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Intellectual property rights protection, labour mobility and wage inequality

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ABSTRACT

By focusing on the role of intellectual property rights (IPRs), this paper contributes to the literature on determinants of skilled-unskilled wage inequality. We use a two-sector general equilibrium model of a small open economy that produces a normal and an innovation good. We show that in the presence of cross-border differences in IPRs and consequent mobility of skilled labour, the impact of IPRs on skilled-unskilled wage inequality can be broken down into a revenue effect and an output effect. We find that a stronger IPRs regime in the source country reduces its skilled-unskilled wage inequality. However, if the output effect is stronger than the revenue effect, an increase in the recipient country's IPRs protection can contribute to an increase in wage inequality in the source country. Our results confirm the importance of institutional factors, such as the IPRs protection, in addressing the skilled-unskilled wage inequality.

1. Introduction

Rising wage inequality between the skilled and the unskilled workers had spurred extensive discussions since the late 1970s (e.g., OECD, 2011; UNDP, 2013; ILO, 2016; World Bank, 2016). This discussion focused mainly on structural changes that were driven by the increasingly connected global economy associated with the rapid spread of digital technologies. In the wake of growing outsourcing activities, the unskilled workers in the globe face an unprecedented pressure. Digital technologies replace job opportunities that were used to be performed by the unskilled workers, while complementing jobs and tasks performed by the skilled workers. Subsequently, highly skilled workers are generally rewarded with greater compensation, which, in turn, causes a negative impact on income distribution between the skilled and the unskilled labour (OECD, 2011; World Bank, 2016). For instance, the proportion of routine (low-skilled) labour in the US declined from 39% to 23.6% from 1968 to 2013, while that of the non-routine (skilled) labour saw an increase from 24.4% to 33.6% during the same period (Eden and Gaggl, 2014). Further evidences also confirm these findings for several countries with different levels of technological progress (e.g. Srour et al., 2013;

Marouani and Nilsson, 2016; Gaggl and Wright, 2017). This trend appears to be fairly common in both the developed and the emerging countries, in contrast to the principle of comparative advantage (Berman and Machin, 2000; Kremer and Maskin, 2006; Maskin, 2015).

Although job markets in the highly technological-diffused countries generally are in favour of the skilled workers, it is not always the case that technological changes are skill-biased, when, in particular, we take into account of the degree of substitutability and complementarity between technology and labour (Saint-Paul, 2008). Acemoglu (2002) emphasizes that institutions and international trade can influence the patterns of wage inequality.¹ Indeed, institutional factors, such as the regime of intellectual property rights (IPRs) protection, have been considered alongside technology since they have facilitated in shaping the different patterns of international flows of skilled migrants, which, in turn, affect wage inequality.

The strength of IPR regimes across borders can constitute a powerful instrument through which the direction of technology development is affected. Higher IPRs protection might induce a higher level of technological change, which, in turn, would increase the demand for skilled workers. Subsequently, this impacts on the mobility of the skilled labour

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¹ A set of institutional mechanisms, which are outside this paper's scope, are those that contribute to determining the wage levels, such as minimum wage law, unionization, non-standard employment contracts, etc. (Lemieux, 2008). The elements, that decrease the role of market forces to determine wages, were adopted at the beginning of the 1980s by several conservative governments that were determined to decrease the role of wage-setting institutions, leaving wages to become more closely aligned with individual productivity. This was possible, for instance, by means of declining unionization and the fall in the real value of the minimum wage. These wage-setting mechanisms worked complementarily to the skill bias technical change hypothesis (Kristal and Cohen, 2015).

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with implications for wage inequality. We consider the strength of IPRs regime as an important determinant of a country's level of institutional strength and, thus, a crucial element while addressing age differentials as a result of the changes in IPRs regimes.

To the best of our knowledge, the role of IPRs protection in determining the rate and direction of wage inequality has not been thoroughly analysed. This paper aims to contribute to fill this gap. We investigate the effects of tightening up the protection of IPRs on skilled migration and income inequality in the global economy. We do so by addressing the following fundamental research question: How do IPRs protections affect the skilled labour mobility and wage inequality? We develop a small open economy model in which the mobility of skilled labour across international boundaries occurs due to the changes in the level of IPRs protection. We show that an increase in IPRs protection in the source country narrows down the skilled-unskilled wage inequality. However, an increase in the recipient country's IPRs protection, leads to an increase in skilled-unskilled wage inequality in the source country, but only when the associated output effect dominates the revenue effect.

The paper is structured as follows. Section 2 reviews the relevant literature. Section 3 contains the basic model, the results on labour mobility and implications for wage inequality. Section 4 summarizes our findings and Section 5 concludes.

2. Literature review

It has long been acknowledged (Rosen, 1981) that technology is a key driver of changes in wages and income (Saint-Paul, 2008; Goldin and Katz, 2009; Kurokawa, 2014). The skill-biased technological change hypothesis is based on the empirical evidence of a positive relationship between the diffusion of the use of computers, in particular on job sites, and wage differentials between workers with low and high skills respectively (Katz and Murphy, 1992; Autor et al., 1998). In a recent empirical study, Mallick and Sousa (2017) found that technology is correlated to the skill premium and the demand for skilled labour, especially in the science-based and production-intensive industries.

