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Export Diversification in Twelve European and Central Asian Countries and the Role of the Commodity Boom

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Abstract

This paper examines export diversification along the product and market dimensions for selected countries in the Europe and Central Asia region and, more generally, export performance. While the latter is extraordinary, with average export growth rates above 10 percent, the evidence on diversification is less impressive, and hints at a role played by the interaction of natural resource abundance and the commodity price boom. A cross-country analysis including 171 economies suggests that the region's resource rich countries are less diversified than would be expected given their resource endowments, level of development, and size. The commodity boom period was associated with an increase in concentration for the resource rich along the product dimension: they did not increase the number of products exported and became more reliant on oil and gas. During the same period, the resource poor increased their export product scope while maintaining other concentration indices unchanged. A similar but milder pattern is found for diversification along the destination dimension.

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Export Diversification in Twelve European and Central Asian Countries and the Role of the Commodity Boom

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JEL Classification: Q11, Q18.

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1. Introduction

During the first decade of the 2000s, the countries in the Europe and Central Asia (ECA) region exhibited an extraordinary export performance, with annual export growth rates well into the double digits. The second half of this period was marked by generalized increases in commodity prices, with oil and gas prices, for example, more than doubling with respect to the price levels in the first half, and directly impacting on export performance of the resource-rich countries of the region. In addition, the end of the decade experienced a sharp contraction in world trade due to a global downturn, to which the ECA countries were no exception.

In this paper we examine one dimension of export performance: that related to export diversification in products and markets during the period 2000-2010. We concentrate on twelve countries in the ECA region—Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan—and give special attention to the link between mineral resource abundance, commodity prices and export diversification.[2] The choice of countries and the period considered provide substantial variation both in terms of the relevant commodity prices (Figure 1) and of natural resource endowments (Figure 3).

Assessing the extent of export diversification of a set of countries and linking it with their resource endowments is relevant from a policy perspective. Diversification has been found to matter for growth and stability. Countries tend to diversify their production bundles as they develop, and only at relatively high levels of income per capita do they start to specialize again (Imbs & Wacziarg, 2003).[3] Reliance on a few export products tends to reduce growth by hampering productivity and increases a country's vulnerability to sharp declines in terms of trade (Lederman & Maloney, 2007).[4] Diversification has also been found to be a mediating factor between openness and growth. By diversifying export bundles along the product and destination dimensions, countries with export-oriented growth strategies hedge against product- or market-specific external shocks (Haddad, Lim, Munro, Saborowski, & Shepherd, 2011).

The main results of the paper are as follows. First, the resource-rich countries of the 12 considered here of the ECA region tend to have more concentrated export structures, along the product dimension, than would be predicted given their size, level of development and resource endowments.The converse is true for the non-resource rich. Second, the product diversification performance was associated with the evolution of commodity prices during the 2000s. Resource rich countries experienced a process of relative concentration during the period of the commodity boom, while the converse was true for the non-resource rich. Third, when considering diversification along the market dimension, the same phenomenon holds, although to a milder extent: the commodity boom was associated with less

[2] From this point onwards in the paper, the term "ECA countries" will refer to this subset of 12 countries unless explicitly stated otherwise.

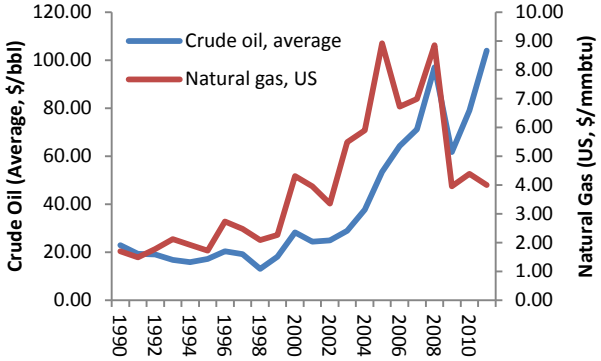
[3] In fact, Imbs & Wacziarg (2003) find that countries start specializing again at levels of income per capita comparable with that of Ireland in 1992.

[4] In addition, and as argued by (Lederman & Maloney, 2007), the presence of a major visible export product may bring about a variety of political economy effects that are deleterious to growth.

diversification for the resource rich, and more for the resource poor. Fourth, most of the overall export growth of the selected ECA countries was explained by growth along the intensive margin: selling more of the same products to the same markets; although the share of growth explained by the extensive margin (diversification) declines with economic size. Extinction rates of export flows are also negatively associated with economic size.

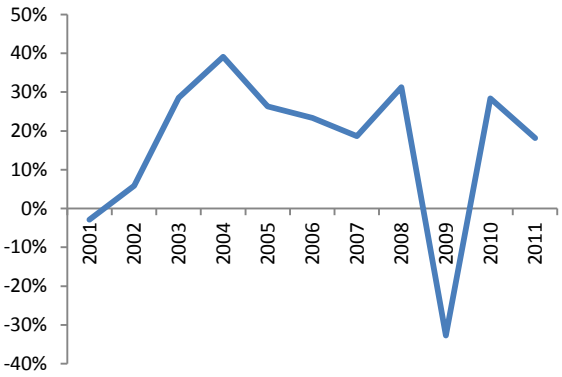
The remainder of this paper is structured in four sections. In the second section, we explore export diversification along the product dimension. We first introduce a method to classify economies as resource-rich and non-resource rich. Then, we examine the link between resource abundance and the extent of diversification along the product dimension. We look at the diversification performance of ECA countries in comparison with that of other countries with similar characteristics in terms of resource abundance, level of development and size. We examine the differential impact that the commodity boom that took place during the second half of last decade had on the diversification performance of resource-rich and resource-poor countries in the region. The third section focuses on diversification along the market dimension, exploring the links between resource abundance and the commodity price boom, and it presents country-specific indicators of diversification. In the fourth section we explore export performance, including the role of diversification in export growth and the evolution of market shares in the main export products and markets. The fifth section concludes.

Figure 1: Oil and Gas Prices over the last 20 years.



Source: Prospect Group, World Bank.

Figure 2: Annual Export Growth ECA Region



Source: Comtrade from WITS.

2. Export Diversification along the Product Dimension: Resource Abundance and the Commodity Boom

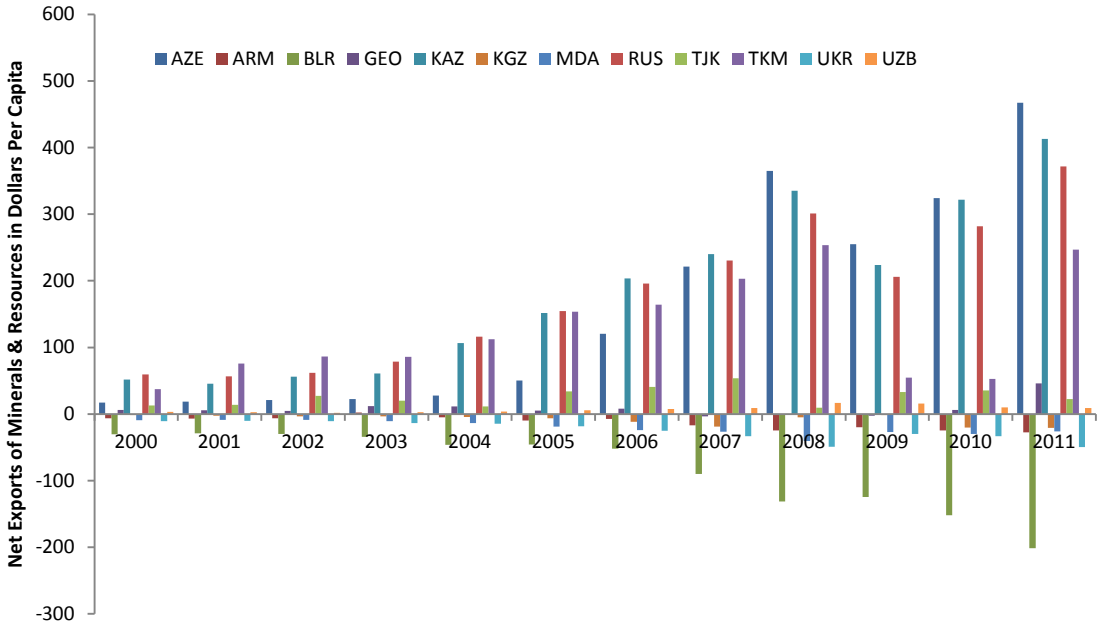
In this section we proceed as follows: first, we classify countries into resource rich or abundant and resource poor; second, we place the diversification performance of ECA countries in perspective from a cross-country point of view, using a model that links diversification with resource abundance, level of development and size; and third, we examine whether the commodity boom taking place in the second half of the last decade impacted the diversification performance of resource-rich and resource-poor countries in the ECA region differently. Finally, we present country-specific descriptive statistics on export diversification along the product dimension.

Defining Natural Resource Abundance

To classify ECA countries into 'resource-rich' (or abundant) and 'resource-poor' categories, we follow (Lederman & Maloney, 2007). Resource rich countries are considered to be those with net exports of minerals and natural resources per person being systematically positive over the period. This classification was previously introduced by (Leamer, 1984), and is dictated directly from a standard Heckscher-Ohlin model. The net exports of minerals and resources include petroleum and derivatives (SITC 33) and raw materials (SITC 27, 28, 32, 34, 35 and 68).

Figure 3 shows the evolution of net exports per capita for the countries under analysis. Two messages emerge. First, the price effect on trade flows of natural resources is evidenced by the 'funnel-shape'—the almost symmetric increases in trade flows for net exporters and importers. Second, there is substantial variation in natural resource endowments. Azerbaijan, Kazakhstan, Russia, Tajikistan, Turkmenistan and Uzbekistan were net exporters of minerals and resources over the period and therefore will be considered to be "resource rich". The cases of Russia, Azerbaijan and Turkmenistan stand out, with net exports of minerals during the period 2000-2011 averaging 176, 159 and 127 dollars per person. Armenia, Belarus, Kyrgyz Republic, Moldova and Ukraine were net importers, and therefore were classified into the resource-poor category. Georgia was also classified into the resource-poor category, as its net trade position in minerals and natural resources oscillated between positive and negative over the period.

