Industrial Restructuring in Romania from a Bilateral Trade Perspective: Manufacturing Exports to the EU from 1995 to 2006

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Abstract
The paper presents an analysis of changes in the volume, structure and quality of Romanian manufacturing exports to the EU since 1995 in order to determine the extent of industrial restructuring in Romania. We argue that the observed five-fold increase in the volume of exports to the EU over more than a decade-long period, albeit a positive development, still hides a persistent reliance upon labour-intensive and low-value added products. Only of late in the examined period, have Romania’s export patterns begun to resemble those of the more advanced Central Eastern European countries (CEECs), as typified by a greater role played by intra-industry exports of differentiated products and the gradual transition from labour-intensive, low value added exports to more technology-intensive ones. The observed changes in bilateral trade patterns reflect the process of industrial restructuring which also benefited from recent changes in the ownership structure of the Romanian industry and increased flows of foreign direct investment to export industries.

Introduction
Industrial restructuring represents the last and longest phase of the economic reform undertaken by all CEECs that transitioned from centrally-planned to market economies. Once macroeconomic stabilisation, price liberalisation and privatisation reforms have been accomplished, the industrial restructuring process often leads to a shift in the structure of production and the creation of a whole new economy. In the literature, industrial restructuring typically denotes all manner of changes to the economic landscape, including the elements of the classic industrial organisation paradigm: basic conditions of supply and demand, market structure, firms’ behaviour and performance (Scherer and Ross, 1990). When successful, loss-making state-owned enterprises (SOEs) are closed, potentially profitable elements of SOEs are technologically upgraded and a dynamic SMEs sector emerges (Blanchard et al, 1991). By 1995, Romania achieved price liberalisation and macroeconomic stability.
and revived its earlier attempts at privatisation but, with no exposure to market-driven reforms prior to 1989 and 90% of output still generated by SOEs, industrial restructuring presented a considerable task (WTO, 2005).

Under the assumption that changes in the volume, structure and quality of products as a result of industrial restructuring are reflected in the changes in export patterns, the present research analyses the characteristics of Romania’s manufacturing exports to the EU\(^1\) since industrial restructuring began in the country. When successful, industrial restructuring allows a country to replace gradually its traditional, labour- and resource-intensive products with a wider range of new, differentiated products, preferably of higher technology-intensity. Moreover, if successful, industrial restructuring enables an economy in transition to avoid the so-called ‘low-quality trap’, i.e. to become an ‘export platform’ of low-quality, labour- and resource-intensive manufactures produced in ‘assembly type’ factories. Empirical studies suggest that most advanced CEE countries, or the so-called ‘early reformers’ such as Slovenia, Hungary, Poland and the Czech Republic, managed to avoid relying upon low-value added products and were successful in upgrading the quality of their exports over time (Kandogan, 2005; Sheets and Boata, 1998). Regrettably, despite its large market size, Romania - a ‘late reformer’ - has attracted considerably less attention from the academic community. Hence a thorough analysis of Romania’s changing trade patterns after 1995 – the outset of the industrial restructuring process and the coming into force of the European Agreement (although its trade component was implemented in 1993) – deserves attention, especially given its relevance in measuring the impact of country’s economic reforms and, implicitly, the country’s convergence with the other CEECs.

In line with existing empirical trade literature, Romania’s export patterns to the EU are analysed using key indices and indicators stemming from classical, neoclassical and modern trade theory. Throughout the analysis, Romania’s export patterns are compared with those of other CEECs, the latter reflected in extant literature. Importantly, the focus of our research is on the manufacturing sector which accounts for over 92% of the total trade between Romania and the EU, and is mostly affected by the industrial

\(^1\) For consistency, given the enlargement of the EU in 2004, the analysis focuses on the core EU15 countries comprising: Austria, Belgium, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Ireland, Italy, Luxemburg, Sweden, Netherlands and Portugal.
restructuring process. Trade data was obtained from the widely available source, the EUROSTAT (EC) database, which allows a great degree of dis-aggregation based on the most used classification system, the ‘Standard International Trade Classification’ (SITC). Although EUROSTAT (EC) provides only bilateral trade data and not data on total trade of a country such as Romania, this is mitigated by the fact that the EU remained, throughout the period, the main trade partner of Romania, accounting for over 60% of its trade by value. Trade indexes and indicators are formulated, calculated and analysed in order to answer questions surrounding the process of industrial restructuring in Romania, such as: given changes in the volume of exports with the EU, is the country exporting more of the same, traditional products or new, diversified ones instead? Has there been a change in the composition of exports? What role does intra-industry exports of differentiated products play today, as opposed to inter-industry exports of homogenous products from different industries? Has the labour-intensity of Romanian manufacturing exports declined over time? How does the composition of Romanian exports compare to that of other CEECs? Has the country managed to improve the competitiveness of its manufacturing products through successful industrial restructuring or is it shifting towards more labour-intensive assembly activities?

