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Ivana KRAFTOVA*, Tomas CHLADEK*, Jakub MINARIK***DO GLOBALISATION AND ECONOMIC CYCLES REDUCE
THE SECTOR INEQUALITY OF SUPRA-REGIONS?****1. INTRODUCTION**

This research presents data accumulated to assist in the testing of the validity of assumed development conditions and relations. The world economy has reached staggered levels of development across the different continents throughout a long period in history. Geographical continental determinants in relation to the climatic and natural conditions across the continents, as well as natural resources, have remained more or less stable. And aside from these aforementioned conditions, there are numerous internal and external factors – among others: the respective states social and political situations, their scope of involvement in the processes of international labour distribution, involvement in the globalisation phenomena and economic cycles – which influence the economy of a continent as a sum of its individual economies. Globalisation, as well as market mechanism principles, reflects the trend of stronger subjects to accumulate advantages at the expense of weaker ones (Smith, 2001; Kraft and Farek, 2008).

On the other hand, globalisation is connected with processes which act to reduce the differences between the centres of wealth and poverty, and may contain potential to reduce the spatial dispersion and sector diversification of the continents. The process of economic internationalisation and globalisation has been gradually intensifying since the Second World War, i.e. in the 1950s, and

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its intensity increased during the 1980s, underlining the suitability of a holistic approach in the search for an answer to the problem indicated in the title of this article, although spatial economics usually explores differently determined lower level economic areas.

The truth is that a more common exploration of trend topics in different relations on the level of individual countries or group of countries (Renski, 2010; Otsuka, Goto and Sueyoshi, 2010; Barta, Czirfusz and Kukely, 2008; Cheshire, 2008) would advisedly be carried out parallel to economic research into specific problems focusing on continents/supra-regions (Venables, 2010; Leeuwen, Strijker and Terluin, 2010; Kraftova and Kraft, 2008).

It is often asked to what extent globalisation processes help to remove the forms of economic inequality that are viewed as being responsible for an upsurge in social problems and political instability across all parts of the world. The United Nations effort aims at their removal within the term it takes to complete the Millennium Development Targets adhered to at Summit 2000 (UN, 2000), and the way the cyclical character of economic development affects balance.

Among the expressions of economic performance inequality in different regions is their different sector structure,¹ and the different degree of representation of the primary, secondary and tertiary sector in the formation of gross domestic product or total value added. A developed economy is characterised by a high proportion of citizens inside the tertiary sector, i.e. the services that include globalisation supporting branches and market appropriation (transport, information technologies and telecommunications),² and also the human cultivation branches (education, health care, culture, sports, tourism, social welfare, etc.).

Taking an historical perspective into consideration, economic development was reflected through a strong primary sector. The growth of labour productivity and needs diversity resulted in the growth of the secondary and later tertiary sectors. To develop the tertiary sector, it is essential to achieve sufficient productivity in the secondary and primary sectors. The significance of total factor productivity is an integral part of growth accountancy, being viewed rather more generally than in terms of sectors (Baier, Dwyer and Tamura, 2006; Klacek, 2006).

Economically developed countries usually experienced such a process, but the scope of the primary sector involvement may differ: e.g. the islands of Japan

¹ Sector structure is in question, statistically depicted through the classification of branches, not being purposeful such as for example an inspirative division of sectors to, 'M-T-I', i.e. Manufacturing sector, Traditional sector and Innovation sector (Dupont, 2007).

² Fujita and Mori (2005) differentiate between two types of impediment to trade in space: transport of goods, and communication costs for doing business over space... The two cost types exert different effects on the spatial organisation of economic activities.

with a highly developed fishing industry versus inland European countries, such as Luxembourg and Switzerland. In recently developed countries we can often see a low representation of the secondary sector compared with the primary sector (countries rich in natural resources), or the tertiary sector (countries with favourable natural and climatic conditions enabling the development of tourism).

World economic inequality may be manifested in either the spatial concentration of sectors or by the sector specialisation of supra-regions (continents). We can assume that globalisation trends will affect the development of economic inequality in the same way as economic cycles (Kraft and Kraftova, 2010).

An assessment of the above indicated problem gains significance also in context with the stress put on the new economic geography, on the identification of strategic branches and on relevant economic growth (Partridge and Rickman, 2009; Blazek and Hampl, 2009; Kraftova, 2008; Capello, 2006; Fujita and Krugman, 2004; Los, 2004; Aroche-Reyes, 2003).

