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## **NEW COORDINATES AND CHALLENGES: MOVING UP THE VALUE CHAIN. A MACROECONOMIC PERSPECTIVE**

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**Abstract:**

*Considerable attention has recently been conducted towards the analysis of increasing globalization and its effects on trade flows. Vertical specialization and global value chains represent the key idea embodied in this paper. The phenomenon happens when countries specialize in certain stages of good's production cycle. I believe that production fragmentation is rife in modern production sequences analysis. I subsequently examine the role of vertical specialization measurement and the current possibilities to perform relevant calculus. I conclude by stressing the need to be aware of international production changes in current times.*

**Key words:** *international trade; vertical specialization; competitive advantage, global value chains*

### **1. Introduction**

The phenomenon of globalization has definitely modified the economic landscape. Trade balances registered gargantuan increase in international flows of goods and services and internalization of production exploded. The traditional methods used to measure production activities broadened and included for analysis new concepts like: global value chains, global supply chains, (international) fragmentation, vertical specialization, global production sharing, outsourcing, slicing up the value chain, offshoring etc. Undoubtedly, all these new approaches challenge conventional perceptions on trade. In modern economy, vertical specialization came as a response for the existence of competitive advantages. As Jack Welch asserts "If you don't have a competitive advantage, don't compete". The new perspective explains the importance of achieving competitive advantages and the strategic decisions for relocation, especially when one decides to perform at international level.

## **2. General data: statistics on trade, production fragmentation, specialization, global value chains, vertical integration**

Global trade and Foreign Direct Investment (FDI) have increased aggressively over the last decade. Companies expanded production and created international production networks and clusters, “trading inputs and outputs between affiliates and partners in Global Value Chains (GVC)”. (OECD, 2013, p. 150)

According with a study conducted by OECD, in present, 60% of global trade consists of exchanges in intermediate goods and services that are embodied at different stages in the production process for goods and services. Vertical specialization and the international share in tasks created “borderless production systems”. (OECD, 2013, p. 150) The new structures can be set up at local, regional, national or international level.

Value added trade has a positive impact on countries' Gross Domestic Product (GDP). In 2010, at global level, 22% of domestic value added in trade was a share of GDP. The percentage is different considering countries' development rank. Developed economies included 22% of domestic value added in trade as a share of GDP, while developing economies 28% and transition economies 30%. (UNCTAD, 2013)

Considering income evolution, GVCs lead to an increase by 106% between 1995 and 2009 (in real terms). Nonetheless, earnings have been differently distributed towards participant countries. For example, in above mentioned period, China increased 6 times its domestic value derived from foreign final demand, while India augmented it 5 times. At the opposite pole, Brazil's domestic value rose 3 times. (OECD et. al., 2013, p.14) Additionally, there have been noticed a positive correlation between participation in GVCs and GDP per capita growth rates. Countries with the fastest growing GVC participation have GDP per capita growth rates with 2% above the average. (OECD et. al., 2013, p.24) Moreover, there have been remarked a higher employment growth, even if the production depended on imported inputs.

According with UNCTAD-Eora GVC Database calculus, the analysis of countries participation to global value chains placed Singapore in top position with the largest participation (82%). It is followed by Hong Kong, China (72%), Malaysia (68%), Korea (63%), South Africa, China and Tunisia (59%). At the opposite side are located Colombia (26%), Bangladesh, India (36%), Brazil (37%), Macao China (38%) and Argentina (39%). (Fujita, 2013, p. 9)

Global value chains appeared as a direct response to the expansion of multinational companies operations which have led to the reduction of barriers and tariffs, to the dispersion of technological advances and to the contraction of trade cost. GVCs engage in general small and medium enterprises (SMEs) through the domestic production of inputs. The gains appear from the rational relocation of resources: a shift from less productive activities to more efficient ones. Global value chains may also be perceived as a nexus between trade and investment. For example, a company can approach foreign markets or resources by setting up a new branch or through trade

operations. Both trade activity and investment have a direct impact on GDP evolution. (UNCTAD, 2013, p.125)

