

УДК 339.54

## ASSESSMENT OF NON-OIL EXPORT POTENTIAL IN AZERBAIJAN UNDER DEVALVATION CONDITIONS\*

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The main objective of the paper is to study structural problems in non-oil export of Azerbaijan. Diversification of non-oil sector has been evaluated through commodity and geographical diversification, structural relevance index based on indicators of 70 countries. In the course of assessment, it was found out that changes in GDP of partner countries and free trade agreements between CIS countries have had significant effects in export growth. The paper also identifies non-oil export potential of Azerbaijan in relation to Russia, Poland, Ukraine, Moldova, Czech Republic, Baltic States, Uzbekistan, Turkmenistan and China.

Keywords: non-oil export, export potential, GDP, structural relevance index.

### 1. Introduction

Support to the development of non-oil sector and increase its portion in export is one of the priorities aimed at the diversification of the economy in Azerbaijan. Thus, the economic boom in the country in 2004- 2014 relied on the high dynamic of rise in oil production and the global market price of the crude oil. Average oil price per barrel (80 \$) in this period was 4 times higher compared to that in previous decade. Oil production in the country increased 3.3 times reaching its highest level in 2010 with 50.8 million t and later on stabilized being 41.6 million t in 2014. Consequently, country's oil export reached its highest level with 33 billion \$ in 2011 compared to 3.2 billion \$ in 2004. Oil export amounted 20 billion \$ in 2014. Increase in export generated huge amount of external surplus for the country in this period. Current account surplus in the balance of payments reached its highest level being equal to 26 % of GDP in 2011. Totally, oil revenues amounted 125 billion \$ in the period between 2001 and 2015.

Decrease in global oil prices starting 2014 evidenced the resource based development model to be unsustainable. The resource based development model is effective in short terms only. In medium and long terms, sustainable development and preservation of macroeconomic balance necessitates adoption of export based growth model.

According to statistics, the amount of non-oil export exceeded 1.8 billion \$ of 2013. Nevertheless, it has tended to decrease in the last years. Estimations show that the role of

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\* This work is performed with financial support of Science Development Foundation under the President of the Azerbaijan Republic. Grant No. E□F-KETPL-2-2015-1 (25)-56/56/5.

price factors in the amount of non-oil export has been rising gradually. In recent years, more intensive increase in prices of commodities and semi-products in global commodities market compared to those of released products [Krichene, 2008] and Azerbaijan's specialization as an exporter of such products necessitates "swell" of exports by means of rise in prices.