It is obvious that the latest synchronous financial and economic crisis will be reflected in the worldwide spatial efficiency distribution. According to H. W. Sinn, the Western World has been experiencing the introduction of a new portfolio balance that turns the international order of growth pace inside out, compared to the pre-crisis situation. Former champions trudge along the race course while former turtles sprint like gazelles (Sinn, 2010).

2. OBJECTIVES AND SELECTED METHODOLOGY

The objective of the research is to assess the supra-regional inequality of wealth formation and its development during the period of intensified globalisation processes, and in relation to cyclical economic development in view of sectors structure and its trends. The authors verify whether:

- globalisation contributed to the reduction of wealth formation inequality and to the equality of the sector structure of supra-regions;
- the economic cycles relate back to the spatial concentration change and sector specialisation of supra-regions;
- the intensity of sector changes correlates with the economic cycles during the period of globalisation (after 1970).

For an assessment of the above indicated problems, comparative regional analysis tools have been used (Bucek, 1992), a particular sector-modified branch specialisation index, concentration index and sector changes intensity indicator, similar to an analysis of the Central and Eastern European branch analysis (Landesmann, 2000), or Visegrad Group (Melišek, 2008), i.e.:

Regional concentration index:

$$I_{RC} = \frac{TVA_R^S}{TVA^S} / \frac{TVA_R}{TVA_T} \quad (1)$$

Sector specialisation index:

$$I_{SS} = \sum \left| \frac{TVA_R^S}{TVA_R} - \frac{TVA^S - TVA_R^S}{TVA_T - TVA_R} \right| \quad (2)$$

The coefficient of sector changes intensity:

$$k_{IS} = \sqrt[3]{\left(\frac{TVA(t)^S}{TVA(t)_T} - \frac{TVA(t-1)^S}{TVA(t-1)_T} \right)^2} * \frac{TVA(t-1)^S}{TVA(t-1)_T} / 100 \quad (3)$$

Explanations

I_{RC}	regional sector concentration index	TVA_R^S	sector total value added S in supra-region R
I_{SS}	regional sector specialization index	TVA^S	overall sector total value added
k_{IS}	coefficient of sector changes intensity	TVA_R	overall supra-regional total value added
$t, t-1$	period $t, t-1$	TVA_T	overall total value added

Special attention was paid to the period after 1970, the era of the so-called ‘petroleum shocks’, considered a starting point for globalisation trends intensification. Statistical data of the United Nations serves as a total value added sector indicators database presented in stable 1990 prices in USD, where International Standard Industrial Classification of All Economic Activities,³ Rev. 3.1 has been applied.⁴ GDP data have been used for the assessment of overall wealth formation, being the elementary aggregate characteristics in the evaluation of the absolute economic effectiveness of individual continents. To assess the sector shares the TVA indicator is used, derived from GDP and monitored according to individual branches. All of this is applied despite construction in terms of economic growth and development shows certain difficulties (Hájek, 2005).

³ International Standard Industrial Classification of All Economic Activities = ISIC.

⁴ This means that the primary sector is an accumulation of branch A – Agriculture, hunting and forestry, B – Fishing, C – Mining and quarrying, E – Electricity, gas and water supply; secondary sector involves D – Manufacturing, F – Construction, with the tertiary sector covering all the remaining branches G to Q, i.e. the service sector.

3. THE DEVELOPMENT OF GDP AND ITS SECTOR STRUCTURE ACCORDING TO THE CONTINENTS IN THE PERIOD 1970–2008

The GDP absolute value development shows different dynamics during the period monitored – a worldwide average is significantly exceeded in Asia, in Africa; America and Oceania move slightly under the worldwide average; Europe is a bit slower.

While the worldwide GDP share has not changed much in the Americas, Oceania and Africa, the shares of Europe and Asia experienced major changes that are by over 11 percentage points in favour of Asia at the expense of Europe (table 1).

