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INVESTIGATING EXPORT MARKET CONCENTRATION FOR DEVELOPED, DEVELOPING AND TRANSITION COUNTRIES

Abstract:

Multilateral liberalisation of international trade started at the second half of the 20th century. Many, especially developing countries, benefited from trade liberalisation increasing their share of trade in global trade. This decrease in inequality of international trade between developed and developing countries can be measured by calculating market concentration indices. The emphasis is given to standardized Herfindahl-Hirschman index as the basic measure of trade concentration. Goal of this paper is to investigate concentration of global merchandise exports for developed, developing and transition countries using various concentration measures in the

period between 1948 and 2016 and testing the validity of Linder hypothesis. Results of the analysis has shown that there has been decrease in market concentration of global merchandise exports in the observed period, the importance of developing and transition countries increased while developed countries preferred mutual trade instead according to the Linder hypothesis.

Keywords:

export market concentration; merchandise exports; concentration indices; Herfindahl-Hirschman index; globalisation; Linder hypothesis

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Introduction

The growth of international trade has been larger than the growth of World gross domestic product after the Second World War. Multilateral liberalisation of international trade started at the second half of 20th century since the GATT creation. Free trade has been seen mutually beneficial for all countries included in the trade, or positive sum game, which is the essence of comparative advantage theory which is contrary to the teaching of mercantilists where only exporter country has gains while importer country has losses. Trade liberalisation led to reduction in trade barriers improving economic growth, development and raising living standards leading to globalisation as the final outcome of the liberalisation process. Many, especially developing countries, benefited from trade liberalisation increasing their share of trade in global trade. Trade among developing countries (often referred to as South-South trade) has more than tripled in the period from to 1980-2011 [18]. In order to measure and understand the structure and inequality of global world trade between developed, developing and transition countries, various measures of trade concentration have been used. Economies can be vulnerable to external economic shocks and it depends on degree of country's export concentration. Export concentration or export partner concentration is a degree to which a country relies on a limited number of partners as markets for its exports. Country that exports only one product to other country has perfect export concentration. On the other hand, country that exports large number of products and trade with many trading partners has more diversified exports and lower export concentration ratios [25]. Export concentration can take several dimensions and can be analysed at different levels [23]. Two well known

forms of export diversification are horizontal and vertical diversification. Although the role and importance of developing and transition countries in global trade has increased, specialization and differentiation in production has led to a regularity in international trade patterns, known as Linder hypothesis according to which countries that have similar demand structures will trade more with each other [14]. According to Linder hypothesis developed economies therefore prefer trade themselves and not with the developing and transition countries. Goal of this paper is to investigate global concentration of merchandise exports for all countries of the World calculated by observing countries as groups of developing, transition and developed countries using various concentration measures in the period from 1948 and 2016. Accordingly the research hypotheses of the paper are the following ones:

H1: Global export market concentration has globally decreased in the period after 1948 due to globalisation and liberalisation of free trade.

H2: Developed countries prefer trade themselves and not with the developing and transition countries according to Linder hypothesis.

In order to measure export market concentration the emphasis will be given to standardized Herfindahl-Hirschman index as the basic measure of trade concentration. In the analysis other concentration measures like concentration ratio, Gini's concentration coefficient, Rosenbluth's concentration index and Hall-Tideman's concentration index will be used also. The importance of the paper is measurement of global export market levels of international trade between developed, developing and transition countries

using concentration indices. In this way the changing structure of global trade is captured which is novelty in regard to the existing literature. Paper is organized in five chapters. After the introduction, the second chapter consists of literature review including theoretical and empirical aspects of global export market concentration in various countries. In the third chapter methodology and data are presented while the fourth chapter displays empirical analysis, results and discussion. Final chapter exhibits concluding remarks.

Literature review

In this chapter theoretical and empirical aspects of global export market concentration in various countries has been presented. [15] stated that globalization is not necessarily biased towards greater concentration in international trade and investment flows and empirical evidence at the world level tends to show the opposite. The term marginalization was often associated to the claim that globalization benefits only a small number of countries and that this leads to greater marginalization of excluded countries. Marginalization is more likely to be explained by domestic policies in relatively closed countries. On the sample of 127 developed and developing countries in the period from 1976 to 1995, results of the analysis has shown that concentration of trade has fallen among open economies, whereas it has increased among closed economies. [6] based on data for 56 countries in the period from 1962-2002 unveil a number of regularities regarding export diversification: export diversification increased for most of the countries, development-export diversification nexus appears to have U-shape pattern, primary products tend to have more focused export structures than exporters of manufactures,

good macroeconomic performance stimulate export concentration, etc.

[12] explored development of export flows from Sweden during the years 1965-2000. The results of the analysis does not support the hypothesis of increasing trade globalisation, exports are becoming more concentrated to specific geographical areas that is becoming more internationally regionalised. [16] measure export concentration for goods, services and destinations through eight different export concentration measures. Export concentration exhibits a negative link with variable country size. Another relevant factor in determining export concentration is stage of economic development. Higher export concentration is measured in smaller and less developed countries. [1] investigate geographic and product diversification patterns across a group of developing nations for the period from 1990 to 2005. Key conclusions of the this paper are that geographic diversification is more important than product diversification, taking part in free trade agreements and trading with countries in the North have positive impacts on export diversification for developing countries. [22] investigate how different market concentration measures explain decisions of Mexican manufacturing firms. They use Dominance Index as a competition measure used by Mexican regulators and Herfindahl-Hirschman index as a traditional measure of market structure concentration suggesting that DI index is a better determinant than the HHI. Developing econometric analysis that uses data from last Mexican census for 182 Mexican manufacturing firms, results suggest that market concentration reduces investment, firm size and investment opportunities have a direct relationship with investment while cash flows have

an inverse one. [2] explored trends in poor-country export partner concentration using IMF's Direction of Trade Statistics database. They computed export, import and total trade concentration levels on a sample of 127 countries that reported trade data continuously for the period from 1980 to 2006. Four measures of export partner concentration were calculated: 1-CON, 3-CON, 5-CON meaning top 1, top 3 and top 5 partner concentration respectively and Herfindahl index. Results of the analysis have shown that average export partner concentration among poor countries has barely changed since 1980, and has actually risen since the mid-1990s. On the contrary, already low levels of export partner concentration in rich countries were declining. The authors see this as evidence of „bifurcation in the effects of globalisation, with rich countries 'globalising' while poor countries are 'globalised' by others“.

[8] explored the evolution of export diversification patterns along the economic development path using database with 156 countries over 19 years. They looked for a new product introduction as an indicator of “export-entrepreneurship founding a hump-shaped pattern of export diversification consistent with the conjecture that countries travel across diversification cones. First observation is that diversification occurs mostly at the extensive margin and the second observation is that middle to high levels diversification of income reflects a slow adjustment process between two equilibria. [3] report seven indices of export, import, and trade partner concentration for 183 countries for which data were available in the period 1980-2008. They also analysed the impact of CUSFTA and NAFTA on Canada, Mexico and United States mutual trade. Canada and Mexico are dependent on United States as a market

for their exports. The implementation of these trade agreements liberalised mutual trade, Canadian and Mexican export partner concentration has rose while US import partner concentration did not change. [24] carried out empirical analysis on export concentration in Bangladesh. Export diversification has a positive effect on export performance and economic growth reducing vulnerability in export performance. [19] examines the determinants of export performance of landlocked developing countries using standard gravity modelling framework. Results indicate that overall export performance of landlocked developing countries is poorer than that of other developing countries due to distance related trade costs. Landlocked developing countries should therefore improve the quality of trade-related infrastructure and logistics creating a more trade-friendly environment. [13] measure export market concentration in the oil and gas sector in Qatar. Using cross-sectional time series data from 2004 to 2013 they develop a measure of export market concentration and estimate the determinants of trade using a gravity model. Results suggest that Qatar should diversify the export market for oil and gas due to moderate concentration in the gas sector and extreme market concentration in the crude sector. [4] explore the impact of natural resources on non-resource export concentration using a variety of non-resource export concentration indices in the period from 1985 to 2010. They found that countries with high share of natural resources in exports tend to have less diversified non-resource export baskets. Another important finding is that capital intensive goods tend to have larger shares on the non-resource export basket when natural resources are high. The higher the technology scale, differentiated goods tend to make for a larger share of the non-resource export basket

while for the homogeneous goods is worth the opposite.

Data and methods

In this paper, global export market concentration is observed on the case of all countries of the World from 1948 to 2016. However, it has to be emphasized that the number of countries was not the same in all observed period. The lowest number of observed countries, 142 of them, was in 1949 whereas since 2011 the highest number of countries, 218 of them, is observed. In 50% observed years the number of observed countries was 184 or less whereas in the other 50% observed years 184 or more countries were observed. In order to calculate global export market concentration, variable export given in US dollars at current prices in millions is used in the analysis. Data for the variable export are collected from the [27]. In the export value are included all goods leaving the economic territory of the observed country [26].

