries starting from the late 1970s created new international business opportunities. The net effect of these developments is a rapid increase in international trade and factor mobility, which has resulted in increase in wages. However, compared to unskilled workers, skilled workers appear to have experienced a much larger increase in wages. For example, the wage gap between the skilled and unskilled workers in the US from the 1970s to the early 1980s increased by approximately 20% (Marquis, Trehan, and Tantivong, 2014).¹ Other studies that have reported growing income inequality in both developed countries and developing countries include Wan, Lu, and Chen (2007), Autor, Katz, and Kearney (2008) and Jaumotte, Lall, and Papageorgiou (2013).

Rising skilled–unskilled wage gap is a concern in both developed and developing countries. As a result, a number of recent studies have attempted to identify the factors that have contributed to an increase in the wage gap. Explanations provided thus far include trade liberalisation (Wood, 1998), inflow of labour (Marjit & Kar, 2005), increased international competition (Wälde & Weiß,

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¹ In the existing literature, “wage gap” and “wage inequality” are used interchangeably.

2007), labour market imperfections (Chaudhuri & Yabuuchi, 2007), skill-biased technological change (Epifani & Gancia, 2008 & van de Klundert, 2008), the presence of economies of scale (Anwar, 2010), the role of information technology (Wheeler, 2005), location (Moretti, 2009), the role of knowledge spillovers (Wang, Fang, & Huang, 2009), education (Dawood & Murshed, 2008 and Mamoon & Murshed, 2013) and outsourcing (Anwar, 2013; Chongvilaivan & Thangavelu, 2012; Chowdhury, 2010).

While examining the role of skilled-biased technological change, Epifani and Gancia (2008) and van de Klundert (2008) have highlighted the impact of the elasticity of substitution in consumption. Both of these studies have shown that the size of elasticity of substitution in consumption affects the level of wage inequality. However, the impact of factor substitution, which is linked with production technology, has not received much attention.

This paper focuses on the role of elasticity of substitution in production that measures the responsiveness of capital–labour ratio to changes in wage–price of capital ratio. Elasticity of substitution has long been recognised as a key explanation for economic growth (Solow, 1956), yet it has not been explicitly considered by the existing literature on skilled–unskilled wage inequality. Using a normalised CES production function, Klump and de La Grandville (2000) have shown that a country that has a higher elasticity of substitution in production would also have a higher per-capita income. Dupuy and De Grip (2006) showed that elasticity of substitution between capital and labour, among other things, can also account for higher demand for factors of production in the presence of skill-biased technical progress. However, Klump and de La Grandville as well as Dupuy and de Grip have explicitly focused on the elasticity of substitution in production in the context of firms that produce largely similar products.² This paper considers a situation where elasticity of substitution in production varies across industries within a small open-economy. Using a theoretical model, we argue that differences in elasticity of substitution in production across sectors can also account for the skilled–unskilled wage inequality within a small open economy.

The rest of this paper is organised as follows. Section 2 contains a brief review of the related literature. A two-sector general equilibrium model of a small open-economy is presented in Section 3. The theoretical model is used to highlight the role of differences in the elasticity of substitution in production in Section 4. The last section offers some concluding remarks.

2. Review of literature

A large number of theoretical and empirical studies have attempted to identify the determinants of the skilled–unskilled wage inequality. In this section some of this literature is classified into three groups.

2.1. International trade, outsourcing and wage inequality

The literature on trade based determinants of skilled–unskilled wage inequality is vast. In this section some of the recent studies are reviewed. Kremer and Maskin (2006) argued that the standard Heckscher–Ohlin model (combined with Stolper–Samuelson theorem) predicts that trade liberalisation increases wage inequality in developed countries, because developed countries are relatively skilled labour abundant (and the result is opposite in the case of developing countries). They further argued that simple conclusions like these cannot explain all the complex real world issues. Kremer and Maskin explicitly considered the labour market structure of the developed and developing countries. They found that the effect of trade on wage inequality depends on the relative number of skilled and unskilled workers within the two countries as well as on relative skill levels. Assuming that unskilled labour and outsourcing are substitutes, Ethier (2005) argued that outsourcing arising from increased globalisation can result in increased wage inequality. The role of outsourcing in explaining wage inequality is also discussed by Chowdhury (2010), Chongvilaivan and Thangavelu (2012) and Anwar (2013). Other studies that consider trade and wage inequality include Beyer, Rojas, and Vergara (1999), Marjit, Beladi, and Chakrabarty (2003), Das (2005), and Mehta and Hasan (2012).

While taking intermediate inputs that can be outsourced into account, Grossman and Helpman (2007) showed that the wage-gap can be linked to a firm's choice between offshore production and outsourcing. Gupta and Dutta (2010) generalised a number of existing results. In addition, Gupta and Dutta (2011) made additional contributions by (i) introducing unemployment in the model and (ii) utilising the Gini coefficient. Using a product variety model, Zhang (2012, 2013) argued that short-run results can be very different from long-run results. Based on the firm level data from China, the empirical work of Anwar and Sun (2012) suggests that trade liberalisation is positively related to the skilled–unskilled wage inequality in China's manufacturing sector. However, an increase in market competition decreases the wage inequality. Using a very interesting two-sector model of endogenous job destruction, Ranjan (2012) shows that trade liberalisation increases inter-sectoral wage inequality. McNabb and Said (2013) examined the impact of openness to trade on wage inequality in Malaysia. Using a sector specific theoretical model, where labour unemployment exists, Barua and Pant (2014) have shown that, in the case of small developing economies, wage inequality is related to labour productivity rather than free trade.

2.2. Factor mobility and wage inequality

Aside from trade, international factor flow is recognised as another major reason for wage inequality. Marjit and Kar (2005) showed that, contrary to the general belief, the emigration of both skilled and unskilled workers from a developing economy can increase skilled–unskilled wage inequality. Wälde and Weiß (2007) examined the impact of increased international competition on

² Antony (2009) proposed a dual elasticity of substitution production function that can be used to explain cross country income inequality.

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