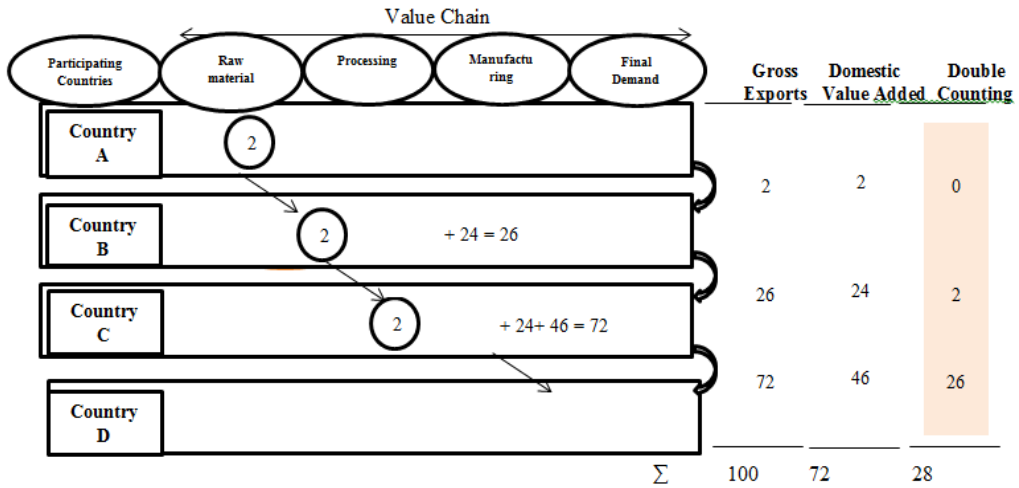
Unfortunately, not all participant countries could successfully integrate into global production networks. Africa and Latin America are such regions that have a limited share of world GVC's income and are still searching for better access and upgrading within value chains. Skills and infrastructure are essential elements required to take part in value chains. Often, these are elements where emerging countries, notably less developed countries (LDCs), face challenges. Additionally, there is a need for an improvement in public governance, tax systems and corporate governance framework. These ingredients mixed together mobilize foreign and domestic financial resources. (OECD et. al. 2013, p.20) Barriers to imports are translated into greater costs for exporters. (OECD, 2013, p. 5) Likewise, to clutch the entire benefits of GVC structures, there should be operated fair-play activities stressing on the importance of anti-competitive practices on trade and investment. Additionally, the absorption of domestic value added is influenced by the size of the country, the economic structure and the export composition.

Today, modern production relies on inputs produced across borders. Such examples which intensively use imported items are electronics and transportation, all manufacturing activities and services sectors. In industries like mining, textiles and apparel or machinery, more than one-third of imported intermediates are meshed to increase the balance of trade. (OECD et. al.2013, p.12)

Vertical specialization is a concept used probably for the first time by Béla Balassa (1967). Vertical specialization is a matter of costs, landscape, proximity, technology, labor, expansion of markets and regulatory framework. (European Commission, 2012, p. 63) One of these elements or a bunch of them represents the origin of strategic ideas regarding production relocation and the creation of global production networks. For instance, United States transnational companies (TNCs) are repositioning considering the following trends: soaring wage costs in developing countries, weaker exchange rates (\$), technological advances (e.g. 3D printing) and plunging energy costs. (UNCTAD, 2013, p. 54)

Vertical specialization involves a sequential mode of production. It occurs when country A imports an input from country B and uses it in the production of its own good or service, and then exports the final good or service in country C. (Hummels et. al., 1999) It implies consumption of the final good across the borders. Vertical-specialization-based trade includes both trade in final goods and imported intermediates used to produce those goods. (Hummels et. al. 1998 p. 2) In contrast, a horizontal specialization consists of the production from start to end in just one country. Considering a company's benefits brought by vertical specialization, it became a more frequent used technique of mass production. Bellow, *Figure 1.1.* illustrates how value added is formed and why it worth to be analyzed.