The paper has 5 sections. The first section calls upon trade theory to explain and predict likely changes in the composition of exports from low-middle income (CEECs) to middle-high income countries (EU). It also includes a discussion of what the theory-predicted changes in trade patterns would imply from the industrial restructuring standpoint. The second section presents empirical results as found in extant literature on trade between EU and CEECs, especially after the implementation of European Agreements, and raises the question of whether Romania has managed as yet to close the gap with the other CEECs. Section three introduces briefly the research method and applied indexes, while section four analyses bilateral exports between Romania and the EU over the last 12 years. It will be argued that, as of recently, the Romania-EU trade patterns have began to resemble those of other CEECs countries, indicating progress in industrial restructuring in Romania. The industrial restructuring process, as reflected by the post-2002 trade patterns, must have been assisted by the growing importance of the private sector in the economy and the impact of high levels of foreign direct investment flows. The article concludes that the changes observed, albeit recent, are significant and bode well for continued industrial restructuring in Romania’s manufacturing sector.
1. Theoretical Predictions on CEECs-EU Trade Patterns and their Implications for Industrial Restructuring

Based on differences in factors of production between CEE and EU countries, classical trade theory predicts specialisation in production and increased volume of trade between the two groups of countries: the CEECs would specialise in the production and export of natural resource products while the EU would export technology-based products. As early as 1990s, research by Collins and Rodrik (1991) and Hamilton and Winters (1992) predicted that trade liberalisation, together with the introduction of economic reforms in the CEECs, would lead to considerably higher volume of exports to the EU in the sectors, industries and products in which the former had comparative advantages.

Similarly, neo-classical trade theory predicts further specialisation in production based on factor intensity and a gradual convergence in factor prices. Those CEECs abundant in low wage labour and natural/mineral resources will specialise in producing labour- and natural resource-intensive products and export them in exchange for technology and capital-intensive products from the core EU countries. Hamilton and Winters’ trade models (1992) predicted a five-fold increase in the volume of trade between the two groups of countries and advocated a relatively rapid catching up period as CEECs’ comparative advantage shifts from low-skilled labour-intensive to high-skilled labour-intensive products. The same authors saw long-run comparative advantages of CEECs in human capital-intensive products (i.e. educated workforce) and, as such, CEECs were expected to export more sophisticated manufacturing products, rather than the traditional labour-, energy-intensive ones.

Changes in CEECs’ comparative advantages are also predicted by the factor equalisation theorem that explains how, through increased volumes of trade and investment, wage differentials between CEECs and EU will diminish and affect the type of products exchanged (Samuelson, 1948). Informed by neo-classical trade theory, Salvatore (2001) proposed a model of trade restructuring during transition whereby, given the initial differences in resource endowments, CEECs and EU will exchange homogenous products belonging to different industries and thus engage in inter-industry trade. Over time, however, trade (by way of competitive pressures, new technologies, organisational skills and factor price convergence) will create conditions for CEECs to produce more sophisticated
manufacturing products and engage in intra-industry trade with EU countries. A shift is therefore predicted by the theory in the composition of trade over time: inter-industry trade is to be complemented by intra-industry trade when, as a result of industrial restructuring, CEECs will be able to offer new, differentiated, higher quality products. Equally, it is expected that (1) the more similar the countries, the higher the share of intra-industry trade in total trade and (2) the higher the discrepancy in income levels, the higher the share of inter-industry trade. Hence, an increasing and predominant share of intra-industry trade in total trade between CEECs and EU will reflect not only the ongoing industrial restructuring but also a convergence in income levels between the two groups of countries.

Importantly, while specialisation in production (as predicted by classical and neo-classical theories) reflected in inter-industry trade may or may not be a result of industrial restructuring, intra-industry trade defined as a two-way trade in same industry products (i.e. differentiated products) implies it clearly. Intra-industry trade is best explained by the new trade theory based on economies of scale and product differentiation (Krugman, 1981). This type of trade has two components: vertical intra-industry trade (VIIT) and horizontal intra-industry trade (HIIT). The vertical intra-industry trade is defined as the simultaneous exports and imports of products in the same industry but at different stages of production (where early stages of production result generally in low-skills labour-intensive, low quality products while later stages of production lead to high-skilled labour and technology-intensive, high quality products). Falvey (1981) showed that the vertical intra-industry trade pattern follows the traditional factor endowment model: the relatively capital abundant country exports higher quality products at later stages of production whereas relatively labour-abundant countries export lower quality goods at early stages of production. By contrast, the horizontal intra-industry trade represents the simultaneous exchange of products at the same stage of production, i.e. close substitutes of similar quality. Research on this type of trade found that horizontal intra-industry trade is positively associated with product differentiation, foreign direct investment and industry concentration (Lancaster, 1980; Krugman, 1981; Helpman 1981, 1985; Bergstrand, 1990). The horizontal intra-industry trade is driven by product differentiation and economies of scale. Research also found that similar income level countries have a larger share of horizontal intra-industry trade compared to trade taking place between countries at different income levels. Based on the above, the theory would predict that intra-industry
trade between CEECs and the EU will increase in time and be dominated by vertical rather than horizontal intra-industry trade, at least at the beginning of the transition period.

Given the fact that the purpose of this research is to look for evidence of industrial restructuring when analysing trade data, it is important to identify the main factors behind changes in the Romanian export patterns by volume, structure and composition (intra- versus inter-industry trade). In this respect, the work by Hummel and Klenow (2002) is highly relevant to the present analysis for they identify three factors behind the increase in exports: the ‘intensive margin’ (or the export of the same set of goods but in larger volumes); the ‘extensive margin’ (or the export of a larger set of products, often differentiated products) or the exports of higher quality goods. The intensive margin often reflects specialisation in production according to comparative advantages, whereas the last two factors clearly imply industrial restructuring. Therefore, evidence of the last two factors is especially relevant for present research. Below we explore the extent to which such aspects have been captured by existing empirical studies.