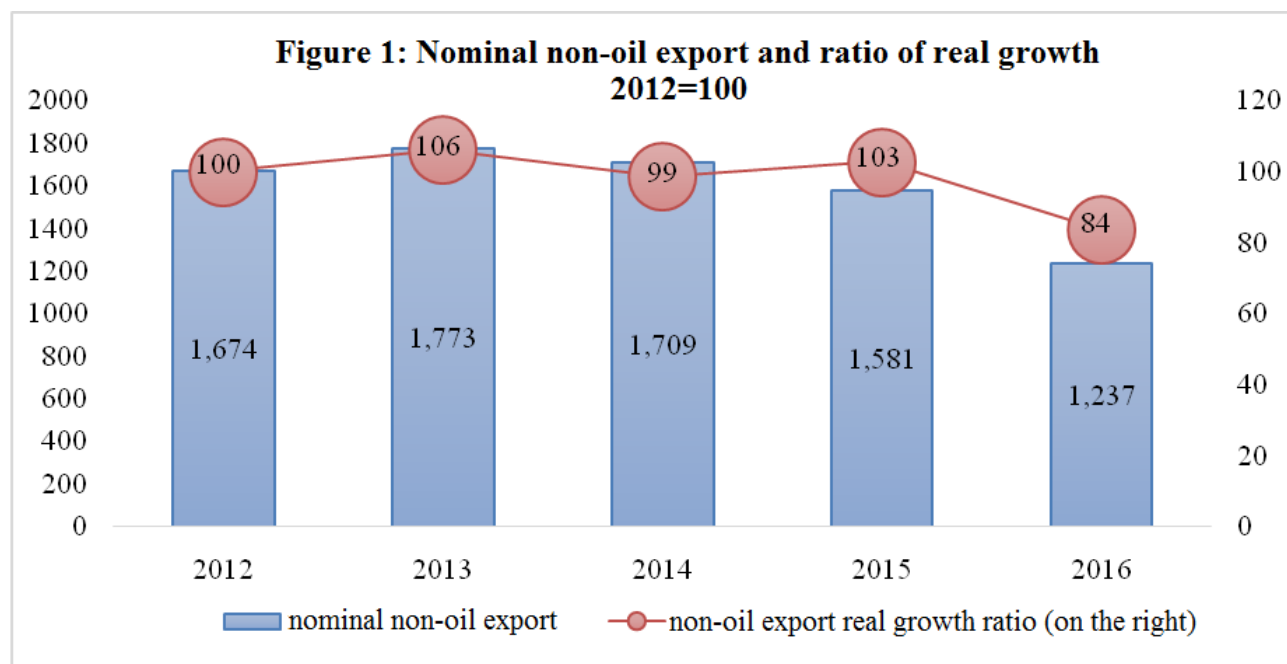


Figure 1: Nominal non-oil export and ratio of real growth  
Source: Azerbaijan's balance of payments and proprietary assessment

As is seen from Figure 1, net increase in non-oil export is falling continuously in the last 5 years. The major source of the decrease is the fall in export potential of the chemical and polymeric materials industry and on the whole in domestic production. Instead of this, it is observable increase in the export of agricultural raw materials. Such changes in non-oil export structure are undesirable when the domestic consumption demand increases and the inflation pressure strengthening.

Thus, over the recent years non-oil export has been remarkable with low level dynamic of rise and increase in problems of export structures. Such problems in structures are reflected both in export commodity structure and weak diversification of geographical structure. More than half of non-oil export consist of 8 commodity groups and are mainly oriented to neighboring countries, which can be sound examples for them.

The main target of the present research paper is to study problems in non-oil export structure and find potential foreign markets. For this purpose, the geographical and commodity structure of export diversification and the level of correspondence to import of

partner countries have been assessed, as well as potential markets defined using cross sectional regression model.

## 2. Methodology

**Commodity structure.** The **Herfindahl index** ( $H_e$ ) has been used to measure the level of concentration in commodity structure<sup>1</sup>:

$$H_e = \sum_{i=0}^n c_i^2 \quad (1)$$

Where  $n$  = number of exported goods,  $c_i$  = density of an individual commodity group in total export. The Herfindahl index obtains values in the range of  $\left[\frac{1}{n}; 1\right]$ :  $\frac{1}{n}$  = equal distribution and 1 = concentration (export covers only one commodity).

The **Herfindahl-Hirschmann index** ( $H_i$ ) is applied to normalize the range space in the Herfindahl index, which is its refinement:

$$H_i = \frac{\sqrt{c_i^2 - \sqrt{1/n}}}{1 - \sqrt{1/n}} \quad (2)$$

Range space of the **Herfindahl-Hirschmann index** is  $[0; 1]$ : where 0 = equal distribution and 1 = full concentration.

The main disadvantage of the Herfindahl and Herfindahl-Hirschmann indices is that they cannot define oligopolistic export structure (covering small number of goods). In other words, when the export consists of 2 or 3 goods of the same capacity, both indices obtain minimum value, which makes the export appear diversified. The **decomposition index** set forward by F. Warren-Boulton and D. Brown are considered as to be useful in elimination of such disadvantages [Warren-Boulton & Brown, 1988]:

$$H = \frac{1}{n} + nV \quad (3)$$

Where  $V$  = statistical dispersion of an individual product density:

$$V = \frac{\sum_{i=0}^n (s_i - \frac{1}{n})^2}{n} \quad (4)$$

This index also obtains values in the range of  $\left[\frac{1}{n}; 1\right]$  like the Herfindahl index.