From wide variety of different concentration measures, it has been decided that the focus will be given to Herfindahl-Hirschman index as one of the most used concentration measure in economy [7] Herfindahl-Hirschman index is calculated by taking into account squared proportions of the observed units at chosen variable ([10]; [11]). So, Herfindahl-Hirschman index is calculated as:

$$HHI = \sum_{i=1}^N p_i^2, \tag{1}$$

where is the Herfindahl-Hirschman’s concentration index, is proportion or share of the -th unit in the total value of the observed variable. Unfortunately, Herfindahl-Hirschman index is not standardized or given in certain value interval. Therefore sometimes

conclusion about achieved concentration level by observing only unstandardized Herfindahl-Hirschman index could be misleading. If the number of observed units is taken into account, standardized Herfindahl-Hirschman index can be calculated as:

$$HHI^* = (HHI - 1/N)/(1 - 1/N), \tag{2}$$

where is the standardized Herfindahl-Hirschman’s concentration index, is the Herfindahl-Hirschman’s concentration index, is the total number of observed units. After the standardization is performed, standardized Herfindahl-Hirschman’s concentration index is bounded to interval from 0 to 1. The conclusion about achieved concentration level can be made according to standardized Herfindahl-Hirschman’s concentration index value as suggested in Table 1.

Herfindahl-Hirschman’s concentration index	Concentration level
Lower than 0.01	Perfect equality
0.01 - 0.15	Low
0.15 - 0.25	Moderate
0.25 or higher	High

Table 1. Concentration level according to standardized Herfindahl-Hirschman’s concentration index value

Except Herfindahl-Hirschman’s concentration index following concentration measures will be calculated also: concentration ratio [5] Gini’s concentration coefficient [17]; [20] Rosenbluth’s concentration index [21] and Hall-Tideman’s concentration index [9]. Those concentration measures will be used to confirm concentration level conclusion brought by

standardized Herfindahl-Hirschman's concentration index. In order to avoid misleading conclusions the standardized versions of the concentration measures will be used. Still, for the sake of comparison the values of unstandardized concentration measures versions will be provided also. The standardized concentration measures are calculated as follows:

i) standardized concentration ratio:

$$CR_r^* = \left[\left(\frac{\sum_{i=1}^r x_i}{\sum_{i=1}^N x_i} \right) - 1/N \right] / (1 - 1/N), \quad r = 1, 2, \dots, N \quad (3)$$

where CR_r^* is standardized concentration ratio for first r units with the highest value of the variable considered, $\sum_{i=1}^r x_i$ is sum of values of the observed variable for first r units, $\sum_{i=1}^N x_i$ is sum of values of the observed variable for all N units, N is the total number of observed units;

ii) standardized Gini's concentration coefficient:

$$G^* = \left[2 \cdot \frac{\sum_{i=1}^N i x_i - (N+1) \sum_{i=1}^N x_i}{\sum_{i=1}^N x_i} \right] / \left(\frac{\sum_{i=1}^N x_i}{N} \right) \cdot N / (N-1) \quad (4)$$

where G^* is standardized Gini's concentration coefficient, N is the total number of observed units, i is rank of an unit, $i = 1, 2, \dots, N$, x_i is the value of the observed variable for unit i ;

iii) standardized Rosenbluth's concentration index:

$$RI^* = \left[1 / \left(2 \cdot \sum_{i=1}^N j p_i - 1 \right) - 1/N \right] / (1 - 1/N) \quad (5)$$

where RI^* is the standardized Rosenbluth's concentration index, j is rank of an unit, $j = N, N-1, N-2, \dots, 2, 1$, p_i is proportion or share of the i -th unit in the total value of the

observed variable, N is the total number of observed units;

iv) standardized Hall-Tideman's concentration index:

$$HTI^* = \left[1 / \left(2 \cdot \sum_{i=1}^N i p_i - 1 \right) - 1/(2N-1) \right] / \left\{ (N-1) / [N \cdot (2N-1)] \right\} \quad (6)$$

where HTI^* is the standardized Hall-Tideman's concentration index, i is rank of an unit, $i = 1, 2, \dots, N-2, N-1, N$, p_i is proportion or share of the i -th unit in the total value of the observed variable, N is the total number of observed units. In order to make conclusion about achieved concentration level, at standardized concentration ratio, standardized Gini's concentration coefficient, standardized Rosenbluth's concentration index and at standardized Hall-Tideman's concentration index different limits will be used as they are used at standardized Herfindahl-Hirschman's concentration index. Here the concentration values lower than 0.25 points out that concentration level is low. If the concentration value is between 0.25 and 0.40, the conclusion about low to moderate concentration level can be brought. The concentration value between 0.40 and 0.60 shows that moderate concentration level is present whereas the concentration value between 0.60 and 0.75 suggests moderate to high concentration level. High concentration level is present if the concentration value is higher than 0.75. Global export market concentration will be first calculated by taking into account all countries of the World. Afterwards, the global export market concentration of the World will be observed by grouping countries according to their economic development level. Here three economic development levels are defined: developing, transition and developed countries.

Furthermore, global export market concentration levels will be estimated for developing, transition and developed countries separately also. Those analyses will be used to inspect the first research hypothesis in which global export market concentration decreasing trend since 1948 is assumed. In order to inspect validity of the Linder hypothesis, in which is stated that developed economies prefer trade themselves and not with the developing and transition countries, the distributions of exports among the groups of countries is observed. The share of export between these different groups of countries is observed in period from 1995 to 2016. However, before performing any concentration level analysis, descriptive statistics analysis will be made. By using descriptive statistics approach countries with the highest and the lowest export value will be emphasized. Furthermore, the discrepancy between these countries will be observed. The differences in export values between developed, transition and developing countries will be observed also.

Analysis and discussion

In section 4.1. export in the countries worldwide is observed by using descriptive statistics methods. Countries are observed according to their geographical position, economic development level and individually. In section 4.2. global export market concentration in period from 1948 to 2016 is inspected. Different concentration measures are used but emphasis was given to Herfindahl-Hirschman's concentration indices. Here countries are observed individually, according to their economic development level and individually in each economic development level country group. In section 4.3. shares of export trade between developing, transitions and developed countries are analysed.

Descriptive statistics of export in the World

In this section, the export of countries is observed from 1948 to 2016. In Figure 1 export of countries grouped according to selected regions is shown.

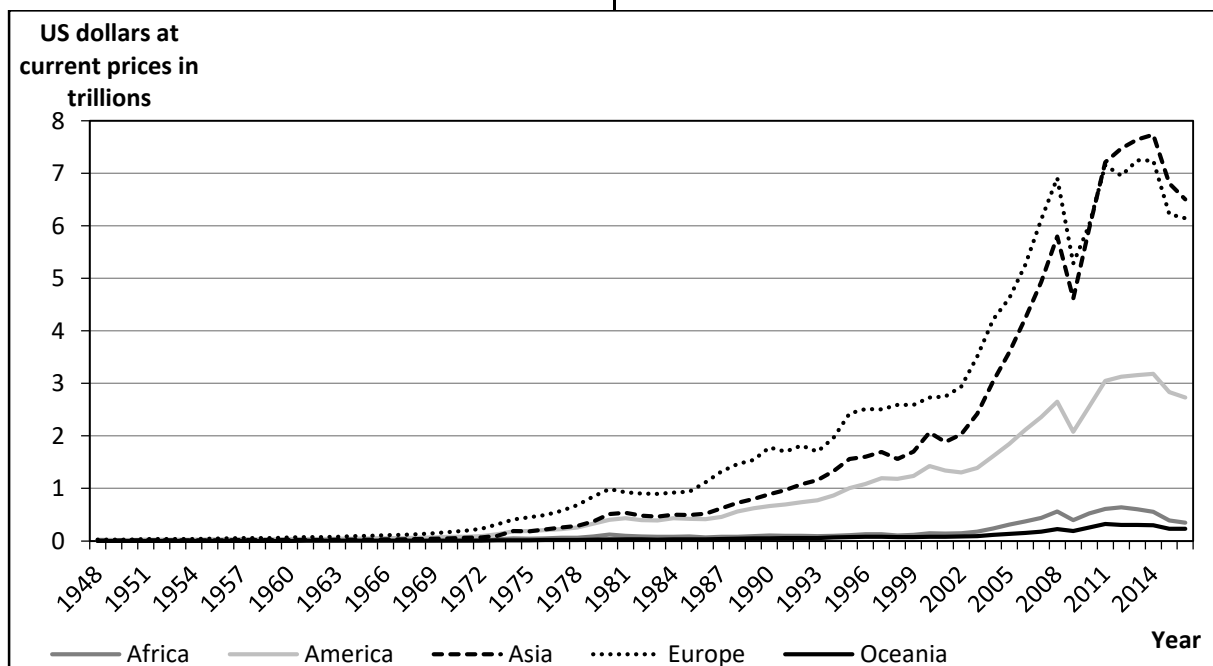


Figure 1. Export of countries, in US dollars at current prices in trillions, countries according to selected geographical regions