Table 1. GDP 1970–2008 by continents (mln USD)

	GDP 1970 (mln USD)	Share in world GDP in 1970 (%)	GDP 2008 (mln USD)	Share in world GDP in 2008 (%)	Growth 2008/1970 (%)
Africa	272,641.5	2.4	999,394.3	2.7	366.6
Americas	3 939,581.2	34.2	12 619,080.9	34.0	320.3
Asia	2 069,355.8	17.9	10 950,464.1	29.5	529.2
Oceania	207,714.6	1.8	653,799.3	1.7	314.8
Europe	5 039,565.3	43.7	11 901,452.2	32.1	236.2
World	11 528,858.5	100.0	37 124,190.7	100.0	322.0

Note: Oceania = Australia, New Zealand, Melanesia, Micronesia and Polynesia.

Source: processed by the authors based on the online data: <http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009).

Leaving the TVA absolute values aside and focusing on its sector structure, we can state that the worldwide growth of the tertiary sector share includes roughly three-fifths of the secondary sector decline and two-fifths of the primary sector decline. This was caused by the development of two more developed continents that is Europe and the Americas. Such facts can prove that the proposition about an inter-sector shift caused by the productivity growth indicated in the beginning of the article is applicable. The growth of the tertiary sector in Asia and Africa is temporarily related to a moderate growth of the secondary sector and any decline in TVA structure is then reflected in the primary sector decline. Oceania has a controversial position, since the secondary sector share in the given period falls against the expected development and the primary sector slightly grows alongside the secondary sector (figures 1–3).

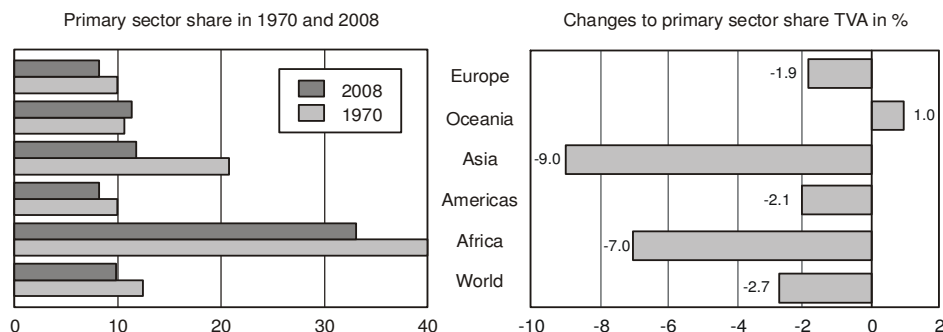


Fig. 1. Comparison of the primary sector share development in economy of the world and continents in 1970 and 2008

Source: processed by the authors based on the online data:
<http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009)

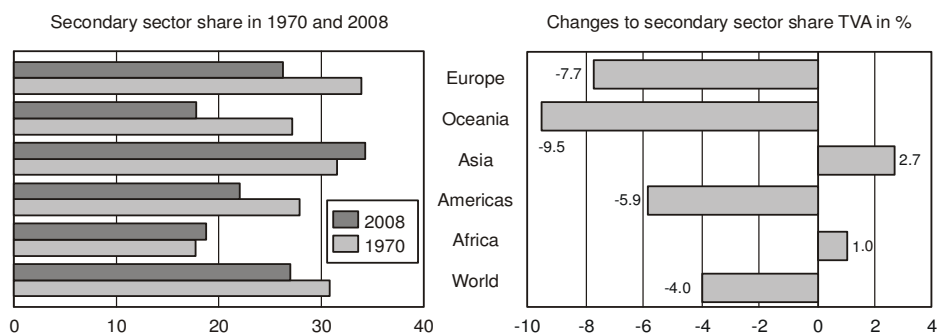


Fig. 2. Comparison of the secondary sector share development in economy of the world and continents in 1970 and 2008

Source: processed by the authors based on the online data:
<http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009)

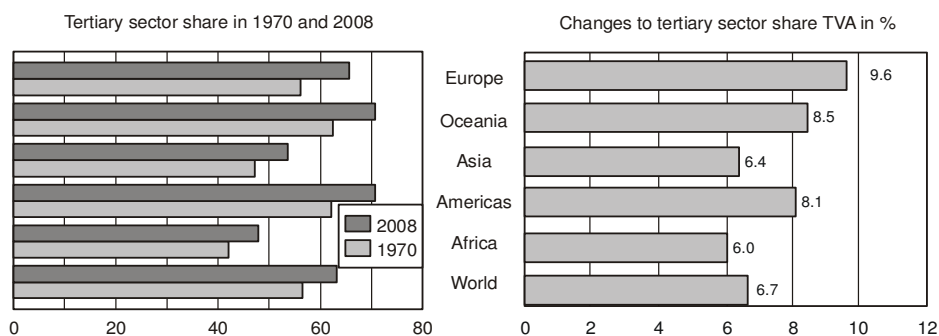


Fig. 3. Comparison of the tertiary sector share development in economy of the world and continents in 1970 and 2008