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<sup>1</sup>This is a prominent index used as a rule for estimation of the level of monopolization in the economy. But, many researchers apply this index to measure the diversification of foreign trade.

**Geographical structure.** J.Stankovsky and Y.Wolfmayr focused on geographical problems in their research paper dedicated to studying Austrian export structure problems as well. The authors argued herewith that the government, through economic instruments in hand, has the capability to impact on geographic structure of the export more effectively compared to export commodity structure [Stankovsky & Wolfmayr, 2003].

But it should be mentioned that both problems are interrelated in small open-economy countries suffering of diversification problems in export commodity structure. Thus, irrelevance between its commodity structure and partner countries' import structure is one of the factors generating geographical diversification problem. It is estimated by applying the **Structure Relevance Index** ( $c_{jk}$ ):

$$c_{ji} = \frac{\arcsin(\sum_{i=0}^n x_{ji} m_{ji})}{\sqrt{\sum_{i=0}^n x_{ji}^2} \sqrt{\sum_{i=0}^n m_{ji}^2}} \quad (5)$$

Where  $i$  = exporter country (Azerbaijan),  $k$  = partner country,  $j$  = commodity groups ( $n = 218$ ),  $x$  = export,  $m$  = import.

The range of structural relevance index (SRI) is  $[0; 1]^2$ . High value of the index shows the relevance to be even higher. In practice availability of values “0” and “1” is not possible. Besides that it is also impossible to define a frame of “satisfaction” for the index. This index is generally considered to be useful for comparisons between countries.

**Cross sectional model.** Practice shows that high structural relevance is not satisfactory for effective geographical distribution of the export. There are number of other factors, including geographical distance, economic potential of partner countries, welfare of the population, proximity between demand and style which is called “converging demands”, political relations, country’s accessibility for import etc. Cross sectional regression model has been used to evaluate influence of all these factors in geographical distribution of export:

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<sup>2</sup>This index is a modified variation of the index proposed by Stankovsky and Wolfmayr ( (2003, p. 3)). The afore-named authors applied the formula as follows.

$$c_{jk} = \frac{\arccos(\sum x_j m_j)}{\sqrt{\sum x_i^2} \sqrt{\sum m_i^2}}$$

We believe that as the index obtains an indefinite range of values in this case and being down sloping curve, the interpretation of its results is less reasonable in economic terms.

$$V_{ijt} = \alpha_0 + \alpha_1 \left(\frac{GDP}{K}\right) + \alpha_2 POP_{ijt} + \alpha_3 POP_{ijt} + \sum_k \alpha_n D_{ijk} + \epsilon_{ijt} \quad (6)$$

Where E = export, GDP/K = GDP per capita, POP = population, DIST = geographical distance,  $\epsilon_{ijt}$  = independent variable,  $\alpha_1, \alpha_2, \alpha_3$  = coefficients, D = dummy,  $\epsilon$  = error and  $t$  = time. Signs of  $i, j$  and  $k$  have the same meanings as in Equation 5.

### 3. Data base

Detailed statistics of foreign trade structures have been drawn on International Trade Center (UNCTAD & WTO), statistics data base of COMTRADE (UN), monthly bulletins on “Foreign trade of Azerbaijan” published by Azerbaijan SSC. 3-digit codes of the Standard International Trade Classification have been utilized from the International Trade Center, 6- and 2-digit codes respectively from COMTRADE and SSC data bases. As per the first classification foreign trade products include 218 commodity groups, as per the second classification approximately 6200 groups and the third one 97 groups.

### 4. Assessment

**Export commodity structure.** In 2016 export of Azerbaijan amounted to \$9143M under 2921 items, including \$1160M of non-oil products. Compared to a year earlier, non-oil export volume has decreased by 23% with the variety of goods shrinking by 3% (from 949 down to 929) which deteriorated the diversification.

