

Trade Liberalization and Wage Skill Premium in Philippine Manufacturing

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The paper aims to examine the relationship between trade liberalization and wage premium at the firm level. Using effective protection rate as trade proxy, the paper assumes that in the face of increasing competition, an import-substituting firm may decide to remain at the low value added stage of the production process which requires relatively less skilled workers and suggests a decline in the wage premium. On the other hand, a firm may move away from the product whose protection rate has fallen and shift and expand toward a higher value added activity. This would require relatively more skilled workers suggesting an increase in the wage premium. The main findings of the paper show that: *First*, trade liberalization lowers the wage premium. A firm responds to import competition by shifting to the manufacture of products with lower value added and importing intermediate inputs rather than producing these within the plant. *Second*, using ASEAN tariff rates as trade proxy, the same results are obtained, however, when ASEAN tariff is interacted with skill intensity, the results show that tariff reduction on skill intensive products is associated with rising wage skill premium. *Third*, firm characteristics such as skill intensity, firm size, and capital labor ratio matter in assessing the impact of trade reform on the wage premium. *Lastly*, exports are associated with increasing wage premium at the firm level the higher their skill intensity. In the literature, greater openness is associated with skill biased technological change with export-oriented and technology intensive activities as channels.

Keywords: wage skill premium, trade liberalization, Philippine manufacturing, labor market

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1. Introduction

Since the 1980s, the Philippines has made considerable progress in opening-up the manufacturing industry by removing tariff and non-tariff barriers. Despite the market-oriented reforms, the growth of the manufacturing industry has been slow. Average manufacturing growth was 0.9 percent in the 1980s, 2.5 percent in the 1990s, and 3.5 percent in the early 20s. Average manufacturing share to total industrial output remained unchanged during the same periods; it accounted for 28 percent of total output in the 1970s, 26 percent in the 1980s, and 24 percent in the 1990s. In terms of employment generation, the manufacturing industry failed in creating enough employment to absorb new entrants to the labor force as its share to total employment dropped from 11.3 percent in the mid-1970s to 9.7 percent in the 2001-2003 period. The industry's total factor productivity growth was negative from 1996 to 2006.

Trade liberalization and integration into the global economy offers opportunities for creating output and employment. Trade liberalization leads to a reallocation of factors of production (labor and capital) within and between firms and sectors. This is the source of the efficiency improvements that underpin the gains from trade. According to the Heckscher-Ohlin model, countries will export goods that use intensively those factors that are relatively abundant at home and import goods that use intensively those factors that are relatively scarce. Trade will increase the demand for the abundant factors, assuming that exports will expand, and will reduce the demand for scarce factors as import-competing sectors contract. In developing countries where unskilled labor is abundant and skilled labor is scarce, trade will increase unskilled labor wages and lower skilled wages, thus, narrowing wage inequality.

In the real world, many of the simplifying assumptions of the model do not hold. Countries do not use exactly the same technology, and transportation costs and non-tariff barriers are present. Many industries operate under conditions of imperfect competition and non-constant returns to scale. The empirical literature indicates that in general, trade liberalization leads to relatively large increases in skill premiums

due to the increased demand for skilled workers (Hoekman & Winters 2005 and Goldberg & Pavcnik 2004). In Mexico, Cragg & Epelbaum (1996) reported a skill premium increase of about 68% between 1987 and 1993. In Columbia; Attanasio, *et al.* (2004) found a 20% increase between 1990 and 1998. Studies indicated that the demand for skilled workers particularly in developing countries may have increased due to the increase in returns to particular occupations that are associated with a higher educational level; shift of skill intensive intermediate goods production from developed to developing countries; skill-biased technological change (SBTC); and compositional changes and quality upgrading of firms and products produced by developing countries.

Despite substantial trade liberalization in the last two decades, the growth of manufacturing has been sluggish and services has become the main driver of growth and employment in the country. Wage premiums declined in industry as education intensity increased suggesting an oversupply of skilled labor relative to the sector's skill needs (World Bank, 2010). With trade liberalization as a major economic reform carried out in the country, it is important to ask whether it has contributed to the decline in the wage skill premium. Using firm level data, the paper aims to analyze the impact of trade liberalization on wage skill premium in the Philippine manufacturing industry. Trade indicators such as output tariffs, input tariffs, and effective protection rates are used in the analysis.