Figure 1: Value added trade: how it works



Source: UNCTAD, 2013, p. 123

However, during the recent crises, there have been noticed an orientation towards less integration. The domestic production gained serious advance of foreign sourcing. The exception is China, which continued to increase its share in the EU. (European Commission, 2012, p. 69)

### 3. Explanation of vertical specialization and global value chain concepts

Today's global economy is characterized by global value chains, which in turn, are coordinated by transnational companies, with "cross-border operations of inputs and outputs taking place within their networks of affiliated, contractual partners and arm's -length suppliers". (UNCTAD, 2013, p. 6) TNCs activities have an important echo in global trade, incorporating 80% of it. (UNCTAD, 2013, p. 6) Analyzing the top of the most attractive destinations in TNCs's investments, India has maintained the first position during 2013-2015. Considering the tumultuous economic environment, TNCs in developed countries retained their "wait-and-see approach" in planning new investment or on contrary, divestment operations. Also, the crises lead to a decrease in TNCs' s process of internalization in 2012. (UNCTAD, 2013) Hence, international trade can be seen as one of the "great victims of the world crisis". (European Commission, 2012, p. 69)

Transnational Companies embrace specific strategies designed to improve the performance of international activities: offshoring, divestment, relocation, reshoring and near shoring. Offshoring is the process of transferring value added activities from the home country to another one. Divestment is the technique involving capital withdrawals and reduction in the stock of assets TNCs hold abroad. Consequently, it decreases the value added registered in foreign countries. Relocation is the reaction to

internal or external shocks. It reckoned to relocate part or all value added activities in response to new environmental factors, policy factors or to reflect new strategies adopted by the TNC. Reshoring is the process of movement of all or part of the value added activities conducted abroad back to home country. Nearshoring involve positioning all or part of the value added operations in a country that has similar features with the country of origin of the TNC with respect to: geography, economy and culture. (UNCTAD, 2013, p. 55)

These new approaches engendered concepts like global value chains, vertical specialization, production fragmentation and others. Ergo, they occurred as a direct consequence of the major changes that took place in the commercial relations and in the perception of the production cycle. This idea was also asserted by David Hummels "*the story of globalization is a story about specialization*". (Hummels et. al. 1998)

Also, European Commission (EU) sustains that geographical fragmentation of production processes is due to technological development. The production is now distributed across borders considering the comparative advantages of each location. This "slicing up of the value chains" globally stimulated augmentation in trade flows of goods and services. An important part of these exchanges are intra-firm trade in intermediate inputs, managed by multinational companies. (European Commission, 2012)

Production fragmentation has different shares among economies sectors. In 2010, the proportion of foreign value added in exports was distributed as follows: secondary sector (29.4%), tertiary sector (14.2%) and primary sector (9.6%). (UNCTAD-EORA GVC Database, 2013) With respect to industries, the highest segmented value chains are those that rely on manufacture operations and incorporate almost 50% of foreign valued added in exports. On the opposite side, with less than 20% of value added usage in exports are industries like: construction, research and development, electricity, gas and water, telecommunications and finance. (UNCTAD, 2013).

#### **4. Vertical specialization and global value chains in modern economy**

According with UNCTAD-EORA GVC Database (2010) the share of usage of imported value added to generate country's export is different from country to country. At global level 28% of countries use imported value added in their exports, while in developed countries the percentage increase to 31%. Top positions are occupied by EU (39%), Central America (31%), East and South-East Asia (30%) and Asia (27%). On the opposite side statistics show that transition economies incorporate only 13% of imported value added to generate exports, while least developed countries (LDCs) use only 14% of imported value added. (Fujita, 2013)

David Hummels explains the role of multinational companies in the scattering of production plants and empirically demonstrates the increasingly important role vertical specialization plays in international trade operations. (Hummels et al. 1998)

An interpretation of production relocation considering advantages of each country is presented in European Commission Report (EC, 2012). The analysis tackles the dependence on raw materials and intermediate goods and the set-up of industries that add value and design new goods and services.