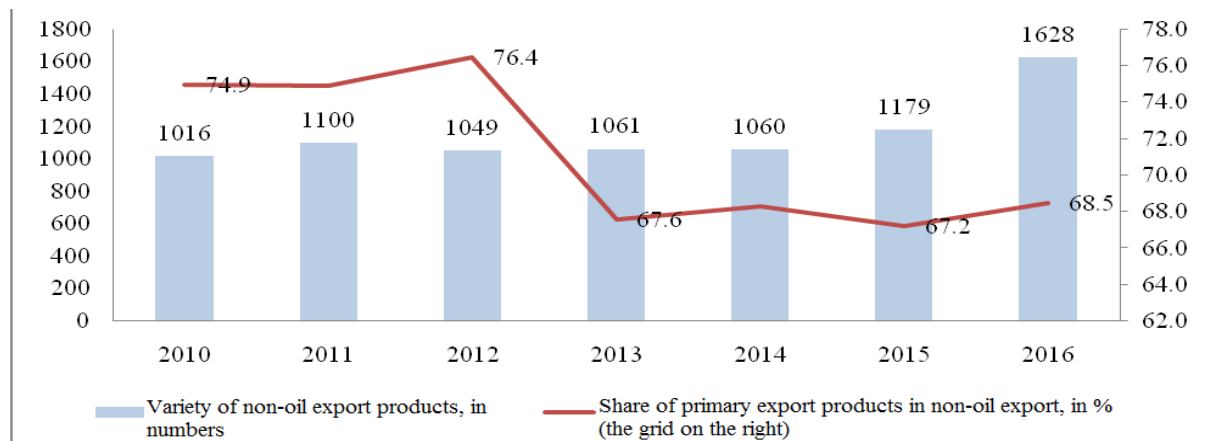


Figure 2: Diversification of non-oil export  
Source: Estimation based on data provided by the SCC

Estimations show that diversification level is considerably low in non-oil sector [Figure 2]. Despite the decrease in 10 largest export goods over the last 6 years from 75% to 68.5%, but were more than half of the total export. Figure 2 shows that the level

of export diversification is significantly dependent on the variety of exported goods. There has been drop in the level of export diversification for the last 2 years.

**Geographical structure of export.** SRI has been estimated on total and non-oil export of Azerbaijan's more than 70 main export partners since 2000. It should be mentioned that 2nd case allows to achieve more satisfactory results. Figure 3 shows to what extend SRI has been reflected in the volume of export.

