# STRUCTURAL CHANGES IN INTERNATIONAL TRADE: INTER-INDUSTRY SHIFTS IN COMPARATIVE ADVANTAGE

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**Abstract:**

*The contemporary industrial configuration centered on intra-firm trade and cross border commodity chains has made comparative advantage look like a rusty concept. Prior to globalization, shifts in comparative advantage would occur mainly across industries, causing clear-cut changes in countries' specialization patterns. By contrast, when factors of production are allowed to move freely across national boundaries, the picture gets somewhat fuzzy: the comparative advantage concept requires a different approach that should take into account the increasing disintegration of production processes and spreading of economic activities across the globe. Due to their relatively high mobility and propensity for outsourcing, labor-intensive industries visibly epitomize this process, which is going on in many parts of the world, including Central and Eastern Europe.*

### 1. Introduction

According to Heckscher & Ohlin's well-known factor-proportion theory, labor-intensiveness is a generic attribute for the goods whose production requires a higher ratio of labor to other factors of production (land, capital, technology, skills, knowledge etc.) relative to other types of goods. Historically, industries that turn out such goods, e.g. the production of textiles, clothing, footwear, sports equipment, toys etc. have been building blocks of industrial development and, not infrequently, spearheads of exports expansion, for many countries of the world. From a purely theoretical perspective, the international trade in labor-intensive goods fits the international product cycle hypothesis (Vernon, 1966): initially developed in the West two hundred years ago, industries that use man's labor with relative intensiveness have been gradually pushed toward Second and Third world countries, where low-skilled labor is still in relative abundance.

This paper deals with the comparative advantage principle and its relevance in terms of international specialization, with particular focus on the trade in labor-intensive goods. The analysis spans two distinct periods: before respectively under globalization. In the former period, Ricardian-type inter-industry specialization patterns were predominant in international trade. The industrialization process that unfolded in many parts of the developing world after the Second World War paved the way for the growth in developing countries' exports of labor-intensive goods thereby making comparative advantage in this kind of goods shift from industrialized to developing countries.[1] Afterwards, comparative advantage continued to shift to ever less developed economies of the developing world. Crook (2006) synthesized the matter: "Often, as developing countries grow, they move away from labor-intensive manufactures to more sophisticated kinds of production: this makes room in the markets they previously served for goods from countries that are not yet so advanced."

By comparison, under globalization, the prominent tendency is that production processes should be broken down into "separate parts that can be located in countries in which factor prices are well matched to the factor intensity of the particular fragments" (Jones, Marjit, 2001). The increasing fragmentation of production has given rise to a different kind of international division of labor, which was suggestively depicted by Krugman et al. (1995): "a good is produced in a number of stages in a number of locations, adding a little bit of value at each stage". In this new context, although the labor-intensive sector is still highly mobile due to its relatively high propensity for outsourcing[2], it is no longer entire industries that are on the move but mere segments of the commodity chain that use man's work with relative intensity.

In the pre-globalization era, since countries' endowment with resources were presumed fixed and factors of production were immobile internationally, changes in the structure of international trade would most often occur as a result of exogenous influences such as trade policy measures or regional integration trends, which exerted direct or indirect influence on goods and factor prices. Shifts in comparative advantage were essentially of inter-industry type and depended on differences among production sectors with respect to elasticity of factor substitution. By contrast, under globalization, shifts in comparative advantage are taking place within individual industries and are related to production sharing-type agreements whereby a flow of skilled-labor intensive activities are transferred by multinationals to subcontracting firms in emerging economies. Comparative advantage will thus not stem from mere cheap unskilled labor but from the ability of the subcontracting firm to accumulate the required expertise and know-how that should allow them to carry out an increased number of high value-added activities and control larger portions of the international value-chain. The relative wage of skilled labor (the ratio between the levels prevailing in the two countries) is a key-variable.