2. Empirical Findings on CEECs-EU Trade and their Implications for Industrial Restructuring

The empirical literature on CEECs and EU trade patterns expanded greatly in the early 1990s and focused on the most advanced CEECs. Most studies carried out a decade later validated the theoretical predictions mentioned above: exports from CEECs to the EU have risen steadily since 1990s and CEECs specialised in labour-, resource – and energy-intensive exports of a limited range of products, typical of less developed economies (Resmini and Traistaru, 2003; Salvatore, 2001).² The extensive literature on the impact of the European Agreements upon CEECs’ trade consistently points in the direction of its reorientation towards EU member states and EU candidates, at the expense of trade with the rest of the world (Landesmann, 2000; Martin and Turrion, 2001). Trade reorientation was found to be most pronounced for those CEECs that were previously less integrated economically with the EU members, such as Romania, Bulgaria, Czech Republic and Slovakia, as opposed to Poland, Hungary and the Baltic Republics who already traded extensively with the EU members prior to the European Agreements (Marquez and Spies, 2006).

² In contrast, the EU countries tend to display more diverse specialisation, even if there are differences among them (Landesmann, 2000).
As predicted by theory, exchanges between CEECs and EU were initially dominated by inter-industry trade with the former exporting low-skill labour-intensive goods such as textile, cloth and leather products, fuel, basic chemicals and metals (reflecting a specialisation in production inherited from central planning regimes) in exchange for consumer goods from the EU (Djankov and Hoekman, 1996; Landesmann, 2000; Resmini and Traistaru, 2003). Subsequent shifts in CEECs’ comparative advantages led to a change in the composition of exports after 1995 towards more sophisticated machinery products, electrical and motor vehicles, in exchange for technology-intensive imports. As a result and, again, in line with theory, the share of intra-industry trade in total trade between CEECs and the EU has increased since 1990s (Firdmunc, 2005; Palazuelos-Martinez, 2007) as countries are becoming ‘more similar’. Although initial research on intra-industry trade between CEECs and EU did not distinguish between its vertical and horizontal components, later studies concluded that vertical intra-industry trade prevailed in the early 1990s (Aturupane et al, 1997; Landesmann and Burgstaller, 1998; Thom, 1999; Gabrisch and Segnana, 2002).

With respect to changes in the quality of CEECs’ exports since the early 1990s, the empirical findings are less clear cut. Earlier studies that focused on pre-1995 period found limited improvement in the quality of products exported by CEECs (Brenton and Gross, 1997), whereas subsequent research acknowledged that advanced CEECs managed to avoid the ‘low-quality trap’ (Sheets and Boata, 1998; Kandogan, 2005). Importantly, some researchers analysing the CEECs exports prior to 1995 observed that, despite being still dominated by lower quality products (most likely due to obsolete technologies inherited from the past), the quality gap between EU and Hungary, Poland, Slovenia and Czech Republic declined, while that between EU and Romania and Bulgaria widened (Landesmann and Burgstaller, 1998; Landesmann, 1999). Equally, research into the pre-2000 period shows the most advanced CEECs slowly closing the gap with the EU, as suggested by a number of quality indicators, including the share of intra-industry trade (Kandongan, 2006a, 229). According to the same study, Romania (and Bulgaria for that matter) was not part of that trend and our research looks beyond 2000 to see if the situation is beginning to change.

3. Research Methods

As mentioned, the research uses the EUROSTAT (EC) database and the SITC Rev. 3 classification; data was collected for the period 1995-2006 at up to 4 digit level of dis-aggregation. The database
provides bilateral trade data, with EU15 as reporter. For our interpretative analysis of Romania’s manufacturing exports to the core EU15 countries we construct and utilise indices and indicators frequently used in specialist trade literature in order to identify changes in the structure of exports and in the quality of products exported over the last 12 years and measure the extent of specialisation in production (based on shifts in comparative advantages). For example, specialisation in production is captured by the revealed comparative advantage index (Balassa, 1965); changes in intra-industry trade are observed using the Gruebel-Lloyd index (Gruebel and Lloyd, 1975), while product differentiation is reflected in the share of horizontal intra-industry exports in total exports. Horizontal and vertical intra-industry exports are determined by decomposing trade according to an intuitive method proposed by Kandogan (2003a, 2003b), avoiding in this way some of the constraints associated with the standard procedure of decomposing intra industry trade according to differences in export and import unit values (Greenaway, 1986). Finally, the technological classification used by Wolfmayr-Schnitzer (1998) and Kandogan (2006b) based on factor intensity is applied to provide evidence of technological product upgrading, as reflection of product quality upgrading of Romanian exports after 1995.

4. Trade Data Analysis

As predicted by the literature reviewed above, the value of bilateral trade between Romania and the EU15 countries has increased sharply over the last 12 years. Specifically, it grew five-fold, rising at an annual average rate of 12% (exports) and 15% (imports). The EU consolidated its position as the main trading partner of Romania, while the latter became in 2006 the 10th largest export market and the 19th largest import market for the EU member states (NBR, Eurostat). The bilateral trade represented 29% of Romania’s GDP in 1995; 51% in 2002-2004 and 38% in 2006: the slight decline after 2004 is due to faster GDP growth rates compared to trade growth rates. The strong growth in trade between Romania and the EU member states begs the question as to whether this reflects industrial restructuring and growing specialisation. Looking at how Romania’s trade with the EU evolved between 1995 and 2006, we see several distinct trends and developments. These often suggest that years 2002/2003 represented a turning point for Romania’s industrial transformation. As imports grew faster than exports, Romania’s trade deficit with the EU increased from €0.4bn in 1995 to €7.1bn in 2006. Higher imports in recent years are generally explained by a growing taste for consumer goods, higher energy prices and the need to modernise the industrial base and the infrastructure of an economy in transition. Importantly, the deficit grew steadily after 2003 when the country removed all quantitative restrictions
on imports. In 2006, the trade deficit with the EU represented 7% of Romania’s GDP. According to
official reports, most of the trade deficit was matched by foreign direct investment which also grew
after 2003 (NBR, 2006).