According to Figure 1 it can be concluded that the World export levels were relatively low until the beginning of 1970s. In 1970s export started to rise and at the beginning of 2000s the rise became very large. However, that seems to be true only for countries from Europe and Asia. Countries from Africa and Oceania did not show so large increase in export values as countries from Europe and Asia. Consequently, the difference in export values

between those groups of countries is remarkable. In recent period countries from Europe and Asia have about 25 times larger export value than countries from Africa and Oceania. Somewhere in the middle of those two distanced groups of countries are placed countries from America which are mainly lead by the United States of America

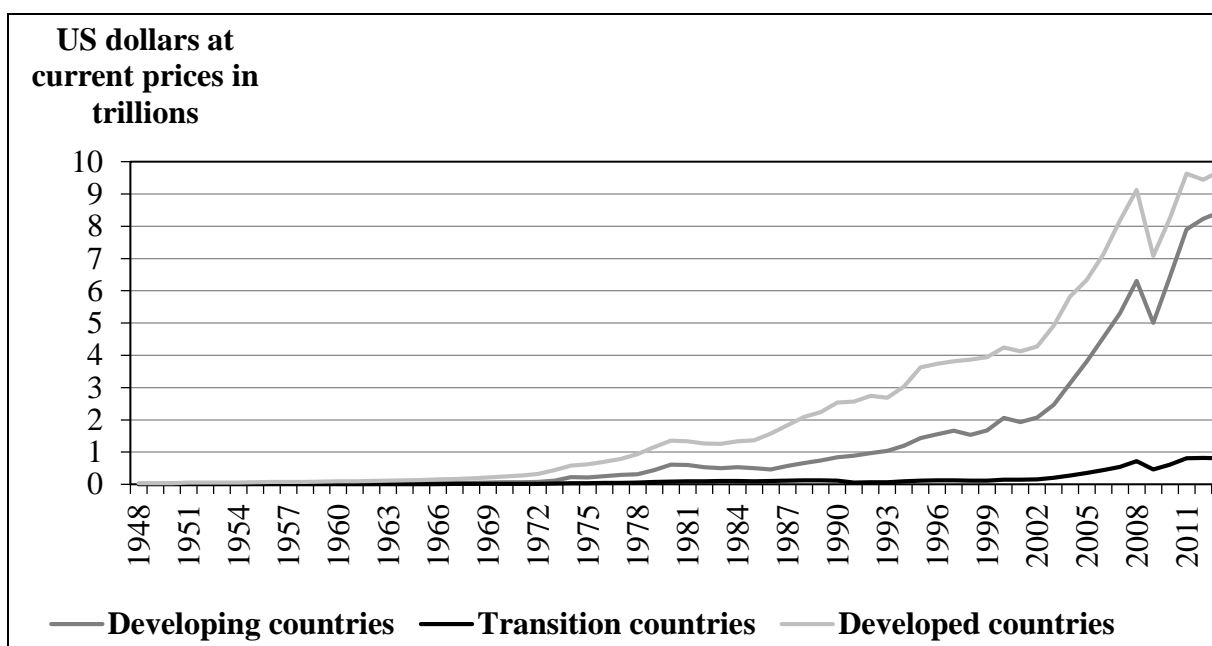


Figure 2. Export of countries, in US dollars at current prices in trillions, countries according to their economic development level

In Figure 2 export of countries grouped according to their economic development level are observed. Again, the rise in export values are present since the beginning of the 1970s. In the whole observed period developed countries tend to have higher export value than developing countries. The difference in export values between the developed and developing countries does not seem to be very large. However, it has to be emphasized that overall there are 169 developing countries whereas only 48

countries are considered to be developed. Similar, only 20 countries can be found in the group of transition countries and that is one of the reasons why transition countries have so small export value in compare to developed and developing countries. In order to get better insight into the difference in export values between countries with different economic development level, in Figure 3 average export value per country in the observed groups of countries are shown.

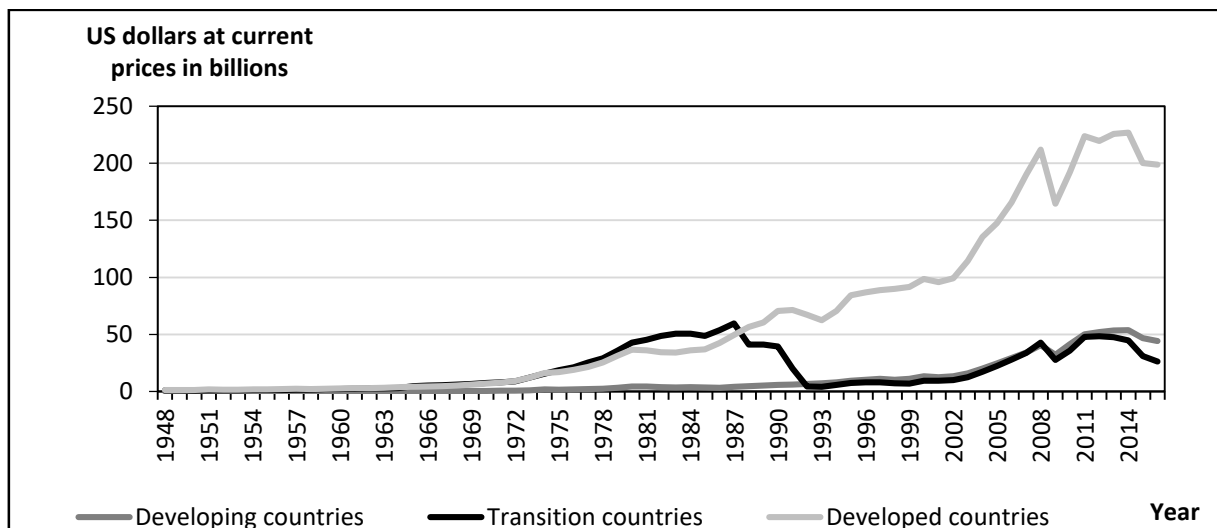


Figure 3. Average export value per included country in the group, in US dollars at current prices in billions, countries according to their economic development level

Figure 3 reveals that transition countries had the highest export value per country included in the group in period from the middle of 1970s to the middle of 1980s. At the beginning of 1990s transition countries had very steep decrease in average export value per country. That can be attributed to the shift from the centrally planned to market system and structural changes in the transition

economies' exports. So, since the beginning of 1990s transition and developing countries seem to have very similar average export values per country included in one of those two groups. On the other hand, developed countries have much larger average export value than both, transition and developing countries.

Statistics	Year								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
N	144	168	170	171	184	186	213	216	218
Mean	406	366	764	1,857	11,142	18,794	30,293	70,843	73,195
Std. Deviation	1,245	1,015	2,139	5,290	29,651	55,472	88,774	193,494	220,368
Coeff. of Var.	306	277	280	285	266	295	293	273	301
1st Quart.	11	6	13	34	117	147	267	431	446
Median	63	54	91	203	930	1,075	1,723	4,858	4,559
3rd Quart.	362	329	587	1,223	8,304	10,079	12,279	49,536	33,062
Range	12,652	9,993	19,626	43,224	225,566	421,100	781,918	1,577,754	2,098,161
Minimum	1.00	0.20	0.47	0.90	0.00	0.05	0.01	0.02	0.10
Maximum	12,653	9,993	19,626	43,225	225,566	421,100	781,918	1,577,754	2,098,161

Table 2. Basic descriptive statistics results, export values in countries of the World, given in US dollars at current prices in millions, in selected years

In Table 2 basic descriptive statistics results in selected nine years are given. Large coefficients of variation in all given years point out that there are large differences between countries regarding their export value. The same conclusion can be brought if the range, defined as difference between the highest and the lowest export value, is observed. Furthermore, if median and mean values are observed it can be concluded that the

distributions of export are positively skewed. In Figure 4 are shown countries which have the largest export values in the observed period in comparison to the other countries. In order to do the comparison, standardized values or z-scores are shown. So, in Figure 4 are shown countries which had export value above three standard deviations from the average of countries' export values in particular years.

