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Can the Rise of (Re-)Emerging Powers Challenge
the International Trading System?

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Abstract / Keywords

BRICS, Cluster Analysis, Global Trade, (Re-)Emerging Powers, WTO

This paper analyzes global trading clusters to break down the effects of the BRICS economic rise for the WTO. Without doubt the BRICS dominate their regions in economic and trade figures as well as compete with - and in the case of China overtake - the G7-states on the global level. The respective literature discusses the BRICS mostly as a challenge for an US/EU-dominated world order. These power shifts also have important implications for international institutions. Here the literature discusses mainly the current establishment of alternative institution by non-western states.

But what remains uncertain are the consequences of the BRICS-rising for trade structures, global interdependences and the WTO? Few other field are stronger regulated on the global level than trade. On the basis of cluster analysis this paper argues that - due to their trade linkages - the rise of the BRICS will not lead to major changes inside the WTO. The WTO remains for (re-) emerging powers a main institution for global trade governance, since they are so far not participating in supraregional trade agreements of the West, and therefore need the WTO as a body to balance the effects of those rather new developments in global trade.

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1 Introduction

In 2015 once again it became clear that political developments are harder to predict than expected, and that international politics are uncertain and permanently transforming. Since the early 2000s a couple of predictions have forecasted a decline of the West in relation to an emerging global rest. The BRICS¹, (re-)emerging powers or the 'Global South' would overtake the US/EU economies, or at least close the lines between them. The world was expected to get more complex, multipolar, and global; with new challenges for international institutions.

The world became indeed more complex in 2015, but in a slightly different way than expected. Of the BRICS only China has jumped up the ranks and competes with the US economy today. But just as the other BRICS, China faces huge political challenges and an economic slowdown, which in Brazil and Russia have already turned into recession. Moreover, the United States have obtained their primary position in the global economy – due to their shale gas revolution – and have furthermore emerged as the leading oil producer on the globe. The oil price collapse in 2015 has hit some countries harder than the financial crisis in 2007/2008. Then again the conflicts in Syria and in the Ukraine have brought classical geopolitics back on the agenda, which seemed to have been overcome. Both the EU and other international institutions, such as the UN Security Council, face the problem to manage diverging interests and to address common issues.

Where is the current situation leading us? What does the emergence or the re-emergence of states such as China, Russia, Brazil, South Africa or India tell us about the future world economy, about global politics per se and, especially, about its regulating institutions? This paper looks into one specific intersection point of international relations and political economy: international trade. Global trade has always been a mirror for domestic economies and therefore shows us both current trends in the global economy and in individual countries. Chinese growth, Russian wealth and the Indian service sector are assumed to be primarily connected to their international trade relations, and only subsequently to their internal consumption, though this might be changing at the moment. Considering the economic implications for nearly all countries in our world, international trade is an important topic for global politics and international regulations. The WTO as institution and the Doha Development Agenda as its current reforming process belong, next to the United Nations and the financial Bretton-Woods Institutions, to the most important arenas of global governance. Even taking into account the current struggles and critiques, the WTO remains especially for the BRICS a cornerstone of the multilateral trading system (BRICS 2016). Also in the light of the recent attempts to form supraregional trade agreements, for the majority of countries, and particularly for (re-) emerging powers, the WTO might become a tool to balance those agreements.

¹ The Term 'BRICS' addresses the five states Brazil, Russia, India, China, and South Africa, the term '(re-) emerging powers' refers to a broader category of states in a certain process of rising (cf. chapter 2).

The main question this paper seeks to answer is where the BRICS are situated in the global trading structure and to what extent they share common trading features, which could be used for (re-)emerging power's cooperation in the regulation of international trade in the WTO.

International institutions are the main regulation mechanism for global politics. The BRICS are promoting a reform of the current international order towards a multipolar system that is not dominated by one single state or bloc (De Coning et al. 2015). But in order to come up with such an alternative system, they first need to find some kind of consensus among themselves. As Stefan Schirm puts it, the politics of leaders need the support of followers (Schirm 2010), even in a group of equals. While the recent creation of the New Development Bank shows such an approach in the area of international investment and funding – as well as Chinese leadership in the AIIB presents an even stronger alternative – in the field of international trade, it is hard to find a major project which bypasses the classical Western powers. Intra-BRICS trade is – with the exception of trade with China – extremely limited², and the supraregional trade agreements currently discussed are no projects of (re-)emerging powers though the growth of (re-)emerging powers is strongly connected to their trade relations.

In order to answer those questions, this paper is using cluster analysis in form of self-organizing Kohonen-maps to uncover the differences of the BRICS in a global trading structure. To this, the analysis is clustering all WTO member states based on several trade variables to locate the BRICS in a comparative and comprehensive scheme from which we can derive the main trade interests of those countries. The aim is not to understand the trade relations between the BRICS themselves, or between the BRICS and other states, but to get an overview about the location of the BRICS in a general global trade scheme and to deduce upcoming challenges and opportunities for BRICS-trade-cooperation, especially in the WTO. It is expected that these results will help to understand the actual interfaces of BRICS influence on institutions or certain policy fields within the debates about BRICS or (re-)emerging powers. The BRICS share the common will to cooperate with each other, but do they also share common trade interests?

The second chapter provides the theoretical embedding of the analysis and discusses in a first sub-chapter the current literature of (re-)emerging powers in a transforming world order by distinguishing between three main debates. A second sub-chapter gives an overview about the BRICS impact in international politics and in the WTO.

The main analysis follows in the third chapter. After introducing the methodology of cluster analysis in a first sub-chapter, in the subsequent second part the analysis presents different trade clusters and the distribution of the BRICS in them. The analysis is testing

² Cf. Annex 5.

155 of the 162 WTO member states³ and groups these countries into four defined clusters based on seven trade variables. The interesting finding is, that the BRICS are distributed in all four of them. The clusters show the major difference in economic development and features of trade between the BRICS, with China on one level with the Western powers and the other four with highly different trade structures.

The chapter closes with a discussion of the main findings and other possibilities to use cluster analysis. It also considers further questions on existing gaps in the literature, which could be filled with more empirical research, as well as upcoming challenges and chances in global trade for the BRICS, the WTO, and other (re-) emerging powers.

2 (Re-)Emerging Powers in a Multipolar World – Theoretical Reflections

Next to China that has risen to one of the two largest economies of our planet, there are quite a number of other states that have gained influence and voice – both in their own geographic regions and on the global level. These (re-)emerging powers, such as Brazil, China, Russia, India and others have managed to combine domestic success in developing and the upgrading of their economy with a louder voice and influential role in global governance. (Re-)emerging powers are furthermore actively seeking to increase their influence in international institutions as well as in their regional integration institutions. Multipolarity implies hereby not only a higher number of actors, but also a diffusion of traditional power centers. One important factor to perform successfully on the global level is to gain acceptance by followers, and followership depends on the inclusion of the interest of followers (cf. Schirm 2010).

This enormous change of the political and economic weight of certain states together with their huge social developments have led to a massive academic interest in various issues related to this transformation – and with this also to an obscure bulk of terms, definitions and categorizations in different academic fields (cf. Chapter 2.1). In order to get a closer understanding about the current literature, the first sub-chapter distinguishes between three main debates in International Relations, Political Economy and Area Studies. Furthermore the chapter reveals the missing inter-connection between those debates and detects gaps in current research, from which it derives the relevance of the following analysis. The second sub-chapter reflects the theoretical debates on current developments in the WTO, the Doha Development Agenda and other trends of global trade. This shows how economic growth and social developments in non-western countries have led to political aspirations of certain states, most prominently in the case of the BRICS, which are the drivers of a transforming world order. The five BRICS countries have bandwagoned on this trend and created a political alliance in form of a dialogue forum.

³ Without the EU as a whole and without Chad, Djibouti, Dem. Rep. Congo, Liechtenstein, Sierra Leone and Tajikistan due to missing data. However, these missing states are neither (re-)emerging or old powers, nor is their exclusion distorting the output.

2.1. Current Debates of (Re-)Emerging Powers in the WTO

This paper argues that the current literature on (re-)emerging powers in the WTO mostly circles around three debates, but still lacks in bringing together those strands⁴. The following three sections shortly introduce those debates. To summarize, the first debate discusses international institutions and global governance in a transforming world order and the rise of (re-)emerging powers. The second debate deals with BRICS trade policies in, and their impact on the WTO. Hereby the focus lies mostly on the BRICS as challengers or threads of the current order. And the third is the upcoming, but so far underdeveloped debate about BRICS policy coordination and cooperation. This debate analyzes at current BRICS trade policies in the WTO, but is still missing empiric research on actual BRICS policy coordination inside the institution and the Doha Development Agenda.