Addressing the nature of growing imports and exports and their impact upon the domestic economy, we
see that across broadly defined SITC sections (at 1-digit level), manufacturing products accounted for
more than 92% of imports and exports to the EU. As data in table 1 suggests, the relative importance
of different manufacturing product groups changed significantly during the period under study.
Bilateral trade had been historically dominated by miscellaneous manufacture products (SITC 8) but
this section is declining, at least in relative terms, to machinery and transport equipment products
(SITC 7) and basic manufactures products (SITC 6) which has registered faster annual growth since
2002. Perhaps not surprisingly, the growth in SITC 7 exports is matched by comparatively high levels
of foreign direct investment targeting machinery and transport equipment industries such as
automobiles, which, according to official sources, received most of the FDI flows to Romania (ARIS,
2006). Several studies confirmed foreign direct investment’s role as an agent of change in transition

3 Based on SITC classification at 1-digit level (sections level), Primary Products include food and live
animals (SITC 0), beverages and tobacco (SITC 1), crude materials, inedible except fats (SITC 2),
mineral fuels (SITC 3) and animal and vegetable oils, fats and waxes (SITC 4); Manufacturing
products include chemicals (SITC 5), basic manufacturing goods classified by material (SITC 6),
machinery and transport equipment (SITC 7) and other, miscellaneous manufacturing articles (SITC 8).
economies through its impact on companies governance structures (more open to ‘active restructuring’), companies investment propensity, productivity growth and export intensity (Landesmann, 2000; Stankovsky, 1998). It is also worth noting the post-2000 relative export decline in chemical products, most likely due to the recent liquidation of many loss-making domestic chemical companies.

Table 1: The Structure of RO-EU exports/import (X/M), by SITC sections (in %)

<table>
<thead>
<tr>
<th>SITC 1-digit level sections</th>
<th>1995 X</th>
<th>2000 X</th>
<th>2006 X</th>
<th>Yr Avg Growth Rate X</th>
<th>1995 M</th>
<th>2000 M</th>
<th>2006 M</th>
<th>Yr Avg Growth Rate M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0- Food and Live Animals</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>1- Beverages and Tobacco</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>2- Crude Materials</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>16</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>3- Mineral Fuels</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4-Animal and Vegetable Fats</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>5- Chemicals</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>6- Basic Manufactured goods (by materials)</td>
<td>28</td>
<td>17</td>
<td>17</td>
<td>8</td>
<td>29</td>
<td>28</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>7- Machinery, Transport Equipment</td>
<td>10</td>
<td>19</td>
<td>31</td>
<td>22</td>
<td>34</td>
<td>39</td>
<td>47</td>
<td>17</td>
</tr>
<tr>
<td>8- Misc. Manufactured goods</td>
<td>49</td>
<td>53</td>
<td>42</td>
<td>11</td>
<td>14</td>
<td>17</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>9- Other</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Total Exports/Imports</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>12</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Data compiled by the author from Eurostat (EC)

Changes in trade pattern of SITC manufacturing sections are shown below (fig. 2): after a remarkable growth in exports of miscellaneous manufactures (SITC 8) between 1999 and 2002 (most likely in consequence of the European Agreements), the SITC 8 exports stagnated in absolute terms after 2002
while exports of machinery and transport equipment (SITC 7) and, to a lesser extent, of basic manufactures (SITC 6), continued to grow in absolute and relative terms.

![Fig. 2: RO exports to EU15, by SITC manufacturing sections](image)

Reviewing the above results, we see that most of the growth in the bilateral manufacturing trade was due to a surge in exports and imports of machinery and transport equipment (SITC 7), especially after 2003, an important change from previous trends when increases in manufacturing exports to the EU were largely driven by the steady growth in miscellaneous manufactures exports (SITC 8). Next we explore the nature of this change at sector and group of products level.

4.1. Changes in Comparative Advantages

Considering the correspondence between the nature of exports and industrial restructuring, we note that changes in the volume and structure of Romanian bilateral exports to the EU arose through changes in comparative advantages over the period. According to neo-classical trade theory, comparative advantages are determined by the abundance of factors of production and the intensity with which those are used in production. The modern theory of trade links comparative advantages with economies of scale and product differentiation. Irrespective of their determinants, as previously explained, comparative advantages do change as a result of increased flows of trade and investment and can be a result of specialisation in production or industrial restructuring. To analyse changes in comparative advantages we used the revealed comparative advantage index (RCA) developed by Balassa (1965) to compare the share of a given sector in national exports with the share of that sector in the world.
exports. A greater than 1 $RCA_j$ index indicates that a country is a preferential supplier of product $j$ to the world and, therefore, a country has a comparative advantage for that product relative to other countries. RCA therefore measures the ‘external’ comparative advantage, the position of a country’s product on an external market. We calculated this index as follows:

$$RCA_{Ro,j} = \left( \frac{x_{RoEU}^{RoEU}}{x_{Ro}^{EU} / x_{EU}^{EU}} \right)$$

where $RCA_{Ro,j} =$ the Revealed Comparative Advantage of Romania in the products $j$; $x_{RoEU}^{RoEU} =$ the export of Romania to the EU in product $j$; $X_{RoEU}^{RoEU} =$ the total exports of Romania to the EU; $x_{EU}^{EU} =$ the total exports to the EU of the product $j$; $X_{EU}^{EU} =$ the total exports to the EU. We applied this index at 3-digit SITC level, across all sectors and the ranking of the specialisation indices so obtained is displayed in tables below.

