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# Trade and Income Inequality in Developing Countries

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**Summary.** — We use a dynamic specification to estimate the impact of trade on within-country income inequality in a sample of 65 developing countries (DCs) over the 1980–99 period. Our results suggest that trade with high income countries worsen income distribution in DCs, through both imports and exports. These findings provide support to the hypothesis that technological differentials and the skill biased nature of new technologies may be important factors in shaping the distributive effects of trade. Moreover, we observe that the previous results only hold for middle-income countries (MICs); we interpret this evidence by considering the greater potential for technological upgrading in MICs.

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*Key words* — globalization, within-country income distribution, technology transfer, developing countries, *LSDVC* estimator

## 1. INTRODUCTION

Since the beginning of the 1980s, several developing countries (DCs) have opened their economies toward international markets. Although the actual patterns of this process have differed across regions and have been determined by different reasons,<sup>1</sup> on the whole trade flows have significantly increased over the last three decades, and the diffusion of technology between countries has become more rapid and widespread.

Whether such a process of globalization is associated with narrowing or widening income disparities within developing countries (within-country income inequality, WCII) is a matter of controversy in the economic literature. The standard trade theory, expressed in the Heckscher–Ohlin model, predicts that DCs should experience egalitarian trends as a consequence of trade. One of the most important corollaries of Heckscher–Ohlin's model (HO) is the Stolper–Samuelson (SS) theorem. According to this main building block of the theory of international trade, openness will benefit a country's relatively abundant factor, since trade specialization will favor sectors intensive in the abundant factor. Taking into account that most DCs—when compared with the world economy—are relatively abundant in unskilled labor and so have a comparative advantage in this production factor, international trade should increase the demand for the unskilled workers and their wages, so ending up with an overall decrease in wage dispersion and in WCII.

However, if the basic dichotomic framework depicted by the HOSS framework is extended to account for multiple skill-related categories of workers (Wood, 1994), country groups (Davis, 1996) and traded goods (Feenstra & Hanson, 1996), the main distributive prediction of the HOSS theory is theoret-

ically undetermined and depends on the relative weights and directions of trade flows. Moreover, if the HOSS assumption of homogeneous production functions<sup>2</sup> among countries is relaxed, then international openness may facilitate technology diffusion from high-income countries to low-income countries (LICs) and middle-income countries (MICs), and it is very likely that the new technologies are more skill intensive in relation to those in use domestically before trade liberalization. If such is the case, then trade—*via* technology—should imply a counter-effect to the HOSS theorem prediction, namely an increase in the demand for skilled labor, an increase in the wage dispersion and so an increase in the income inequality (see Lee & Vivarelli, 2004, 2006b).

This paper contributes to this literature by presenting new empirical results based on a unique dataset including 65 developing countries over the 1980–99 period. Indeed, the first novelty of this paper is the use of a global inequality dataset—the UTIP-UNIDO database—which has been made available very recently and which ensures data comparability both through time and across countries (see Section 4).

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The second novelty of this paper regards the econometric specification and the estimation technique. Given the revealed persistence of the within-country inequality indexes, we use a dynamic specification which allows us to account for the path-dependent nature of the distributional pattern. The resulting endogeneity problem is addressed by using a least squares dummy variable corrected (*LSDVC*) estimator, a recently proposed panel data technique particularly suitable for small samples.

As regards our dependent variables, we use trade measures<sup>3</sup>—namely import and export—further disentangled accordingly to their origin/destination areas. Our results show that both imports and exports from/to industrialized countries (ICs) significantly worsen the income distribution in MICs. We interpret these findings by considering the interactions between a country's economic integration and its technological upgrading.

The remainder of the paper is organized as follows: in Section 2, we critically discuss the arguments in favor of the alleged egalitarian impact of trade on within-country income inequality, mainly from a theoretical point of view. Section 3 presents the empirical model and explains the econometric specification. Section 4 describes the data and shows some descriptive statistics. Section 5 presents and discusses the results, while conclusive statements are derived in Section 6.