The paper is divided into five parts, after the introduction, section two will provide a brief review of the trade and employment literature. Section three will discuss the trade and employment policies affecting the manufacturing industry along with a review of its performance and contribution to employment. Section four will present the empirical framework and analysis of major findings. Section five will summarize the results and policy implications of the paper.

2. Review of the Trade and Employment Literature Review

2.1. Overview of the Trade and Employment Literature: rising skill premium and wage inequality between skilled and unskilled workers

The trade and employment literature focuses on the channels emphasized by the workhorse model of trade, the Heckscher-Ohlin (H-O) model and the Stolper-Samuelson model. A simple version of the model with 2 countries, 2 goods and 2 factors of production predicts that countries should specialize in the production and export of goods that use more intensively their relatively abundant factor and import those goods that use intensively those factors that are relatively scarce. The Stolper-Samuelson model suggests that trade liberalization will increase the demand for and returns to the abundant factor in each of the two countries. If the two factors are skilled and unskilled labor, trade reform in the unskilled abundant country should lead to a decrease in wage inequality between skilled and unskilled labor as the demand for unskilled workers rises. The opposite happens in the skilled labor abundant country.

The Heckscher-Ohlin model suggests that trade liberalization would lead to a redistribution of employment away from import-substituting sectors towards export-oriented sectors under the assumptions of homogeneous firms and products and inter-industry specialization and trade. In many developing countries, however, empirical work has consistently documented a lack of major labor reallocation across sectors despite substantial trade liberalization episodes in these countries from the 1980s to the 1990s (Goldberg & Pavcnik, 2004).

New studies using micro-level data provide evidence of substantial output reallocation following trade reforms from less productive towards more productive firms within an industry leading to an increase in aggregate productivity. Faced with increased import competition, less efficient firms in the industry are forced to downsize, improve efficiency or exit while efficient firms expand their market shares. Overall total factor productivity increases more in industries that liberalized more (Hoekman & Winters, 2005).

It is important to note that in these studies, the assumption of firm heterogeneity within an industry has been adopted in contrast to traditional models that rely on the

representative firm assumption. In the presence of within-industry firm heterogeneity, trade liberalization may lead to improved productivity through the exit of inefficient firms and the reshuffling of resources and outputs from less to more efficient firms. As Melitz (2002) points out, trade opening may induce a market share reallocation towards more efficient firms and generate an aggregate productivity gain, without any change at the firm level.

One of the robust stylized facts on the trade and employment literature is the **significant increase in skill premium and wage inequality between skilled and unskilled workers** (Hoekman & Winters 2005 and Goldberg & Pavcnik 2004). While the Hecksher-Ohlin model would predict that trade liberalization could induce a decline in skill premium and wage inequality; empirical studies show relatively large increases in skill premiums over a short period of time. The increase in skill premium is driven by increased demand for skilled workers. Studies indicate that the demand for skilled workers particularly in developing countries may have increased due to the following:

2.1.1. Increase in returns to particular occupations that are associated with a higher educational level

In the case of pre NAFTA Mexico, Cragg & Epelbaum (1996) find strong support for this hypothesis especially in the occupational premia of professionals and administrators. The authors attributed the increase to the rapid changes introduced in the economy by reforms that increased the demand for individuals who could implement these reforms. Although in Columbia, Attanasio, *et al.* (2004) found that occupational returns remained relatively stable during the period 1986-1998. Although there is a spike in the returns to managers and other professionals in 1992, a year after a dramatic trade and labor reform, this was short-lived and cannot explain the increase in skill premium in the late 1980s and 1990s.

2.1.2. Shift of skill intensive intermediate goods production from developed to developing countries

It is important to point out that trade takes place not only in final goods but also in intermediate goods. As Feenstra & Hanson (1996, 2003) indicated, the increase in global production sharing or outsourcing can partly account for the increased demand for skilled labor in both developed and developing countries. The production of final

goods requires the use of intermediate inputs that differ in their skill intensities. Trade and investment liberalization shift the production of some of these intermediate goods from developed to developing countries. While these products would be characterized as unskilled labor intensive from a developed country's perspective, they appear as skilled labor intensive from the point of view of developing countries. Hence, the average skill intensity increases in both the developed and developing countries, inducing an increase in the skill premium in both places.