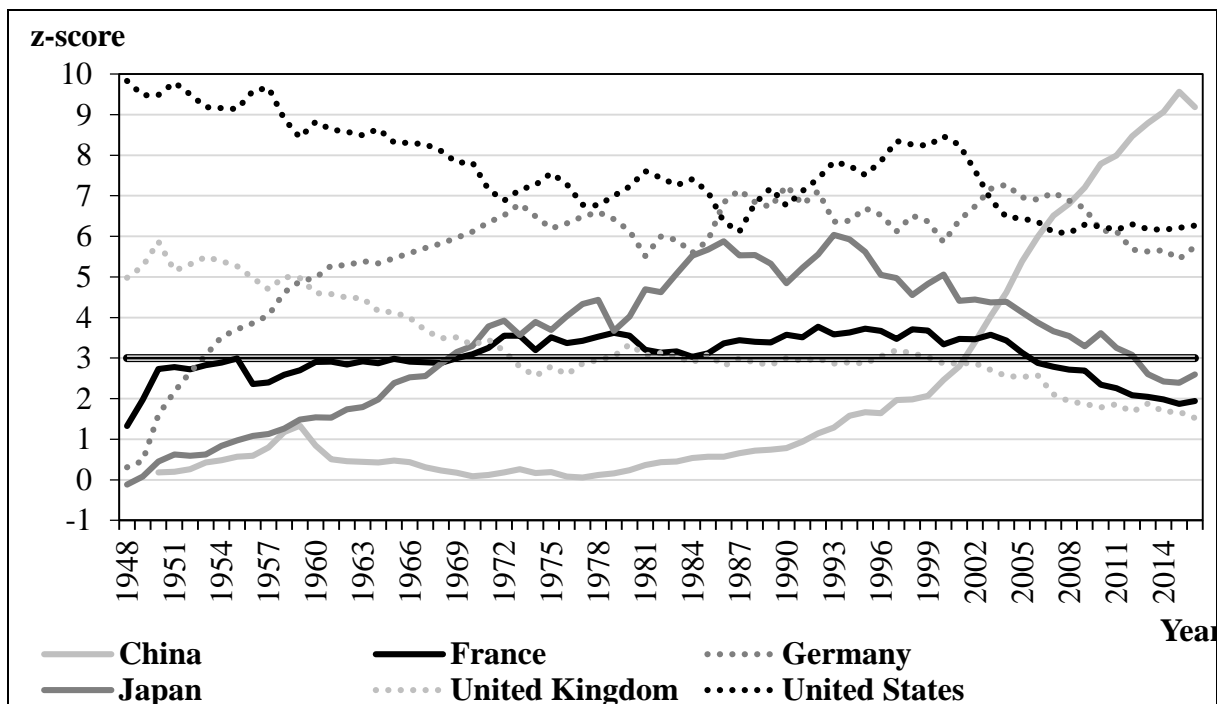


Figure 4. Countries with the highest export values, standardized values (z-scores)

Figure 4 reveals that the United States of America in the whole observed period had export value well above the export averages. Furthermore, in periods from 1948 to 1985, in 1989 and from 1991 to 2002 the United States of America had the highest export value in compare to all other countries of the World. Since the beginning of 1970s Germany had similar export values as the United States of America. In some years Germany had export value higher than the United States of America. Since 2007 China had the highest export value in the World. According to the export value, Japan

managed to be placed on the third position from the beginning of 1970s to the beginning of 2000s. Since then the relative position of Japan, considering the export, is decreasing. On the other hand, the impact of export value of the United Kingdom is slowly decreasing since the beginning of the observed period. As opposite to Japan and the United Kingdom, France managed to have relatively stable export value impact in the whole period. So, in the observed period export value of France was always around three standard deviations above the average export value. The

conducted descriptive analyses have shown that certain inequalities in export values between countries are present. The inequalities are present no matter countries are compared individually or as group of countries. The concentration analyses, which will be shown in the following sections, should measure achieved inequality or concentration levels regards export values precisely and they should show if the concentration level tends to decrease or not.

Analysis of global export market concentration in period from 1948 to 2016

In order to inspect whether global export market concentration has globally decreased or not in the period after 1948, in the first step global export market concentration will be measured by taking into account export value of each country separately. Afterwards, the countries will be placed in groups of developing, transition and developed countries and the global export market concentration structure will be observed by taking

into account those three groups. Finally, global export market concentration will be observed by inspecting achieved export market concentration levels in developing, transition and developed countries separately. In that case, concentration measures will be calculated by taking into account countries from certain group of countries. In Figure 5 both, unstandardized and standardized, Herfindahl-Hirschman's concentration indices are given. The Herfindahl-Hirschman's concentration indices are used to measure global export market concentration in period from 1948 to 2016. It has to be emphasized that the number of countries, which were taken into account when Herfindahl-Hirschman's concentration index was calculated, varied in the observed period ranging from 142 to 218 countries. The number of observed countries can be considered as large. Consequently, there are no great differences in values of unstandardized Herfindahl-Hirschman's concentration index and standardized Herfindahl-Hirschman's concentration index.

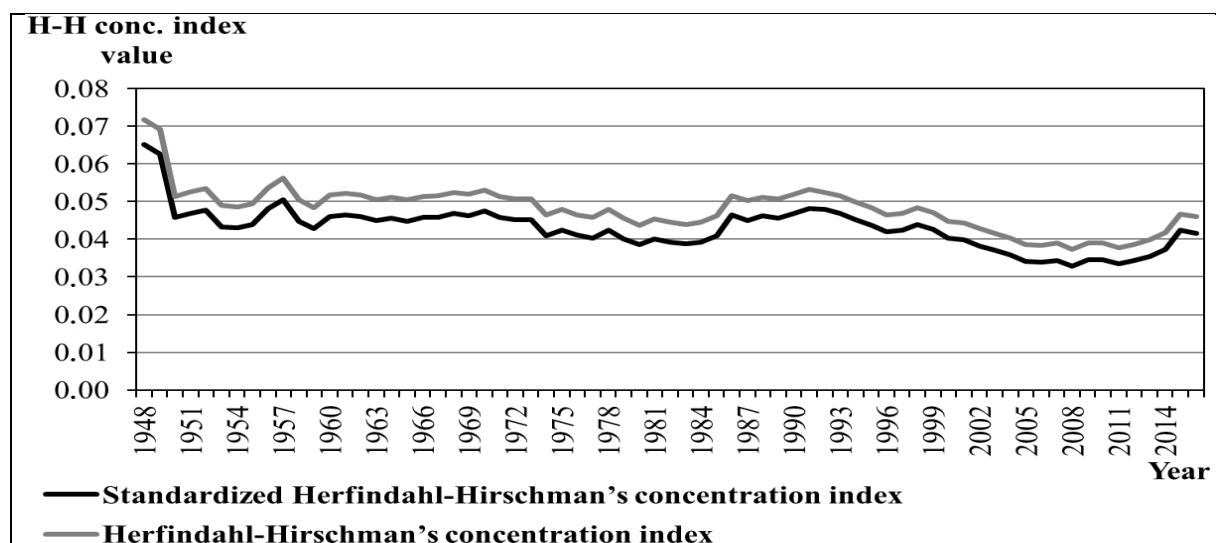


Figure 5. Herfindahl-Hirschman's concentration indices, calculated by observing countries individually

According to Figure 5, lines of unstandardized Herfindahl-Hirschman's concentration index and standardized Herfindahl-Hirschman's concentration index are almost one top of another. Furthermore, both Herfindahl-Hirschman's concentration indices show that there is present low concentration level in the whole observed period. After the drop of 0.02 points in the first observed years, the Herfindahl-Hirschman's concentration indices were almost the same until the beginning of 1990s when global export

concentration levels appear to decrease. Due to the economic crisis global export concentration seems to rise from the beginning of 2010s. However, despite the recent changes in global export concentration levels, it can be concluded that the global export concentration level is lower now than it was at beginning of the observed period. This conclusion is supported by majority of other observed concentration measures, which are given in Table 3, also.