The related literature of the first debate discusses possible outcomes of power shifts and their consequences for global governance. (Re-)Emerging powers as a theoretical concept is linked to discussions on *regional powers*, *economic powers*, and *new powers* as well as to debates on global governance. In nearly all regions of the world, we can see emerging political coordination and economic cooperation (Katzenstein 2005; Hurrell 2007, 239). Commonly, different criteria are developed to measure regional or emerging power (cf. Osterud 1992; Schoeman 2003; Nolte 2006/2012). However, some authors also refer to different ideas to describe the current order: Either as a *uni-multipolar system* in which the USA remains the only superpower next to several other global powers (Huntington 1999, 36), as an economically *multipolar world structure* in which many powers compete about dominance (Zoellick 2010, 40), as a *G-Zero World* without any leadership (Bremmer/Roubini 2011, 2), or as an *multiplex world order* with a complex structure of actors and ideas (Acharya 2014, 653). Alastair Johnston wrote about China as a status quo power and argued that China will stick to the rules of international politics and will not challenge US leadership (Johnston 2003). Noteworthy are here the responses from Zheng Bijians, John Mearsheimers, and John Ikenberrys (Zheng 2005; Mearsheimer 2006; Ikenberry 2008). While Zheng is following Johnston in framing China as a responsible stakeholder, Mearsheimer refers to realism and the unavoidable conflict between China and the US. Ikenberry makes the important turn from looking at individual countries to the structure of global governance, when he predicts that the shifts of power will maybe change the actors, but not the liberal systems and liberal rules, established through the liberal international institutions. This discussion is today more relevant than ever, because it touches one main objective of International Relations: The balance of power.

Concerning international institutions then the debate evolved around the effects of (re-)emerging powers and power shifts. Some authors see (re-)emerging powers as challengers of the global order inside of international institutions (Schweller 2011, 290),

⁴ A similar classification of the literature was recently made by Gregory T. Chin, but is focusing on phases in the literature about BRICS in multilateral organizations.

while others argue that the impact of (re-)emerging powers on global governance is much smaller than suggested (Wade 2011, 347). There are attempts to work on 'if' and 'how' the transformative world order influences global governance. In order to understand what kind of change these power shifts bring to international institutions, it is necessary to analyze what the emerging powers really want (cf. Nel 2010; Stephen 2012). Philip Nel argues in this regard the main purpose of '*emerging powers*' is to get recognition and redistribution, which could be organized inside, but also outside of the existing institutions. The institution itself has the responsibility to balance the needs of the old as well as new powers. Matthew D. Stephen concludes that '*rising powers*' are mainly interested in the outcomes of international institutions rather than in fundamentally changing them.

For the WTO these developments are assumed to be problematic. For Soo Y. Kim the WTO is in a complicated situation due to its institutional structure. While its institutional agenda is committed to establish and develop liberal trade (Kim 2010, 2), due to its consensus principle the WTO has become a tool for (re-)emerging states to disagree and challenge the liberal agenda of western powers. Especially in 2008 the unsolvable dispute on special safeguard mechanisms for developing countries in agriculture between the USA on the one hand and India and China on the other has led to a deadlock of the WTO.

In conclusion of this first debate we can say that the literature here is mainly concerned with the decline of the liberal, western dominated world order and its institutions (cf. Ikenberry 2008). The main tenor is that (re-)emerging powers challenge and complicate international institutions and global governance. Disputes between the West and the "rest" are seen as problems, rather than as a revision of the way global governance is performed to date. The rise of non-western ideas is less examined - on the contrary the focus and concern lies on the survival of the old Bretton-Woods order. Therefore the WTO and Doha Round are seen in a deadlock, due to the current disagreements between developed and developing countries on specific issues. So far the literature does not understand such political friction points in the WTO as a necessary broadening of the current agenda as a means to integrate (re-)emerging powers.

The second debate deals with the BRICS and their role in the WTO. In the respective literature there are rarely contributions on combined BRICS policies in institutions like the WTO, but what can be found instead is a comparative focus on the single countries economic and trade policies. Many scholars seek to interpret the behavior of BRICS in international politics as well as in the international economy. For (re-)emerging powers is often assumed that their main aim is to build a coalition to challenge western dominance (cf. Friedmann 2005, Prestowitz 2005).

After Jim O'Neill's framing of the acronym 'BRIC' (O'Neill 2001, 4), an academic discussions evolved around the legitimacy of the term itself, the similarities of the BRIC(S) or other (re-)emerging powers, and on the question about who is in the grouping (cf. Nolte 2006/2012; Kappel 2010). Since then the international political landscape has changed

and actors did not only adapt the term, but most importantly the labeled countries themselves have created a political association - maybe inspired by the acronym. De Coning et al. argue that the BRICS mainly formed a political grouping because they realized a common ground on their current situation within the global order and related criticism. The authors argue that the BRICS “*share a common experience in the way that they all were negatively affected by being on the periphery of a world order dominated by the USA and its allies*” (De Coning et al. 2015, 1), and label the BRICS approach to global governance as a strategy of coexistence. Taking this vision into account, the institutional structure of the WTO should be rather suitable for the BRICS, since a veto strategy is possible.

But others disagree and some authors question a shared or common vision. For example, Steward Patrick argues that no coherent alternative to ‘*today’s Western order*’ has emerged (Patrick 2014). He points out that conflicting interests of the BRICS complicate their relations and that, while they obviously disagree with the western order, their economic and security strategies still divide them.

On the topic of BRICS in the WTO detailed work has been done by Amrita Narlikar about India’s role in the Doha Development Agenda and India as a challenging bargaining power (cf. Narlikar 2006; Hurrell & Narlikar 2006; Narlikar & Narlikar 2014). She focuses on India’s negotiation strategies and examines the domestic factor which drives the country often to be a blocking actor in international trade regimes. In recent years, several articles about Russia’s accession to the WTO have been published. Most commonly, their focus is on the economic circumstances of the accession and further implications for Russia (cf. Sutyurin et al. 2012) or for other states as the USA (cf. Cooper 2012). Also, the role of Brazil or South Africa, especially as regional powers in South-South-Cooperation but also as an important actor during the Doha Round, are discussed (cf. Mildner & Husar 2008; Nogueira 2009). These publications are exemplary for the general habit to study single countries, but to leave intra-BRICS cooperation aside. If they are discussed, many actors split up the grouping into subgroups as the BIC, IBSA or BASIC countries⁵. In this connection, Brendan Vickers also stresses the growing influence of the BIC countries in the WTO. According to him the WTO is not the ‘*rich men’s club*’ anymore, as it used to be before during the GATT rounds, but the BIC have moved ‘*the front line*’ of negotiations especially during the Doha Round (Vickers 2012, 260). Here the debate is turning towards labeling the individual countries strategies. Most common is the discussion about them as “*status quo or revisionist powers*” (Schweller 2015, 3ff). Schweller stresses that a revisionist power is a state, which does not stick to international law and the rules given in international institutions out of a position of dominance. Therefore he argues that only the United States are a truly revisionist power and the BRICS are so far followers of the system, because they still do not aim to dominate the global order or individual

⁵ Those groups have emerged in different political occasions or publications. BIC stands for Brazil, India and China (cf. Nölke et al. 2014); BASIC stands for Brazil, South Africa, India and China and has emerged as a group during the UN-Climate Conference in Copenhagen in 2009.

institutions. Some scholars therefore regard the BRICS as reformist than as revisionist. Especially in the case of China there is a growing argument that the country is moving from being a rule-taker to becoming a rule-maker (cf. Kennedy & Cheng 2012). This describes a status quo power, which is satisfied with the general rules and institutions, but seeks a more active role and some shifts in the agenda setting.

The third, newest and most underdeveloped debate is about BRICS cooperation in the WTO. Respective publications not only seek to examine individual BRICS countries' economies or impacts, but also analyze the factors that have led those states to increase their trade and cooperation. Without doubt there is increasing intra-BRICS trade in the last decades. International Political literature offers different perspectives and especially the complementary character of BRICS' trading structures (cf. Mathur et al. 2013, 11). However, complementary implies deviation in domestic economic interest, which them might of cause lead to contrary policy interests and disagreements about specific regulations. BRICS coordination is by most scholars seen as a pure geopolitical and strategic alliance in order to balance, or challenge the West as well as to reshape the international institutional system (Stuenkel 2015, 3). According to Oliver Stuenkel the BRICS have become the most powerful political grouping outside of the West. He also argues that the BRICS started as an odd grouping, because they do not only differ in their economic structure, but are also split into revisionist countries as Brazil and India, who are seeking for fundamental redistribution of institutional power, and status quo powers as Russia and China, who already have a power position and are more reluctant towards change (Stuenkel 2014, 6). On the other hand Stuenkel claims, that the BRICS have succeeded in implementing themselves through their summits as a political group (Stuenkel 2014, 12). This leads to the recognition that BRICS cooperation is not exclusively geopolitical pragmatism, but could have other, especially economic reasons. Before the first BRIC summit in Russia 2008, several meeting on minister level were held during G8 and G20 meetings. Thereby the main driver of new geopolitical coordination in BRIC has also led to a new development of BRICS-coordination in economic fields (Koval 2011, 10). Several working groups for economic and trade cooperation have been established, as well as dialogues about global issues such as global health or climate change. Brendan Vickers points out, that both India and Brazil have a long history in GATT/WTO coalition building (Vickers 2012, 261): for example during the Uruguay round in the G10 and later in the Like-Minded-Group as well as in the G33. With the accessions of China and Russia towards the WTO we could also expect WTO coalition building in the BRICS grouping. Economists forecast several areas of convergence as well as few points of divergence in the trade policies of the BRICS (Mathur et al. 2013, 13). They are pointing out that intra-BRICS trade is heavily increasing in recent years, thus representing a strong need and reason for more intense coordination. Furthermore, though India's, Brazil's and Russia's trade shares are much smaller, they have significantly increased in recent years. Most contributions to this debate focus directly on the intra-regional BRICS trade and the increasing economic cooperation, growing investment and the complementary character of the BRICS trade structures. At the same time, other scholars argue that while the

suggested power of the BRICS is mostly analyzed in their economic growth and trade rates, analyzes of their policies on global order are much less prominent in the debate (De Coning et al 2015, 3). It is indeed hard to find publications on BRICS policy coordination, even in respect of the very recent history of BRICS summits or other forms of BRICS cooperation. Also the official statements of state leaders or press releases from ministerial meetings show very little actual output in this area. There is thus a strong gap in the empirical research on what is actually achieved by and during BRICS meetings or summits and if these processes lead to deepening BRICS coordination.