2.1.3. Skill-biased technological change (SBTC)

Most of the existing evidence favors the SBTC view as responsible for the rising skill premium. Based on studies using different methodologies (inspired by the H-O model); Lawrence and Slaughter (1993), Sachs & Shatz (1994), Robbins (1996), Desjonquieres, *et al.* (1999) and others find that trade has little explanatory effect on changes in labor demand and relative wages across industries. Freeman & Katz (1991), Katz & Murphy (1992), Revenga (1992), Bernard & Jensen (1995) and Berman, *et al.* (1994) conclude that SBTC explains a large part of the changes in employment and relative wages based on the finding of a strong positive association between R&D expenditures and a rise in the relative return to skilled labor.

Note however, that although the evidence is in favor of SBTC, this does not necessarily imply that trade policy did not indirectly contribute to changes in the wage distribution especially if technological change was itself an endogenous response to more openness (Goldberg & Pavcnik, 2004). Recent theoretical papers have explored channels through which trade openness may have induced or at least contributed to SBTC. Wood's (1995) defensive innovation hypothesis states that intensified competition from abroad may induce firms to engage in R&D or take advantage of existing new technologies that they may have had little incentive to adopt prior to liberalization. The same argument was put forward by Thoenig & Verdier (2003). Acemoglu (2003) develops an endogenous technological change model and argues that in the case of developing countries this technological change may take the form of increased imports of machines, office equipment, and other capital goods that are complementary to skilled labor.

Trade liberalization affects the demand for skilled labor by reducing the prices of the relevant capital goods and hence increasing their imports. In the model developed by Aghion, *et al.* (2003), firms' response to trade liberalization depends on how close they are to the technology frontier. Firms that are sufficiently close can survive or deter entry of competitors by innovating while those that are far from the frontier may not be able to fight external entry. The authors also emphasize the role of domestic institutions, labor market restrictions in particular, and their interactions with technology adoption for the impact of trade policy on wage inequality. Another explanation focuses on the increased exports from developing countries following trade reforms. Empirical evidence from the US suggests that exporting is a skill-intensive activity (Bernard & Jensen, 1997) and to the extent that this is true for developing countries, an increase in exports will increase the relative demand for skilled labor. In Mexico, Harrison & Hanson (1999) finds a positive association between a firm's exporting status and the relative employment of white collar workers during a period of trade liberalization. Based on regressions relating the change in the share of skilled workers by sector to the change in tariff protection during the 1984-1998 period; Attanasio, *et al.*(2004) show that the increase in demand for skilled workers was largest in those sectors that experienced the largest tariff cuts (textiles and apparel). This provides some support for the theory that SBTC was itself an endogenous response to trade liberalization.

2.1.4. Compositional changes and quality upgrading of firms and products produced by developing countries

One puzzling finding in studies on trade liberalization studies in developing countries is the lack of labor reallocation across sectors which is the complete opposite of trade and productivity studies that are based on micro-level data. These studies find major resource reallocation across firms after trade liberalization with resources moving from less productive to more productive firms within the same industry which leads to increases in aggregate industry productivity. Recent work focus on compositional change in response to trade reform that may induce reallocation of both capital and labor towards "higher quality" firms. Trade openness induces a quality upgrading of firms where quality can mean either firm productivity

or product quality. This higher quality firms employ a higher proportion of skilled workers so that aggregate demand for skilled workers increases relative to unskilled workers. In response to trade reforms, firms in import-competing sectors try to avoid competition from cheaper countries by differentiating themselves. Trade can also shift resources from non-exporters to exporters and there is sufficient evidence that exporters tend to be more productive than non-exporters.

Using Indonesian manufacturing data and assuming firm heterogeneity, trade in final and intermediate goods as well as firm-specific wages; Amiti & Davis (2011) shows that the impact of a tariff change on wages depends on the globalization mode of the firm at which a worker is employed. A decline in output tariffs reduces wages of workers that sell only in the domestic market, but increases wages of workers at firms that export. Meanwhile, a decline in input tariffs increases the wages of workers at firms using imported inputs, but reduces the wages of workers at firms that do not import inputs.

In another paper, Amiti & Cameron (2011) analyzed the wage skill premium impact of tariff reduction on intermediate and final goods within firms in Indonesia. The analysis relied on firm-level census data on manufacturing covering firms employing 20 or more workers during the period 1991-2000. Their findings show a strong link between input tariffs and wage skill premium; their results indicate that tariff reduction on inputs reduces the wage skill premium within firms. However, in terms of tariff reduction on final goods, no similar significant impact on the wage skill premium was observed within firms.

2.2. Philippine Trade and Employment Studies

In the Philippines, similar studies that examine the relationship between trade

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