Skilled migration has long been understood to be an important indicator of technological change within the context of international relations. A large literature has suggested that skilled labour provide new invention and the emigration of skilled labour alters a country's capacity to be innovative. Grubel and Scott (1966) first used the term "brain drain" to explain the impact of the trend of skilled migration from developing countries in reducing the innovative capacity of source countries (Commander et al., 2004). In a recent study, Agrawal et al. (2011) found that the emigration of skilled labour does in fact weaken local knowledge networks (i.e., the brain-drain effect) but it also allows innovators to retain their access to knowledge accumulated abroad (i.e., the brain-bank effect).

A number of studies have attempted to identify the determinants of skilled-unskilled wage inequality based on the mobility of workers and other factors. For example, Li and Zhou (2013) examined the impact of migration on wage inequality in the host country by focusing on the remittance of migrants; similar studies include Zhang (2012, 2013), Anwar (2010), Anwar et al. (2013), Anwar and Sun (2015) and Pi and Zhou (2012). While most of the literature takes market forces into account, few studies have explicitly considered the link between the institutional level and skill premium. Pi and Zhou (2014, 2015) investigated the impact of institutions' quality on wage inequality. To date, the literature has mainly focused on the role of institutions in general terms, without specifying how each institution impacts inequality. We focus on IPRs as they are the most important institutional instruments that governments can enforce structural change across the institutional landscape of a country.

Only recently, a number of studies have explored the link among IPRs protection, skilled labour mobility and innovation, starting from the literature on the relationships between IPR protection and North-South

trade (Lai and Qiu, 2003; Grossman and Lai, 2004) and IPR protection and outsourcing/offshoring (Antras and Helpman, 2004). This literature emphasizes the possible benefits from a government's relative incentive to provide patent protection that typically increases with its relative endowment of human capital (Grossman and Lai, 2004), and the benefits that both North and South can derive from harmonisation of its IPR standards; this together with the North liberalising the goods market (Lai and Qiu, 2003). With regard to outsourcing/offshoring, this has been shown to impact the skill premium in a similar way to technological change. In fact, it directly affects the wages of unskilled workers, thus increasing wage inequality; although when it happens in the service sector, it has been shown to affect skilled labourers as well (Bottini et al., 2007). Mondal and Gupta (2008) analysed the conditions through which, within a North-South model, the strengthening of IPR protection may favour innovation in the South and South-North migration. McAusland and Kuhn (2011) shown how governments use IPRs policy as a tool to attract the creators of intellectual property, a concept referred to as "bidding-for-brains"; they also identified an opposing force that reduces the incentives of a country facing brain drain to protect IPRs. This so-called "expatriate brains" effect occurs because innovations are heterogeneous in their usefulness to different countries. The assumption draws on work by Diwan and Rodrik (1991) that North and South may have differing technological needs, making innovations abroad less relevant to the country of origin. They shown the negative effect of brain drain on IPRs are dominant in small or lagged economies, whereas the positive effect through a bidding war is more significant for advanced countries. This is essentially due to the large distance to the frontier regarding IPR laws in developing countries that hinders their use of IPRs protection to retain their brains. Chu and Peng (2011) developed a two-country R&D-based growth model in which the strengthening of patent protection in either country increases economic, growth as well as income inequality in both countries. They found that strengthening patent protection in developing countries increased global economic growth but also worsened global income inequality. Finally, Naghavi and Strozzi (2015) shown that IPRs moderate the relationships between migration and innovation because they provide the knowledge required to stimulate domestic innovation in developing countries. The strength of IPRs protection also determines whether migration results in brain drain or not.

Public policies might therefore, influence the relationships between technology and labour and drive more equitable results. A proper market for IPRs is thus seen as crucial by the OECD, which highlights patent policies as one of the main elements to strengthen innovation and technological changes in both developed and developing countries (OECD, 2013; 2014a, 2014b). IPRs are thus an important institutional element, the strength of which impacts innovation and the mobility of inventors, which, in turn, leads to changes in the wage premium for skilled labour.²

Almost all the above-mentioned literature focuses on the welfare effect on skilled labour, such as change in skilled labour income, by exploring the direct impact of IPRs, or how IPRs lead to spill-overs and in turn impact on skilled labour's income. One important issue that remains unresolved is the extent to which the IPRs regime affects the wages of unskilled labour and the return to capital, and, thus the wage inequality of an economy. These questions can adequately be studied within a general equilibrium analysis, which is the basic framework of this study and will be addressed in the next paragraph.

² For instance, the Office of the U.S. Trade Representative (USTR) releases 'Special 301 Reports' identifying its trading partners' protection and enforcement of IPR. In the latest list, 2016 Special 301 list, some emerging countries such as China and India are in the Priority Watch List (PWL), which indicates the poor enforcement of IPR in such countries. Coincidentally, these countries are recognized as the main sources of emigration of highly educated labour. There is clear evidence for a growing brain drain from developing countries since 1970s (Docquier and Rapoport, 2008).

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