Table 2a: Product Groups with the highest RCA (2006)

<table>
<thead>
<tr>
<th>Product Description</th>
<th>RCA Trend</th>
<th>RCA</th>
<th>% total exports</th>
<th>% total exports</th>
<th>% of total exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1995</td>
<td>2000</td>
<td>2006</td>
</tr>
<tr>
<td>773- Equipment for distributing electricity</td>
<td>+</td>
<td>1.71</td>
<td>2.98</td>
<td>7.86</td>
<td></td>
</tr>
<tr>
<td>841- Men’s or boy’s coats, capes, jackets, suits, blazers, etc of textile fabrics</td>
<td>-</td>
<td>11.13</td>
<td>10.91</td>
<td>6.92</td>
<td></td>
</tr>
<tr>
<td>842- Women’s or girls coats, capes, jackets, suits, blazers, etc of textile fabrics</td>
<td>-</td>
<td>10.46</td>
<td>12.29</td>
<td>9.16</td>
<td></td>
</tr>
<tr>
<td>851- Footwear</td>
<td>+</td>
<td>9.11</td>
<td>11.27</td>
<td>9.31</td>
<td></td>
</tr>
<tr>
<td>811- Prefabricated buildings</td>
<td>+</td>
<td>0.12</td>
<td>0.23</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>635- Wood manufactures</td>
<td>+</td>
<td>0.73</td>
<td>1.50</td>
<td>1.31</td>
<td></td>
</tr>
<tr>
<td>821- Furniture and parts thereof; bedding, mattresses, cushions and similar stuffed furnishings</td>
<td>-</td>
<td>8.73</td>
<td>5.51</td>
<td>5.54</td>
<td></td>
</tr>
<tr>
<td>844- Women’s and girl’s coats, etc knitted or crocheted</td>
<td>+</td>
<td>0.80</td>
<td>1.48</td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td>HS Code</td>
<td>Description</td>
<td>RCA</td>
<td>% Total Exports 1995</td>
<td>% Total Exports 2000</td>
<td>% of Total Exports 2006</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----</td>
<td>----------------------</td>
<td>----------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>791-</td>
<td>Railway vehicles and associated equipment</td>
<td>+</td>
<td>0.19</td>
<td>0.54</td>
<td>0.55</td>
</tr>
<tr>
<td>843-</td>
<td>Men’s or boy’s coats, etc knitted or crocheted</td>
<td>+</td>
<td>0.50</td>
<td>0.78</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Source: Author’s calculation based on Eurostat (EC) data.

Table 2b: RCA of the most important export products of Romania (2006)

<table>
<thead>
<tr>
<th>HS Code</th>
<th>Description</th>
<th>Trend</th>
<th>% Total Exports 1995</th>
<th>% Total Exports 2000</th>
<th>% of Total Exports 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>851-</td>
<td>Footwear</td>
<td>+</td>
<td>9.11</td>
<td>11.27</td>
<td>9.31</td>
</tr>
<tr>
<td>842-</td>
<td>Women’s or girls coats, capes, jackets, suits, blazers, etc of textile fabrics</td>
<td>+/-?!</td>
<td>10.46</td>
<td>12.29</td>
<td>9.16</td>
</tr>
<tr>
<td>773-</td>
<td>Equipment for distributing electricity</td>
<td>+</td>
<td>1.71</td>
<td>2.98</td>
<td>7.86</td>
</tr>
<tr>
<td>841-</td>
<td>Men’s or boy’s coats, capes, jackets, suits, blazers, etc of textile fabrics</td>
<td>-</td>
<td>11.13</td>
<td>10.91</td>
<td>6.92</td>
</tr>
<tr>
<td>821-</td>
<td>Furniture and parts thereof; bedding, mattresses, cushions and similar stuffed furnishings</td>
<td>-</td>
<td>8.73</td>
<td>5.51</td>
<td>5.54</td>
</tr>
<tr>
<td>784-</td>
<td>Parts and accessories of motor vehicles of groups 722, 781, 782 and 783</td>
<td>+ (*)</td>
<td>0.59</td>
<td>0.98</td>
<td>4.42</td>
</tr>
<tr>
<td>845-</td>
<td>Articles of apparel, of textile fabrics, whether or not knitted or crocheted</td>
<td>-</td>
<td>4.63</td>
<td>7.05</td>
<td>4.08</td>
</tr>
<tr>
<td>772-</td>
<td>Electrical apparatus for switching or protecting electrical circuits or for making connections to or in electrical circuits</td>
<td>+ (*)</td>
<td>0.23</td>
<td>0.34</td>
<td>2.01</td>
</tr>
<tr>
<td>673-</td>
<td>Flat-rolled products of iron or non-alloy steel, not clad, plated or coated</td>
<td>-</td>
<td>5.44</td>
<td>1.78</td>
<td>1.81</td>
</tr>
<tr>
<td>699-</td>
<td>Manufactures of base metal, nes</td>
<td>+ (*)</td>
<td>0.79</td>
<td>0.77</td>
<td>1.73</td>
</tr>
</tbody>
</table>