Concentration measures	Years								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
Number of countries	144	168	170	171	184	186	213	216	218
Unstandardized									
Concentration ratio 1	0.216	0.163	0.151	0.136	0.110	0.120	0.121	0.103	0.131
Concentration ratio 2	0.329	0.265	0.239	0.244	0.204	0.233	0.206	0.187	0.223
Concentration ratio 4	0.419	0.365	0.375	0.366	0.325	0.377	0.331	0.319	0.347
Concentration ratio 10	0.568	0.529	0.586	0.637	0.581	0.617	0.562	0.505	0.532
Gini's	0.785	0.798	0.817	0.828	0.828	0.859	0.862	0.842	0.855
Herfindahl-Hirschman's	0.072	0.051	0.052	0.053	0.044	0.052	0.045	0.039	0.046
Rosenbluth's	0.032	0.030	0.032	0.034	0.032	0.038	0.034	0.029	0.032
Hall-Tideman's	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002
Standardized									
Standardized conc. ratio 1	0.211	0.157	0.146	0.131	0.105	0.116	0.117	0.099	0.127
Standardized conc. ratio 2	0.324	0.261	0.235	0.239	0.200	0.229	0.203	0.183	0.219
Standardized conc. ratio 4	0.415	0.362	0.371	0.362	0.321	0.374	0.328	0.316	0.344
Standardized conc. ratio 10	0.565	0.526	0.584	0.634	0.579	0.615	0.560	0.502	0.530
Standardized Gini's	0.791	0.803	0.822	0.833	0.833	0.863	0.866	0.846	0.859
Stan. Herfindahl-Hirschman's	0.065	0.046	0.046	0.047	0.038	0.047	0.040	0.035	0.042
Stan. Rosenbluth's	0.026	0.024	0.026	0.028	0.026	0.033	0.029	0.025	0.027
Stan. Hall-Tideman's	0.117	0.109	0.098	0.091	0.091	0.074	0.072	0.084	0.076

Table 3. Global export concentration, selected unstandardized and standardized concentration measures, calculated by observing countries individually, in selected years

In order to observe global export concentration level from other perspective, in the following analysis countries were not observed separately but they were placed into the three groups of countries. So, the countries were placed in the group of developing, transition or developed countries. Because only three values of export were taken into account in each observed year, larger differences between unstandardized and standardized concentration measures values are expected.

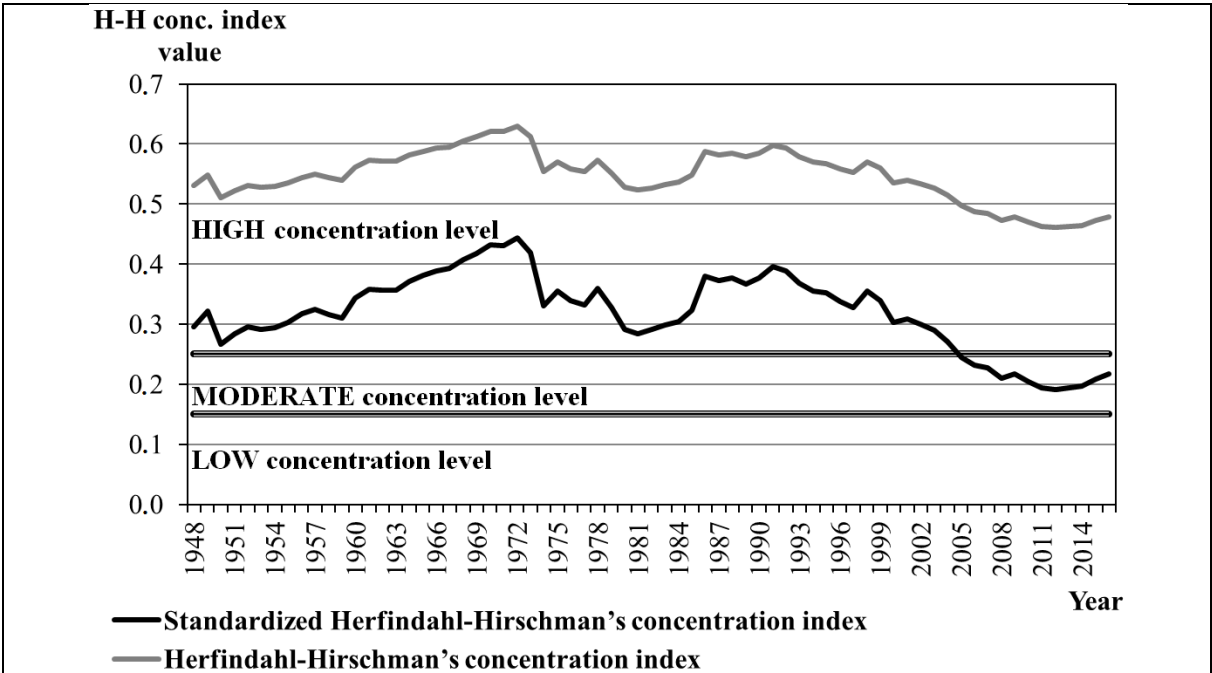


Figure 6. Herfindahl-Hirschman's concentration indices, calculated by observing countries as groups of developing, transition and developed countries

In Figure 6, unstandardized Herfindahl-Hirschman's concentration index and standardized Herfindahl-Hirschman's concentration index lines are shown. Because only three groups of countries are observed the differences between them are significant. According to unstandardized Herfindahl-Hirschman's concentration index it could be concluded that global export concentration level between three groups of countries was high in the whole observed period. However, unstandardized Herfindahl-Hirschman's concentration index does not take into account the number of units. Consequently, the conclusions brought by observing only unstandardized Herfindahl-Hirschman's concentration index could be

misleading. Instead, more appropriate is to bring conclusions about achieved concentration levels by observing standardized Herfindahl-Hirschman's concentration index. According to standardized Herfindahl-Hirschman's concentration index global export concentration level was high until 2004 whereas since 2005 standardized Herfindahl-Hirschman's concentration index was below 0.25, but above 0.15, meaning that global export concentration level is moderate. It seems that global export concentration level was increasing almost perfect linear in period from 1950 to 1972. In the 1972 the highest value of standardized Herfindahl-Hirschman's concentration index (0.4437) was reached. However, the value of standardized Herfindahl-Hirschman's concentration index was

considerably decreased to value of 0.2847 in 1981. After 1991 global export concentration level seems to have negative linear trend. Again, despite the increase of global export concentration level in the recent years, it can be concluded that global export

concentration level decreased in the observed period. Most of other observed concentration, given in Table 4, measured confirmed that global export concentration level decreased in the period from 1948 to 2016.

Concentration measures	Years								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
Number of groups	3	3	3	3	3	3	3	3	3
Unstandardized									
Concentration ratio 1	0.655	0.628	0.707	0.763	0.662	0.725	0.658	0.539	0.536
Concentration ratio 2	0.973	0.968	0.953	0.954	0.958	0.966	0.977	0.960	0.972
Gini's	0.418	0.398	0.440	0.479	0.413	0.461	0.423	0.333	0.338
Herfindahl-Hirschman's	0.531	0.511	0.562	0.621	0.527	0.585	0.535	0.470	0.478
Rosenbluth's	0.573	0.553	0.595	0.639	0.568	0.618	0.578	0.500	0.504
Hall-Tideman's	0.235	0.238	0.232	0.225	0.236	0.228	0.234	0.250	0.249
Standardized									
Standardized conc. ratio 1	0.482	0.442	0.560	0.645	0.492	0.587	0.486	0.309	0.303
Standardized conc. ratio 2	0.959	0.953	0.929	0.932	0.937	0.949	0.965	0.940	0.958
Standardized Gini's	0.628	0.597	0.659	0.718	0.620	0.691	0.634	0.500	0.508
Stan. Herfindahl-Hirschman's	0.296	0.267	0.343	0.432	0.291	0.377	0.302	0.204	0.217
Stan. Rosenbluth's	0.360	0.330	0.392	0.459	0.352	0.427	0.366	0.250	0.256
Stan. Hall-Tideman's	0.262	0.289	0.237	0.191	0.269	0.211	0.257	0.375	0.368

Table 4. Global export concentration, selected unstandardized and standardized concentration measures, calculated by observing countries as groups of developing, transition and developed countries, in selected years

In the following analysis export concentration level will be inspecting by observing countries in each group separately. Therefore in Figure 7 development of standardized Herfindahl-Hirschman's concentration index for developed, transition and developing countries in period from 1948 to 2016 is shown. The values of selected concentration measures are provided in Table 5 for developing countries, in Table 6 for transition countries and in Table 7 for developed countries.