Johnson and Noguera (2012) considered proximity role in production fragmentation. According with the authors, the phenomenon took place due to changes in transportation costs. Also, the implementation of regional integration initiatives (e.g. European Union, NAFTA) played an important role. Changes in production chains have different impact on sectors, countries and trading partners. The role of rapid declining in transportation costs due to production and consumption relocation is also analyzed by Erumban, Stehrer et al. (2012).

Production specialization leads to major benefits under free trade conditions. It is important to distinguish between trade value and value added in trade. (Arndt, 2003) Likewise, Jiang and Milberg (2012) perceive vertical specialization as the content of imports in final exports and a source of industrial development and economic growth. Also, Ferrarini and Scaramozzino (2011) introduce net trade flows in exchange of unique trade flows as a source of competitive advantages and vertical specialization measurement.

Global production networks are the origin of job creation in developing countries. However, such employment can often be unreliable and conducted under fierce. This issue is continuously debated: global production networks provoked drawbacks or they bring investments, increase technological and industrial capacity. (Barrientos, 2007) McCall and Itçaina (2013) analyze the role of transnational cooperation networks considering institutional arrangements, factors that have an influence on networks development, proximity approach and sustainable economic development. Elms and Low (2013) tackle the issue of global production chains through four main perspectives: the changing characteristics of global production chains, trade measurement in terms of value added, problems arising in supply chains and policies relevant to the supply chains. In author's perspective, the companies involved in global production chains have to be open, flexible and able to face ongoing changes (new government policies, changes in technology, fluctuations in consumer behavior, and changes in logistics).

Another study conducted by Richard Baldwin (2011) present internalization of production chains as a fundamental factor that contributes to industrial development plans.

Environmental performance is of growing interest in both advanced and developing economies. Environmental quality has direct effects on living standards through its ability to sustain economic growth. Porter and Esty argued that there is a need for better environmental data at global, national, local and corporate level. The authors found out that "a stringent environmental regime relative to income may speed up economic growth rather than detract from it". (Porter, Esty, p.19) This idea is also shared in a study conducted by Porter and Linde (1995, p.115): "well-designed environmental regulations might lead to improved competitiveness". Also, it is

suggested an orientation shift from pollution control to resource productivity. Ambec, Cohen et. al (2011) analyzed various studies on this subject, using as central idea Porter Hypothesis. Environment protection is seen as a “win-win” situation for whole society.

This preoccupation for environmental impact came along with the negative effects that caused damages to the Earth. In 2008, humans caused \$6.6 trillion in environmental harm (Kaval, 2011), although there have been in force several initiatives: Joint Working Party on Trade and Environment (JWPTE), WTO Committee on Trade and Environment (CTE), UNEP’s Economics and Trade Programme and others. For instance, EIPOD project (environmental impacts of trade) pursues to find out if it is possible to quantify the environmental impacts and to create environmental trade balances. Additionally, the scheme comes with suitable solutions for the identified problem considering several dimensions: economic, environmental impact, geography, time and life cycle stage. (Wiedmann et. al. 2009)

Throughout time, economists have been expressing various thoughts on new approaches regarding trade relations. The general idea stressed on in all papers is clear: international trade flows have undergone major changes which directly affect the production process.

## **5. Policy approach**

The participation in global production networks and global markets is directly influenced by trade facilitation measures. They can benefit all countries in their role of importers as well as exporters, granting better access to inputs for production and greater presence in global value chains. Trade policies also play a role in supporting sustainable trade flows.