## 2. Productivity and wages: key determinants of comparative advantage

Two hundred years ago, David Ricardo applied the comparative advantage principle to international trade: "Under a system of perfectly free commerce – he wrote – each country naturally devotes its capital and labor to such employments that are most beneficial to each." (Ricardo, 1996) The key words from the cited phrase are "naturally devotes", suggesting that comparative advantage is in fact, more than a principle; it is a law governing the international trade system in its entirety. Scholars identified certain limits of the original model, notwithstanding its great intuitive power: firstly, it was built on one productive input only, labor. It is therefore difficult, as Bhagwati (1964) noted, "to adapt the one-factor, Ricardian approach to the multi-factor real world." Secondly, the model fails to explain "why differences in comparative advantage will exist" and implicitly, "the resulting pattern of productivities and specialization" (Samuelson, 1948). Moreover, the concept "must be extended to the trade in the services of factors of production". (Deardorff , 1980)

In the course of time, comparative advantage came to be ever more closely connected to countries' export shares in international trade with various types of goods. Balassa (1989), using export shares (as proxies of export performance) found a strong correlation between export shares and productivity but no significant correlation between export shares and wages. Yet despite this unexpected result, it would be wrong to conclude that wages play no role in comparative advantage determination, although it is by no means easy to explain why are exports performances tightly correlated with productivity but hardly or not correlated with wages. Roberts (2004) considers that wages in poorer countries are much lower not necessarily because of lower productivity relative to developed countries but because of the huge supply of labor they are endowed with, which obviously exceeds demand.

## 3. Inter-industry shifts in comparative advantage

Suppose $n$ countries (1, 2…$n$) produce two types of goods, say, clothing ($X$) and manufactures ($Y$)[3], using two factors of production, labor and capital. Factors are assumed to be perfectly mobile inside each country but immobile across countries. Perfect competition, constant returns to scale and identical tastes are presumed; transportation costs are ignored.[4] If the $X$ sector is labor-intensive and the $Y$ sector is capital-intensive, the following general inequality holds for all the $n$ countries:

$$\frac{x_l^c}{x_k^c} > \frac{x_l^m}{x_k^m} \qquad (1)$$

where:

$x_l^c, x_k^c, x_l^m, x_k^m$ = production coefficients, measuring the amount of labor (*l*) respectively capital (*k*) required to produce one unit of clothing (*c*) respectively manufactures (*m*).

Let *L* and *K* denote the physical amount of labor respectively capital, and *r* and *w* denote the prices of capital (rent) respectively labor (wages). If, say, in country *i-1* the rent-wage ratio is higher than in country *i*, the former country is labor-abundant relative to the latter and vice-versa. Thus if:

$$\left(\frac{r}{w}\right)_1 > \left(\frac{r}{w}\right)_2 > .... \left(\frac{r}{w}\right)_{i-1} > \left(\frac{r}{w}\right)_i > ... > \left(\frac{r}{w}\right)_n \qquad (2)$$

the *n* countries are in a sequence of decreasing labor-intensiveness.

If country *i-1* is labor-abundant relative to country *i*, its production ratio (clothing over manufactures) must be higher than in country *i* (*i* = 2…*n*). This means that if:
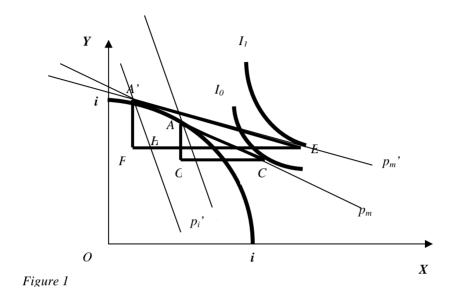
$$\left(\frac{Q_c}{Q_m}\right)_1 > \left(\frac{Q_c}{Q_m}\right)_2 > ... > \left(\frac{Q_c}{Q_m}\right)_{i-1} > \left(\frac{Q_c}{Q_m}\right)_i > ... \left(\frac{Q_c}{Q_m}\right)_n \qquad (3)$$

country *i-1* has comparative advantage in the clothing production relative, not only to country *i* but to all the countries ranking between *i* and *n*. If countries' endowments with resources are fixed and factors are immobile internationally, changes in the structure of international trade will most likely occur as a result of other types of influences such as trade policy measures or regional integration trends. Let's consider the following case: countries *i, i+1…n* decide to establish a trade union, which does not include countries 1, 2…*i-1*. As a rule, newly-created trade unions will dismantle inside trade barriers but raise higher ones against third countries' imports, especially in economic sectors where competition from outside the union is most intense. Since labor-intensive industries generally fall under this category, in our example, an inter-industry shift in comparative advantage will most likely result from a fall in the rent-wage ratio in country *i,* due to the lopsided trade protection at the union's frontier: much higher in the clothing sector than in the manufactures sector.[5]