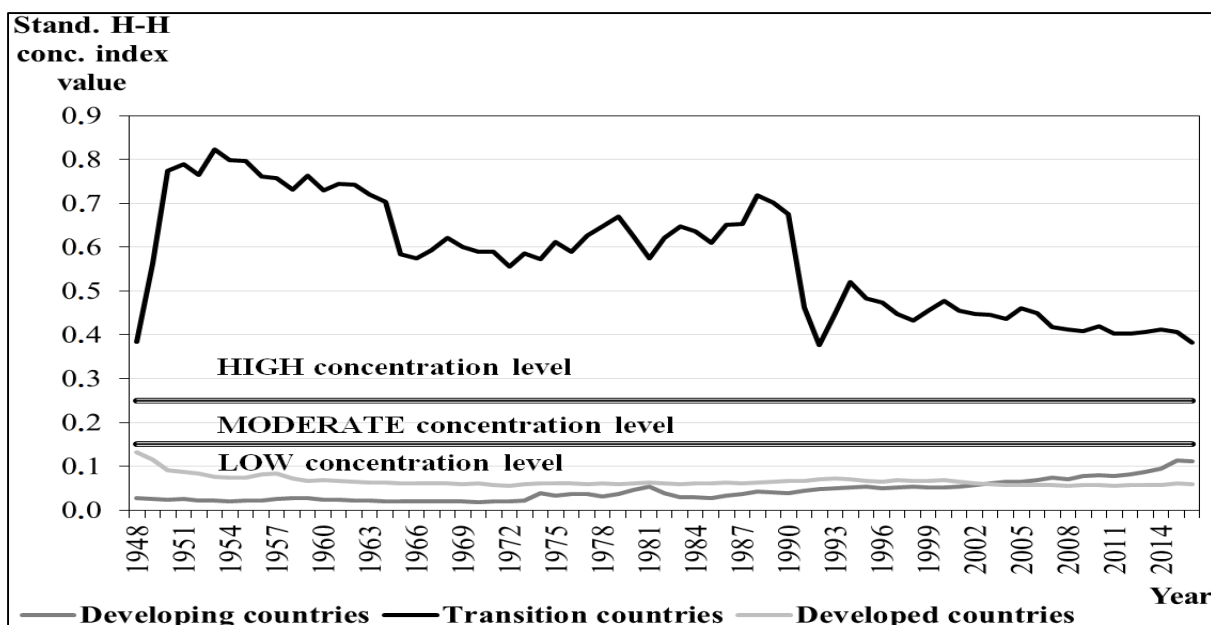


Figure 7. Standardized Herfindahl-Hirschman's concentration index, calculated by observing countries as groups of developing, transition and developed countries individually

If standardized Herfindahl-Hirschman's concentration index values for developing countries are observed, it can be concluded that all values are lower than 0.15 which suggest that export concentration level among developing countries is low. However, Figure 7 reveals that standardized Herfindahl-Hirschman's concentration index for developing countries

exhibits positive trend. In other words, it seems that export concentration level among developing countries is increasing. All observed standardized measures, except Hall-Tideman's concentration index, which are given in Table 5, confirmed that export concentration level at developing countries is becoming higher.

Concentration measures	Years								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
Number of countries	108	132	132	133	145	147	154	156	158
Unstandardized									
Concentration ratio 1	0.088	0.066	0.081	0.055	0.179	0.098	0.121	0.245	0.301
Concentration ratio 2	0.158	0.122	0.154	0.108	0.223	0.177	0.219	0.317	0.375
Concentration ratio 4	0.285	0.233	0.259	0.195	0.307	0.328	0.384	0.434	0.500
Concentration ratio 10	0.504	0.480	0.466	0.415	0.515	0.594	0.675	0.662	0.722
Gini's	0.714	0.744	0.730	0.699	0.800	0.823	0.859	0.868	0.889
Herfindahl-Hirschman's	0.036	0.032	0.032	0.026	0.053	0.046	0.057	0.086	0.116
Rosenbluth's	0.032	0.030	0.028	0.025	0.034	0.038	0.046	0.048	0.057
Hall-Tideman's	0.005	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.003

Concentration measures	Years								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
Number of countries	108	132	132	133	145	147	154	156	158
Standardized									
Standardized conc. ratio 1	0.079	0.058	0.074	0.048	0.174	0.092	0.115	0.240	0.297
Standardized conc. ratio 2	0.150	0.116	0.148	0.101	0.217	0.172	0.214	0.313	0.371
Standardized conc. ratio 4	0.278	0.227	0.254	0.189	0.302	0.324	0.380	0.431	0.497
Standardized conc. ratio 10	0.499	0.476	0.462	0.410	0.511	0.592	0.673	0.660	0.720
Standardized Gini's	0.721	0.750	0.736	0.705	0.805	0.829	0.865	0.873	0.895
Stan. Herfindahl-Hirschman's	0.027	0.024	0.025	0.019	0.047	0.039	0.051	0.080	0.111
Stan. Rosenbluth's	0.023	0.022	0.021	0.018	0.028	0.032	0.040	0.042	0.051
Stan. Hall-Tideman's	0.163	0.143	0.153	0.174	0.108	0.094	0.073	0.068	0.056

Table 5. Global export concentration, selected unstandardized and standardized concentration measures, calculated by observing countries in groups of developing countries, in selected years

In compare to developing and developed countries, transition countries seem to have convincingly the highest export concentration level. One reason for this situation can be found in the fact that in the group of transition countries relatively small number of countries can be found. That is especially expressed between 1950 and 1990. Consequently, only the concentration measure values for period after 1990 should be observed. According to Figure7, after 1990 standardized Herfindahl-Hirschman's concentration index can be found between 0.3764 (in 1992) and 0.5194 (in 1994). Furthermore, it seems that the standardized

Herfindahl-Hirschman's concentration index shows negative trend since 1994. In the most recent year, in 2016 standardized Herfindahl-Hirschman's concentration index had value of 0.3826 what is very close to the minimum value achieved in 1992. The detected negative trend of standardized Herfindahl-Hirschman's concentration index and results from Table 6 lead to the conclusions that export concentration level among transition is being decreased. However, it has to be kept on mind that in all observed period export concentration level among transition countries is considered to be high.

Concentration measures	Years								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
Number of countries	2	3	3	2	2	3	16	17	17
Unstandardized									
Concentration ratio 1	0.810	0.918	0.900	0.884	0.895	0.877	0.702	0.658	0.632
Concentration ratio 2	1.000	0.997	0.992	1.000	1.000	0.998	0.800	0.756	0.715
Concentration ratio 4	-	-	-	-	-	-	0.908	0.884	0.848
Concentration ratio 10	-	-	-	-	-	-	0.982	0.985	0.976
Gini's	0.310	0.610	0.595	0.384	0.395	0.583	0.810	0.808	0.771
Herfindahl-Hirschman's	0.692	0.849	0.819	0.795	0.812	0.784	0.510	0.454	0.419
Rosenbluth's	0.725	0.855	0.823	0.812	0.826	0.800	0.330	0.307	0.256
Hall-Tideman's	0.382	0.207	0.209	0.361	0.358	0.211	0.035	0.033	0.033
Standardized									
Standardized conc. ratio 1	0.620	0.877	0.851	0.768	0.790	0.816	0.682	0.636	0.609
Standardized conc. ratio 2	1.000	0.995	0.988	1.000	1.000	0.997	0.786	0.741	0.697
Standardized conc. ratio 4	-	-	-	-	-	-	0.901	0.877	0.839
Standardized conc. ratio 10	-	-	-	-	-	-	0.981	0.984	0.974
Standardized Gini's	0.620	0.915	0.893	0.768	0.790	0.875	0.864	0.859	0.819
Stan. Herfindahl-Hirschman's	0.384	0.774	0.729	0.590	0.624	0.676	0.477	0.420	0.383
Stan. Rosenbluth's	0.449	0.782	0.735	0.623	0.653	0.700	0.285	0.263	0.210
Stan. Hall-Tideman's	0.290	0.053	0.067	0.168	0.151	0.079	0.075	0.078	0.102

Table 6. Global export concentration, selected unstandardized and standardized concentration measures, calculated by observing countries in groups of transition countries, in selected years

According to Figure 7 standardized Herfindahl-Hirschman's concentration index is below 0.15 in the observed period meaning that export concentration level among developed countries is low. As opposite to the detected positive trend at developing countries, Figure 7 shows that values of

