



# Tariffs, relative prices and wage inequality: Evidence from China



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## ABSTRACT

This paper, based on data from China after its membership into the World Trade Organization (WTO), shows the co-existence of a fluctuating skill premium and rises in wages for both skilled and unskilled labor. Our research provides one specific factor, the tariff reduction biased toward unskilled labor-intensive sectors, to explain and quantify the magnitudes of skill premium dynamics using the mandated-wage approach. The empirical evidence indicates that sector-biased tariff reductions have widened wage inequality in China through their effect on product prices. World price competition, on the other hand, has contributed to declining wage inequality via product prices, which is consistent with the endowment-based expectations of China's integration into the more skilled-labor abundant world.

## 1. Introduction

China's accession into the WTO in 2001 has emphasized increased globalization and wage inequality, and led to extensive empirical research. Given that China's tertiary gross enrollment ratio has been consistently lower than the world's average,<sup>1</sup> we argue that China has liberalized trade within a more skilled-labor abundant world. If this is true, the relative price of unskilled labor-intensive goods produced in China, after joining the WTO, should rise. Consequently, this would lead to a fall in China's skill premium based on the Heckscher-Ohlin (HO) and Stolper-Samuelson (SS) theories, which suggest that increases in the relative prices of goods tend to push up the return of the factors relatively intensively used in the production of those goods.

Many stylized facts about the enlarged wage gap in developing countries are inconsistent with the simple HO model and SS theory linking trade and inequality.<sup>2</sup> Economists have examined trade-unrelated factors, such as skill-biased technological progress, declining real minimum wages, differential access to schooling and labor market friction to determine the reasons why the skill premium rises in both rich and poor countries.<sup>3</sup> Additional research, which relaxes the HO setting, has shown that trade forces can help reconcile theory and practice.<sup>4</sup> A wider wage gap between countries, due to heterogeneous agents, specific factors, non-traded goods, intermediate inputs, offshoring and multiple cones of diversification is a theoretical possibility (Feenstra & Hanson, 1996; Deardorff, 2001; Beladi & Batra, 2004; Davis & Mishra, 2007; Xiang, 2007; Grossman & Rossi-Hansberg, 2008; Barua & Pant, 2014). Feenstra and Hanson (1996), who develop a model of offshoring in which the demand for labor favored more skill-intensive workers, conclude that

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<sup>1</sup> China's tertiary gross enrollment ratio in 2002 and 2010 are 12.8% and 26%, respectively, which is much lower than the world's average of 23.2% in 2002 and 32% in 2010. According to Barro and Lee (2010), the average number of years of tertiary schooling in China's labor force is just 18% of the US level.

<sup>2</sup> See Hanson and Harrison (1999), Goldberg and Pavcnik (2007a, 2007b), Feenstra (2008), Dinopoulos, Syropoulos, Bin, and Yoton (2011), etc.

<sup>3</sup> For a more in-depth discussion, see Wood (1997) and Harrison, McLaren, and McMillan (2010).

<sup>4</sup> The HO assumptions, such as perfect competition, perfect mobility of factors across sectors within countries, homogeneity of products and factors from all trading partners, constant returns to scale technologies, etc. have sabotaged the ability of standard trade theories to explain the rising inequality in developing countries (e.g., Winters (2002), Davis and Mishra (2007), Harrison et al. (2010)).

the relative wages of skilled workers rise in all countries that engaged in trade. The research of Barua and Pant (2014), based on specific factors or non-traded intermediate goods included in the Heckscher-Ohlin-Samuelson (HOS) general equilibrium framework, shows the co-existence of both increasing wages for skilled and unskilled workers and rising wage inequality.

The literature reveals mixed findings about the wage effect of globalization. Grossman and Rossi-Hansberg (2008), building upon the research of Feenstra and Hanson (1996), find that offshoring has increased the productivity of low-skilled workers leading to a rise in their wage rate but also a decline in their relative wages through the subsequent expansion of the supply of low-skilled workers. Whether this is mainly due to a productivity effect or labor supply effect is an empirical question. Harris and Robertson (2013) investigate a small open economy with human capital accumulation and find that the change in skill premium is non-monotonic with tariff liberalization.

Trade liberalization in China, which has increased foreign investment, free trade, exports and international outsourcing, has widened wage inequality in the country (Wu, 2001; Zhao, 2001; Chaudhuri & Ravallion, 2007; Zou, Liu, & Zhuang, 2009; Anwar & Sun, 2012; Anwar, Sun, & Valadkhani, 2013).<sup>5</sup> For example, Wu (2001) has shown that the relative wages of skilled labor in China has risen along with increases in foreign direct investment in differentiated sectors. The higher wages paid by foreign firms to skilled workers in China also tend to increase the skill premium (Zhao, 2001). Zou et al. (2009) find that capital-skill complementarity and increased trade are associated with a rising skill premium. By making use of firm-level panel data, Anwar and Sun (2012) show that increased trade liberalization has contributed to an increase in skilled-unskilled wage inequality in China's manufacturing sector.