Geometrically, the effects are illustrated in figure 1. Under free trade, country *i*'s production is located in point *A*, on its production possibility frontier (*ii*). The domestic relative price of goods is equal to the world relative price, as indicated by the slope of the $p_m$ line. Consumption is located in point *C*, on the $I_0$ indifference curve. One can notice that country *i* is a net exporter of manufactures (production is greater than consumption) and a net importer of clothing (consumption exceeds production). The imposition by the trade union of a quota on imports of clothing from third countries will cause the world relative price of clothing to decline (from $p_m$ to $p_m$')[6]. The rise in the world relative price of manufactures will stimulate producers in the *Y* sector to increase production. The production mix will be transferred in point *A'*, where country *i* produces a larger quantity of manufactures and a lower quantity of clothing than before.[7]

However, on the internal market, the relative price of clothing will rise following the imposition of the import quota (as shown by the slope of the $p_i$' line). This will determine, according to Stolper and Samuelson (1941), a rise in the income of the

factor the clothing sector uses intensively, which is labor, and concomitantly, a decline in the income of capital, the factor the manufactures sector uses with relative intensity. Further on, the fall in the relative price of capital will implicitly generate a rise in the demand for this factor, which becomes more sought after relative to labor.



*Figure 1*

### 4. Alternative sources of comparative advantage

Due to its formidable predictive power, the Ricardian theory continues to underlie world countries' long-term trade policy strategies. Reality has nevertheless shown that, if based on comparative advantage in labor-intensive goods, international specialization is conducive to a sorry economic state characterized by deteriorating terms of trade, a dramatic decline in export revenues and enhanced vulnerability to external markets whims. Accepting the idea that such an international division of labor is indelible would mean admitting that certain countries are eternally condemned to poverty. And the truth is, many less developed economies are in dire straights for being unable to improve their position in international trade. Briefly, comparative advantage associated with cheap labor turns out to be inherently volatile[8] the more so as labor costs as a percentage of the total costs of a firm have declined constantly. Globalization has rendered it even more volatile because labor-intensive industries exhibit pronounced mobility toward the periphery.[9] Textiles and clothing are an illustrative example, as emphasized by Young and Zhong (1998): because clothing is more labor-intensive than textiles, the Asian tigers lost comparative advantage in clothing more rapidly than in textiles and hence a large part of their clothing production activities has moved overseas, especially to China and other Asian countries.

By contrast, the opposite view, according to which specialization could be successful and lead to sustained growth only if based on the development of technological knowledge and skills, has been gaining ground in the last decades. Still, one must take account, as Dollar (1993) emphasized, of the fact that mere flows of information or one-off or sparse technological developments are not a source of long-term comparative advantage. This can only be achieved by "institutions that generate new technology on an ongoing basis and train complementary technical labor". The bottom line is that, because investment in plant and equipment is highly correlated with growth and so are education and human capital upgrading, changing international specialization requires the implementation of a development strategy based on the novel concept of dynamic comparative advantage (Cypher, Dietz, 1999)

Globalization has made it possible that comparative advantage should be derived from alternative sources. Since manufacturing segments within the value-chain are generally populated by small and medium-sized firms, switching from unskilled-labor to skilled-labor intensive activities might result from a shift in comparative advantage determined, beside technological progress, by market organization, financial imperfections or wealth in general. Wynne (2005) Furthermore, as Lall (2001) argues, comparative advantage changes with accumulation, i.e. countries use to invest more in education as they get richer. This last point gives better insight into why comparative advantage in labor intensive industries shifted to South-East Asian countries during the 1950s and 1960s that is earlier than in other regions of the world.

**5. The conceptual framework, adjusted to changes induced by globalization**

During the last decades, the production of labor-intensive goods has expanded over a vast area of the developing world, including countries which, though systematically by-passed by foreign investors because of their poorly competitive economies, control large and often untapped pools of unskilled labor. As a result, new jobs are still being created in droves in poor countries but they do not seem to be contributing to their long-term economic development. Instead, the overwhelming supply of low-cost, unskilled labor on the global markets is fuelling a race to the bottom among developing countries, leading to a continuous decline in wages and working conditions throughout the developing world. (It is always possible to find another would-be subcontractor, located in an even poorer country, willing to carry out the same task for a few pennies less.) On the other hand, globalization has rendered the production of goods heavily dependant on outsourcing: in order to stay price-competitive, leading firms from western countries, owning state-of-the-art technologies, valuable brands and solid positions on international markets will transfer manual labor-based activities to developing countries, trying to capitalize on the latter's cheaper labor force.