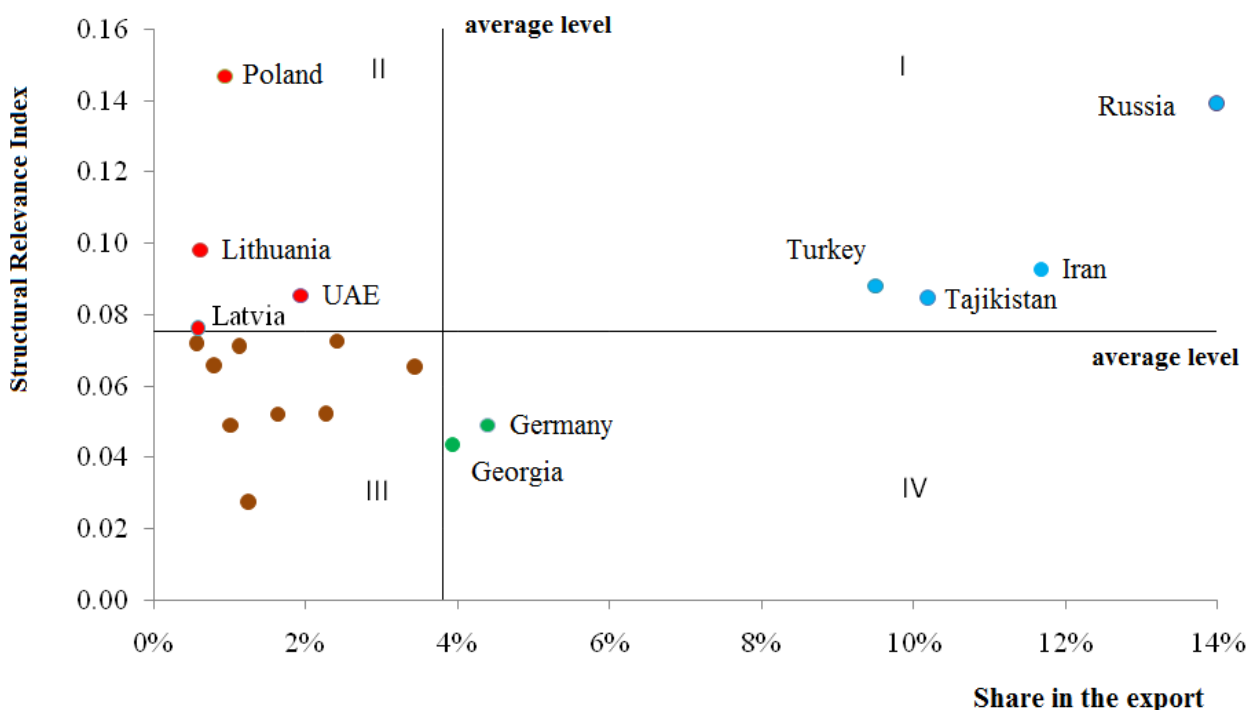


Figure 3: Structural Relevance Index  
Source: Estimations based on information from the SCC

As we can see, the figure is divided into 4 quadrant through horizontal and vertical lines reflecting average level of the SRI and share in the export. The Countries in the 1st quadrant includes the countries with high SRI or the ones where it is used. These are Russia, Turkey, Iran and Tajikistan. Up to 70% of non-oil export go to these countries, including more than 30% to Russia (To make clear, Russia's share has been decreased to the upper level of the grid in Picture 2). Export to the first 3 countries is also distinguished for the variety of goods and diversification coefficients are higher than the average level. Thus, in 2016 the Herfindahl index for export to Iran was 0.49, to Russia 0.33, to Turkey 0.32. It should be mentioned that in the same year this index for the total export was 0.04. Although the export to Tajikistan, which is considered to be one of the main partner in non-oil export, was not large in terms of variety of export

goods, since 1999 huge amount of aluminum-oxid produced in Ganja aluminum plant has been exported to this country.

The 2nd quadrant covers the countries with high SRI of non-oil export, but not used. These countries (mainly Eastern European countries) can be considered as potential markets for extension of non-oil export. The 3rd quadrant includes the countries with low level of SRI and small amount of export from Azerbaijan. And the 4th quadrant includes the countries with large export from Azerbaijan despite low level of SRI.

**Regression equation.** According to information from the SSC since 1996 Azerbaijan has exported non-oil products to 133 countries. In 2007 there were 90 such countries. Out of them about 70 have relative weight in the export and therefore, they are taken as variables in the equation (6). However, estimations show that single approach to all these countries is not statistically important. Therefore, the countries are divided into 2 group:

**The 1st group – countries which Azerbaijan traditionally maintains trade relations with.** This group covers 28 countries including all the post-Soviet countries, Iran, Turkey and Afganistan. The outcome of the model for these countries is given below:

$$E_k = 0.20GDP_k - 1.14tax_k + 32.5agreement_k - 0.002distance_k + 70.2$$
$$dummy \quad 0.014 \quad 0.408.60.00116.7$$
$$R^2 = 0.92; DW = 1.31$$

As the equation shows that the export to the 1st group of countries is directly proportional to GDP of these countries and free trade agreement with Azerbaijan and inversely proportional to average tax imposed on import and the distance. GDP growth by 1 unit nominal in partner countries brings on 0.2 unit increase in Azerbaijan export and the rise of import tax by 1% entails drop in the equivalent \$1.14M amount. The only variable of less statistical importance in the equation is geographical distance of a partner country from Azerbaijan. The more 1000 km, the less export by \$2M.