Figure 3: Net exports of minerals and natural resources per capita in ECA countries



Source: Authors' calculations based on Comtrade Data from WITS.

Benchmarking Diversification Performance

We place ECA's export diversification performance along the product dimension in perspective by comparing it with that of other countries of similar characteristics. Specifically, we are interested in

comparing diversification performances among countries with similar natural resource endowments, similar levels of economic development, and similar size.

For these purposes, and using data for 171 countries over the period 2000-2011 and following Lederman and Maloney (2012, Chapter 7), we estimate a model linking diversification indicators (the Herfindahl Index, the count of export products, and the share of the top 5 products in total export revenue) [5] with an indicator of resource abundance (net exports of natural resources per capita, as defined above), the level of economic development as measured by the log of GDP per capita, and the size of the labor force, as in equation (1) [6]:

$$\mathrm{D_i} = \beta_0 + \beta_1 \mathrm{NXR_i} + \beta_2 logGDPpc_{\mathrm{i}} + \beta_3 logLabForce_{\mathrm{i}} + \varepsilon_{\mathrm{i}} \quad (1)$$

where Di is the diversification indicator (for the Herfindahl we consider the average of the square root of the Herfindahl Index of export concentration for country 'i' over the period 2000-2011, for the count of products we use the logarithm of the average count of products exported by country 'i' over the period 2000-2011, and for the share of the top 5 products we take its average over the period 2000-2011), NXR is the average of net exports of minerals and natural resources of country 'i' over the period 2000-2011, logGDPpc is the average of the logarithm of per capita GDP in constant dollars of 2000 over the period 2000-2011, and logLabForce is the average of the logarithm of the size of the labor force of country 'i' over the period 2000-2011.

Results are reported in Table 1 (Appendix). As expected, the estimation of equation (1) for each of the diversification indicators suggests unambiguously that while resource abundance is associated with more concentrated export structures, the level of development and the size of the labor force are associated with more diversified ones. The three coefficients on the explanatory variables are very well determined at 5 percent significance, and the models fit the data at all conventional levels of significance (in fact, the models explain 31.7, 42.7 and 81 percent of the variance of the root of the Herfindahl index, the share of the top 5 products, and the log count of exported products, respectively).

The estimated models allow us to benchmark ECA countries' performances with respect to the conditional means of the sample. Within ECA, resource rich countries are less diversified than resource poor countries, and they are also less diversified than predicted, given their size, their resource endowments and their level of development. Figures 4, 5 and 6 plot the actual concentration indices (root of Herfindahl Index, share of the top 5 products in total exports, and log of count of exported products) against the predicted concentration indices that emerge from the models (results are in Table 1). The 45-degree lines in each figure plot the locus along which the actual level of diversification of a given country matches the predicted one based on the model. For example, both for the Herfindahl and the share of the top 5 products, Azerbaijan, Turkmenistan, Kazakhstan and Russia are well above the 45-degree line, suggesting that their export structures are substantially more concentrated than predicted

[5] The Herfindahl Index measures the concentration of export shares held by a particular product (destination) in a given export profile, and varies from zero (no concentration) to one (full concentration). The count of export products is the count of different HS-6 categories that contain exports of at least 100,000 USD, and the share of the top 5 export products measures the sum of export revenue obtained from the largest 5 export products as a portion of total export value in a given year.

[6] Alternative non-linear specifications could also be considered, given the findings in the literature on diversification and the level of development mentioned above (Imbs & Wacziarg, 2003).

by the models. Resource-poor countries, such as Moldova, Ukraine, or Kyrgyz Republic, appear below the 45-degree line; their export structures are more diversified than predicted by the model.

Figure 4: (Root) Herfindahl Index Against Prediction

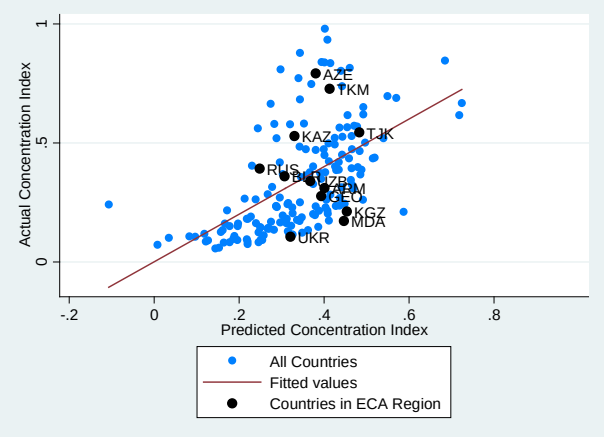


Figure 5: Share of Top 5 Products Against Prediction

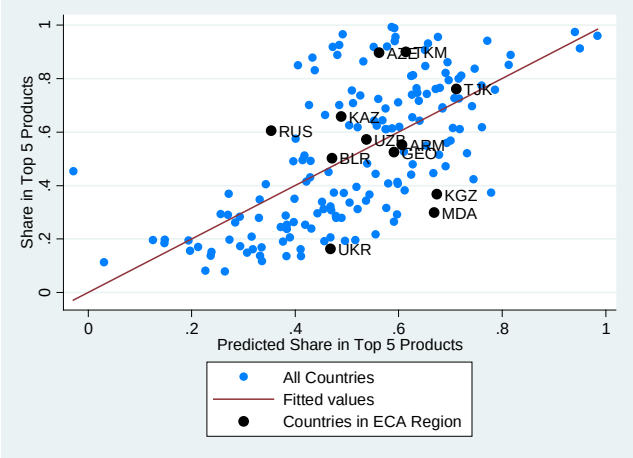
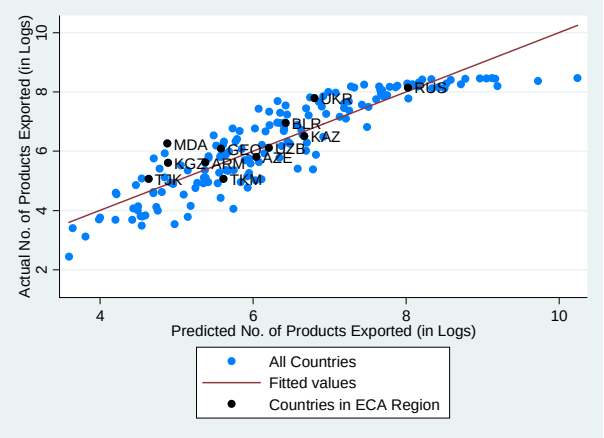


Figure 6: (Log) Count of Export Products Against Prediction



The same pattern emerges from Figure 6 that compared the predicted and actual number of exported products. In this case, the variables considered in the estimated model explain more than 80 percent of the total variation of the diversification indicators, which suggests that resource abundance, development and size explain the largest portion of diversification patterns. This shows by how much closer each country is to the 45-degree line in which the predicted count matches the actual count of export products.

Source: Authors' calculations based on WDI and Comtrade data from WITS.

Still, most of the resource rich countries of the region (Turkmenistan, Azerbaijan, and Kazakhstan) are below the 45-degree line, which means that they export fewer products than is predicted by the model. Russia and Uzbekistan's numbers of export products match those predicted by the model, while Tajikistan exports more products than predicted.

Diversification and the Commodity Boom

We assess whether the diversification performance of ECA countries during the commodity boom period differed between resource-rich and resource-poor countries, also taking into consideration diversification of exports into services.

For these purposes, we estimate the following equation (2):

$$D_{i,t} = \alpha + \alpha_i + \beta_1 CBoom_t + \beta_2 CBoom_t * RR_i + \varepsilon_{it} \quad (2)$$

where D_{it} is the diversification indicator (share of exports in top 5 products in total exports, number of products exported, the Herfindahl Index and the share of services exports in total exports) for country i in period t, CBoom is a dummy that takes value 1 if the period falls under the commodity boom (2006-2011) and zero otherwise, and RR is a dummy variable that takes the value 1 if the country in question is rich in natural resources (Azerbaijan, Kazakhstan, Russia, Tajikistan, Turkmenistan and Uzbekistan) and zero otherwise, and α_i is a set of country fixed effects that capture the country specific factors affecting diversification that are time invariant.

The change in diversification during the period of the commodity boom for resource-rich economies and for resource-poor economies is given by differentiating (2) with respect to the commodity boom dummy (CBoom), conditional on RR=1 and RR=0, respectively (as in equations (3) and (4)). To have a robust idea of these effects and using the estimates of equation (2), we constructed 90 percent confidence intervals for these, as described in equation (5).

$$\left.\frac{dD_{i,t}}{dCBoom}\right|_{RR=1} = \beta_1 + \beta_2 * 1 \qquad (3)$$

$$\left.\frac{dD_{i,t}}{dCBoom}\right|_{RR=0} = \beta_1 + \beta_2 * 0 \qquad (4)$$

$$CI = dD/dCboom \pm 1.645 * s.e.(\beta_1 + \beta_2 * RR) \quad (5)$$

with

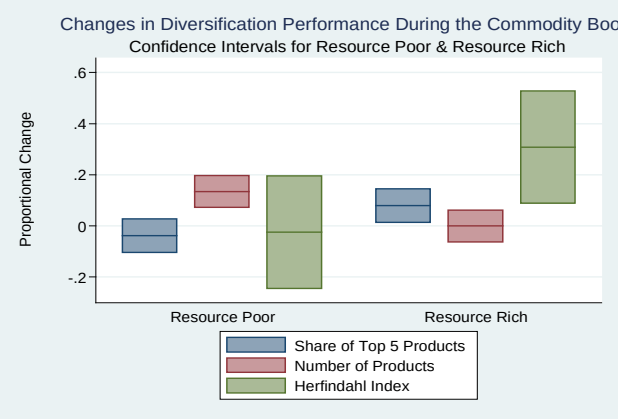
$$s.e.\, dD/dCBoom = \sqrt{V(\beta_1) + V(\beta_2 * RR) + 2Cov(\beta_1, \beta_2 * RR)} \quad (6)$$

For the case of resource poor countries, equation (6) collapses to $\sqrt{V(\beta_1)}$, as RR=0.