What relevance does the comparative advantage concept have under the new conditions? In the context described above, the claim that low wages are a source of comparative advantage is a fallacy. A terminological differentiation is therefore necessary: the comparative advantage concept needs to be distinguished from the absolute advantage in manufacturing operations (mostly requiring unskilled labor), resulting from wage rate differentials among countries. On the contrary, comparative advantage must be associated with firms' capacity to acquire the knowledge and technical and managerial abilities that should enable them to carry out all of the skilled-labor intensive activities involved by the production and marketing of a good, not just the unskilled-labor intensive ones required in final assembly. This makes it easier to understand why labor-intensive industries are highly mobile – both geographically and socially – and why scholars consider the comparative advantage in labor-intensive industries volatile. Countries that have comparative advantage in the production of labor-intensive goods will be tempted to forego the absolute advantage in the manufacturing of the respective goods in favor of other poorer countries, where wages are even lower and unskilled labor is in plenty.

**Notes**

[1] The growth in developing countries' share in international trade with labor-intensive goods put heavy pressure on competing industries in the West, which incurred significant job losses during the 1980s and 1990s. However, according to certain scholars, e.g. Revenga (1992), a solid correlation between international trade and the fall in western countries' manufacturing employment "has not been convincingly demonstrated".

[2] According to Feenstra and Hanson (1996), outsourcing refers to all intermediate or final goods that are imported by a multinational enterprise from a less developed country, to be used in the production of, or sold under the brand name of the former. In this broader sense, the term implies a transfer of activities from the multinational to the less developed country, thus acting as an "endogenous technical change".

[3] These are generic terms, designating two different classes of goods depending on factor intensity: "clothing" designates labor-intensive goods, while "manufactures" refers to a wide range of goods, with various degrees of processing, which use other factors than labor (capital, in our case) with relative intensiveness.

[4] This assumption, although somewhat unrealistic is important because it maintains the analysis within the framework of the Heckscher-Ohlin-Samuelson theorem, on which the first part of the model is based. These restrictions will be relaxed in the second part.

[5] These assumptions are realistic enough. For example, the establishment of the European Economic Community (EEC) in 1957 led to the removal of customs frontiers among the member countries. But afterwards, the adoption of the Multi Fibre Arrangement in 1973 translated into high trade barriers (mainly quotas) against imports of textiles and clothing from developing countries. This caused, as I'm going to

demonstrate, comparative advantage to shift from member-countries like, say, Greece and Portugal, to outside countries like Yugoslavia, Bulgaria, Romania, Hungary, Poland and others.

[6] Had the measure been imposed by a small country, the effects upon the world price would have been null; it would only have determined a rise in the domestic price of clothing (as shown by the slope of the $p_i$ line). On the contrary, the imposition of an import quota by a large country (in our case, the trade union) will depress the world demand and determine a fall in the world price of the good; the production mix moves to *A'*.

[7] By comparing the trade triangles *AGC* and *A'FE*, one can notice that country *i*'s terms of trade improved: the increase in exports (from *AG* to *A'F*) was accompanied by a more than proportional increase in imports (the segment *FE* is much longer than *GC*). The consumption point, *E* is located on a higher indifference curve ($I_1$). And another interesting aspect: the country's exports of manufactures (*A'F*) are exchanged for *FH* imports of clothing (in domestic prices), which is equivalent to *FE* imports of clothing (in world prices).

[8] Volatility of comparative advantage is a term coined by Bhagwati (2002), who used it to explain the loss of comparative advantage by western economies beginning with the 1980s, in a number of industries, in favor of their rivals from emerging economies, mainly from South-East Asia.

[9] The terms "core" and "periphery" are commonly used in literature to denote the social status of workers irrespective of where their activity is located geographically. In general, high-value added activities belong to the core while the low-value added ones belong to the periphery. (UNIDO 2000)

[10] A country, say Taiwan can have comparative advantage in the production of a good, say, computer hardware, without producing any physical unit of it; the entire production (assembly) will be subcontracted to companies located in a less-advanced neighboring country, say Vietnam.

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