



Is capital deepening process male-biased? The case of Turkish manufacturing sector



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ABSTRACT

This paper analyzes the effects of technological change, capital intensity and increased trade activity on the gender- and skill-differentiated employment in the Turkish manufacturing industry subsectors during the 1990–2001 period. The primary objective is to find out the changes in relative employment opportunities for women workers as industries respond to increased international competition by pursuing the high road of increasing productivity. I use the seemingly unrelated regression (SUR) method to examine the determinants of skill- and female-intensity of employment. I find evidence for capital deepening having gender biased employment effects for the period 1990–2001. Specifically, I find that for the manufacturing industry as a whole capital had a preference for skilled males over skilled females controlling for the effects of trade. When I focus on the individual sectors, I find that some sectors had skilled-male labor complementarity with capital as well.

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1. Introduction

This paper analyzes the effects of the change in capital intensity and expansion in trade on the gender-/skill-differentiated employment in Turkish manufacturing industry subsectors over the 1990–2001 period. The period is distinguished by the attempts of Turkish manufacturing exporters to improve their technology in the expectation of growing market shares in the European Union after the Customs Union Agreement of 1996. The primary objective is then to find out the changes in female/male employment ratio¹ as industries respond to increased

international competition by pursuing the high road of increasing productivity. I use the seemingly unrelated regression (SUR) method to examine the determinants of gender-differentiated skill ratios. I also use sector dummies interacting with proxies for embodied technological change to capture the effects of capital intensity change on gender-/skill-differentiated employment in different subsectors controlling for trade within a fixed effects model framework. The data are collected for ISIC three-digit subsectors constituted by private plants that employ ten or more employees by the annual manufacturing surveys. The first and last years for which both gender and skill disaggregated data are available are 1990 and 2001, respectively.

To preview the results, I find that capital deepening did have gender-biased employment effects during the 1990–2001 period. Specifically, I find that for the manufacturing industry as a whole capital had a preference for skilled males over skilled females controlling for the

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¹ Throughout this paper I will refer to the ratio of female workers to male workers as the female intensity.

effects of trade. Furthermore, when I focus on the individual sectors, I find that some sectors had skilled-male labor complementarity with capital as well.

A unique feature of this paper has been its use of detailed gender- and skill-differentiated employment data. Unlike studies that use administrative personnel as a proxy for skilled labor and refer to production workers as unskilled workers, this study focuses only on the production workers to examine the gendered employment effects of trade, and embodied and disembodied technological change. By using the detailed Manufacturing Survey data, this paper constructs six gender- and skill-employment ratios, based on the assumption that theoretically, various worker groups are substitutable in production.

In the following sections, I first review the literature on the effects of technological change and trade on factor substitution focusing on the production theory in Section 2. This section also reviews the empirical literature on the gendered effects of trade liberalization and technological change. In Section 3, I turn to the process of Turkey's integration into the global economy with an emphasis on the labor market implications. Specifically, I classify the Turkish liberalization period in terms of high road/low road strategies. In Section 4, I estimate the SUR model of the determinants of skill-/gender-differentiated employment and present the regression results. Furthermore, in this section I present a more thorough analysis of the determinants of the ratio between skilled females and skilled males in manufacturing subsectors using a fixed effects model. Section 5 concludes.

2. Previous literature

Since I am interested in finding out the effect of capital deepening on gender and skill-differentiated manufacturing data, in the survey below I will focus on empirical studies on developing world that use the wage differential between skilled over unskilled labor groups and the gender-wage gap to gauge the effects of technological change and trade on gender/skill-differentiated employment. Due to the lack of gender differentiated wage data for manufacturing sub-sectors in Turkey, my study is limited to capturing the gender inequalities in employment. However, theoretically the changes in employment are linked to the changes in wage differentials.

The first attempts to measure the effects of technological change on the use of factors mostly focused on the capital-labor substitution, treating labor as a homogeneous group. The effect of technological change on different skilled labor groups has become an important issue following the parallel changes in the skill premium and the changes in skilled-unskilled labor intensities in the US and other OECD countries starting from the late 1970s. The same period witnessed a decreased employment level of unskilled labor in the manufacturing industry. Changes that would predict an increase in the demand for skilled labor have been considered as a result of skill biased technological change (SBTC) (see among others Bound and Johnson, 1992; Krueger, 1993; Berman et al., 1994; Doms et al., 1997; Berman et al., 1998). Most of the studies that test the hypothesis of SBTC use a proxy for technological change

and find the effects of the latter on some kind of a skill decomposition of the labor market.

Persuaded by the pervasiveness of SBTC in the developed world, Berman and Machin (2000) attempt to connect SBTC with technology transfers to the developing countries. During the 1980s many developing countries (Chile, Mexico, Costa Rica, Uruguay) experienced an increase in income inequality in favor of skilled workers and an increase in the skilled labor demand as well (Pavcnik, 2000). Since most of the developing countries transfer technology from the countries which had SBTC through foreign direct investment or otherwise, Berman and Machin (2000: 3) reason that developing countries must be choosing from a menu of best practices that includes an ever-increasing propensity of SBTC. This study finds evidence for the adoption of SBTC in the middle-income countries as well.

Apart from the cross-section evidence on technology adoption and skill upgrading, the literature on the skilled labor share in employment or wage-bill for developing countries uses the idea of capital-skill complementarity as an explanation for skill upgrading. Griliches (1969) defines capital-skill complementarity as a difference in the marginal rate of substitution (MRS) between capital and skilled labor on the one hand and capital and unskilled labor on the other. Specifically, he states that skill or education is more complementary with physical capital than unskilled or raw labor (Griliches, 1969: 465).

This literature on the factor-biased technological change does not take gender into consideration as an analytical category. While its gender effects might be relatively predictable to the extent female workers are disproportionately unskilled,² if we consider the effects of biased technological change for the same skill category of females and males, the literature remains silent. After controlling for the productivity differences, the technological change literature does not foresee a difference between skilled females and skilled males on the one hand, and unskilled males and unskilled females on the other, unless the technological change is itself gender biased.

Another explanation for the increase in the skilled wage for the developed world has been the increased trade with the developing world. Based on the Heckscher-Ohlin-Samuelson (HOS) model together with Stolper-Samuelson theorem, it is proposed that the increased trade is supposed to raise demand and therefore the skilled labor wage in the North or the developed world. The HOS model is based on the premise that the comparative advantage of nations arises from the relative abundance of the factors of production.³ For the South, we have the opposite result of increased wages for the unskilled labor. Therefore, it is proposed that trade

² It should be noted that women workers being less skilled than men is itself a product of gender inequalities that have to do with women and girls' limited access to education and skills, including in cutting-edge educational fields and women's limited access to new technologies for production, training, information and marketing (UN, 2011).

³ This result is proven under strict assumptions of fixed-shared technology for both countries, constant returns to scale (CRS), factor specialization irreversibility, perfect factor mobility within the country, immobility of factors across countries and identical tastes.

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