Source: processed by the authors based on the online data:
<http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009)

Worldwide TVA growth is characterised by different pace and by a shift in individual sector dynamics. The intensity of economic relations among countries, and across the continents, in the period of globalisation may be a subordinate factor to the transfer of the sector growth determinants, and it can also be a reason for a deeper fixation of sector inequality because the needs of the secondary sector outcomes of the economies, whose efficiency relates to the growth of the primary or secondary sector, may be supplied from outside.

If we divide the whole monitored period into decades, then the most dynamic TVA growth occurred in the 1970s when tertiary sector growth largely exceeded the growth of the primary and secondary sectors, measured by geometric average.

The following two decades are characterised by lower growth dynamics and by the diversification of individual sector growth rates when the primary sector lags behind. The positive difference of the tertiary sector growth against the remaining two has fallen. The beginning of the 21st century witnessed a complete turnaround, since the rate of individual sector growth was almost equal, which is rather surprising especially in regard to the primary sector. Such a result was affected by the size of the base from which we derive the growth rate. Nevertheless, it is obvious that the apparent worldwide equality in the development of TVA sectors obscures a major supra-regional inequality. Overall observation does not allow us to observe this fact, it is essential to analyse the problem in a spatial view, according to individual branches and in terms of individual growth factors (figure 4).

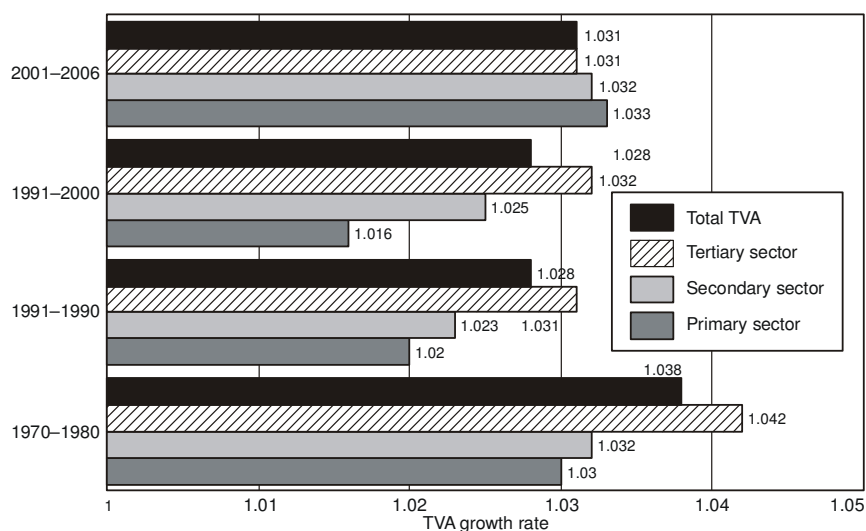


Fig. 4. Development of worldwide TVA growth (geometrical average of the period)
 Source: processed by the authors based on the online data: <http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009)

4. THE RANGE OF SPATIAL CONCENTRATION AND SECTOR SPECIALISATION OF SUPRA-REGIONS

The period of globalisation has not eliminated the cyclical character of economic development; on the contrary, the recession shows its influence on economic cycle synchronisation. Therefore attention was further paid to the economic sectors of world supra-regions in terms of their concentration and specialisation as supporting descriptive characteristics. The research aimed at the investigation into whether regional sector specialisation and concentration development have been significantly changing during individual cycle stages.

4.1. Range of Regional Concentration

The regional concentration index I_{RC} (1) expresses the ratio between regional share in the TVA sector and a region's share in overall TVA. If that equals 1, then the share of a region in the TVA sector equals the region's share in overall TVA. At the values under 1, the share of a region in the TVA sector is lower than the share in the overall TVA and *vice versa*.

I_{RC} calculated for individual supra-regions proves that economic cycles have no special influence on the regional concentration of sectors, it is instead a long-term trend.

However, the development in individual continents is different. In the period 1970–2008, the primary sector concentration increased most in Oceania (1.40), in Africa (1.06) and surprisingly in Europe (1.04). The concentration has fallen in Asia (0.72) and in the Americas (0.55).