As the coefficient of «GDP» variable (0.2) displays, the economic capacity of a partner country is an important source of demand for export products. From this point of view, expectations for rise of economic growth rate in partner countries (especially Russia, Kazakhstan and Iran) in the coming year promise satisfactory prospective for non-oil export. Thus, according to IMF estimations, real GDP growth rate in these countries (1.4% in Russia, 2.5% in Kazakhstan, 3.3% in Iran) will together make 7.2% in 2017. Nevertheless drops in oil prices in global markets for the last years have negatively affected the GDP of these countries [IMF, 2017].

The model shows that non-oil export is significantly dependent on free trade agreements with partner countries. Naturally, this is in line with the emerging philoso-

phy of export potential of non-oil sector. Thus, protectionist trade policy by various countries in relation to Azerbaijan, since it is not a WTO member, and current insufficient level of competitiveness of export products hampers free access to world markets without support from the state. Estimations show that free trade agreements increase the export to the foreign country by \$32.5M.

Solution of regression equation based on existing variables shows that existing trade potential with Georgia and Tajikistan is sufficiently exploited, with Poland, Ukraine, Romania, Moldova, Czech Republic, Uzbekistan and Turkmenistan China below potential and with the other countries almost totally.

### **The 2<sup>nd</sup> group – the other countries**

It covers 42 countries which are not included in the 1st group and annual export of Azerbaijan has averagely amounted in \$0.5M in the last 10 years. Amount of non-oil exports to these countries from Azerbaijan is small being only 6% of the total export:

$$E_k = 0.0014GDP_k - 0.04tax_k - 0.0003distance_k + 26.3dummy + 2.9$$

|        |      |        |      |     |
|--------|------|--------|------|-----|
| 0.0002 | 0.03 | 0.0001 | 2.08 | 1.1 |
|--------|------|--------|------|-----|

$$R^2 = 0.86; DW = 2.06$$

As in the 1st group, the most dominant variables affecting to non-oil export here are national GDP and import duties, too. But, unlike the 1st group, only the average-weighted tax imposed on agricultural products ensued to be of statistical importance in this group, not the average tax rate for the total amount of goods. It is associated with the fact that domestic industrial products are less competitive in these markets and Azerbaijan exports to these countries mainly agricultural products.

It should be also mentioned that the variables applied in the equation less reflect rational geographical distribution of non-oil export compared to the 1st group of countries. This can be explained with ecological and quality standards applied to import by majority of the 2nd group of countries (mainly Advanced Economies), poor awareness of people on products made in Azerbaijan and with other bottlenecks.

Among the 2nd group of countries, Germany, Italy, Belgium, Austria and the UAE are the countries with higher level actual capacity usage, while China and several Latin American countries are those with lower level actual capacity usage. Export of the other countries amounts approximately relative capacity.

**Specifying commodity relevant to potential markets.** According to the results of the abovementioned two models and SRI Central and Eastern European countries, Baltic States, Uzbekistan, Turkmenistan and China have been determined to be potential markets. Among these countries the following ones are the main buyers of non-oil export products of Azerbaijan in world markets:



Table 1: Main non-oil export products of Azerbaijan (based on mirror statistics)