Trade facilitation measures include such initiatives as: documents, automation, information availability, procedures, governance and impartiality. (OECD, 2013) At country level, the implementation of such measures will have the following results in cost trade:

**Table 1: The impact of administrative reforms on trade cost**

<b>Measure</b>	<b>Reduction in trade cost approximately</b>
<b>Harmonizing and simplifying documents</b>	3 %
<b>Streamlining procedures</b>	2.5 %
<b>Automating processes</b>	2.3%
<b>Availability of trade-related information</b>	1.7%
<b>Advance rulings on customs matters</b>	1.2%

Source: OECD (2013)

Aside from administrative measures, there are non-tariff procedures that have an impact on trade costs at a larger influence than tariffs.

European Commission acknowledged a need for more appropriate policies that better understand the development and prospects of global industrial value chains. (European Commission, 2012)

Also, this issue has been tackled after the 2008-2009 crises. Decision makers and politicians have discussed on trade, offshoring and the movement of jobs. Still, much of these discussions have been based on scant empirical evidence. (Escaith et. al. 2012)

**6. Vertical specialization’s measurement**

The growing importance of GVCs has led to changes in the way international trade has traditionally been accounted. Consequently, the framework used to determine the value added in trade and to illustrate how value added flows between countries along the value chain till the final consumer has been continuously enhanced.

Value added in trade can be measured using international input-output (I-O) tables, which show the economic interactions between countries. These analytical techniques were pioneered by Leontief in 1940s, and they were firstly applied to national accounts but have seen little use in international economics. (Jones et. al., 2013, p.3) There have been various initiatives for mapping value added in trade but, hereinafter will be presented the most important ones. Databases differ in data sources and also in their mode of construction. For instance, a part of tables are constructed of input-output tables made by individual researchers, others are based on official supply – tables, and yet others are based on official input-output tables.

**Table 6.1. Selected projects mapping value added in trade**

Initiative	Institution	Data Sources	Countries	Industries	Years	Observations
<b>UNCTAD-EORA GVC Database</b>	UNCTAD/Eora	National Supply-Use and I-O tables, and I-O tables from Eurostat, IDE JETRO* and OECD	187	25–500**	1990–2010	UNCTAD-Eora Database covers the greatest number of countries. Lenzen et. al. (2013) describes its functioning.
<b>Inter-Country-Input-Output model (ICIO)</b>	OECD/WTO	National I-O tables	40	18	2005, 2008, 2009	Including national Input-Output Tables harmonized by OECD.
<b>Asian International I-O tables</b>	Institute of Developing Economies (IDE-JETRO)	National accounts and firm surveys	10	76	1975, 1980, 1985, 1990,	Mainly United States-Asia tables, but also bilateral tables.



					1995, 2000, 2005	
<b>Global Trade Analysis Project (GTAP)</b>	Purdue University	Contributions from individual researchers and organizations	129	57	2004, 2007	GTAP does not include information regarding the use of imported intermediate input by sector. To minimize this shortfall, researchers applied proportionality assumption to estimate them.
<b>World Input-Output Database (WIOD)</b>	Consortium of 11 institutions, EU funded	National Supply-Use tables	40	35	1995-2009	For more information search for Timmer (2012). It is the first freely available IIO database at <a href="http://www.wiod.org">www.wiod.org</a> .
<b>OECD Trade in Value Added (TiVA) database</b>	OECD WTO	National Input-Output Tables	58 plus China processing trade	37	1995, 2000, 2005, 2008, 2009	The database includes new input-output tables for economic operations in China: processing trade, ordinary trade, and domestic-only enterprises. Even if the database is not publicly distributed, TiVA results are available at <a href="http://www.stats.oecd.org">www.stats.oecd.org</a> .

\* JETRO (Japan External Trade Organization)

\*\*Depending on the country

Source: UNCTAD, 2013, p. 124; OECD 2012; [http://www.wiod.org/new\\_site/home.htm](http://www.wiod.org/new_site/home.htm) ; [www.oecd.org/trade/valueadded](http://www.oecd.org/trade/valueadded); <https://www.gtap.agecon.purdue.edu/about/project.asp>; <http://www.ide.go.jp/English/Publish/Books/Sds/090.html>.