Supra-regional concentration of the secondary sector has been developing differently. As expected, the largest growth was encountered in Asia (1.24) and in Africa – in regard to the low base – almost equally (1.21). The degree of concentration has fallen in Oceania (0.75) and it was relatively similar in Europe (0.89) and in the Americas (0.91).

Only the tertiary sector increased its concentration equally in all the supra-regions, despite its intensity slightly differing – the largest in Europe (1.05), to a lower degree in the relatively small economies of Africa and Oceania (equally 1.05); and the lowest, yet above the value of 1, in Asia and the Americas (1.01). In the case of the Americas, the development is a result of the high values accumulation in North America and lower values in the rest of the continent.

It is also interesting to note the change in the position of a continent in terms of its worldwide share of sector concentration. It concerns the position of the Americas in the primary sector, where the share in the primary sector TVA appears lower than that of overall TVA at the break of 2003 and 2004, while Oceania shows an opposite trend at the break of 1982 and 1983. Looking at the

secondary sector concentration, only Europe has changed its position, since its share in the secondary sector dropped, compared to its share in overall TVA after 2003, while the European position in terms of tertiary sector concentration was balanced with the overall TVA share in 1991 and 1992; and in the following years the tertiary sector concentration share in Europe exceeded its share in the overall TVA.

4.2. Range of Sector Specialisation

The sector specialisation range of supra-regions was assessed by means of the sector specialisation index I_{SS} (2), representing the difference between ‘supra-regional specialisation’ in a particular sector (the TVA sector share in a region in the regional TVA) and worldwide specialisation in a particular sector regardless of the assessed supra-region (the share of a particular sector TVA in all other regions and the sum of the overall TVA of all the remaining regions).

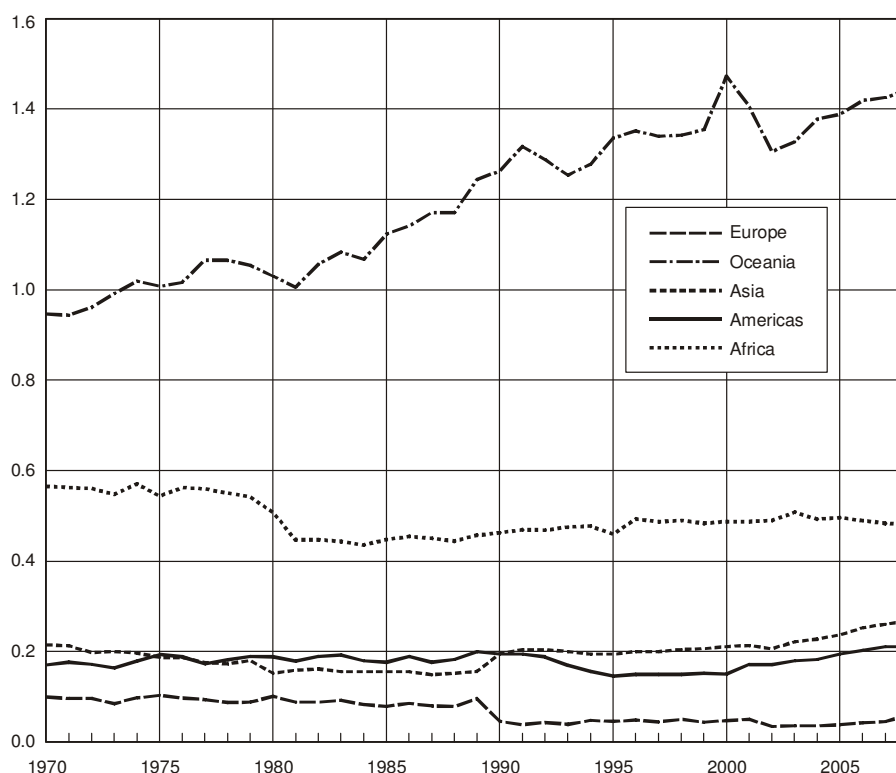


Fig. 5. Development of supra-regions specialisation range in 1970–2008 (measured by ISS)

Source: processed by the authors based on the online data:
<http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009)

Individual items represent the degree of specialisation of a particular continent compared to the given sector as a relation value against 'the rest of the world'. If that equals zero, then the degree of specialisation of a supra-region to a given sector equals with 'the rest of the world'. The higher the value, the higher is the specialisation of the particular supra-region to a given sector, and *vice versa*. Negative value means that the rest of the world is more specialised than the monitored supra-region. Regarding the fact that the TVA of each supra-region is a sum of its sector TVAs, summarisation is carried out in absolute values. The higher the absolute values sum, the higher the sector specialisation of a given supra-region.