During the commodity boom, resource rich economies in ECA tended to concentrate their goods export baskets when compared to the first half of the decade, in contrast with the trend for the non-resource rich economies. Estimates of equation (2) reveal that during the commodity boom resource-poor countries did not increase concentration as measured by the share of the top 5 products in total exports or the Herfindahl index, but increased the number of export products. In contrast, resource-rich countries increased concentration as measured by the share of the top 5 products in exports and the Herfindahl Index, while they did not increase the number of export products (see Figures 7 & 8 for an illustration of the confidence intervals for proportional impact effects of the commodity boom on resource-rich and resource-poor countries) (estimates of the three versions of equation (2) are

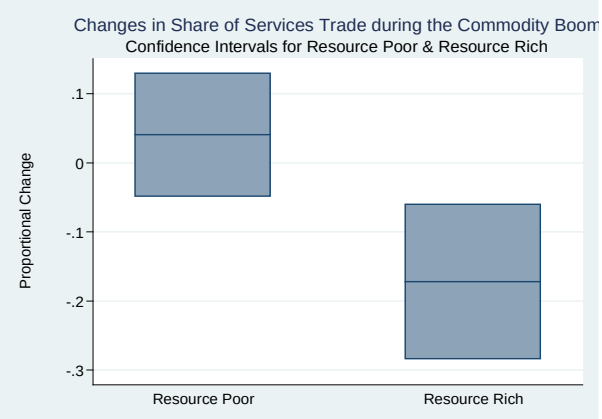
presented in the Appendix to this paper). On average, the share of the top 5 export products in total exports increased by about 7 percentage points for the resource-rich group of countries during the commodity boom period, which represents a proportional increase of 9.4 percent. The Herfindahl index, another useful indicator of concentration of exports, also shows an average increase in concentration for the resource-rich group of countries while for the resource-poor group, the change was statistically insignificant (Figure 7).

Figure 7: Average diversification trends during the commodity boom.



Source: Authors' calculations based on Comtrade.

Figure 8: Services trade trends during the commodity boom.



Source: Authors' calculations based on WDI.

Concentration among resource-rich economies in ECA during the commodity boom has also meant a reduction in the importance of services exports in overall exports. On average, during the commodity boom, the share of services exports dropped by about 6 percentage points among resource-rich economies, which implies a proportional reduction of about 25 percent. For the resource-poor economies, the same share remained largely unchanged when compared to the first half of the decade, as shown in Figure 8.[7]

Country-Specific Product Diversification Statistics

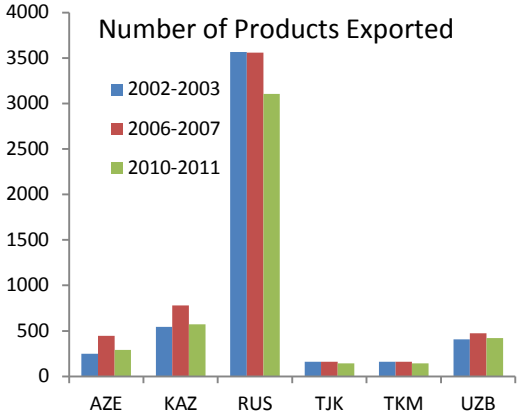
The average trends in terms of diversification discussed above, however, mask substantial heterogeneity. Among the resource rich, the share of the 5 most important export products in total exports has risen in Azerbaijan, Kazakhstan and Russia, but fallen in Turkmenistan and Uzbekistan. In Russia, for example, the most diversified economy in the region, the top 5 products accounted for 54.5 percent of total exports in the period 2002/03 but accounted for almost 70 percent in 2010/11. Over the same period, the number of products exported by Russia dropped from 3565 to 3104.[8] Turkmenistan and Uzbekistan, on the other hand, managed to decrease dependence on their top 5 export products, from 91 and 59 percent to 80 and 51 percent, respectively. Among the relatively resource poor economies, a moderate process of diversification is evidenced by decreases in the share of the top 5 export products in total exports and by increases in the number of products exported when comparing 2002/03 with 2006/07. Coinciding with the world trade collapse, these trends have been at least partially reversed toward the end of the decade. According to this indicator, Ukraine and Moldova show

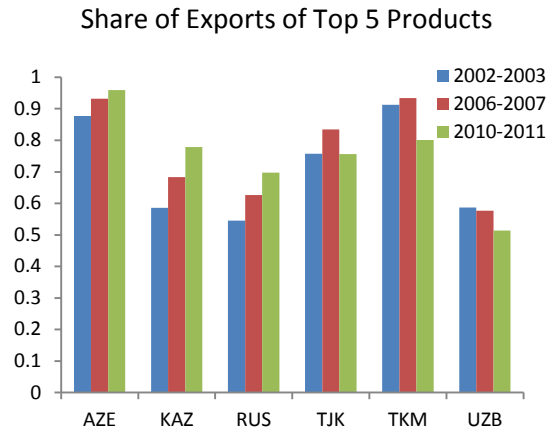
[7] Unfortunately, data availability constraints for services trade prevent us from analyzing export diversification trends within services products.

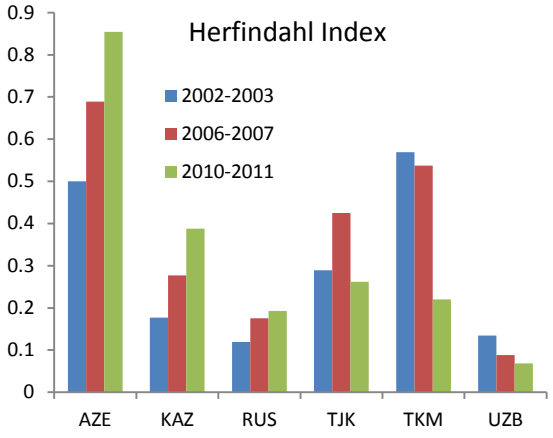
[8] A product is an export category defined at the 6 digit level disaggregation of the HS classification.

the least concentrated export structure by product, while Azerbaijan shows the most concentrated one (in fact, for the latter country, the share of exports in the top 5 products was above 95 percent in 2010/11). The evolution of the Herfindahl index is in line with the evolution of the previously discussed indicators (Figures 9a and 9b).

Figure 9a: Diversification Indicators for Resource Rich Economies.

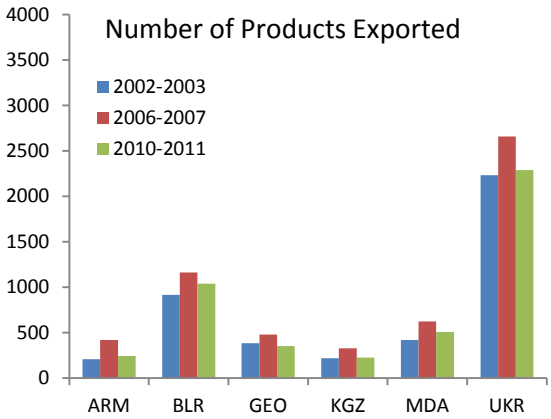


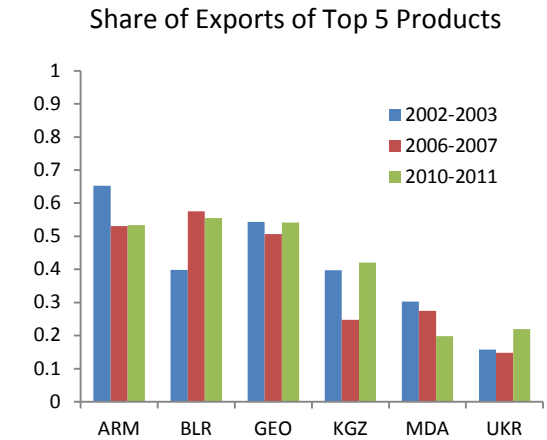


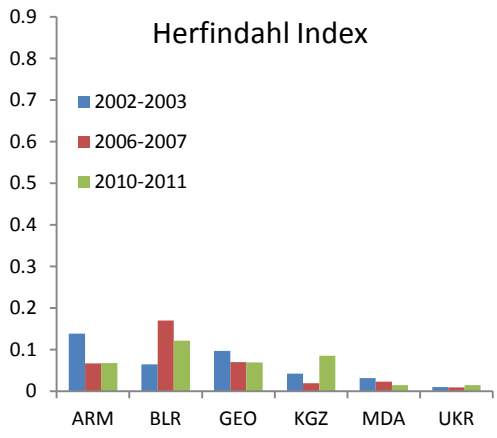


Source: Authors' calculations based on Comtrade data from WITS.

Figure 9b: Diversification Indicators for Resource Poor Economies.

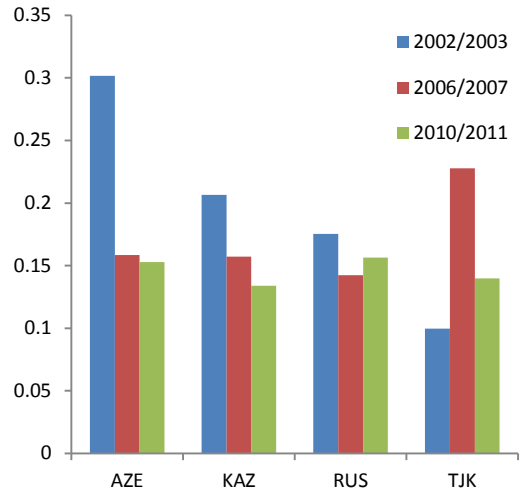






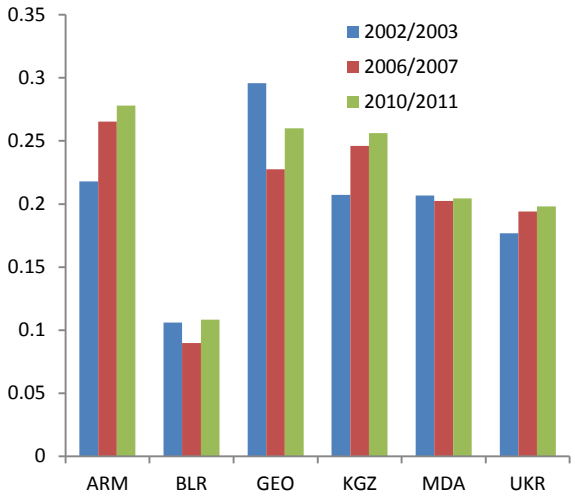
Source: Authors' calculations based on Comtrade data from WITS.