Note: + = increase; - = decrease; * = change from disadvantage to advantage

Source: Author’s calculation based on Eurostat (EC) data.
Analysis of RCAs shows the dominance of manufacturing products (the products with the highest RCA and with the largest share of Romanian exports are all manufacturing products). In addition, product groups with increasing RCAs belong to miscellaneous manufactures (SITC 8), machinery and transport equipment (SITC 7) and basic manufactures (SITC 6), in decreasing order of importance according to their share in total exports. The SITC 8 products still dominate exports, although many of them (841, 842, and 821) are losing competitiveness (as reflected in declining RCA during the period) and it is expected their shares in exports will continue to decline in the future. Other groups of SITC 8 products increased their competitiveness (811, 844, and 843) but account for very low export shares. The 851-‘Footwear’ remains the only SITC 8 group of products with a consistently high RCA and the largest export share. It is important to note that, once again, the dominance of SITC 8 group of products is now challenged by increasingly competitive SITC 7 product groups, especially 773- ‘Equipment for distributing electricity’ (with the highest RCA), 784- ‘Motor vehicles parts and accessories’ and 772- ‘Electrical apparatus for switching’ (some of these turning previous comparative disadvantages into comparative advantages). As a result, their export shares rose considerably, especially after 2000.

Changes in RCAs for SITC 7 products suggest that the share of machinery and transport equipment products in total exports is set to increase in the future, replacing the more traditional SITC 8 products such as footwear, textile and clothing. One last relevant trend to note is that all products groups (except for 773) with increasing RCAs are labour-intensive suggesting that Romania (unlike the most advanced CEECs) continues, well into the mid-2000s, to specialise in labour-intensive rather than technology-intensive products.

To summarise, the stagnant export share of SITC 8 product groups is due to losses in their revealed comparative advantage (with the exception of 851 product group) and to simultaneous improvement in the competitiveness of several SITC 7 groups of products such as 773, 772 and 784 which account for most exports in component parts. Importantly, even though Romania’s comparative advantages are shifting within the manufacturing sector, they tend to persist in labour-intensive products. We now turn to examine how did changes in comparative advantages arise and seek evidence of specialisation in production (i.e. the exports of the same products in larger quantities, often leading to inter-industry exports) versus industrial restructuring (implying the sale of new, differentiated products, taking the form of intra-industry exports).
4.2. Evidence of Specialisation in Production

We measured the extent of specialisation in production by using the Hummel and Klenow intensive margins index (HKIM) which shows the extent to which an increase in a country’s exports is due to exporting the same sets of goods in larger volumes. We adapted and applied the HKIM index to Romanian bilateral exports to the EU at the 4-digit level as follows:

\[
HKIM_t^{Ro} = \frac{\sum_{p \in C} \sum_{t} X_{pR}^{RoC}}{\sum_{p \in C} \sum_{t} X_{pW}^{WC}} \quad \text{and} \quad P_{95}^{RoC} = \left\{ p : \frac{X_{p95}^{RoC}}{p} > 0 \right\}
\]

where \( HKIM_t^{Ro} \) is the Hummel-Klenow intensive margin index for Romania in year \( t \), \( C \) is the set of EU market economies; \( X_{pR}^{RoC} \) is the export from Romania to a country in \( C \) in product \( p \) at time \( t \) and \( X_{pW}^{WC} \) is world exports to a country in \( C \) in product \( p \) at time \( t \).

Our calculations indicate a change in the intensive margins of 98% during the period under study, i.e. a third of the rate of increase in the overall manufacturing exports to EU, of 337% (see figure 3). This suggests that selling the same products that were previously sold to the EU (i.e. specialisation in production) accounts for less than a third of the increase in exports to the EU. Importantly, the value of HKIM index did not change after 2003, so the increase in the value of bilateral exports to EU is no longer due to larger exports of traditional products but to other factors, most probably the increase in the variety of products and/or product quality. Thus, the contribution to exports from specialisation in the production of traditional export goods reached its limit in 2003. Further increases in Romanian exports to the EU are driven solely by the sale of new, differentiated products or products of higher quality (all of which reflect industrial restructuring).

![Fig. 3: HKIM index](image-url)
4.3. Evidence of Industrial Restructuring

Turning to evidence of industrial restructuring, we first examine the role played by differentiated products in the increased volume of trade by way of the intra-industry trade index and intra-industry trade components and second, we seek evidence of product differentiation and product upgrading, by looking at the proportion of differentiated products in total exports and changes in production technology. It is important to recall that the inter-industry trade reflects specialisation in production, whereas intra-industry trade represents exports of differentiated products and thus becomes illustrative of industrial restructuring.

The Grubel-Lloyd index (1975) measures intra-industry trade based on models that assume balanced trade. When substantial trade deficits exist the index is adjusted as per formula below (GLadj):

\[
GLadj = \frac{\sum_i (X_i + M_i) - \sum_i \text{abs}(X_i - M_i)}{\sum_i (X_i + M_i) - \text{abs}(\sum_i X_i - \sum_i M_i)}
\]

The values of GL_adj index range between 0 (inter-industry trade) and 1 (intra-industry trade). Many studies use this index on SITC trade data at 3-digit level, taken to approximate the industries/products traded. At this level, during the period under study, the evolution of GL_adj for Romania suggests a steady, upward trend in intra-industry trade, albeit from lower levels compared to other CEE countries.