When speaking about the specialisation development, we cannot see any significant influence of economic cycles; a long-term trend is in question. The specialisation has been increasing in Oceania (1.52), Asia (1.22) and America (1.20). Lower specialisation, that is a more balanced representation of individual sectors in the economy, is seen in Europe (0.63) and Africa (0.85). At the same time, the development takes place on a significantly different level – the high specialisation of Oceania and Africa, and on the contrary, the highest sector diversification in Europe (figure 5).

The results are also reflected in the spatial concentration of sectors in individual continents.

5. INTENSITY OF STRUCTURAL CHANGES AND THEIR DEVELOPMENT WITHIN ECONOMIC CYCLES

Contemporary economic development of individual economies shows a cyclical character through different intensity and periodicity. The analysis proved that the recent length of a cycle is approximately 8.25 years, i.e. it moves within the Juglar cycle dimensions, often connected with investment into new machinery and technology (Kraft and Kraftova, 2010).

In the assessment of individual supra-regions GDP growth in the monitored period, we can earmark the middle of the 1970s, the beginning of the 1980s, the beginning of the 1990s and the turn of the century as a recession since the growth kept falling in an asynchronous manner in all the continents. A different situation started in 2008, when the recession was reflected synchronously worldwide.

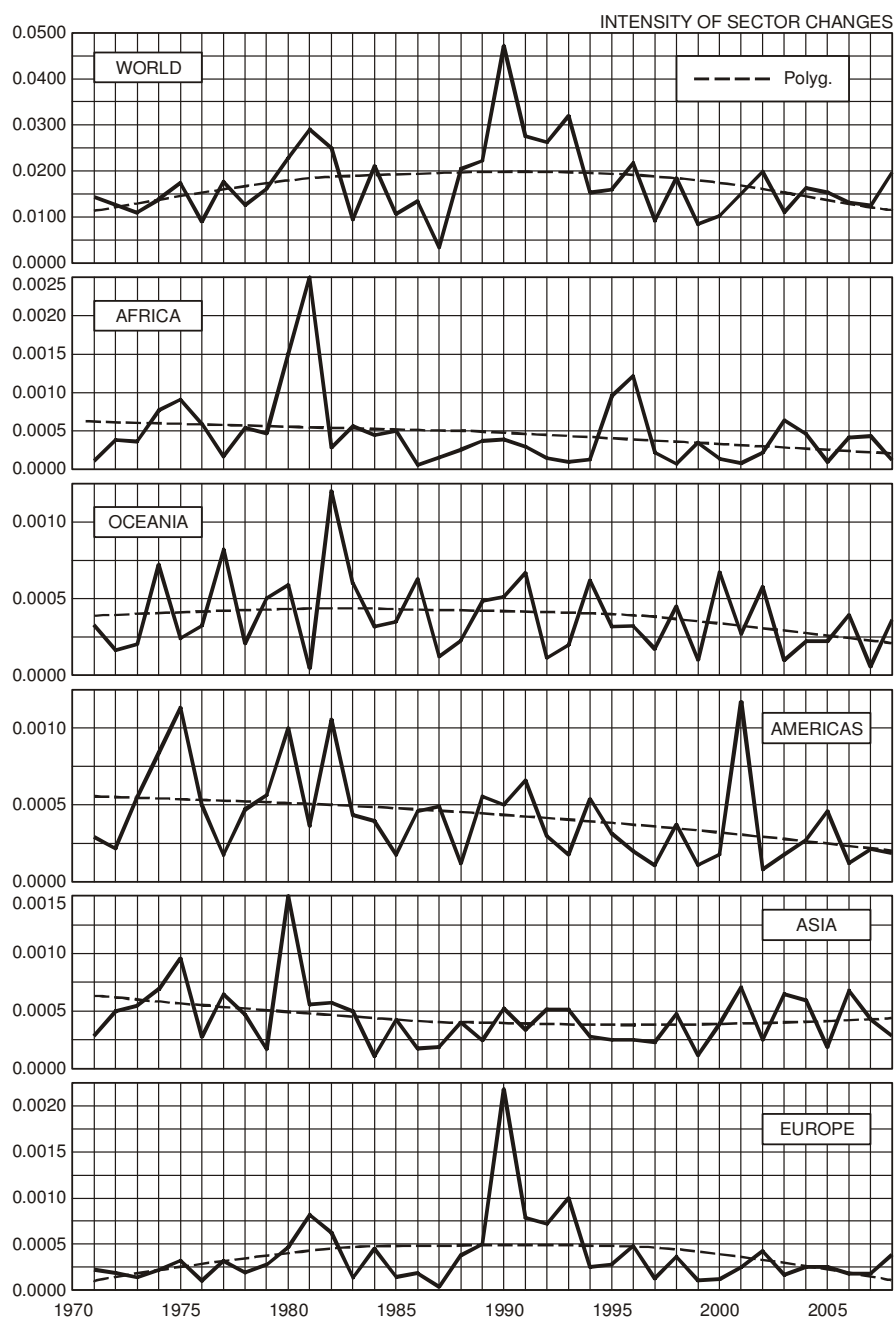


Fig. 6. Development of the world sector changes intensity in the world and in supra-regions in relation to economic cycles

Source: processed by the authors based on the online data:
<http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009)

We can state that worldwide development reflects the dominant development of Europe where social and political changes at the beginning of the 1990s meant an extensive shift in the world economy. The preceding top of the sector changes intensity in Europe occurred in 1981 (similarly in 1990) in the year of the economic recession. Despite Europe trying to react to the economic development by changes to the TVA structure, it has been experiencing a sustained loss in GDP share (from 44% in 1970 to 32% in 2008; in the critical year 1990 it was 38%, which confirms a sustained decline).