2.2 BRICS in the World Trade and WTO

The 2009 created BRICS dialogue forum has since then become a regular event with growing scope and content. Brazil, Russia, India, China and South Africa have built a political grouping that has consequences for the whole international system. Besides their annual meetings and the creation of more and more working groups or other exchange forms, the BRICS also meet in connection to other international occasions, in most international organizations and recently also on the level of non-state actors. The pure fact of existence and coordination itself, affects many levels of foreign relations, global business and the global trading system. Those countries are mostly classified as (re-)emerging powers – as states whose economic growth leads ambitions and claims for leading roles and new structures in global governance and international organizations as the WTO (Cooper and Antkiewicz 2008; Flemes 2007).

Especially since the WTO Ministerial in Cancun in 2003 (re-)emerging powers have become powerful players in the WTO. Andy Hurrell and Amrita Narlikar see three major reasons for this developments (Hurrell & Narlikar 2006, 433). Firstly, (re-)emerging powers are not challenging the WTO itself, but have after some years of integration adapted to the institution and are now playing the given diplomatic tools in the same way as Western powers do. Secondly, the authors argue that (re-)emerging powers WTO-politics are not driven by domestic factors, but by new South-South coalition building and new self-confidence of some states. And thirdly, the Cancun failure and DDA deadlock is, according to Hurrell & Narlikar, not a reason to North-South confrontation - even if Brazil and India used this in their rhetoric. (Re-)Emerging powers have also divergent interests and close relations with the Western world. Following this thought, we can understand that in its first years the DDA has been some kind of experiment field for (re-)emerging powers to test their ability to influence the multilateral agenda. This can be seen as the first steps for new coalition building and a challenging of other multilateral systems. After Cancun (re-)emerging powers have intensified their relations, established the BRICS and discovered their real power.

With regards to this, Stefan Schirm has formulated what (re-)emerging powers need to do, in order to attract followership and create coalitions. In his view, leadership always depends on followership and the argument is that “the inclusion of the interests of

another country [...] is a necessary condition for the other country to accept the policy positions, shifts in power and status desired by the (re-)emerging power” (Schirm 2010, 199). Schirm follows here John Ikenberry and argues that benign leadership is organized in more reciprocal, consensual and institutionalized relations (Ikenberry 2001, 28). Especially the BRICS, who are in concurrence to the established great powers, need to include other states interests – smaller countries which are also not satisfied with the existing order and are likely to support an alternative order.

Leadership and followership is not automatically hierarchical or dominating. For example, Sandra Destradi has formulated a follower initiated leadership type in which equal states assign a leader to reach common goals (Destradi 2008, 23). Coalition building requires certain resources of soft or normative power as agenda setting, willingness for rulemaking, institutional capacities and of course also financial reserves.

Similarly, Daniel Flesmes describes this type of coalition building and follower recruitment as soft balancing (Flesmes 2007, 47). In his work Flesmes recalls two major reasons for this strategic alliance. First, it can be regarded as a coalition of developing countries in international institutions and second, also as a platform for new South-South cooperation. According to the author, soft balancing helps countries of the periphery of the current world system to delay, frustrate and undermine the great powers unilateral policies (Flesmes 2007, 14). Hereby soft balancing uses institutional structures and the formation of limited diplomatic coalitions to constrain the traditional powers. The aim is to shift the balance of economic power in a long term and push domestic interest through multilateral coalitions. In the case of BRICS trade policy cooperation, the states therefore need a common consensus in the WTO in form of some shared policy interests or aims. The following analysis seeks to find out if there are any similarities that the BRICS share, in comparison to other groupings in global trade.

3 Clustering Countries to uncover Trade Coherences

The main aim of this paper is to analyze the global trading structure by clustering countries based on trade variables. In comparison with other quantitative methods that are looking for specific variables that explain outcomes, cluster analysis groups data by variables into units with equal features – and therefore offers this paper the possibility to understand if the current political grouping is represented in the global trade data, or not. The method helps us to organize data in groups with similar variables. This similarity structures are called clusters, which then can be labeled after the attributes and features which are more or less present in the individual clusters. In the second sub-chapter then the actual cluster analysis shows the structures we can find in the current international trade data. Out of these clusters the differences in trading structures between the BRICS become visual and help us to understand the problematic of political alliances and the current debates in world trade. As will be shown, the BRICS are in very different clusters, and those trade clusters are mainly defined by the overall size of trade and by the export

breakdowns after commodity group. In the following first sub-chapter the methodology of cluster analysis is introduced.

3.1 Cluster Analysis in form of Kohonen-maps

Cluster analysis has become an important feature of data mining, the discipline of transforming and discovering huge amounts of data. Contrary to classification, where data is ordered in already existing systems, cluster analysis identifies new groups of data (cf. Abonyi & Feil 2007).

This analysis uses Kohonen-maps or self-organizing maps, an artificial neural network that helps us to show and understand the clusters easily. It is an unsupervised training set for big data sets, first developed by Teuvo Kohonen in the 1980s (Kohonen 1995). The Kohonen net is a computationally convenient abstraction building on work on biologically neural models from the 1970s and morphogenesis models dating back to Alan Turing in the 1950s.

Self-organizing maps can be used to solve economic problems like modeling, forecasting, or pattern-searching in large data sets. The used algorithm represents a specific variant of clustering multidimensional vectors. An important feature of the algorithm used by the computer program Loginom, which has been used for this analysis, is that all parts of the maps (called neurons or nodes) are arranged to one another in a certain structure. The method uses two steps, namely training and mapping. In a specific training the maps are built by the input variables through vector quantization. Here not only the best matching unit is modified, but also its neighbors. A matching unit is the node which corresponds with the input variable more closely than all others. Mapping automatically classifies a new input vector. Through this a multi-dimensional space can be projected on a lower dimensional space, mostly a two-dimensional grid (Loginom 2008, 88). Therefore these maps can be considered as a method to project complicated data sets into two-dimensional groups. The projection is usually located on 2D grids of rectangular or hexagonal cells. In this analysis we use hexagonal cells, which are easier to understand due to its visualization.

The output grids of Kohonen self-organizing maps are useful for finding dependencies in the data between variables - but they don't have specific outputs as for example in the case of regression analysis. Rather, this method simply runs new variables over previous variables in order to arrange the cases in a logical order. Out of this order we can then label groups or clusters according to the variables values of the nodes in them.

Important to notice here is that the presence of two countries in different clusters does not hinder or disturb their trade relations, but can deduce highly different interest in trade regulating policies. Furthermore, the clusters show the major difference in economic development and value of trade between the BRICS, with China on one level with the Western powers and the other four countries with highly different trade structures.

3.2 Economic embedding of (Re-)Emerging Powers in Trade Clusters

The following paragraphs present and describe the cluster analysis based on Kohonen-maps. The data sample, the variables, the clustering process and finally the output clusters are each discussed in individual sections.

3.2.1 The Data set

The idea is to locate the BRICS in a broader scheme of countries, in order to understand their differences as well as their implications for the WTO. Therefore we used data includes 155 or the 162 WTO states (cf. Annex 1). The EU has not been considered as a member of the WTO, since the single EU member states' data is already a part of the sample. Including the EU would thus not only lead to an extreme outsider case, but also duplicate data. Furthermore, for six single states the data provided by the WTO was not complete, so that they could not be considered in the calculations. However, these six countries - Chad, Djibouti, Dem. Rep. Congo, Liechtenstein, Sierra Leone and Tajikistan - are neither (re-)emerging powers, nor does their exclusion influence the outcome of the analysis significantly. The data is generated out of the countries' trade profiles from the WTO Statistical Database and relates in 98% to the year 2014 and - due to a lack of current data - only in 2% of the cases to data from the years 2012 or 2013. The used data represents the trade with all trading partners in all goods.

3.2.2 The Variables

The seven input variables for the cluster analysis are each countries' (1) exports of all goods, (2) trade balance, (3) Most Favorite Nations (MFN) applied tariffs, (4) exports of all services, (5) percentage of agricultural products of all exports, (6) percentage of fuels and mining products of all exports, and (7) percentage of manufactured products of all exports. Due to the WTO goods' classification in the WTO Statistical Data Base the percentages of variables 5, 6, and 7 do not always end up to 100%, which makes it necessary to include all three variables. The correlation between those three variables is not high with the Pearson Correlation between variables 5 and 6 being 0.282 and between variables 5 and 7 at 0.367. Only between the variables 5 and 7 we see a higher correlation with 0.603, but the value is not high enough to exclude one of the variables. An overview of the correlations between all variables can be found in Annex 4. In the original data set the variables 'imports of all goods', 'GDP', and 'imports of all services' were also present, but have been excluded due to very high correlation of over 0.846, 0.933 and 0.929 with the variables 'export' resp. 'service exports'.