## 2. THE LITERATURE

The standard model used by economists to analyze the effect of trade on the relative returns to different factors of production is the HO model. In its simplest version, as reported in Wood (1994), the model assumes two factors of production—skilled- and unskilled-labor—and two countries, the North and the South, each producing two goods (skilled and unskilled labor-intensive).<sup>4</sup> The related predictions in terms of the distributive consequences of international trade are well known: greater openness should increase the relative demand and the prices for unskilled labor and lead to a more equal distribution of wages in the low-skilled-labor abundant countries. However, the HO model and the SS theorem are based on several assumptions that are too restrictive to describe the real world.<sup>5</sup> In the next paragraphs, we discuss the implications arising if some assumptions of the model are relaxed.

### (a) *Global or local validity of the SS theorem?*

Even the retaining the central assumptions of the HO model, what matters for the distributive consequences of trade liberalization is the relative position of a given country amongst the other countries within its own “*cone of diversification*” (Davis, 1996). In fact, a developing country may be considered as “unskilled abundant” in global terms, but this may not be true in relation to other DCs. If factor abundance is defined in a *local* sense, the distributional consequences of trade can be the exact opposite of what we expect in a traditional HOSS framework (Davis, 1996). This argument is particularly important for middle-income countries (MICs), which are likely to be relatively unskilled-labor-abundant in comparison with high-income trading partners and relatively skilled-labor-abundant in comparison with low-income ones.<sup>6</sup>

Feenstra and Hanson (1996, 1997) pushed this argument a step further and propose a model, where there is a continuum of goods ordered along a ladder whose steps are characterized by different levels of skill intensity. Trade liberalization would

shift the production of intermediate inputs (through trade and foreign direct investment) from developed to developing countries. While such products would be characterized as unskilled-labor-intensive from a developed country's perspective, they appear to be skilled-labor-intensive from a developing country's point of view. In this way, average skill intensity and therefore the demand for skilled labor increase both in the North and in the South, inducing a rise in the skill premium in both areas. Zhu and Treffer (2005) had extended Feenstra and Hanson's model to a case without foreign direct investment but with a Ricardian source of comparative advantage added to that based on the factor endowment. In their model, technological catch-up by the developing country causes a shift in the production of the least skill-intensive Northern goods to Southern countries, where they become the most skill-intensive goods produced, thus leading to a rise in the demand for skilled labor in both developed and developing countries. Xu (2003) had also developed a model with a *continuum* of goods, where the boundary between traded and non-traded goods is endogenous and determined by trade policy. He shows that trade liberalization by expanding a developing country's export set can raise wage inequality.

### (b) *The role of technology*

If the hypothesis of identical technologies among countries is dropped and one assumes that developed countries and DCs differ in their technology levels<sup>7</sup> and that globalization facilitates technology diffusion from North to South, then the final impact of trade in terms of demand for labor also depends on the skill intensity of the transferred technology relative to that currently in use. There are many empirical studies showing the skill-biased nature of technological change in the developed economies (see, for instance, Autor, Katz, & Krueger, 1998; Berman, Bound, & Griliches, 1994; Machin & Van Reenen, 1998). Without necessarily assuming that developed countries transfer their “best” technologies to the DCs, it is quite reasonable to expect that the transferred technologies are relatively skill-intensive, that is, more skill-intensive than those in use domestically before trade liberalization. In more detail, trade can imply a substantial technological up-grading in the opening developing countries through different channels (see also next Sections (i) and (ii)). On the one hand, a developing country can implement the embodied technological change through the importation of “mature” machineries (including second-hand capital goods, see Barba, Navaretti, Solaga, and Takacs (1998)) from the more industrialized countries. On the other hand, a lagged DC can enjoy the “last comer” benefit of jumping directly on a relatively new technology (see Perkins & Neumayer, 2005).<sup>8</sup> By the same token, technological catch-up may be induced by exporting to richer countries both through substituting/replacing out-dated technologies in the exporting sectors and through the development of the entirely new businesses characterized by process and product innovation addressed to satisfy a more sophisticated demand coming from the industrialized countries. Indeed, to the extent that technology upgrading is linked to trade, globalization may increase the demand for skilled labor in DCs, reversing the prediction of the SS theorem.<sup>9</sup>

### (i) *The import channel*

Trade liberalization favors technological upgrading by increasing the international flows of capital goods (Acemoglu, 2003). There is much literature that finds that import flows can in fact contribute to the international transfer of technology by providing DCs' local firms access to the newly embodied

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