Figure 10a: Share of Services Trade in Total Trade (Resource Rich Countries)



Source: Authors' calculations based on WDI. Note: Data for Turkmenistan and Uzbekistan, also resource rich, are not available.

Figure 10b: Share of Services Trade in Total Trade (Resource Poor Countries)



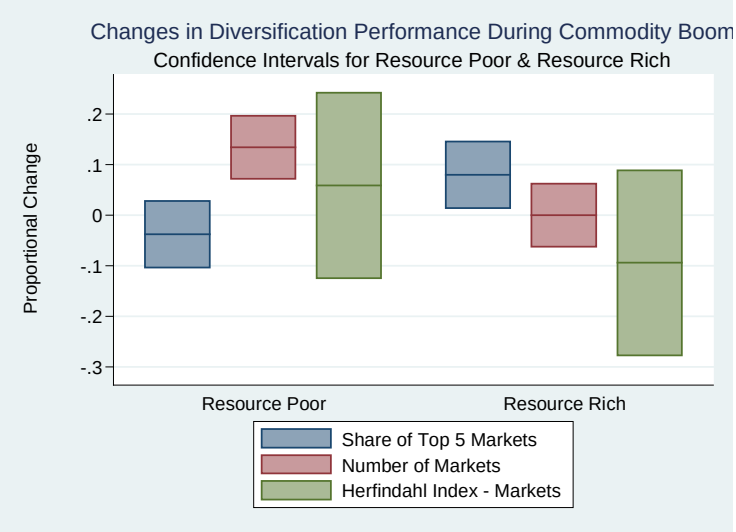
Source: Authors' calculations based on WDI.

3. Export Diversification along the Destination Dimension

Destination Diversification and the Commodity Boom

The commodity price boom had some effects on diversification along the market dimension among the ECA countries. Using the same methodology as in the previous section, we look at whether some identifiable pattern could be extracted from how export diversification performance varied along the destination dimension between the resource-rich and the resource-poor countries in the region. Results from estimating equation (2) but using destination diversification indicators as dependent variables are reported in Table (3) in the Appendix. Though less striking than for the product diversification case, results suggest that the commodity boom could have acted as a barrier to diversification along the market dimension too.

Figure 11: Average diversification trends during the commodity boom.



Source: Authors' calculations.

Figure 11 shows that while the number of markets served increased during the period for resource-poor countries (they have penetrated into eight new markets, on average, which represents, roughly, a 15 percent increase), this is not the case for resource-rich countries, where no significant increase in the number of markets served by their exports is observed. [9] At the same time, while during the period resource-poor countries have not increased dependence on their top 5 destinations, resource-rich countries' dependence has increased mildly.

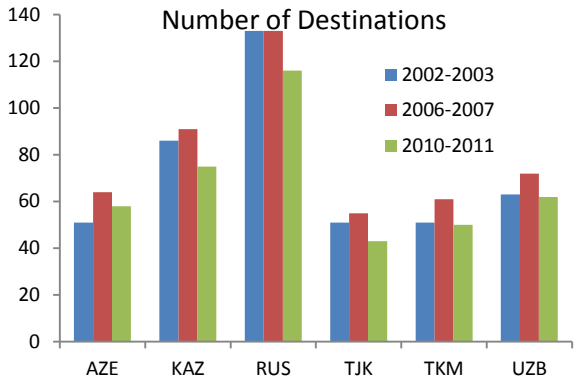
Country-Specific Destination - Diversification Statistics

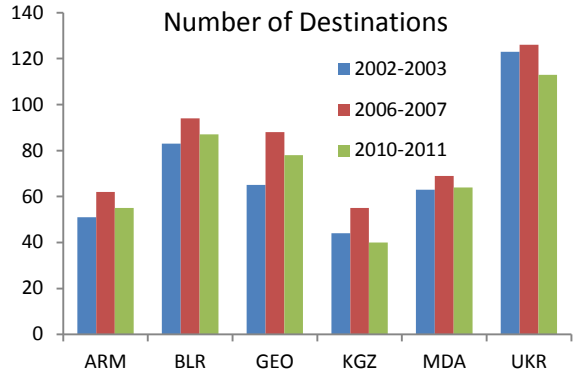
As in the case of diversification indicators along the product dimension, heterogeneity is revealed when we zoom into country-specific trends. Russia, Ukraine and Uzbekistan decreased the number of markets served during the period, and increased their dependence on their top 5 destinations, which resulted in an increase in the Herfindahl index of concentration. In Uzbekistan, for example, while the number of markets served decreased only moderately during the period, its dependence on the 5 most important export destinations increased dramatically, from 45 percent in 2002/03 to roughly 82 percent in 2010/11. In contrast, other economies, such as Azerbaijan, managed both to widen the number of export destinations and to decrease their dependence on the most important ones. Azerbaijan added seven new export destinations and decreased its dependence on the top 5 export destinations by almost 10 percentage points over the period. While in 2002/3, the 5 most important markets for Azerbaijan accounted for 74 percent of total exports, they accounted for about 64 percent in 2010/11 (Figures 12a & 12b).

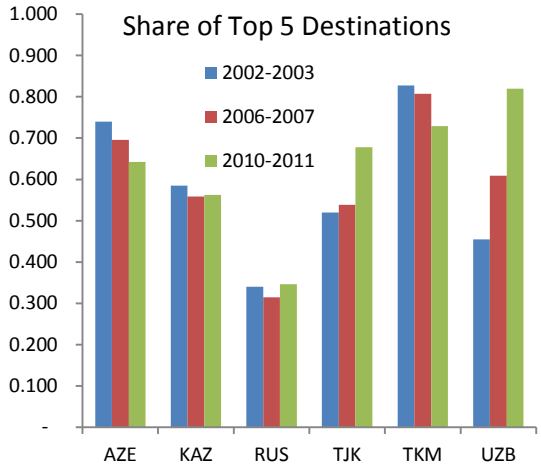
Figure 12a: Diversification Indicators for Resource Rich Economies.

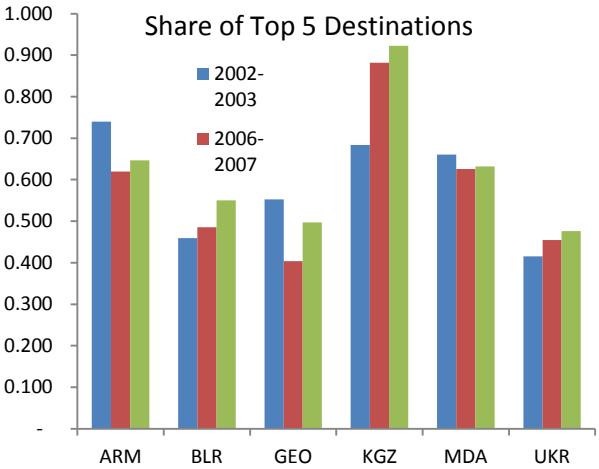
Figure 12b: Diversification Indicators for Resource Poor Economies.

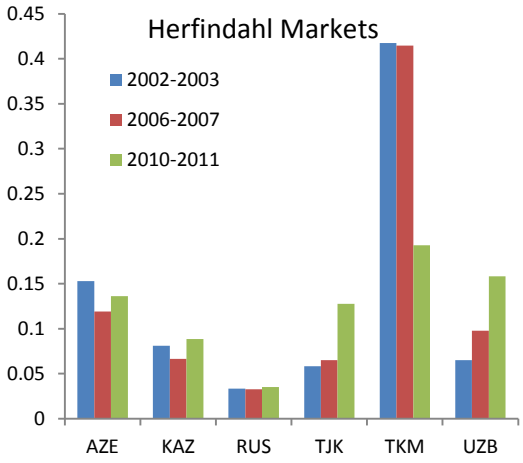
[9] The methodology used to calculate the confidence intervals reported in Figure 12 is discussed in the previous section.

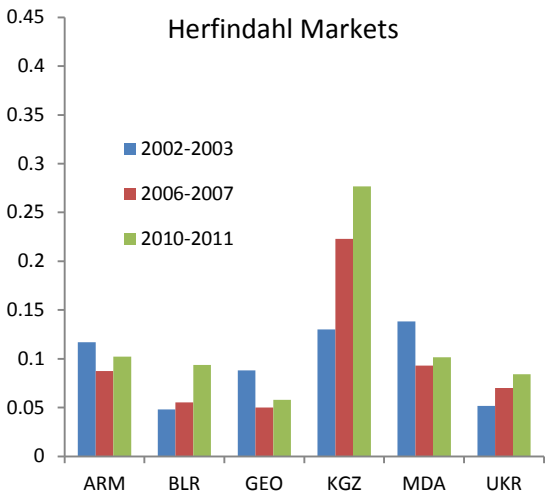












Source: Authors' calculations based on Comtrade Data.

4. Export Performance

In this section we describe the export performance of the twelve ECA countries under consideration using a threefold approach. We first examine the role played by diversification in the export growth

patterns over the period 2000-2010. For this we decompose export growth for each country under consideration into growth via the intensive margin (more of the same products to the same destinations) and growth via the extensive margin (new products, new markets, or a combination). We perform this decomposition for global export growth, for export growth to a traditional export market—the European Union - 27 (EU-27) —and to new and fast-growing trading partners—countries in the East Asia and Pacific (EAP) region. We then explore whether these countries have gained or lost market share for their most important products and in their most important markets.

The Role of Diversification in Export Growth: Extensive and Intensive Margin Decomposition

Decomposing export growth into the margins of trade will inform us further on the role played by diversification along the dimension of markets as well as of products by showing the portion of export growth that can be accounted for by the extensive margin.