However, studies on China's rising skill premium are inconclusive. For example, Ianchovichina and Martin (2004) argue that China's WTO accession will reduce skill premiums and Xu and Li (2008) find that export expansion has a negative direct effect and a positive indirect effect (export-induced skill-biased technical change) on skill demand. Harris and Robertson (2013) use a dynamic open economy model to calibrate the changing pattern of China's trade-wage and show that tariff removal has created an initial jump in the skill premium but that an accumulation of skilled labor eventually causes this skill premium to fall.<sup>6</sup>

Neither widened nor narrowed wage rate inequality perfectly matches what we have found from China's real data. Fig. 1 shows the path of relative wages since 1995. China's skill premium has increased from 1996 to 2005, displaying some moderate rises after the country's WTO membership and then falling after 2005 reflecting a deeper degree of trade liberalization.<sup>7</sup> Although our observation of the final drop in the skilled labor premium is in line with the SS theorem's prediction, the rising wage rate inequality prior to 2005 requires that more factors be incorporated into the explanation for the transition of China's skilled labor premium.

This paper focuses on the impact of tariff reductions on the skilled-unskilled labor wage gap in China's manufacturing sector. Our research attempts to prove that the rising wage inequality in China after the country's accession into the WTO could be due to dramatic tariff reductions.<sup>8</sup> Joining the WTO has had an important impact on China's trade liberalization. To fulfill its accession commitment, China has taken concrete steps to continuously lower tariffs, reducing the overall tariff level of 15.3% in 2001 to 9.8% in 2011. By tracking the changing path of tariffs, most tariff reductions occurred in the first four years after the country joined the WTO. After that, China's government has made only a few minor adjustments on tariff rates across different goods. The perfect timing for wage inequality and tariff reductions indicates that tariff reductions could be a highly plausible reason for China's widened wage inequality prior to 2005. Since no further large-scale adjustment to tariff rates occurred after 2005, other trade-related factors, such as resource endowments and world price competition, may play more important roles and gradually reduce China's wage inequality.

One relevant question is whether the effects of tariff reductions on product prices are sector-neutral or sector-biased. To answer this question, we have to consider two factors: the magnitude of tariff reductions in different sectors and tariff pass-through rates. For example, supposing that China's tariff reductions are biased toward unskilled labor-intensive sectors, tariff reductions may lower the relative prices of unskilled labor-intensive products and raise China's skill premium if the pass-through rates of tariffs to product prices are uniform across all sectors. However, relative product price decreases might reveal no sector-biasness if the tariff pass-through effects are greater in skilled labor-intensive sectors. Therefore, this paper attempts to address three issues by analyzing the relationship between trade liberalization and wage inequality: (1) whether tariff reductions are sector-biased, (2) whether the pass-through rates of tariff changes to output price changes depend on market and industry structures and (3) whether output price changes resulting from tariff reductions can explain variations in wage inequality.

We present several findings in this paper. First, China's tariff reductions are biased toward unskilled labor-intensive sectors. Second, we find empirical evidence that estimated tariff pass-through rates hinge on market- and industry-structural characteristics. Third, our research extends earlier studies on China's wage inequality, and shows that sector-biased tariff reductions have significantly mandated widened wage inequality through their effects on product prices. By 2005, China had fulfilled most of its WTO

<sup>5</sup> Income inequality in China has been studied from a number of perspectives. Trade flows and productivity associated with foreign direct investment, better quality infrastructure and trained workers in the coastal areas have contributed to increases in regional income inequality (Ma, 2006; Fleisher, Li, & Zhao, 2010; Ramasamy & Yeung, 2010; and Fu & Wu, 2013). Anderson, Huang, and Ianchovichina (2002) show that rural-urban income inequality in China has been significantly affected by the country's accession into the WTO.

<sup>6</sup> Alternatively, Pi and Zhang (2016) investigate how the hukou system reforms affect skill premiums and find that an increase in the strength of the hukou system reforms reduces wage inequality.

<sup>7</sup> Relative wages are defined as the ratio of skilled-labor wages over unskilled-labor wages. The detailed definition and data source can be found in the footnote to Fig. 1. Labor costs have increased by 53.4 billion RMB in 2004, and the growth rate, at 36.4%, is at the highest level since 2000. This might be the reason why we see the spike in relative wages. The economic and political forces behind this huge jump in labor costs are an area that we suggest for future research.

<sup>8</sup> Previous literature examines other trade restrictions. Bao and Qiu (2010) focus on the impact of technical barriers to trade (TBTs) on Chinese imports by controlling for tariffs, import licenses and quotas. Imbruno (2016) explores the effectiveness of different trade liberalization components on Chinese imports (i.e., tariff cuts and the gradual removal of non-tariff barriers).

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