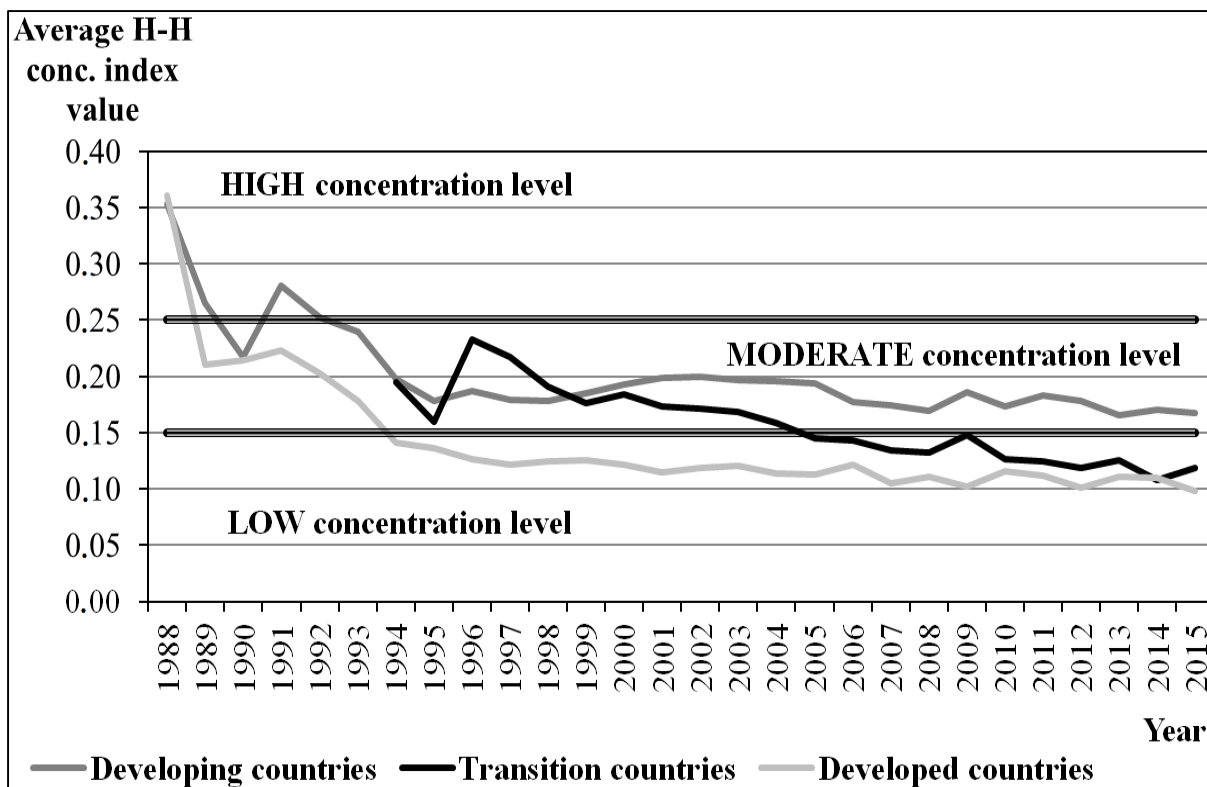
standardized Herfindahl-Hirschman's concentration index are slowly decreasing in the observed period. It can be concluded that export concentration level among developed countries is falling. Standardized measures from Table 7 confirmed this conclusion.

Concentration measures	Years								
	1948	1950	1960	1970	1980	1990	2000	2010	2016
Number of countries	34	33	35	36	37	36	43	43	43
Unstandardized									
Concentration ratio 1	0.330	0.257	0.213	0.178	0.166	0.166	0.184	0.155	0.170
Concentration ratio 2	0.502	0.420	0.337	0.319	0.308	0.321	0.314	0.307	0.327
Concentration ratio 4	0.639	0.579	0.528	0.478	0.491	0.521	0.504	0.470	0.469
Concentration ratio 10	0.834	0.816	0.794	0.808	0.812	0.835	0.819	0.765	0.757
Gini's	0.720	0.679	0.662	0.660	0.672	0.693	0.726	0.687	0.685
Herfindahl-Hirschman's	0.157	0.118	0.095	0.086	0.086	0.092	0.089	0.079	0.082
Rosenbluth's	0.105	0.094	0.085	0.082	0.082	0.091	0.085	0.074	0.074
Hall-Tideman's	0.017	0.018	0.017	0.017	0.016	0.016	0.013	0.014	0.014
Standardized									
Standardized conc. ratio 1	0.309	0.234	0.190	0.155	0.143	0.142	0.165	0.135	0.150
Standardized conc. ratio 2	0.487	0.402	0.318	0.299	0.289	0.302	0.298	0.291	0.311
Standardized conc. ratio 4	0.628	0.566	0.514	0.464	0.476	0.507	0.492	0.458	0.456
Standardized conc. ratio 10	0.829	0.811	0.788	0.802	0.807	0.830	0.815	0.760	0.751
Standardized Gini's	0.742	0.700	0.681	0.679	0.690	0.713	0.743	0.703	0.702
Stan. Herfindahl-Hirschman's	0.131	0.090	0.069	0.060	0.061	0.066	0.068	0.058	0.060
Stan. Rosenbluth's	0.078	0.066	0.058	0.055	0.057	0.065	0.063	0.052	0.052
Stan. Hall-Tideman's	0.150	0.178	0.192	0.194	0.185	0.169	0.149	0.176	0.177

Table 7. Global export concentration, selected unstandardized and standardized concentration measures, calculated by observing countries in groups of developed countries, in selected years

In Figure 8 average values of Herfindahl-Hirschman's concentration index for each of three observed groups of countries in period from 1988 (for transition countries from 1994) to 2015 is shown. The values of Herfindahl-Hirschman's concentration index have been calculated by taking into account export products values of each country individually (World Bank, 2017). In the next step, all Herfindahl-Hirschman's concentration index values of countries from the same group have

summed up and divided by the number of countries in that group. Figure 8 shows that developed countries reached low concentration level in 1994 and transition countries in 2005. On the other side, developing countries seems to have moderate concentration level. However, it can be concluded that in all three groups of countries export concentration level is lower than at the beginning of the observed period.



Source: World Bank (2017).

Figure 8. Average Herfindahl-Hirschman's concentration index, calculated by observing countries as groups of developing, transition and developed countries individually

Results of the analysis indicate that the first hypothesis of the paper can be accepted. There is present low global export concentration level in the whole observed period when looking countries individually. Also, it can be concluded that the global export concentration level is lower now than it was at beginning of the observed period. When looking countries as groups, transition countries experience higher concentration levels or inequality while developing and developed countries have similar lower levels of concentration index. Furthermore, concentration index for developing countries exhibits positive trend.

Analysis of shares of export trade between developing, transitions and developed countries

In order to inspect whether developed countries prefer to trade among them and not with the developing and transition countries and to test the second hypothesis of the paper, countries will be observed as groups of developing, transitions and developed countries. Focus is given to analysis of export trade shares. Namely, each group of countries has achieved certain total export value which has been calculated as sum of export values of all countries in the observed group. However, that export value is a result of trading with countries from other two groups but with countries in the same group also. In Figure 9 share of export trade between countries in the same group in period from 1995 to 2016 is given.

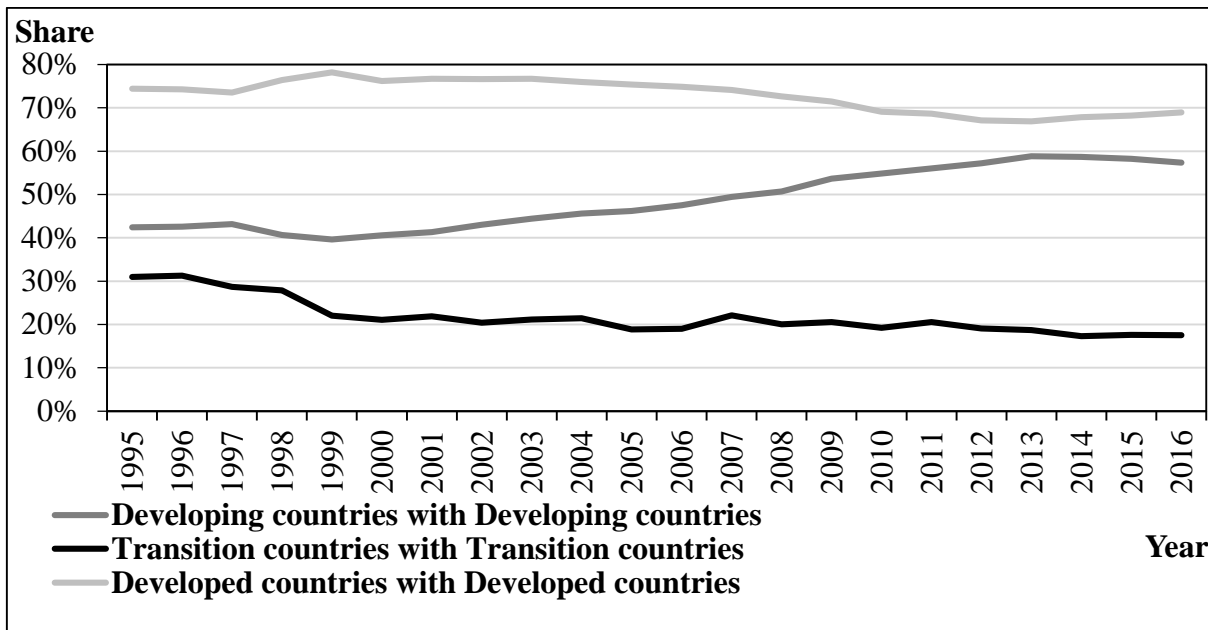


Figure 9. Share of export trade between countries in the same group, in percentages, in period from 1995 to 2016

According to Figure 9 developed countries had the highest share of export which is a result of trading between countries in the same group. So, it can be concluded that about 70% of export value of developed countries is achieved between countries which belong in that group. On the other side, transition countries have the lowest share of export value which is a result of trading between

countries in the same group. At the beginning of the observed period, the share of export trade between transition countries was about 30% whereas since 1999 it is about 20%. Developing countries have increased share of export trade achieved between them from 42% in 1995 to 57% in 2016.