The logic behind the chosen variables is to distinguish between the amounts of trade as well as between its values. The inclusion of applied tariffs was then considered to get an estimate about the level of protectionism of the countries, also in order to understand which of the clusters apply higher or lower tariffs. Trade in services has been recently an important topic at the WTO and might also have an implication for soft power projection. Finally, since the trade in agriculture as well as the NAMA negotiations have played a

crucial role in the Doha Development Agenda and the WTO in the last 15 years, a differentiation of the main categories of trade in goods appears necessary. That is why the variables 5, 6, and 7 are included, in order to differentiate between the domestic backgrounds of countries. Exports are a mirror of domestic economies, though especially agricultural lobbying and domestic politics sometimes leads to an overrepresentation of certain sectors in trade negotiations.

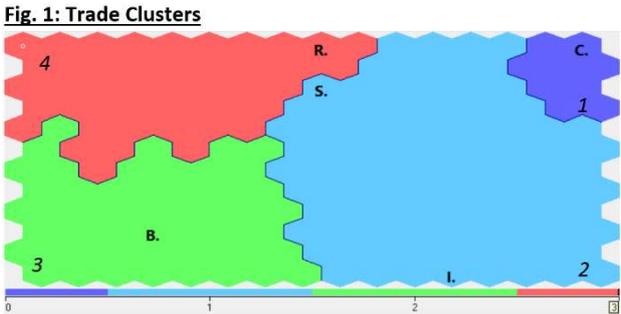
3.2.3 The Clustering Process

The output of Loginom provides us with four clusters based on our seven variables. The output is shown in a map or set of nodes, in which each node can be associated with a hexagonal area of the picture. The coordinates of this area are determined by the coordinates of the respective node in the grip. It is important to note that not every hexagon represents a reporting country here, but the whole map together presents the pattern of the variables. The resulting map represents an atlas which shows the location of the countries, their interconnections, and the relative position of the various values of each country.

In a first step all data is normalized by linear normalization of the initial values. Here all variables are transformed in a set from 0-1 or into similar modes dependent of the program. The purpose of normalization is to transform the data into the most suitable type for the clustering. We then define a training set and the weight coefficient of the neurons. The analysis uses eigenvectors in which the weights are initiated using the values of the vectors linearly ordered along the linear subspace passing between the two principal vectors of the data set (Loginom 2008, 89). The resulting maps can be understood as a layer cake in which each layer represents a color produced by one of the data set components. If we overlap all seven layers of our seven variables we have a final cluster map. The general principle is that each variable creates its own clusters, which then run through other variables to construct common clusters (Loginom 2008, 90).

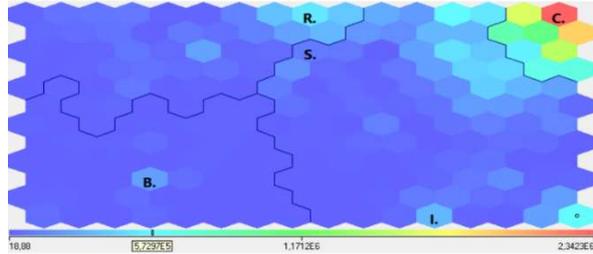
3.2.4 The Clusters

Figure 1 shows the four clusters and the positions of the five BRICS inside, indicated by their initials. The first and smallest cluster in the upper right corner includes China and six other states: France, Germany, Hong Kong, Japan, the UK, and the USA. This cluster is labeled ‘Economic Leaders’ as will be explained later by the variable distribution. The second cluster is the largest one with 73 states and is labeled ‘Manufacture Exporters’. It also includes India and South Africa, though with a huge distance between them. The third cluster in the lower left corner consists of 38 countries, including Brazil, and is labeled ‘Agricultural Exporters’; the fourth cluster includes Russia and 36 other countries, and is labeled ‘Resource Exporters’. Noteworthy is that Russia has a rather small distance to South Africa. A list of each countries cluster



affiliation is provided in Annex 3. Regarding the EU countries, we find only Greece in cluster 4 and Germany, France and the UK in cluster 1, while the other 24 EU member states are all in cluster 2 and none of them in cluster 3. Other geographical tendencies show South East Asian countries in cluster 2, Middle Eastern countries in cluster 4, and African as well as Latin American countries in cluster 3.

Fig. 2: Exports



In order to determine the first cluster we can look at the distributions of the variables export, trade balance, and export of services. For the variable exports' we clearly see in figure 2 a strong concentration of high values in cluster 1, with China actually as the biggest exporter of the world. Furthermore, we can also see that Russia, Brazil and India have significant higher export values than their surrounding areas. There is a concentration of medium volumes of exports in cluster 2, close to cluster 1, while cluster 3 shows nearly no other high export nodes, besides the one around Brazil. In cluster 4 we see around Russia a couple of nodes with higher values.

A different, but interconnected picture shows the node distribution of the variable trade balance in figure 3. Here cluster 1 includes the largest as well as the lowest values. China and Germany account for the highest surpluses, while the USA, the UK, Japan and France – together with India in cluster 2 – have the biggest negative balances. Furthermore, we see around Russia an accumulation of larger values, while South Africa and Brazil show no different values as compared to the rest of the nodes.

Fig. 3: Trade Balance

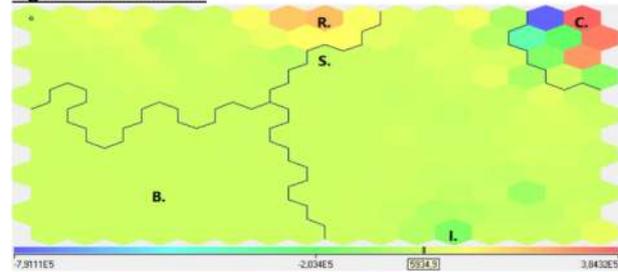
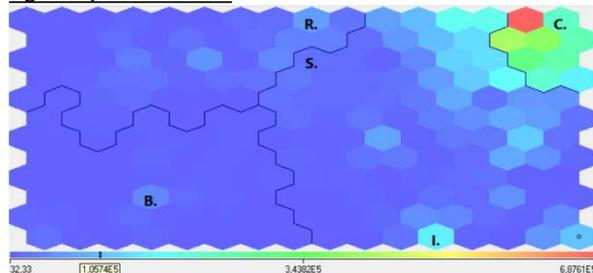


Fig. 4: Export in Services



Similar to the export of goods distribution is the distribution of exports in services as we can see in figure 4. A clearer picture of cluster 1 emerges here. Again cluster 1 – together with India and some other nodes of cluster 2 which are located around cluster 1 – shows the highest values of export in services. Therefore we understand that high exports of goods and high exports of services together constitute cluster 1, as we can also see in a Pearson Correlation of 0.797 between both variables⁶. Again Russia and Brazil show significant higher values in export in services in comparison to their clusters, but at the same time significant smaller values than cluster 1. Inside of cluster 1 the USA dominate clearly in exports in services. So far

⁶ Cf. Annex 4.

we can observe that cluster 1 countries have significant higher exports and imports⁷ in goods as well as in services; furthermore, those countries have also either an extreme surplus or loss in their trade balances. See the figure also shows that cluster 2 is much closer to cluster 1, while cluster 3 is the farthest away.

The next three export breakdown variables show the composition of the clusters 2, 3, and 4. Figure 5 shows us the percentage of agricultural products in the exports. We can clearly see the composition of cluster 2, including Brazil which of the BRICS has the largest proportion of agricultural products in its exports. However, we see even higher values in those nodes, which are farthest away from cluster 1. We can see some medium-low values of agricultural trade in cluster 2, and minor values in cluster 4. However, these high values of trade in agriculture explain Brazil's distance to the other BRICS.

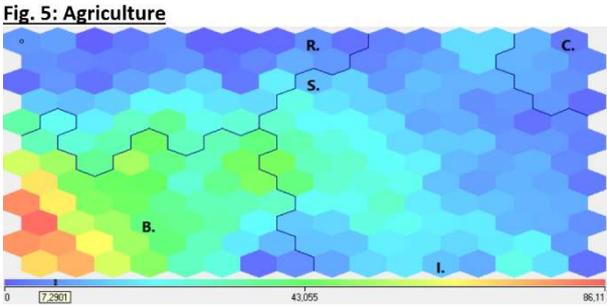
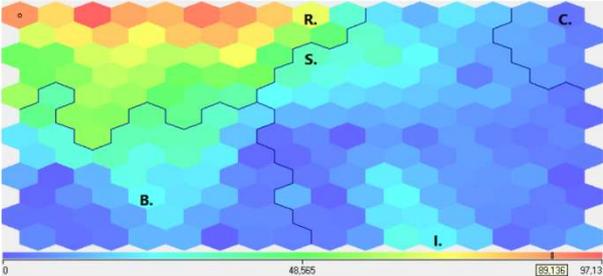
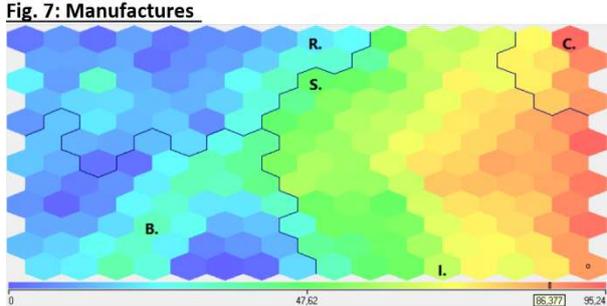


Fig. 6: Fuel & Mining



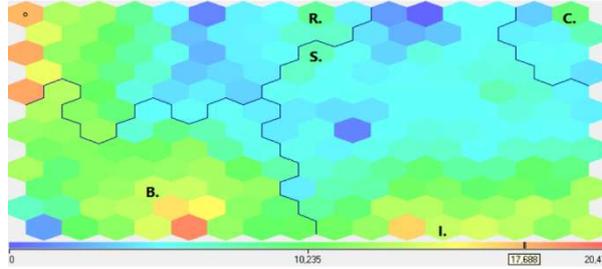
In figure 6 we see that cluster 4 includes mainly all countries with over 50 % of their exports in fuels and mining products. Here we can find Russia with a high value of around 70% its exports in this sector. Also, we see some medium values in cluster 2 and cluster 3, especially around Brazil and India, while cluster 1 has the lowest values in this variable. Interesting is the position of South Africa, being located close to Russia due to its medium high value, but far away from India with a similar value in this variable. However, the distribution in the variables of Figures 2, 3 and 4, explains very well the distance between India and South Africa. Furthermore in cluster 3 we see some medium-low nodes around Brazil.