Both low efficiency supra-regions – Africa and Oceania – do not significantly differ from the worldwide trend. Africa is more ‘at ease’ in terms of sector changes showing basically two culmination years: 1981 and 1996; both years are closer to the years of industrial boom fluctuation (1982 and 1996) than to a period of recession.

Oceania, on the other hand, experienced a strong oscillation around the trend during the whole monitored period, with a culmination in 1982, the year of the economic recession.

The two remaining supra-regions – the Americas and Asia – show an analogical development in a way, since we can differentiate three sections in the period monitored: the beginning of the 1970s until the mid-1980s as a high sector changes dynamics; then a relatively quiet period at the end of the 1990s, reflecting the recession in Asia, followed by the turn of the millennium marked by a higher sector changes intensity in both supra-regions. The year 2001 on the American continents represents the culmination of the changes in the whole monitored period. It is worth mentioning that Asia, after absolute GDP decline in 1998, immediately reduced the sector change intensity, starting to grow only in 2001, the same way as in the Americas, but with a lower intensity.

6. CONCLUSIONS

The research demonstrates that in the intensive globalisation period after 1970 there exists a certain equality of the overall supra-regional effectiveness, especially in a comparison of the three highly efficient continents, i.e. Europe, America and Asia (figure 7). Moreover, it is evident that Asia does so at the expense of Europe, if we pay attention to the share expressed by the GDP size.

Not only the absolute value of an indicator is important in wealth formation, but it is also a relative value of economic intensity measured by e.g. *GDP per capita*. The analysis also aimed at the evaluation of the share, i.e. the relation of supra-regions in terms of their worldwide GDP and the world number of inhabitants. Comparing the situation between the years 1970 and 2008, we can

see a different inequality distribution in terms of the supra-regions share than that of absolute values of the GDP measured effectiveness. Oceania clearly ranks first (being small as a supra-region with the smallest area – max. 6% of the planet), followed by Europe and the Americas. The two regions with a relatively low effectiveness are Asia and Africa, where the delay is partially caused by the growth in the number of inhabitants.