Figure 13a: Decomposition of Export Growth, 2000-2010

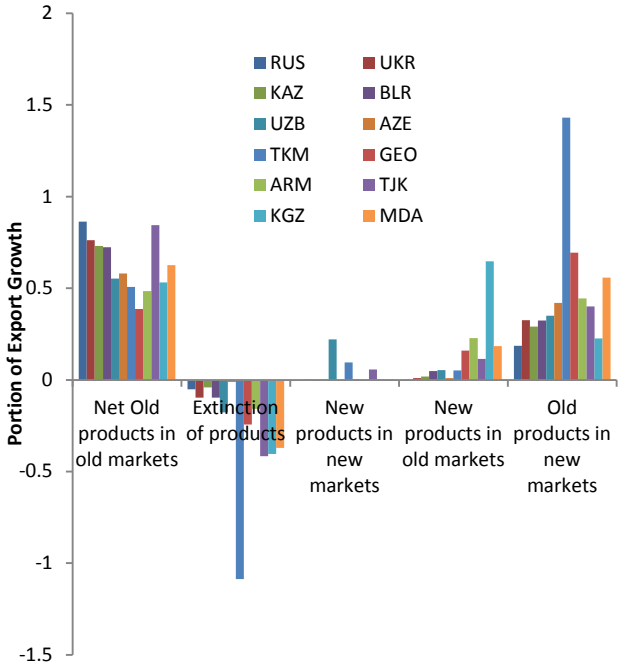
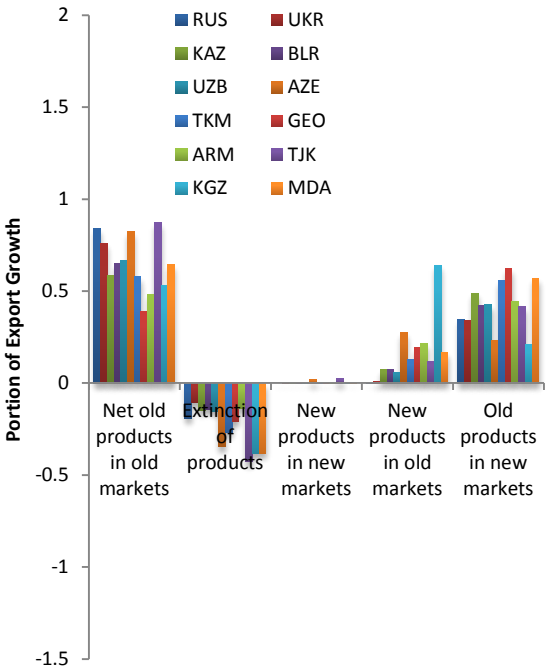


Figure 13b: Excluding Oil & Gas, 2000-2010



Source: Authors' calculations based on Comtrade and WDI.

Figures 13a & 13b show the decomposition of export growth (for all exports and for non-oil and gas exports, respectively) over the period 2000-2010. The growth rate is decomposed into net growth of old products in old markets, extinction of products, introduction of new products in new markets, introduction of new products in old markets and growth via old products sold in new markets. The figure presents the ECA countries ranked according to their economic size (measured by GDP in 2010, adjusted by PPP).

With the exception of some outlier performance in Turkmenistan (referring to extinction of products and to variations in the extensive margin categories (new products in new markets and old products in

new markets)), likely related to data reporting issues, the exclusion of oil and gas does not alter the message conveyed by this decomposition.

A larger portion of export growth in ECA's smaller economies was accounted for by growth in the extensive margin (selling to new markets and introducing new products) relative to the larger economies. This shows in an upward trend in the bars that show the share of export growth accounted for by new products in old markets and old products in new markets, and by the downward trend in the bars showing the share of growth explained by the net change in old products in old markets. This seems reasonable, given that larger economies tend to have already exploited the extensive margin to a greater extent: they have been trading more goods with more partners.

Smaller economies also face relatively higher extinction rates of products. This is likely a direct consequence of higher 'experimentation'. That is, smaller economies whose exports grow more through the extensive margin also see a higher rate of disruption of these 'new' trade flows.

The rapid growth observed in the economies of EAP, combined with the relative geographical proximity, present a unique opportunity for the countries in the ECA region, not only to increase exports, but also to diversify their bundles. While the importance of EAP in the export baskets of ECA countries has increased, here we look at the relative importance of the margins of export growth, but zooming into the EAP region as the relevant destination, and then comparing it with the relative importance of the margins of export growth with the EU-27, a traditional partner trading partner for countries in the ECA region. Essentially, the question addressed is the following:

Has export growth to the EAP countries been mainly driven by the intensive or the extensive margin over the period 2000-2010? That is, has the growth in EAP been a driving force for greater exports of the same products to the same markets, to new markets, or a force for diversification by selling new products to old or new markets in that region? And how does it compare to export trends to EU-27?

Figures 14a & 14b show the results from decomposing ECA countries' export growth to EAP and to EU-27, respectively, into the intensive and extensive margins.[10]

In line with the results reported above, when performing the intensive-extensive margin decomposition at the global level, export growth in larger countries tends to be explained predominantly by exporting 'more of the same, to the same' (intensive margin). Here again we ordered countries by economic size (from largest to smallest). It is possible to see a downward trend in the bars of Figures 14a and 14b showing the portion of export growth with EAP and EU-27, respectively, that is accounted by net increases of old products in old markets, as well as in the rates of extinction of products. Smaller countries struggle more to keep export flows 'alive' in all markets in general, and with EAP and the EU-27 in particular.

Small economies of ECA seem to have taken advantage of their fast growing neighboring countries in EAP to diversify their export baskets along the market dimension. For the small economies of the ECA

[10] In Figure 15a, Kyrgyz Republic's shares of export growth explained by the different categories of intensive and extensive margins are plotted in the right-hand side vertical axis.

region, growth in the extensive margin – through increased exports of the same products to new markets - has been more important than growth in the intensive margin. And this has been similar, although to a lower extent, when looking at export growth with EU-27. It seems undisputable that over the period considered, small ECA countries have diversified the market destinations taking advantage of the fast growing neighboring markets. Here again, for the relatively larger countries (Russia, Kazakhstan, Belarus, Uzbekistan), growth at the intensive margin is more important than at the extensive margin.

Figure 15a: Decomposition of Export Growth to EAP, 2000-2010

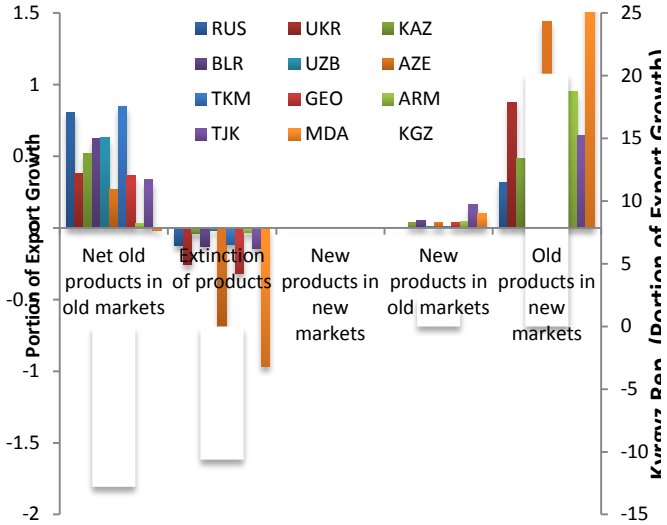
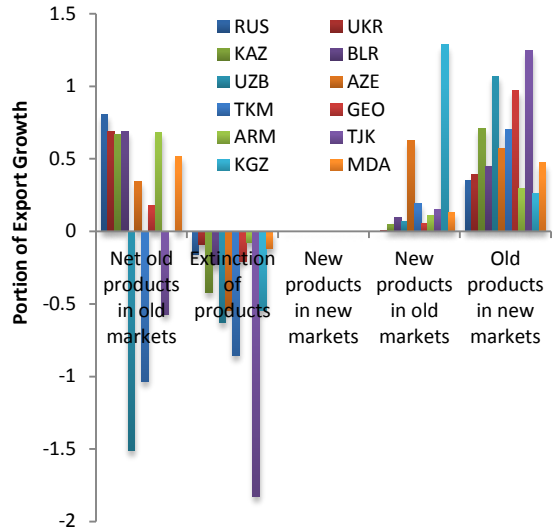


Figure 15b: Decomposition of Export Growth to EU-27, 2000-2010



Growth Orientation of Export Products & Export Markets

To complement the indicators of diversification above and inform on how ECA countries' most important export products and export markets are faring in international competition, we compare their export growth to the growth in world demand for their exports, over the period 2005-2010, now excluding oil and gas from the export basket, following (Reis & Farole, 2012).[11] Figures 15a and 15b plot the annual averages growth rates of world demand for the top 10 most important products for each of the ECA countries (in the X-axis) against the average export growth of those products in the country in question (in the Y-axis). Figures 16a and 16b plot the annual average growth rates of world exports to the top 10 most important destinations for each of the ECA countries considered (in the X-axis) against the average export growth of the ECA countries to those destinations. These graphs are informative on the country's performance within the intensive margin of export growth in two respects:

(i) The degree of diversification of a country within the top ten most important products (markets), which is illustrated by the relative sizes of the bubbles that represent the importance of the product (market) in the export basket of the country.

[11] To identify the products, we consider the top 10 most important at the beginning of the period (2005).

(ii) How world market shares evolve for these products (markets). This shows on the position of the bubble relative to the red line, which indicates that the growth of world demand equals the growth of exports in the country in question, suggesting no change in the country's world market share for that product (market).

In Azerbaijan and Kazakhstan, the increase in importance in the export basket of the top 5 products, documented in Figure 15a, is clearly explained by increases in exports of crude petroleum oils, since once we exclude these products, we see that these countries have been losing market shares (as for most of the products, their export growth is outperformed by world demand). In addition, for many important products, export growth is negative over the period (for Azerbaijan this is the case for two important products like hazelnuts and cotton; for Kazakhstan it is the case for titanium, aluminum oxide and ferrous waste). Russian performance in non-oil and gas exports seems to be more balanced, gaining world market shares in wood products, diamonds, and semi-finished steel products, while losing world shares in, for example, ferrous waste and non-alloyed aluminum. For Tajikistan, on the other hand, export growth has been positive over the period for the majority of its most important products, while for the most important one (non-alloyed aluminum), market shares remained unchanged. Uzbekistan, on the other hand, has lost market share in cotton, which was its most important export product in 2005.