Figure 7 completes the picture with the percentages of manufactured trade. As might have been already expected, we see high values in the nodes of cluster 2, but also of cluster 1 with especially China leading the high values. South Africa and India show medium values in this variable, which explains their location in cluster 2. Russia and Brazil have lower values, but we see why Russia is inside of cluster 4 still very close located to cluster 2.



⁷ Cf. Annex 4.

Fig. 8: Applied MFN Tariffs



Finally, figure 8 shows the distribution of the average applied MFN tariffs of all WTO member states. Here we can actually see similar tariff values of all BRICS with medium-high tariffs between 7.5 and 13.5. China is an outsider in cluster 1, and we can see significant higher tariffs in cluster 3 and cluster 4. Furthermore, Cluster 2 has a bisected distribution of the nodes. On the one side all 24 EU states of cluster 2 share the value of 5.3, on the other side we can observe in the area around India an aggregation of higher tariffs between 10 and 15. However, we can definitely see, that the BRICS do not belong to low tariff countries. Fig. 8 is the least structured map and does only slightly follow the more clear division of the previous variables. However, we can also see some correlations between high tariffs and agricultural exports.

4 Summary and Outlook

This paper aims to explain the similarities and differences of the BRICS in global trade, in order to understand the BRICS impact of the WTO and the global trading system. Therefore the paper used cluster analysis in order to locate the BRICS in a broader scheme of countries, to define their differences and uncover their possible disagreements of trade regulation. What do the clusters tell us now about BRICS cooperation in the WTO or in global trade? First of all it is noteworthy, that the clusters tell us nothing about intra-BRICS trade relations. But, as can be seen in Annex 5, intra-BRICS trade is both limited and complementary. The BRICS provide major manufacturing, fuels and mining products, agricultural products as well as a growing service sectors. However, BRICS trade flows are mainly oriented towards the EU or USA, since these are still the two largest economies on the globe. The intra-BRICS consumption of fellow BRICS products has huge potential, considering the amount of world population that the five countries comprise. Here, a better distinction of the technical level or value chain position of manufactures products explains the differences between China and for example Japan or Germany.

What the analysis of the paper showed, is that the BRICS economies are highly different and produce different outputs. Considering the strong standing of the BRICS for national sovereignty and a protectionist policy for state owned enterprises, it is not surprising that in a global comparison the BRICS all belong to the higher tariff countries. But, as for example the lone voice of India in the Bali Process on agricultural protectionism shows, the BRICS protect firstly their own trade interests instead of their new partnership. Also, the glut of cheap Chinese products on the Russian and Brazilian market has contributed to rising national concerns. For example, the membership in the newly established Eurasian Economic Union implied the rise of tariffs against China, e.g. for Kyrgyzstan on the EEU level, in order to prohibit a backdoor for Chinese exports to the Russian lead Union.

As cluster 1 of the *'economic leaders'* showed, the high export values correlate with high GDP values⁸ and high trade in services. However, cluster 1 nodes also have high or medium-high values in manufactured exports, leading to the assumption that in order to become a leading world economy and trade power, a huge amount of manufacturing is necessary. Here, especially Brazil and Russia do not provide competitive industries so far, but rely too much on their two economic backbones: Resources and Agriculture.

With regards to industrial structures, trade is however rather resilient. A resource wealthy country will not change overnight to become an industrial exporter. Resource exports provide substantial revenues for the state and all connected parties. To be a major agricultural exporter also implies that a huge part of one's population is employed or dependent to this sector. A transition process is thus long and complicated. In the case of China we see that it took four decades from the first reforms and special economic zones in the late 1970s to its economic power today.

Referring to the WTO, the findings imply that the BRICS should have highly different trade interests, which might indeed be good news. This means that the "old" alliances and blocs in the WTO that orient themselves on policies or sectors will also be the main coalitions in trade negotiations in the future. Furthermore it is likely that WTO supraregional free trade zones or regional common markets such as the EU will play stronger roles. Russia will most likely try to strengthen the role of the EEU in the WTO once Belarus joined the institution. So far, the Chinese economic foreign policies are more concentrated on investment and infrastructure, which should support international trade. But even in the recent major 'One Road One Belt' project of Beijing there are no trade policy implications anchored.

A main implication might be, that in order to join China in the *'economic leaders'* the other four BRICS have to increase their trade volumes in goods as well as in services and, therefore, need more trade-friendly policies with lower tariffs and less protectionism. In this connection it is crucial to consider, that the growth of (re-)emerging powers is mostly based on their internationalization and on new trade relations. The tremendous economic growth of (re-)emerging powers over the last decades has led to a claim for more political power. Since this growth is strongly connected to their external trade, trade structures and the global trading system have been a key factor for those developments – and therefore have a huge importance for the BRICS. However, since the BRICS have been beneficiaries of the current trading system, it is highly unlikely that they are aiming to change the whole system, furthermore we can expect them to claim a stronger voice and power in the maintenance of it.

Reflecting the method of cluster analysis, further studies about the dynamic of those clusters could be interesting. Especially with regards to Russia and Brazil we could observe a growth of fuel and agricultural exports in recent decades. Moreover, additional

⁸ Cf. Annex 4.

variables could be tested given that the product scheme is relatively thin. Nevertheless, the analysis showed that cluster analysis with self-organizing maps helps to locate and interpret data sets in a broader context.

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Annex 1 – Dataset

The data was inherited from the WTO Statistics Database and is based on the WTO country profiles in 2014 (for cases marked with * the data is from 2012 or 2013). In the data set are presented all current WTO member states, without the EU and six WTO members, who are left out due to a lack of data (Chad, Djibouti, Dem. Rep. Congo, Liechtenstein, Sierra Leone and Tajikistan). The data of 'Exports' and 'Trade Balance' refers to trade in goods of all commodity groups with all trading partners and is presented in million US\$. The data of 'Agriculture', 'Fuels & Mining', and 'Manufactures' is a percentage-wise breakdown of all trade into these commodity groups. Please note that due to the products not classified by the WTO in the three main product groups, the sum of shares may not add up to a 100. The data of 'Service Exports' refers to all trade in services with all trading partners and is presented in million US\$. All values have been aligned on two decimal places.

<u>Reporter</u>	<u>Exports</u>	<u>Trade Balance</u>	<u>Applied Tariffs</u>	<u>Agriculture</u>	<u>Fuel & Mining</u>	<u>Manufactures</u>	<u>Service Exports</u>
Albania	2430,72	-2799,25	3,78	7,53	33,50	52,24	2654,79
Angola	62400,00	34080,00	11,42	0,03	97,12	2,25	1315,70
Antigua and Barbuda	23,08	-528,67	9,90	3,23	8,08	37,27	462,56
Argentina	68335,10	3011,72	13,64	52,64	7,56	29,63	13511,47
Armenia	1490,19	-2669,33	3,69	27,22	37,72	27,40	1604,00
Australia	240444,68	12900,45	2,72	16,02	63,42	11,87	53367,56
Austria	169714,99	-2732,48	5,31	9,52	5,45	83,94	66336,06
Bahrain	18030,74	-2042,93	4,69	3,12	71,54	24,87	3301,60
Bangladesh	30405,19	-11862,39	13,92	5,58	1,59	92,30	1430,63
Barbados	480,75	-1259,72	10,70	23,09	24,75	52,04	1445,96
Belgium	472201,27	19428,73	5,31	10,71	14,11	72,82	122078,71
Belize	364,89	-637,49	11,60	42,83	13,40	3,71	465,07
Benin	951,00	-2645,08	11,92	22,04	6,22	17,98	499,69
Bolivia	12856,06	2363,96	11,63	15,39	74,97	3,35	1328,88
Botswana	7915,47	85,02	7,58	2,10	7,57	90,32	513,84
Brazil	225098,41	-3961,65	13,54	39,04	24,38	33,25	39209,63
Brunei	10508,83	6910,09	1,16	0,41	92,65	6,80	479,42
<u>Reporter</u>	<u>Exports</u>	<u>Trade Balance</u>	<u>Applied Tariffs</u>	<u>Agriculture</u>	<u>Fuel & Mining</u>	<u>Manufactures</u>	<u>Service Exports</u>