As indicated previously, the increase in intra-industry trade represents the most important feature of the recent development in CEECs-EU trade, reflecting technological progress and income convergence.
This began to apply to Romania as well, especially after 2003, when the rise in intra-industry trade has been much steeper than before. This is consistent with previous results of the increasing role played by trade in components and parts, due to positive changes in revealed comparative advantages for SITC 7 products. At the beginning of transition, the intra-industry index for CEECs-EU trade was around 20-50%, whereas the index for intra-EU trade was 60-80%. In time, however, the level of intra-industry trade index increased in the more advanced CEECs and caught up with (and, in some cases, even surpassed) other EU countries (Firdmunc, 2005). The average of our GL index for Romania during 1995-2006 is 0.42, compared to 0.56 for Slovakia and 0.68 for the Czech Republic calculated over 1993-2000 period (Palazuelos-Martinez, 2007). Our calculation of GL index (adjusted) for Romania suggests that intra-industry trade increased over the last 12 years by 69.8%, from 0.379 to 0.5229. This is an encouraging trend, suggesting that Romania’s trade patterns are rapidly catching up with those of other CEECs.

Yet, given its two components (horizontal and vertical) the intra-industry trade index may still reveal specialisation in production rather than industrial restructuring. In order to separate the two, we calculate and compare intra-industry exports (IIX), inter-industry exports (INX), vertical intra-industry exports (VIIX, which are still a result of specialisation in production) and horizontal intra-industry exports (HIIX, i.e. trade in close substitutes of similar quality and thus the result of industrial restructuring). To determine these components and their evolution over the last 12 years, we employ the intuitive method proposed by Kandogan (2003a; 2003b) who uses the value of exports and imports at two different levels of aggregation. Accordingly, the higher level of aggregation defines industries and the lower level of aggregation defines different products in each industry. At the higher level of aggregation, the total amount of intra-industry exports is computed by finding the amount of exports that are matched by imports. Then, the amount of matched exports in each products of an industry is computed using a lower level of aggregation. This gives us the trade in similar products, i.e. the horizontal intra-industry exports. The rest is the matched export of different products or goods at different stages of production within an industry, i.e. vertical intra-industry exports:
Using SITC 2-digit data as the higher level of aggregation (representing industries) and SITC 4-digit data as the lower level of aggregation (representing products), changes in the composition of Romanian manufacturing exports to the EU can be studied. The two components of total exports (intra-industry and inter-industry exports) grew steadily until 2002, from an initial situation in which inter-industry exports represented 64% the total exports. After 2002, however, inter-industry exports stagnated and even declined slightly, while intra-industry exports increased steeply and replaced inter-industry exports as the dominant component in the total exports. By 2006, intra-industry exports represented 66.4% of the total exports of Romanian manufacturing products.

As predicted by theory, bilateral exports to the developed markets of EU led over time to higher shares of intra-industry exports. The annual average rates of growth throughout the period were 17% and 7% for intra-industry and inter-industry exports respectively. Although the data lends good weight to the various observations, notably that for manufacturing there was strong growth in intra-industry trade, we conducted a T-test to ensure the robustness of these interesting results. Specifically, we examined the
intra-industry data (at two digit SITC level) for years 1995 versus 2006 and for 1995 and 1996 versus 2005 and 2006 and concluded that the observed changes in the average measure of intra-industry trade across manufacturing sectors had increased in a statistically significant manner between the beginning and the end of the time series.

Considering the changes in horizontal and vertical intra-industry exports during the period under study, much of the increase in intra-industry exports was due to a higher average rate of growth in horizontal (18%) compared to vertical intra-industry exports (16%). Here again, both intra-industry components increased at a faster rate after 2002. Although differences in average growth rates are marginal, across all SITC sectors horizontal intra-industry exports exceeded vertical intra-industry exports, indicating a growing ability to export differentiated products (through industrial restructuring). This revises earlier findings by Aturupane et al (1997) that intra-industry trade between CEECs and EU was predominantly vertical in nature, but is consistent with the prediction of Salvatore’s model that takes into account different phases of the economic integration process between CEECs and the EU.

At SITC manufacturing sections level, figures below show that by 2000/2001 horizontal intra-industry exports were the largest component of Romania’s bilateral exports with the EU, but for one exception. In the case of SITC 8, the inter-industry component was by far the largest, but its share in total exports declined from 80% in 1995 to 68% in 2006 (mainly due low level of imports, Romania being a net exporter of textile, clothing and footwear). This explains why it was only in 2005 that horizontal intra-industry exports surpassed inter-industry exports at manufacturing sector level. Therefore, across all
SITC sections, export growth was driven mainly by horizontal intra-industry exports, reflecting industrial restructuring efforts.
The above results show that, except for SITC 8 products, manufacturing exports to the EU were primarily intra-industry and, as of recently, of a horizontal type, indicating companies’ increased capacity to produce new and diversified products according to newly revealed comparative advantages. But how important is product differentiation in the overall increase in Romania’s exports to the EU? To answer this question, we calculate the share of horizontal intra-industry exports in total exports to the EU over the last 12 years. Figure 11 presents our results which indicate that 30% of the increase in the volume of exports of manufactures was due to an increase in product differentiation. The percentage is still below that for Poland and Slovakia (45-51%), but close to those for Hungary and Estonia, as recorded in a recent study for 1992-1999 period, when only 20% of Romania’s exports represented horizontal intra-industry exports (Kandogan, 2006b, p.17). Therefore, over an extended period of time, the share of differentiated products in total exports of manufactures has increased in Romania, which speaks well of the process of industrial restructuring in the country.