In Armenia, Kyrgyz Republic, Moldova and Ukraine, exporters seem to have lost market share in the majority of their most important products, while in Belarus, export performance in the most important products is relatively more balanced.

Figure 15a: Growth Orientation of Export Products Resource Rich

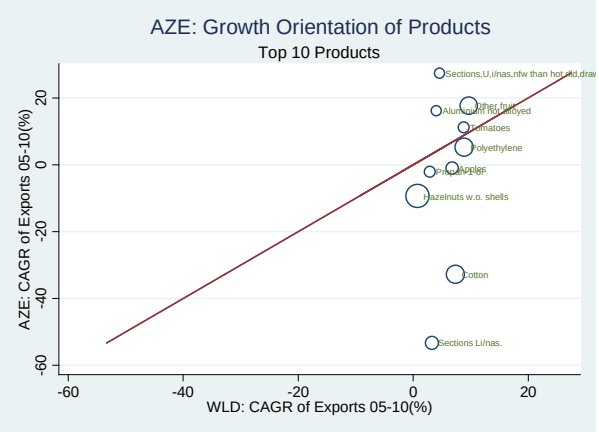
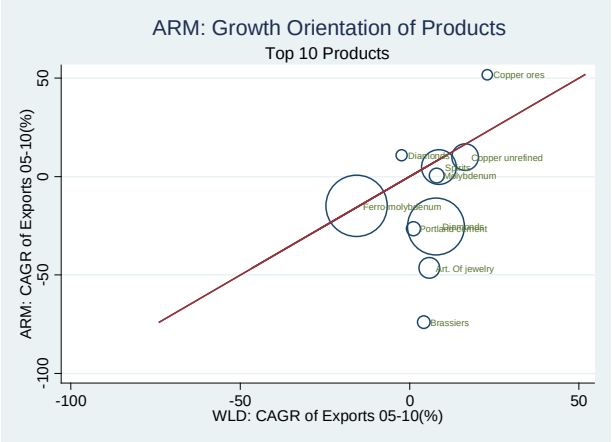
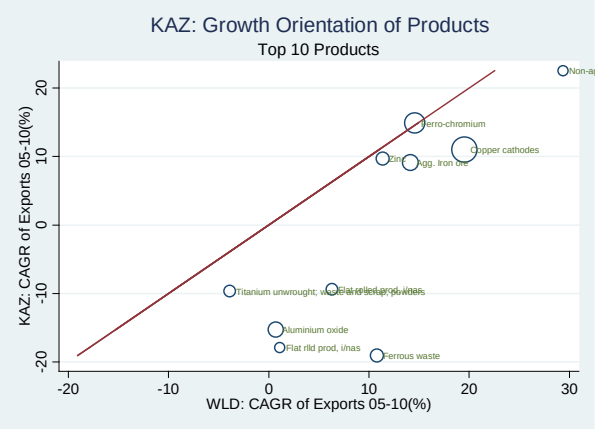
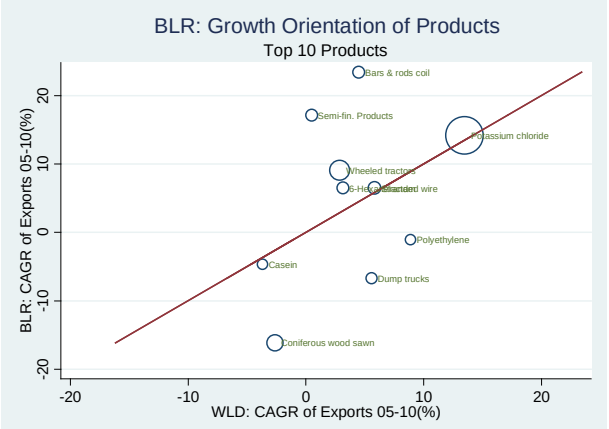
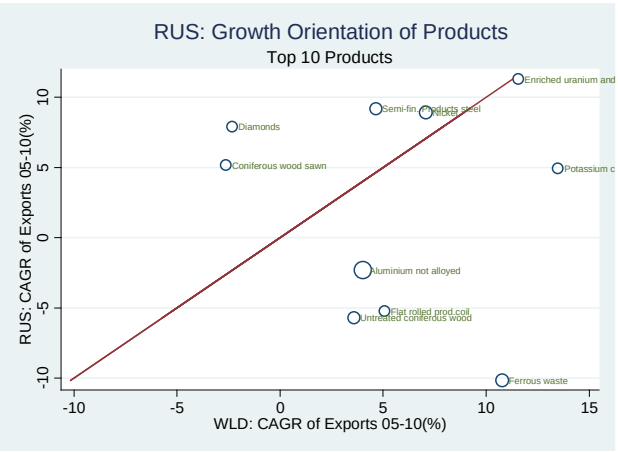


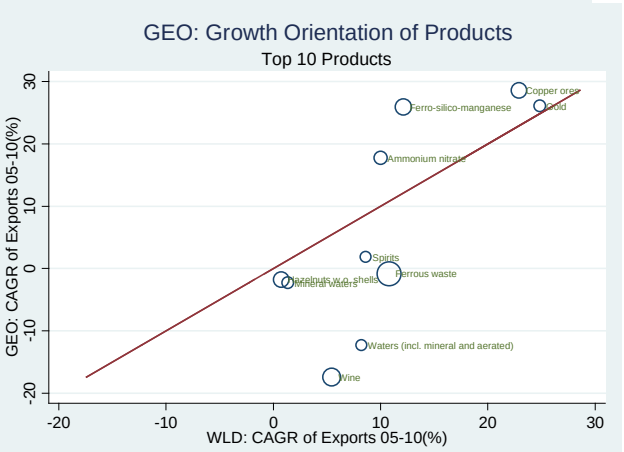
Figure 15b: Growth Orientation of Export Products Resource Poor

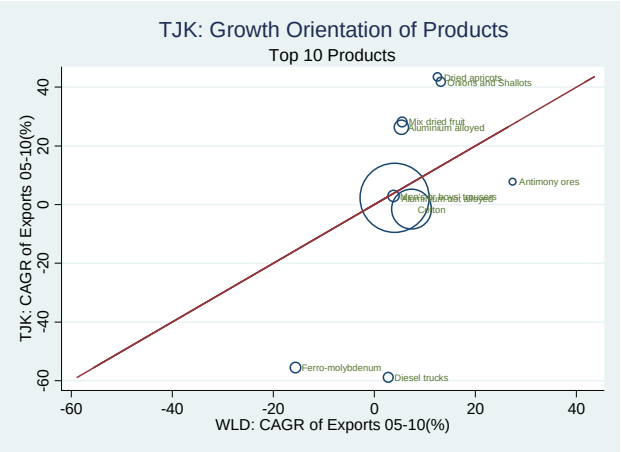


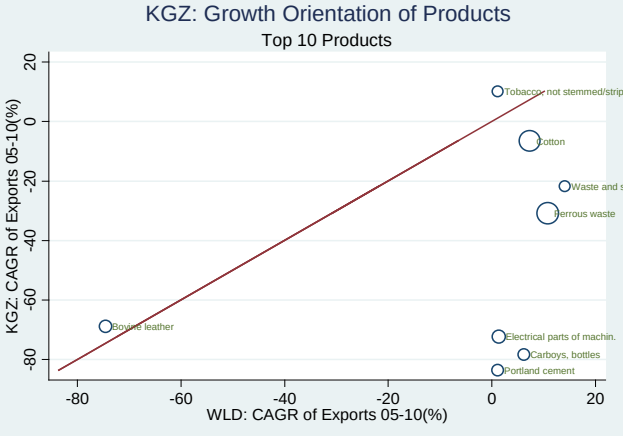

KAZ: Growth Orientation of Products
Top 10 Products
KAZ: CAGR of Exports 05-10(%)
WLD: CAGR of Exports 05-10(%)
Ferro-chromium
Copper cathodes
Titanium unwrought; waste and scrap; powders
Aluminium oxide
Flat rlld prod, i/nas
Ferrous waste

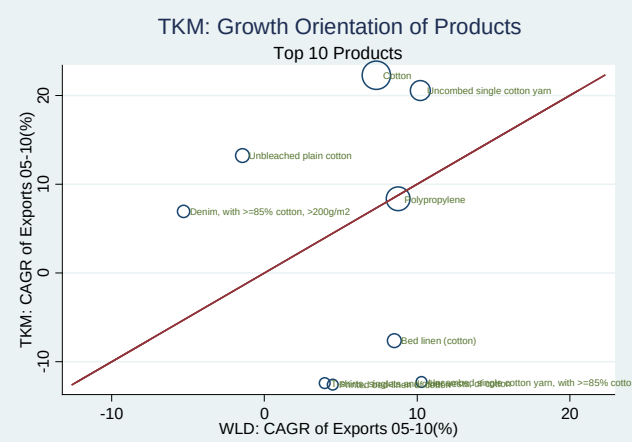

BLR: Growth Orientation of Products
Top 10 Products
BLR: CAGR of Exports 05-10(%)
WLD: CAGR of Exports 05-10(%)
Bars & rods coil
Semi-fin. Products
Potassium chloride
Wheeled tractors
Polyethylene
Casein
Dump trucks
Coniferous wood sawn

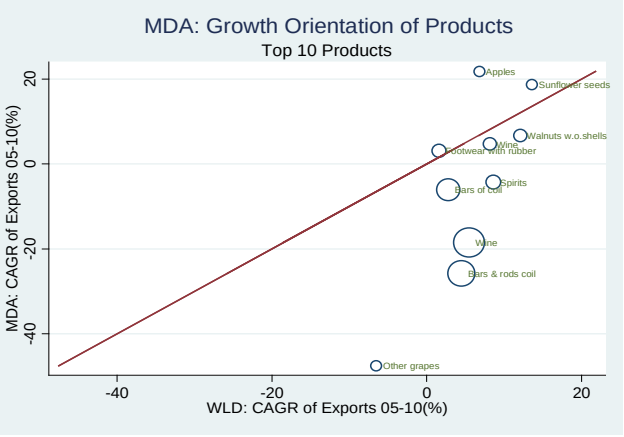

RUS: Growth Orientation of Products
Top 10 Products
RUS: CAGR of Exports 05-10(%)
WLD: CAGR of Exports 05-10(%)
Diamonds
Coniferous wood sawn
Aluminium not alloyed
Flat rolled prod,coil
Untreated coniferous wood
Ferrous waste