Bulgaria	29386,54	-5353,50	5,31	17,95	27,43	53,13	10014,71
Burkina Faso	2845,60	-729,49	11,92	32,60	15,16	7,80	458,10
Burundi	141,50	-531,08	12,75	64,71	3,51	25,47	32,33
Cabo Verde	80,54	-688,20	10,08	86,11	0,20	13,62	625,01
Cambodia	10800,00	-2700,00	11,23	7,02	0,18	92,76	3922,93
Cameroon	5159,52	-2401,62	18,24	33,82	57,87	8,28	1860,13
Canada	473556,51	10527,18	4,17	14,35	33,76	44,68	84911,37
Cent. African Rep.	20,70	-287,33	18,01*	16,97	25,22	3,71	48,19*
Chile	76639,25	4294,91	5,98	29,18	57,09	13,60	11244,92
China	2342343,01	384321,71	9,55	3,18	2,72	93,99	232455,70
Chinese Taipei	313695,91	39669,74	6,54	2,07	7,63	83,77	56876,00
Colombia	54794,81	-9232,80	5,84	13,40	66,54	17,14	6869,24
Congo	6550,00	3202,34	18,09	1,54	50,39	22,45	590,09
Costa Rica	11251,85	-5934,32	5,58	38,85	1,62	59,19	6855,09
Côte d'Ivoire	12985,05	1807,39	11,92	58,44	21,04	15,21	805,68*
Croatia	13843,90	-9062,97	5,31	17,98	17,48	62,33	13549,75
Cuba	5187,30	-7926,60	10,60	20,14	54,89	25,11	12330,72
Cyprus	1923,55	-4905,05	5,31	21,17	22,48	51,39	10034,76
Czech Rep.	174279,45	21053,99	5,31	6,16	4,72	88,24	25557,52
Denmark	110748,92	11181,09	5,31	22,16	8,96	66,98	72097,13
Dominica	38,59	-166,41	9,96	11,30	9,69	79,00	117,48
Dominican Rep.	9927,80	-7823,90	7,33	23,00	8,85	52,23	6792,95
Ecuador	25730,11	-1785,31	11,94	37,97	53,10	5,59	2218,67
Egypt	26812,20	-44525,55	16,77	18,70	27,18	49,62	20261,50
El Salvador	5272,67	-5240,18	6,01	20,00	4,11	75,44	2164,65
Estonia	17568,14	-2599,74	5,31	16,68	12,74	69,63	6786,36
Fiji	1373,26	-1877,20	11,59	44,77	27,57	23,24	1160,39
Finland	74338,83	-2434,42	5,31	9,54	15,84	67,11	25729,45
Reporter	Exports	Trade Balance	Applied Tariffs	Agriculture	Fuel & Mining	Manufactures	Service Exports

France	566656,17	-93215,91	5,31	13,94	6,34	78,21	267104,03
Gabon	8926,00	5933,00	17,69	7,29	89,14	3,15	200,03
Georgia	2860,67	-5732,65	1,52	29,37	13,52	55,47	2953,84
Germany	1498157,78	283202,11	5,31	6,68	5,78	85,41	266244,03
Ghana	13216,06	-1350,17	12,94	23,36	36,93	15,19	1960,82
Greece	35755,37	-26425,26	5,31	19,26	45,65	32,92	41190,11
Grenada	37,00	-303,00	10,41	58,64	0,30	41,06	183,51
Guatemala	10890,69	-7372,55	5,60	45,61	14,98	39,36	2602,48
Guinea	1946,67	-562,54	11,89	5,03	52,57	10,39	100,33
Guinea-Bissau	162,00	-66,00	11,92	25,68	0,16	0,02	37,90*
Guyana	1174,05	-609,26	11,16*	51,46	12,78	10,26	148,40
Haiti	917,35	-2682,65	4,76	4,76	0,00	95,24	640,21
Honduras	4533,35	-3450,28	5,72	30,33	2,20	59,13	2556,93
Hong Kong SAR	524064,90	-76548,17	0,00	2,01	1,60	86,71	105969,37
Hungary	112196,29	9085,30	5,31	9,77	5,13	84,78	24079,85
Iceland	5051,30	-320,62	5,26	44,53	40,99	13,83	4256,80
India	317544,64	-141824,82	13,48	13,52	23,26	62,33	155627,25
Indonesia	176036,19	-2143,15	6,85	25,01	33,87	40,25	22919,62
Ireland	118287,43	47238,39	5,31	12,57	2,80	83,79	133401,36
Israel	68965,01	-3366,77	4,56	3,70	2,35	93,83	34580,20
Italy	529528,73	55446,17	5,31	8,97	6,19	82,61	115861,52
Jamaica	1451,99	-4383,53	8,51	8,51	68,65	8,02	2792,67
Japan	690217,47	-121967,29	4,21	1,55	5,00	87,43	158080,94
Jordan	8385,33	-14354,93	10,15	20,33	7,68	71,96	6578,59
Kazakhstan	79458,75	38163,29	8,58	3,47	86,60	9,60	6270,40
Kenya	6114,95	-12281,35	12,77	50,77	13,78	33,52	4027,05
Korea, Rep. of	573074,77	47517,80	13,32	2,08	11,16	86,38	105760,20
Kuwait	101131,95	69643,30	4,66	0,56	90,83	5,61	5684,32
Reporter	Exports	Trade Balance	Applied Tariffs	Agriculture	Fuel & Mining	Manufactures	Service Exports

Kyrgyzstan	1649,90	-4082,40	4,58	14,55	12,91	28,44	889,62
Laos	2650,00	-650,00	10,01	0,00	0,00	0,00	761,04*
Latvia	13602,82	-3195,54	5,31	30,77	9,90	58,69	5047,75
Lesotho	924,89	-1283,43	7,57	13,99	0,35	55,20	56,64
Lithuania	32394,30	-2823,07	5,31	21,29	19,09	59,52	7754,72
Luxembourg	14767,55	-9079,22	5,31	9,73	4,69	83,09	98483,92
Macao SAR	1240,03	-10155,91	0,00	8,27	8,29	54,08	53106,80
Macedonia	4933,84	-2342,86	6,87	13,20	6,89	79,82	1689,96
Madagascar	2243,19	-1111,61	11,73	27,25	33,39	34,56	1253,47
Malawi	1341,90	-1432,47	12,56	80,45	11,39	7,68	100,76
Malaysia	234134,98	25311,55	6,07	12,87	24,97	61,57	39409,82
Maldives	144,84	-1847,91	20,47	43,49	0,92	0,09	2974,97
Mali	2100,00	-1876,62	11,92	20,80	1,57	12,03	372,27
Malta	4970,79	-3474,42	5,31	9,88	8,46	80,30	11899,29
Mauritania	2139,81	-1501,95	12,02	34,74	58,65	0,02	167,53
Mauritius	2663,00	-2944,22	1,05	28,10	0,52	56,70	3330,75
Mexico	397098,82	-2878,05	7,52	6,64	13,40	77,76	21036,60
Moldova	2339,53	-2977,43	4,57	46,21	2,40	51,36	1090,49
Mongolia	5774,33	642,88	4,98	6,28	83,72	2,98	572,64
Montenegro	440,66	-1926,09	4,14	36,18	46,63	16,38	1368,44
Morocco	23815,82	-22375,93	11,15	19,49	12,81	67,02	15948,42
Mozambique	4725,33	-4017,74	10,07	19,21	64,46	16,32	1154,37
Myanmar	11030,70	-5195,40	5,60	26,49	43,79	29,46	2203,65
Namibia	5983,84	-2547,15	7,58	30,52	35,04	34,43	1020,93
Nepal	900,86	-6689,23	12,29	23,11	3,17	67,52	1043,22
Netherlands	571347,54	63314,66	5,31	16,67	20,90	61,87	186586,97
New Zealand	41635,62	-862,12	2,04	69,64	6,11	19,87	14412,83
Nicaragua	4973,50	-772,92	5,72	46,92	1,09	41,44	1302,08
Reporter	Exports	Trade Balance	Applied Tariffs	Agriculture	Fuel & Mining	Manufactures	Service Exports

Niger	1049,68	-1101,41	11,92	9,07	51,04	8,06	146,55
Nigeria	102878,50	56346,23	11,94	8,26	79,87	3,39	1493,95
Norway	143791,33	54621,35	7,70	8,85	69,31	17,53	49476,62
Oman	50718,32	21415,22	4,68	2,28	82,99	10,02	3016,53
Pakistan	24722,18	-22822,71	13,36	20,86	4,41	74,73	3498,00
Panama	818,20	-12887,06	6,84	4,55	0,71	92,54	10652,70
Papua New Guinea	5670,00	1670,00	4,73	23,85	40,98	6,24	176,95
Paraguay	9635,74	-2532,82	10,05	66,48	23,82	9,42	836,00
Peru	38459,25	-3734,32	3,37	20,93	50,30	12,24	5716,44
Philippines	61809,76	-5909,11	6,31	11,19	9,52	78,28	24822,77
Poland	214476,79	-2210,50	5,31	14,19	8,10	77,57	47933,38
Portugal	63885,57	-14409,37	5,31	14,50	10,73	74,10	30032,65
Qatar	131591,55	101143,90	4,70	0,01	86,74	9,59	12774,75
Romania	69877,89	-8011,18	5,31	12,69	9,04	77,71	19747,12
Russian Fed.	497833,53	211184,75	8,43	6,20	70,27	20,80	64871,80
Rwanda	653,36	-1300,84	12,73	30,91	42,04	14,79	532,02
St. Kitts and Nevis	42,00	-231,80	9,13	10,39	0,09	89,51	156,03
Saint Lucia	146,29	-495,81	8,44	28,78	22,05	48,21	443,78
St. Vincent a.t. Gren.	48,15	-313,84	10,19	74,78	3,61	21,61	140,24
Samoa	50,92	-337,10	11,39	16,11	0,61	30,20	185,85
Saudi Arabia	353836,01	190836,01	5,10	0,96	80,97	12,80	11662,73
Senegal	2813,66	-3743,00	11,92	36,26	20,92	30,24	1176,51
Seychelles	539,04	-604,26	6,41	52,53	35,60	2,48	477,72
Singapore	409768,67	43521,35	0,16	2,90	17,93	70,94	140140,12
Slovakia	85976,29	4622,12	5,31	5,04	6,96	87,63	8654,36
Slovenia	30522,10	472,80	5,31	7,60	10,20	82,05	7334,90
Solomon Islands	458,52	-41,10	9,54	66,67	0,26	0,72	108,51
South Africa	90612,10	-9280,63	7,57	12,49	34,78	46,45	16457,70
Reporter	Exports	Trade Balance	Applied Tariffs	Agriculture	Fuel & Mining	Manufactures	Service Exports