| Thousands of Unites States dollars         | Export         | Export markets |               |               |              |              |               |                |               |                |
|--|----------------|----------------|---------------|---------------|--------------|--------------|---------------|----------------|---------------|----------------|
|  | Azerbaijan     | Russia         | Germany       | Italy         | Poland       | Kazakhstan   | Georgia       | Czech Republic | Belarus       | Turkey         |
| 1. Edible fruits and nuts                  | 231,094        | 165,2          | 26,907        | 25,483        | 2,979        | 1,480        | 1,216         | 1,135          | 613           | 16             |
| 2. Aluminum and articles thereof           | 125,152        | 14,390         | 92            | 21,607        | 91           | 89           | 395           | 46             | 3,188         | 71,452         |
| 3. Vegetable oil                           | 3,399          | 7              | -             | -             | -            | 156          | 3,133         | 2              | 18            | -              |
| 4. Ferrous metals and related products     | 26,598         | 2,245          | 1,129         | 287           | -            | 5,923        | 5,133         | -              | -             | 7,811          |
| 5. Plastic materials                       | 124,427        | 3,646          | -             | -             | 133          | 569          | 1,523         | 106            | 6,078         | 80,267         |
| 6. Caoutchouc, rubber and articles thereof | 702            | 1              | -             | -             | -            | 489          | 149           | -              | 2             | -              |
| 7. Cotton                                  | 24,869         | 12,581         | 3             | -             | -            | -            | 13            | 79             | 198           | 11,743         |
| 8. Vegetables and certain roots and tubers | 126,096        | 125,665        | -             | -             | -            | 72           | 258           | -              | 23            | -              |
| 9. Tea                                     | 5,400          | 2,764          | 55            | -             | -            | 230          | 2,246         | -              | 4             | 84             |
| 10. Fruit juice                            | 5,799          | 3,024          | 230           | -             | 428          | 82           | 30            | 174            | 132           | -              |
| 11. Spirits                                | 18,307         | 16,506         | 10            | -             | 14           | -            | 186           | -              | -             | 20             |
| 12. Margarine                              | 2,151          | -              | -             | -             | -            | -            | 2,151         | -              | -             | -              |
| 13. Butter                                 | 436            | 436            | -             | -             | -            | -            | -             | -              | -             | -              |
| 14. Cigarettes                             | 56             | -              | -             | -             | -            | -            | 56            | -              | -             | -              |
| 15. Copper and related products            | 23,939         | 1,109          | 109           | -             | -            | -            | 2,220         | -              | -             | 13,761         |
| <b>Total (1-15)</b>                        | <b>718,425</b> | <b>347,599</b> | <b>28,535</b> | <b>47,377</b> | <b>3,645</b> | <b>9,090</b> | <b>18,709</b> | <b>1,542</b>   | <b>10,256</b> | <b>185,154</b> |
| <b>Percentage of total exports</b>         |                | <b>48%</b>     | <b>4%</b>     | <b>7%</b>     | <b>1%</b>    | <b>1%</b>    | <b>3%</b>     | <b>0.2%</b>    | <b>1%</b>     | <b>26%</b>     |

Source: Estimation based on TradeMap data

As Table 1 shows, among these countries Russia can be regarded as a potential market for a number of products. Another advantage of Russia is that it has traditional free trade relations with Azerbaijan.

Studies have also found out that the countries apply mainly lower tariffs for the mentioned products. There are exceptional cases when only agricultural products and spirits in Eastern European countries and food products in China are imposed higher taxes [WTO, 2008].

### **Conclusion**

The study on export potential of the non-oil sector has come to the following conclusions and appropriate recommendations:

- Diversification level of the non-oil export is characterized to be relatively lower and having declined in recent years. Such declination increased the irrelevance of import structure between Azerbaijan and partner countries;
- Non-oil export is significantly dependent on nominal GDP of partner countries such as Russia, Iran and Kazakhstan. Shrinking nominal GDP due to drop in oil prices has negatively affected non-oil export of these countries;
- Bilateral and multilateral free trade agreements with a number of countries have an important effect in extension of non-oil export. Taking into account competitiveness of the sectors constraining imports, it would be reasonable to extend the geography of such countries;
- Relative export potential with Georgia, Tajikistan, Germany, Italy, Belgium and Austria is exploited enough. Poland, Ukraine, Romania, Moldova, Czech Republic, Slovakia, Baltic States, Uzbekistan, Turkmenistan and China are the countries Azerbaijan has underexploited its export potential. These countries can be considered as potential markets. Export potential with other countries is almost totally exploited.

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