All these databases ease the identification of the sources and destinations of the value formed through global value chains. Also, it identifies the role countries and industries play in global supply chains and also important, the sources of competitiveness. (OECD - WTO, 2012)

## **7. The importance of measuring vertical specialization**

In present, the entire cycle of production exploded, moving towards the country's frontier. "The modern multinational firm uses production plants – operated either as subsidiaries or through arm's length relationship-in several countries." (Hummels et. al., 1998) The reason for externalization of operation is the exploitation of locational advantages such as proximity and access to cheaper labor.

Furthermore, the tendency registered in the last period is the increasing participation in GVCs. In most of the developing countries, including the poorest, value

added trade increased from 20% in 1990 to 30% in 2000 to over 40% in present (UNCTAD, 2013, p. 3). GVCs are an important source for developing countries to build productive capacity, mostly through technology dissemination and skill enhancement. Within a global value chain, each participant purchases inputs, process them, and add value to it. This process is becoming an additional cost for the next stage of production. The sum of the additional costs added by everyone in a certain chain indicates the final product price. The natural analysis of these values includes activities such as manufacturing, design and branding, distribution, sales and services, activities which “transport” the good to the final consumer. (Dedrick et. al, 2008) All in all, the value of the final good may “travel directly or take a circuitous route through multiple sectors and across multiple borders”. (Jones et. al, 2013, p. 8)

Today, the processes of creation and production of a successful good within one of the GVC spreads prosperity far beyond the lead firm. While the parent company and its shareholders are the main beneficiaries, other gaining parties include partners in the firm’s supply chain. Also, firms that offer complementary products or benefits may gain, sometimes even more than the lead firm. (Dedrick et. al, 2008)

An example that clearly highlights the importance of both understanding and measuring vertical specialization is the cycle of production of an Apple iPod. The study analysis the entire cycle of production and the origin of each input used for the final assembling. The results illustrated that the final value of \$144 (Chinese factory-gate price of an iPod), Chinese contributed with less than 10% to the creation of value added. The rest of components (approximately \$100) were imported from Japan, US and South Korea. (Dedrick et al. 2008)

However, at company level vertical specialization present both advantages and disadvantages. On one hand, vertical specialization involves several benefits. It encourages specialized activities and implementation of functional organizational structure. Moreover, externalization offers flexibility and contracts costs. On the other hand, vertical specialization leads to the loss of skills, qualification and the reputation in providing certain services. Furthermore, it weakens innovative capacity and increase actual economic costs of transition and adaptation.

## **8. Conclusions**

International fragmentation of production has become increasingly relevant since trade in final goods has been replaced by trade in tasks. The new approach challenges many neoclassical understandings and it offers a new viewpoint on Heckscher-Ohlin-Samuelson models. This perspective is also tackled by Hummels who states that “globalization has gone beyond just “more trade” ”. (Hummels et al., 1998)

This shift was driven by changes in business and regulatory framework, systematic liberalization of trade and investment, technologies and variation in corporate thinking over the past two decades. Additionally, in today’s world of

international production fragmentation, exports depend more than ever on imports. (OECD, 2013, p.5)

It is clear that global value chains have become a powerful feature of international trade and investment, enveloping all developing, emerging and developed economies. The percentage of participating into GVCs of developing countries, including the poorest, is continuously growing. (UNCTAD, 2013, p.19)

Although there are several global databases offering information on various dimensions of internalization of production network, the provision of comprehensive and credible data is still a challenge. Moreover, policymakers need to come up to a decision to close the gap formed between traditional rule making and the reality of business and to enhance the productive capacity. (OECD et. al., 2013, pg.8) Additionally, a current huge task in a world of global value chains is to foster the building of a complete value chain. GVCs are responsible for the growing significance of “double counting” in global trade figures. Also, trade and global investment are intertwined through international production networks.

All in all, globalization provoked severe changes into trade flows and it lead to a shift in production methods including new approaches like global value chains, (international) fragmentation, global supply chains, vertical specialization, global production sharing, slicing up the value chain and others.

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