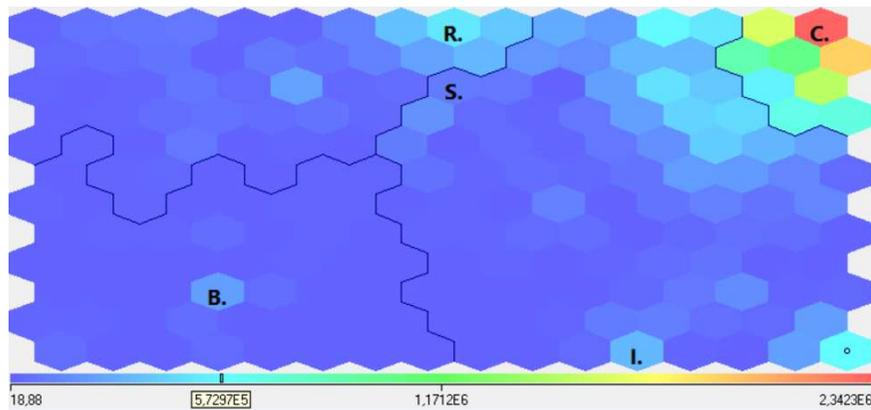
Spain	318649,31	-32328,46	5,31	16,88	13,29	68,27	133707,93
Sri Lanka	11295,49	-7948,98	9,54	28,40	3,16	68,16	5573,77
Suriname	1917,67	90,94	10,39	3,84	11,09	3,00	197,66
Swaziland	1918,00	339,00	7,58	18,10	1,15	44,62	273,43
Sweden	164413,81	2193,13	5,31	10,29	13,45	74,41	76656,38
Switzerland	311145,88	36091,89	6,69	3,23	3,31	68,11	113300,25
Tanzania	5704,65	-6986,46	12,77	32,41	15,24	17,51	3406,78
Thailand	227572,76	-358,74	11,57	17,46	6,58	74,71	54941,88
The Gambia	103,94	-283,27	14,08*	26,26	1,17	68,43	223,11
Togo	1350,00	-1450,00	11,92	16,22	9,64	45,66	437,00*
Tonga	18,88	-199,31	11,70	69,57	15,70	8,61	47,93
Trinidad and Tobago	12590,00	5100,00	10,67*	2,45	66,08	31,47	1019,87*
Tunisia	16755,61	-8072,03	14,05	10,00	17,59	72,22	4573,40
Turkey	157714,95	-84509,01	10,66	11,69	7,77	76,76	49759,03
Uganda	2261,96	-3811,56	12,73	59,75	7,08	31,59	2415,28
Ukraine	53913,30	-468,11	4,51	32,30	13,36	53,31	14478,00
UAE	380347,00	81731,00	4,69	2,23	30,96	23,59	19768,55
United Kingdom	511145,44	-183198,88	5,31	7,12	14,63	69,36	337216,99
Uruguay	9165,71	-1596,59	10,48	75,05	1,40	22,81	3180,86
USA	1619742,86	-791112,61	3,51	11,25	12,44	71,82	687605,33
Vanuatu	62,76	-248,07	9,11	83,18	1,55	7,75	299,72
Venezuela	80470,00	80457,14	12,86	0,09	97,13	2,10	1613,41
Viet Nam	150217,14	2378,09	9,54	17,64	8,05	73,85	10833,00
Yemen	2416,89	-9624,69	7,47*	5,45	72,29	2,17	1551,38*
Zambia	9687,92	148,89	13,49	8,76	77,01	12,79	850,87
Zimbabwe	3063,74	-3316,02	16,26	39,59	20,70	22,31	359,00*

The Data can be found on the WTO Statistical Database website: <https://www.wto.org/english/res e/statis e/statis e.htm>

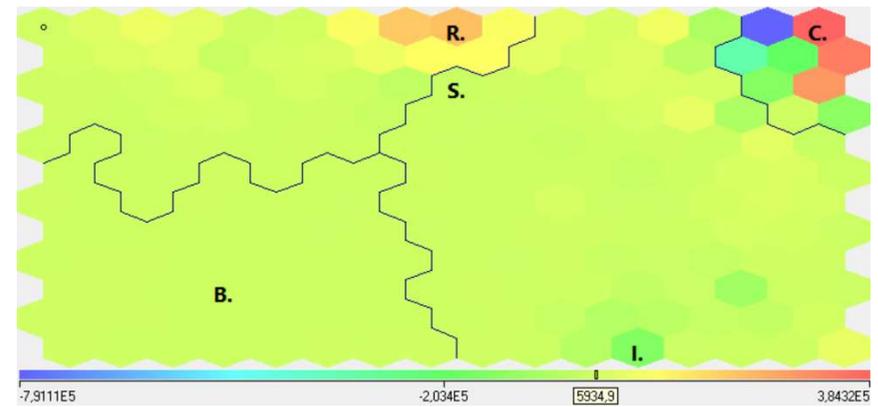
Annex 2

The following eight graphs are self-organizing maps created by the program Loginom with the data from annex 1. The maps 1-7 show the Reporters (countries) distribution after the variables, and are divided in four clusters from map 8. The BRICS positions on the maps are marked by their initials.