As for evidence of product upgrading, changes in the quality of exports can be inferred from changes in production technologies, which may use over time different mixes of factor endowments. Historically,
all CEECs’ exports to the EU were resource-intensive and a move towards human- and capital-intensive production often implies improvements in production technology and product quality. Our analysis uses the technology classification utilised by Wolfmayr-Schnitzer (1998) to discriminate between high-tech and low-tech sectors and the different sophistication of goods according to the main inputs used: human capital, physical capital, labour and other resources. This classification method was proposed by Legler (1982) based on data for Germany and further developed by Schulmeister (1985, 1987 and 1990). It takes into account factor intensities across product groups at the 3-digit level of SITC to define the following categories of products: resource-intensive, human capital intensive and low technology, labour intensive, human capital intensive and medium technology and labour intensive; human capital intensive and medium technology and capital intensive; human capital intensive and high technology and labour intensive and, finally, human capital intensive and high technology and capital intensive. Of the seven categories so identified, the last four represent human capital intensive products. Figures 12a and 12b show changes in the structure of Romanian exports by factor intensity during the last 12 years.
Importantly, the share of resource-intensive exports has declined steadily from 28% in 1995 to 11% in 2006, whilst the share of human capital intensive exports (with low, medium and high technology) doubled, reaching 31% in 2006. At the same time, the share of the four top human capital intensive products exported grew from 10% in 1995 to 18% in 2006. According to our calculations, labour-intensive products accounted for 58% of total exports in both 1995 and 2006 (after peaking at 70% in 2002). The post-2002 decline in the share of labour-intensive exports and the growth in human capital intensive products indicates gradual improvement in production technologies and, implicitly, in product quality. This is a welcome departure from the gloomier findings of previous studies according to which the export pattern of Romania differed from that of other CEECs in terms of high resource and labour-intensive products (Brenton and Gross, 1997; Wolfmayr-Schnitzer, 1998; Havlik, 1998 and Kandogan, 2005). The post-2002 decline in labour intensive exports helped Romania to close the gap with other CEECs whose high-quality exports represented 29% to 51% of their total exports in 1999 (Kandogan, 2005). This research shows that through trade, Romania - much like the rest of CEECs- is redefining comparative advantages as factors of production and technologies are continuously upgraded. Future research on these aspects may endorse further this healthy trend that started in 2003.

The prospect of EU accession certainly encouraged a rapid economic integration between Romania and the EU, as reflected in the recent growth of bilateral trade. Other factors contributed, such as the recent rise in foreign direct investment flows to Romania and the growing role of the Romanian private sector. According to WTO reports (2005, 2006), striving SMEs contribute substantially to Romania’s output and exports from 2002 onwards, when they accounted for more than half of the country’s production and a quarter of total exports. Equally important, the share of FDI flows to Romania also grew spectacularly after 2003 when Romania acquired NATO membership. As a result, the FDI stock increased three times since 2003, from €9.6bn to €31.3bn in 2006. The trend continues well into 2008, with new investments in export producing industries. With respect to the value of FDI flows, in 2006, Romania came second after Poland, among CEECs (ARIS, 2006). Half of the FDI went to industry, especially automotives, car components and parts as a result of major investment projects by Renault, Michelin, Pirelli and Yazaki to name some of the largest investors (ARIS, 2008). Among the other sectors attracting FDI were electronics, wood and furniture products. On the contrary, textile and clothing received relatively little FDI, but benefited from private initiatives including foreign and domestic capital. As foreign direct investment often facilitates a country’s integration in the
international economy (Martin, 1998), the recent rise in FDI flows to Romania should, over time, result in higher volume of trade in new and differentiated products.

5. Conclusions

This paper analysed changes in the volume, structure and composition of Romania’s exports to the EU in order to observe the process of restructuring manufacturing industry after 1995. The research was based on bilateral trade data between Romania and her dominant trade partner – the EU15. In Romania, a successful macro-stabilisation programme and privatisation initiatives paved the way for bilateral trade growth with the EU member states and helped in the reorientation of trade patterns from the former socialist block to Western Europe. The research noted a fivefold increase in Romania’s manufacturing exports to the EU since 1995 and provided evidence of the ongoing industrial restructuring process by analysing changes in the share of intra-industry exports versus inter-industry exports and in horizontal versus vertical intra-industry exports. Based on our analysis, the increase in the volume of exports to the EU between 1995 and 2006 is the result of three important factors: the intensive margin (the selling of more of the same products as in 1995, evidence of specialisation in production), the extensive margin (the selling of new, differentiated products) and improved product quality. Reflecting the process of industrial restructuring in Romania, the last two factors account for two thirds of the increase in the bilateral exports.

Our analysis also suggests that Romania has recently made good progress in catching up with the more advanced CEECs that, as previous research has shown, managed to avoid the ‘low-quality’ trap by gradually replacing exports of labour and resource-intensive products with high value added products, incorporating more advanced technology (Landesmann and Burgstaller, 1998; Landesmann, 2000; Garbisch and Segnana, 2001). Ten years after Romania signed the European Agreements, the country’s export patterns began to indicate specialisation in production away from resource-intensive exports and towards more technology-intensive products; the significant role played by intra-industry trade in new and differentiated products and the relative decline in the importance of Romania’s traditional labour-intensive export products. The process of economic convergence with other CEECs might have started in 2002/2003, as reflected in the rising share of horizontal intra-industry exports in total exports, the increase in the percentage of human-capital-intensive exports and the decline in the, albeit still dominant, share of labour-intensive exports. Further research on trade data for the remaining part of
this decade should consolidate our findings and provide additional evidence of economic convergence with other European economies. Romania’s changes in export patterns reflect the ongoing industrial restructuring process which, undoubtedly benefited not only from EU trade liberalisation measures, but also from increased foreign direct investment flows and a striving SMEs sector in Romania.

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