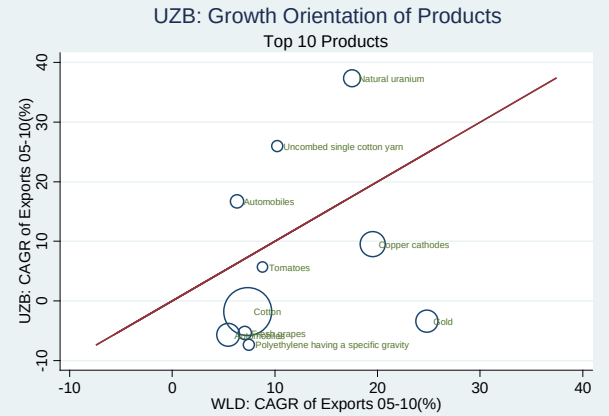

GEO: Growth Orientation of Products
Top 10 Products
GEO: CAGR of Exports 05-10(%)
WLD: CAGR of Exports 05-10(%)
Ferro-silico-manganese
Ammonium nitrate
Spirits
Ferrous waste
Waters (incl. mineral and aerated)
Wine


TJK: Growth Orientation of Products
Top 10 Products
TJK: CAGR of Exports 05-10(%)
WLD: CAGR of Exports 05-10(%)
Onions and Shallots
Aluminium alloyed
Antimony ores
Cotton
Ferro-molybdenum
Diesel trucks

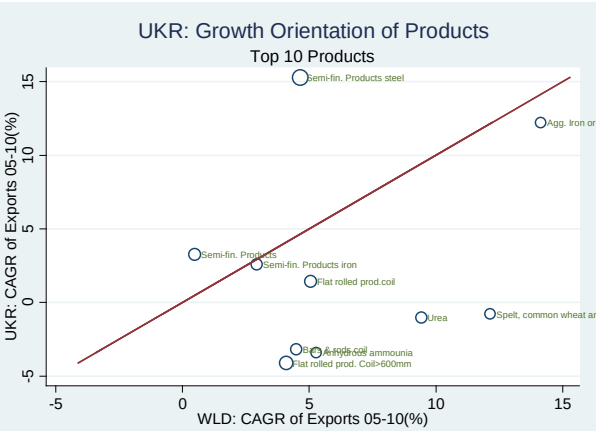

KGZ: Growth Orientation of Products
Top 10 Products
KGZ: CAGR of Exports 05-10(%)
WLD: CAGR of Exports 05-10(%)
Cotton
Ferrous waste
Bovine leather
Carboys, bottles
Portland cement







Source: Authors' calculations based on Comtrade data from WITS



Source: Authors' calculations based on Comtrade data from WITS

The results for the 'growth orientation of markets' analysis are presented in Figures 16a and 16b for resource poor and resource rich countries, respectively. Take the case of Azerbaijan. Exports to its most important partner (Italy) have grown at an impressive annual rate of 40 percent, much higher than the 6 percent annual average rate of growth of world exports to Italy. This implies that over the period, Azerbaijan gained market share in Italy. However, this is purely explained by oil and gas exports. Excluding oil and gas, exports to Italy have contracted by about 20 percent per annum (and those to Germany have decreased in a similar manner). It was only within the region that Azerbaijan sustained positive non-oil and gas export growth in their most important markets. This was the case in Russia, Ukraine, Georgia, Iran and Turkey, with Azerbaijan increasing its global market shares in the last two destinations.

The Russian case is worth a mention; while this country lost market shares in all of its largest partners but one (Germany), it still increased non-oil and gas exports to most of them.

Most of the relatively smaller economies of the region, such as Kyrgyz Republic, Moldova, Tajikistan and Turkmenistan, exhibited an underwhelming export performance with their largest destinations, with

non-oil and gas exports decreasing at relatively high rates (China for the case of Kyrgyz Republic, Russia for the case of Moldova, and USA for Tajikistan and Turkmenistan).[12]

Figure 16a: Growth orientation of markets (RP).

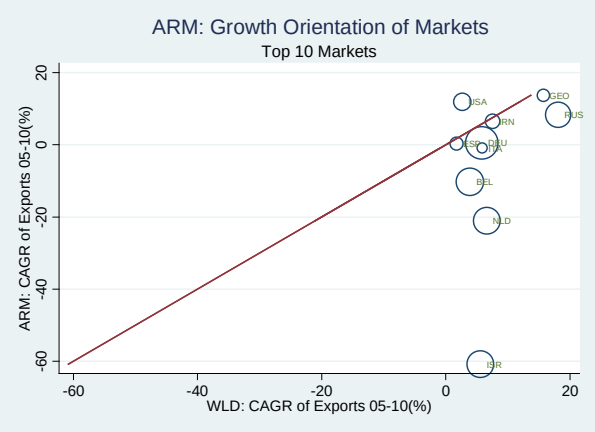
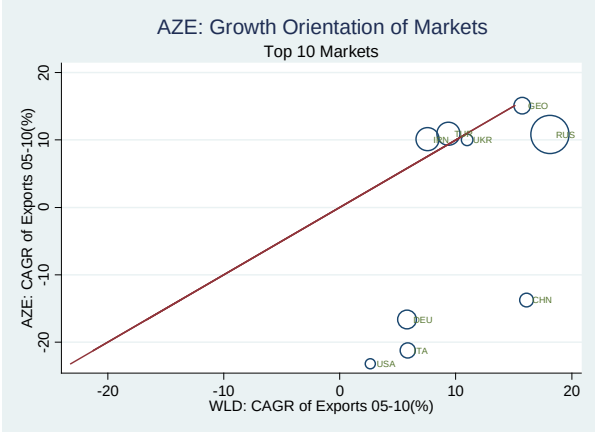
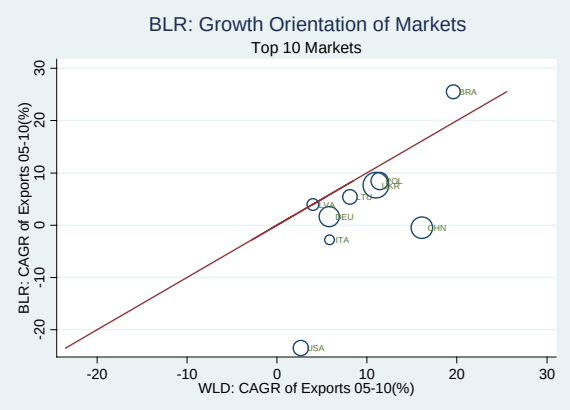
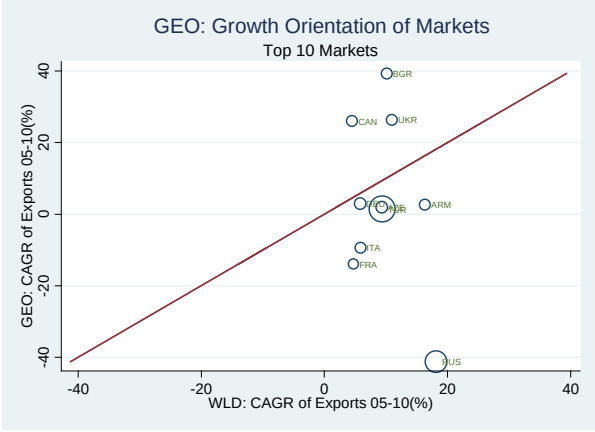
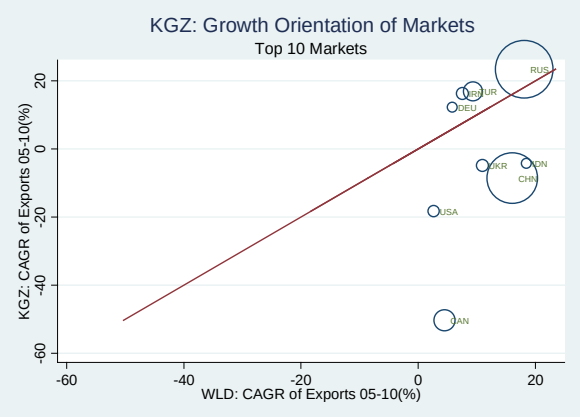


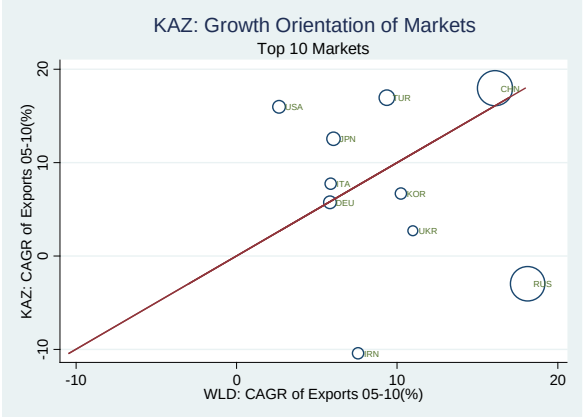
Figure 16b: Growth orientation of markets (RR).