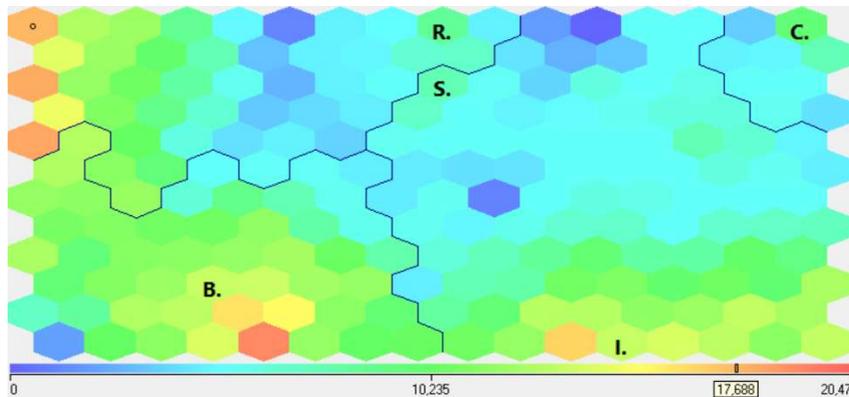
1. Exports



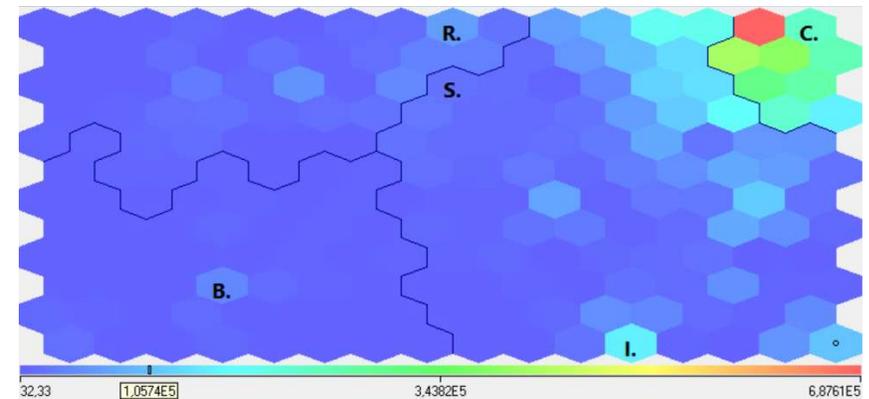
2. Trade Balance



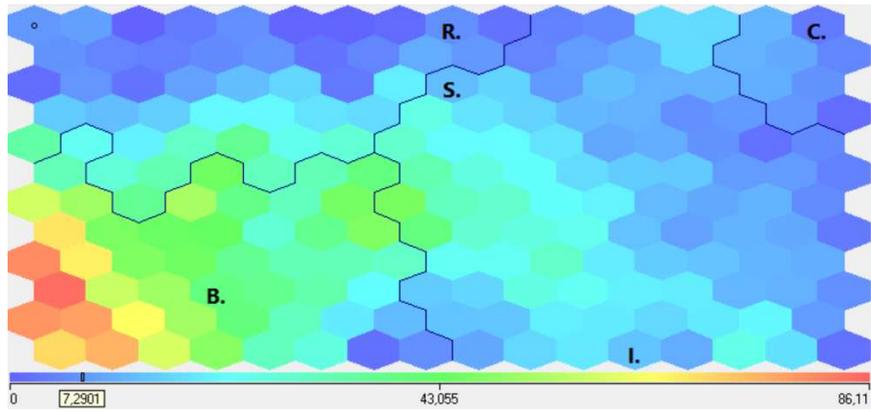
3. Applied Tariffs



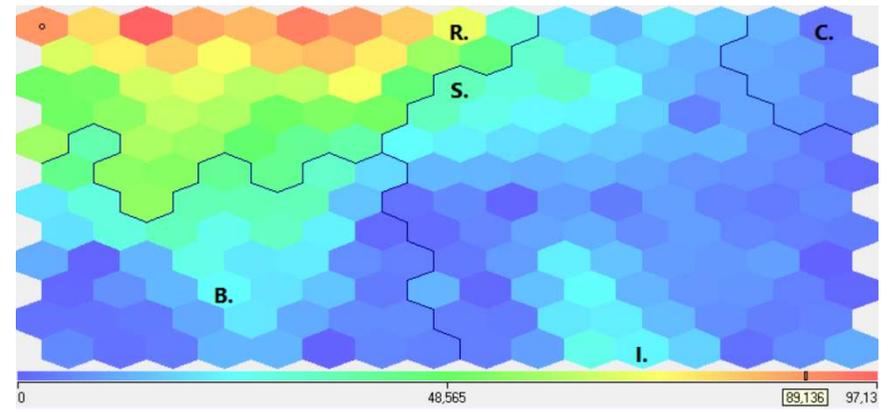
4. Service Exports



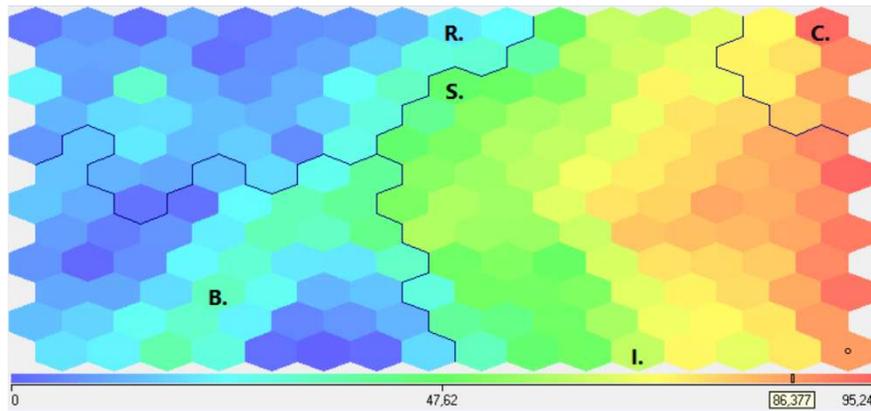
5. Agriculture



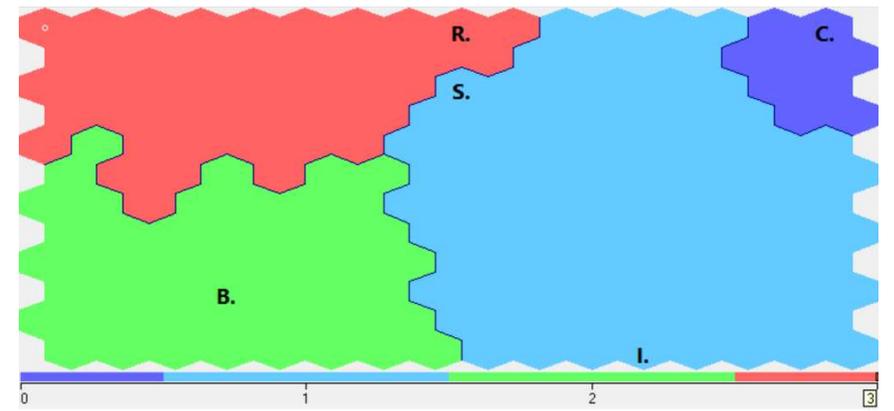
6. Fuel & Mining



7. Manufactures



8. Clusters



Annex 3

This table shows the distribution of countries in the cluster of the analysis, calculated by the program LOGINOM. The labels are chosen after their main differences and features.

Cluster 1 (N 7) Economic Leaders	Cluster 2 (N 73) Manufacture Exporters		Cluster 3 (N 38) Agri. Exporters	Cluster 4 (N 37) Resource Exporters
China	Albania	Macao SAR	Argentina	Angola
France	Antigua and Bar.	Macedonia	Belize	Armenia
Germany	Austria	Malaysia	Benin	Australia
Hong Kong SAR	Bangladesh	Malta	Brazil	Bahrain
Japan	Barbados	Mauritius	Burkina Faso	Bolivia
United Kingdom	Belgium	Mexico	Burundi	Brunai
USA	Botswana	Moldova	Cabo Verde	Cameroon
	Bulgaria	Morocco	Ken. African Rep.	Chile
	Cambodia	Nepal	Côte d'Ivoire	Colombia
	Canada	Netherlands	Fiji	Congo
	Chinese Taipei	Pakistan	Ghana	Cuba
	Costa Rica	Panama	Grenada	Ecuador
	Croatia	Philippines	Guatemala	Gabon
	Cyprus	Poland	Guinea-Bissau	Greece
	Czech Republic	Portugal	Guyana	Guinea
	Denmark	Romania	Iceland	Jamaica
	Dominica	St. Kitts & Nevis	Kenya	Kazakhstan
	Dominican Rep.	Saint Lucia	Laos	Kuwait
	Egypt	Samoa	Madagascar	Mauritania
	El Salvador	Singapore	Malawi	Mongolia
	Estonia	Slovakia	Maldives	Montenegro
	Finland	Slovenia	Mali	Mozambique
	Georgia	South Africa	Namibia	Myanmar
	Haiti	Spain	New Zealand	Niger
	Hondura	Sri Lanka	Nicaragua	Nigeria
	Hungary	Swaziland	Paraguay	Norway
	India	Sweden	Rwanda	Oman
	Indonesia	Switzerland	St. Vincent	Papua New Guinea
	Ireland	Thailand	Senegal	Peru
	Israel	The Gambia	Seychelles	Qatar
	Italy	Togo	Solomon Islands	Russian Federation
	Jordan	Tunisia	Suriname	Saudi Arabia
	Korea, Rep. Of	Turkey	Tanzania	Trinidad and Tobago
	Kyrgyzstan	Ukraine	Tonda	United Arab Emirates
	Latvia	Viet Nam	Uganda	Venezuela
	Lesotho		Uruguay	Yemen
	Lithuania		Vanuatu	Zambia
	Luxembourg		Zimbabwe	

Annex 4

The following table shows the correlations between the variables, including the three original variables 'Imports', 'GDP', and 'Service Imports', which have been excluded due to their high correlation with the variables 'Exports' and 'Service Exports' of 0.845, 0.933 and 0.929. Also the exclusion of these variables follows a theoretical logic. The amount of imports is already included in the combination of the exports and the trade balance, the high correlation between GDP and exports is also understandable and furthermore is GDP not a real trade variable. And finally the correlation between service imports and service exports might just lead to the assumption if a country has a significant market for service trade or not.

		Exports	Imports	Trade Balance	GDP	Applied Tariffs	Agricultur.	Fuel and mining	Manufact.	Service Imports	Service Exports
Exports	Pearson Correlation	1	,959**	,027	,846**	-,197*	-,267**	-,098	,339**	,933**	,797**
Imports	Pearson Correlation	,959**	1	-,257**	,938**	-,203*	-,239**	-,138	,352**	,947**	,902**
Trade Balance	Pearson Correlation	,027	-,257**	1	-,424**	,042	-,067	,154	-,087	-,161*	-,466**
GDP	Pearson Correlation	,846**	,938**	-,424**	1	-,128	-,161*	-,078	,232**	,862**	,865**
Applied Tariffs	Pearson Correlation	-,197*	-,203*	,042	-,128	1	,241**	,044	-,334**	-,229**	-,257**
Agricultural	Pearson Correlation	-,267**	-,239**	-,067	-,161*	,241**	1	-,282**	-,367**	-,267**	-,229**
Fuel and mining	Pearson Correlation	-,098	-,138	,154	-,078	,044	-,282**	1	-,603**	-,112	-,157
Manufactures	Pearson Correlation	,339**	,352**	-,087	,232**	-,334**	-,367**	-,603**	1	,356**	,363**
Service Imports	Pearson Correlation	,933**	,947**	-,161*	,862**	-,229**	-,267**	-,112	,356**	1	,929**
Service Exports	Pearson Correlation	,797**	,902**	-,466**	,865**	-,257**	-,229**	-,157	,363**	,929**	1

** The correlations is on a level of 0,01 (bilaterally) significant.

* The correlation is on a level of 0,05 (bilaterally) significant.

Annex 5

The table shows the percentage of intra-BRICS trade in relation to the overall trade of the five BRICS countries. The data source is COMTRADE and refers to the year 2014. In the rows are the reporting countries and in the columns the trading partners. As can be seen only the trade with China is outstanding for Brazil, Russia, India and South Africa, while for China intra-BRICS trade accounts for 6% of its overall trade. Furthermore is India an important trading partner for South Africa.

Partner Country	<u>Brazil</u>	<u>Russia</u>	<u>India</u>	<u>China</u>	<u>S. Africa</u>
Brazil	-	1.5 %	2.5 %	17 %	0.4 %
Russia	0.8 %	-	0.9 %	11.2 %	0.1 %
India	1.6 %	0.8 %	-	9.2 %	1.5 %
China	1.8 %	2.1 %	1.6 %	-	0.5 %
S. Africa	1 %	0.4 %	6.1 %	13.2 %	-

The Data can be found on the Comtrade website: <http://comtrade.un.org>