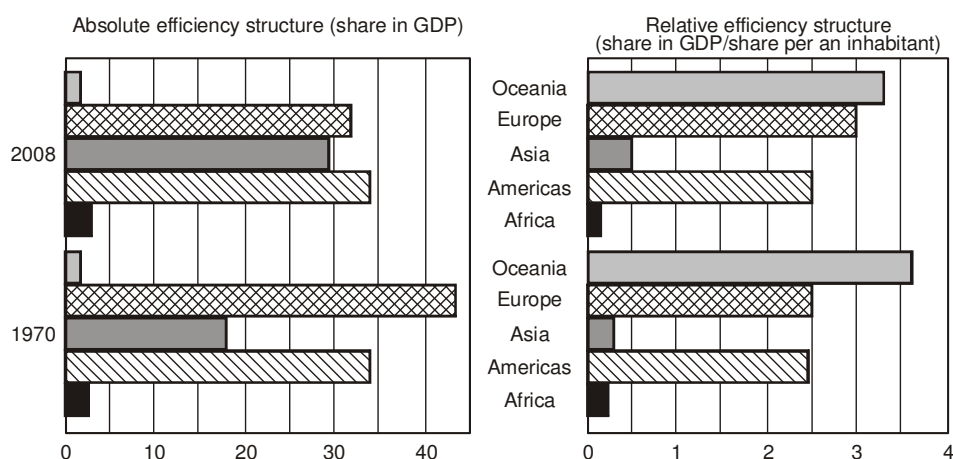


Fig. 7. Comparison of supra-regions efficiency between years 1970 and 2008

Source: processed by the authors based on the online data:

<http://unstats.un.org/unsd/snaama/dnlList.asp> (cit. 31.12.2009), and

<http://unstats.un.org/unsd/demographic/products/dyb/dyb2008.htm> (cit. 8.10.2010)

The calculated variable statistic characteristics show that the inequality of wealth formation among individual supra-regions slightly fell, but certain differences were sustained – i.e. generally lagging Africa, Oceania lagging in absolute efficiency and Asia lagging in relative efficiency. Looking at the worldwide trends of the supra-regions sector structure, we can see the primary and secondary sector declining, while the tertiary sector is growing. Such trends are obvious, forming the base for the sector balance increase. The variability of the sector efficiency of supra-regions between the years 1970 and 2008 shows decreasing values: the primary sector TVA variation coefficient decreased by only 1.4 percentage points but that of the secondary sector TVA is lower by almost 10 percentage points, and by almost 12 percentage points at the tertiary sector.

No link in the changes to cycles has been observed in the spatial sector concentration, it is rather the decrease or increase trends relating to individual sectors effectiveness, as was noted above. Also the remarkable break within the secondary sector in 1989–1990 in Europe and Asia appears to be a part of the development trend in the given region, rather than a cyclical impulse.

On the other hand, a long-term trend of the secondary sector effectiveness relation on both the mentioned continents in the form of a flat 'X' with the centre in the year 1989 raises questions about the reasons for such a fact, moreover in relation to the development of their share in overall wealth formation. (It is analogically equal in both supra-regions with lower dynamics and opposite trends of the tertiary sector.) The shift in the secondary sector concentration from Europe to Asia is a reflection of numerous factors, including the significant role of the extensive use of Asian economic potential (especially that of China).

We can assume that the knowledge factors (Fujita and Mori, 2005) are pursued only on a certain level of productivity, raising a dominant development of the tertiary sector. The latter is demanding in terms of labour, therefore the overall labour productivity decreases with its development. Economic development, lacking the appropriate participation of the secondary sector, is substantially slower than in its presence.

As far as the sector specialisation of regions is concerned, it is again the trend rather than a cyclical course: the high and sustained value of the specialisation index is evident in Oceania, the second largest but less stable level is reflected in Africa. The Americas and Asia show a low but relatively stable value in the sector specialization index; perhaps it is the secondary sector expansion at the beginning of the 1990s in Asia that shows a minor jump in the sector specialisation index growth. Europe has been showing the lowest and constantly decreasing values in the sector diversification.

Although some cyclical decrease types in the three supra-regions (America, Europe and Oceania) are connected with increased intensity of sector changes and the attenuation of such intensity relates to the industrial boom oscillation (Europe), we cannot take such a relationship as generally accepted. Its invalidity can be judged from the development of cycles and the values in the relative efficiency lacking supra-regions, i.e. Asia and Africa.

To answer the question in the title, we can state the following: the globalisation period 1970 to 2008, showing a worldwide asynchronous character of economic cycles, has experienced a decrease in the sector structure inequality of supra-regions. However, the trend is not unambiguously related to economic cycles. The future will reveal whether the worldwide synchronisation of economic cycles repeats. In such a case, their role in relation to the development of supra-regional sector structure could change.

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