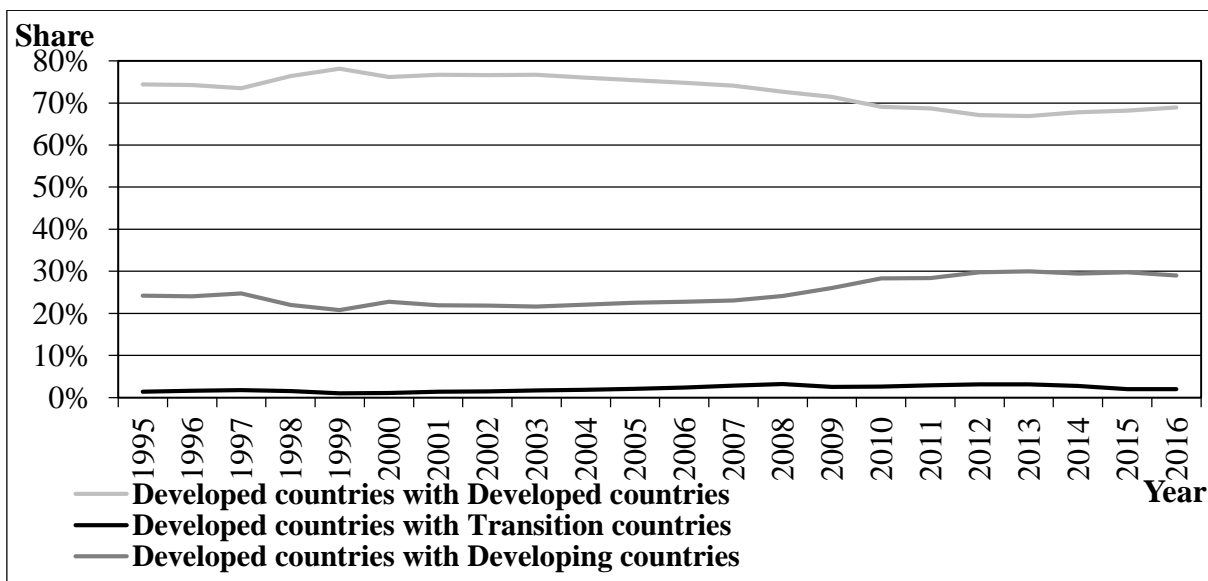


Figure 10. Share of export trade between developed countries and other group of countries, in percentages, in period from 1995 to 2016

In Figure 10 share of export trade between developed countries and other groups of countries is observed. It can be seen that developed countries trade relatively more with developed countries in regard to developing and transition countries. The result is expected because developed countries have the highest share of export trade so it is assumed that they will trade

relatively more with countries of the same group. In order to test the second hypothesis of the paper, that developed countries prefer to trade themselves, the difference between relative shares of export trade for developed countries in total trade and shares of mutual trade between developed countries will be calculated and explained presented in Figure 11.

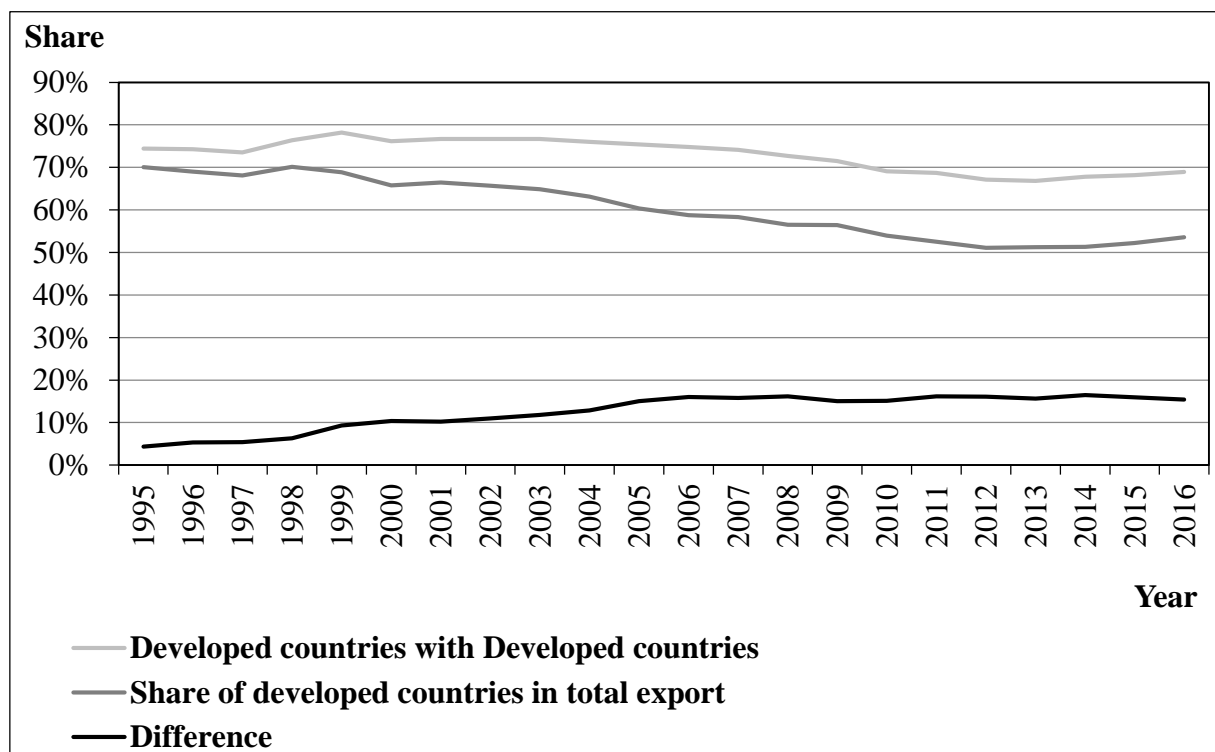


Figure 11. Share of export trade between developed countries and share of developed countries in total export value, in percentages, in period from 1995 to 2016

From Figure 11 it can be seen that mutual trade between developed countries exceeds share of trade of developed countries in total export trade for all years in the observed period. That difference is actually widening from the first year 1995. So, second hypothesis of the paper that developed countries prefer trade themselves and not with the developing and transition countries can be accepted.

Conclusion

The aim of the paper was to investigate and calculate global concentration level of merchandise exports for all countries of the World classified in three groups according to their level of economic development using various concentration measures in the period from 1948 to 2016. The emphasis was given to standardized Herfindahl-Hirschman index as the basic measure

of trade concentration but other concentration measures were also used in the analysis like concentration ratio, Gini concentration coefficient, Rosenbluth's concentration index and Hall-Tideman's concentration index. This is significant because global trade structure has changed significantly since the trade liberalisation started after the Second World War. The importance of paper is analysis of global trade structure using various concentration measures, which is concept that has not used much in the previous researches in this field. Main strength of the methodology used is an explanation of inequality and changes in global trade structure. After descriptive statistics, countries were observed individually and according to their geographical position and economic development level. Two research hypotheses were tested. The results of the analysis indicate that first hypothesis of the paper that global export market concentration has globally decreased in the period after 1948 can be accepted. Global export concentration level is now lower than it was at the beginning of the observed period. Transition countries experience higher concentration levels in regard to developing and developed countries which have similar lower levels of concentration indexes. Second hypothesis of the paper which states that developed economies prefer to trade themselves can also be confirmed. In order to test second hypothesis of the paper difference between relative shares of export trade for developed countries in total trade and shares of mutual trade between developed countries was calculated and observed. The results show that this difference is actually widening pointing out to the conclusion that developed economies prefer mutual trade with

countries of the similar economic development level. Limitations of research are related to low number of countries in some samples, especially for transition countries, and therefore uneven pattern of countries. Also, data for mutual trade between groups of countries were available only for period after year 1994. Recommendations for future research can go in the way of analysing merchandise imports and total trade and not only merchandise exports. Furthermore, it would be interesting to investigate and measure market concentration levels for various regional economic integrations intended to promote intra-regional and global trade.

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