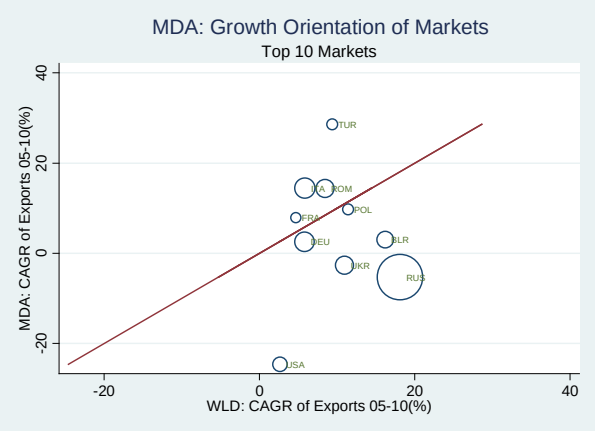


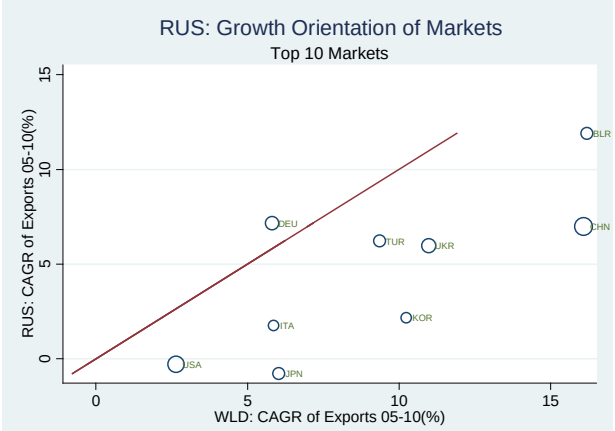


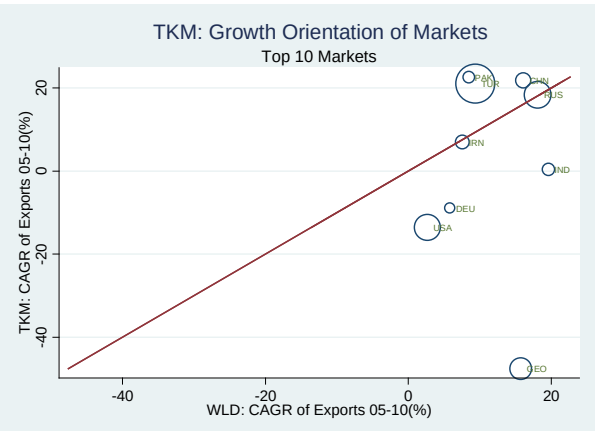


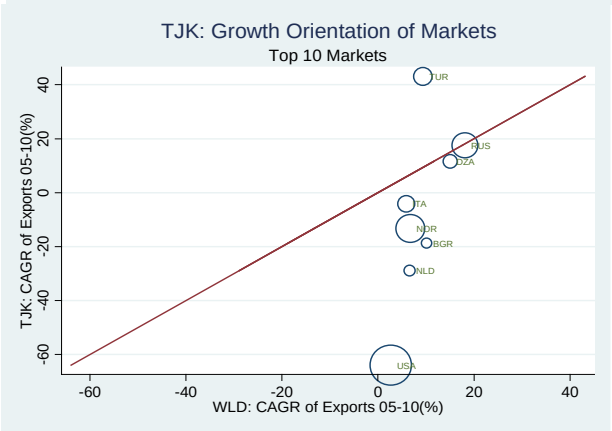


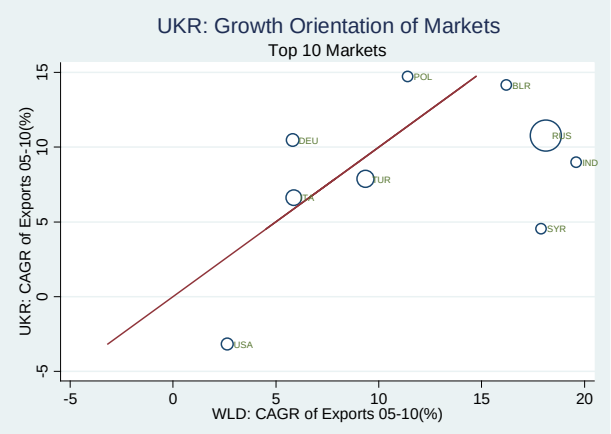
[12] Some of this was driven by the trade collapse of 2008-2009.

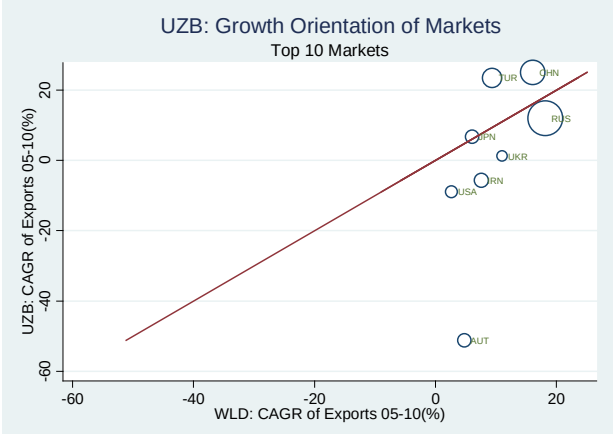












Source: Authors' calculations based on Comtrade data from WITS.

5. Conclusions

This paper examined the export diversification performance of a subset of twelve ECA countries along the product and market dimensions, as well as export performance in the mentioned countries. It put substantial focus on the link between export diversification, resource abundance and the impact of the commodity boom, first, by examining where ECA countries stand in the cross-country long-run link between export diversification, natural resource abundance, development and size, and second, by

examining the specific role that the commodity boom had on their diversification performance over the last decade, both along the product and the market dimension.

With systematically positive net exports of minerals and natural resources per capita, Azerbaijan, Kazakhstan, Russia, Tajikistan, Turkmenistan and Uzbekistan appear to be resource rich, and, less diversified than their relatively resource poor neighbors Armenia, Belarus, Georgia, Moldova, Kyrgyz Republic and Ukraine.

The relative concentration of export bundles of the resource-abundant countries of ECA also holds when performing a wide international comparison. Results from a cross-country analysis linking average diversification performances for 171 countries over the period 2000-2011 with natural resource abundance, level of economic development and size of the labor force suggest that the resource rich countries from ECA exhibit more concentrated export bundles than countries with similar relevant characteristics, while the opposite is true for those relatively poorer in resources.

Abundance in natural resources is not only associated with the *level* of diversification. For ECA countries, the combination of resource abundance with a commodity price boom during the second half of the last decade was also associated with relatively weaker *changes* in diversification, when compared to the non-resource abundant countries. While resource poor countries of the region increased the number of products exported over the period 2000-2011, the same did not hold for the resource rich. In addition, this latter group increased its export basket concentration as measured by the Herfindahl Index, its dependence on its 5 most important products, and its share of services in total exports. Along the market dimension, empirical evidence suggests that the commodity boom also affected export diversification performance, although to a lower extent than it affected diversification along the product dimension. While resource poor countries, on average, penetrated eight new markets, implying an increase of roughly 15 percent on the number of destinations reached, resource rich countries did not increase the breadth of export destinations significantly during the period.

Then the focus was shifted to export performance. Overall, as a general message, when oil and gas exports are excluded, the export dynamism in ECA countries' most important products seems to have been outpaced, almost systematically, by that of the rest of the world, implying that often, these countries have lost global market shares in their top exportable products.

As it is typically found in the literature, most of export growth for the relatively larger economies of the region was explained by selling more of the same products to the same partners, that is, with little role for diversification, while for relatively smaller economies, diversification, mainly along the market dimension, explained a larger portion of growth. Then we looked specifically at how ECA countries performed in penetrating the dynamic markets in East Asia Pacific – the fastest growing region in the world, both in terms of the amount of exports to these destinations, and in terms of the type of exports. In particular, if the increased trade implied more exports of the same goods to the same partners or if it implied diversification either along the product dimension or along the market dimension. With the exception of Ukraine and Kyrgyz Republic, all countries in the ECA region increased export exposure to EAP. The pattern of export growth with EAP showed similarities and differences with the pattern of

global export growth. Contrasting with ECA exports to the world, for the small economies of the ECA region, most of the export growth to EAP was explained by growth at the extensive margin, and in particular, by selling more of the same products to new markets. Like with ECA exports to the world, the larger economies in the ECA region (i) have more of their export growth toward EAP explained by increases in the intensive margin, that is, exporting more of the same products to the same destinations, and (ii) have lower extinction rates of trade flows. One of the key challenges for the small economies of the region to deepen their diversification and export growth paths is to tackle the constraints to export flow survival. Further research would be needed to identify what are the binding constraints faced by export flows to remain active.

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Appendix

Table 1: Results from Estimating Equation (1)

VARIABLES	(1) Root Herfindahl	(2) Share Top 5	(3) Log Count
Log of Labor Force	-0.0351***	-0.0575***	0.551***
	(0.00643)	(0.00732)	(0.0307)
Net Exports of Natural Resources Per Capita	1.449***	1.684***	-2.118**
	(0.315)	(0.362)	(0.903)
Log of GDP Per Capita	-0.0538***	-0.0739***	0.630***
	(0.00776)	(0.00877)	(0.0324)
Dummy Hong Kong SAR, China	0.754***	0.847***	
	(0.183)	(0.216)	
Constant	1.287***	1.950***	-6.843***
	(0.105)	(0.119)	(0.572)
Observations	171	171	171
R-squared	0.317	0.428	0.810

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Results from Estimating Equation (2)

VARIABLES	Herfindahl	Share Top 5	Count of Products	Share of Services Exports
Commodity Boom	-0.0046	-0.022	114.72***	0.0077
	(0.025)	(0.023)	(32.3)	(0.0103)
Commodity Boom*Resource Rich	0.0636*	0.067**	-115**	-0.0407**
	(0.036)	(0.0322)	(45.68)	(0.0166)
Constant	0.1776***	0.561***	824.67***	0.198***
	(0.01277)	(0.011)	(16.15)	(0.0058)
Observations	72	72	72	59
F(2, 58)	2.68*	2.42*	6.31***	3.48**

Robust standard errors in parentheses

Table 3: Estimation of Effects of Commodity Boom on Market Diversification

Variables	Herfindahl	Share top 5 markets	Count of Markets
Commodity Boom	0.007	-0.014	8.67***
	(0.0133)	(0.021)	(2.188)
Commodity Boom*Resource Rich	-0.018	0.0288	-7.22**
	(0.0189)	(0.029)	(3.09)
Constant	0.121***	0.595***	73.22
	(0.0067)	(0.010)	(1.094)
Observations	72	72	72
F(2, 58)	0.50	0.48	8.06

Robust standard errors in parentheses

***p<0.01, **p<0.05, *p<0.1