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# **ECONOMIC DEVELOPMENT AND SOCIOPOLITICAL DESTABILIZATION: A RE-ANALYSIS**

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## **ECONOMIC DEVELOPMENT AND SOCIOPOLITICAL DESTABILIZATION: A RE-ANALYSIS<sup>8</sup>**

Our empirical tests generally confirm the validity of the Olson - Huntington hypothesis suggesting a bell-shaped relationship between the level of economic development and the level of sociopolitical instability. According to this hypothesis, up to certain values of the average per capita income its growth tends to lead to increased risks of sociopolitical destabilization, and only in the upper range of this indicator its growth tends to be associated with the decrease of sociopolitical destabilization risks. Thus, for higher values of per capita income we deal with a negative correlation between per capita income and the risk of sociopolitical instability, and for lower values this correlation is positive. As a result, the maximum values of political instability tend to be observed in the mid-range of the GDP per capita spectrum rather than among the poorest or the richest countries.

However, our analysis has shown that for various indices of sociopolitical destabilization this curvilinear relationship can be quite different in some important details. On the other hand, we detect the presence of a very important exception. We show that the relationship between per capita GDP and the intensity of coups and coup attempts is not curvilinear; in this case we are rather dealing with a pronounced negative correlation; a particularly strong negative correlation is observed between this index and the logarithm of GDP per capita. We demonstrate that this fact makes the abovementioned bell-shaped relationship with respect to the integral index of sociopolitical destabilization considerably less distinct and makes a very significant contribution to the formation of its asymmetry (when the negative correlation between per capita GDP and sociopolitical destabilization among the richer countries looks much stronger than the positive correlation among poorer countries). However, our analysis shows that for all the other indices of sociopolitical destabilization we do witness the bell-shaped relationship assumed by the Olson - Huntington hypothesis. On the other hand, for example, in relation to such indices, as political strikes, riots and anti-government demonstrations we deal with such an asymmetry that is directly opposite to that mentioned above - with such an asymmetry, when a positive correlation between GDP and instability for poorer countries is much stronger than the negative correlation

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for richer countries. An especially strong asymmetry of this kind is found for such an important index of social and political destabilization, as the intensity of anti-government demonstrations. Thus, we arrive at the following conclusions. (1) Different types of political instability events have different functional relationships to changing levels of GDP/capita. Some do have a curvilinear response, others have a monotonic one. They also are more frequent at certain ranges of GDP/capita that are not the same, but rather are particular to certain types of events. (2) These findings show that certain types of events are more common at lower levels of income and political development, while others are more common at mid-levels, and yet others (anti-government protests, strikes) are more common at higher levels. (3) The functional relationships are most often linear in rising stages, but exponential or logarithmic in their declines. There are thus generally strong asymmetries in how such events react to changes in GDP/cap in the lower vs. upper ranges. (4) The overall notion of a curvilinear relationship between instability and GDP/capita is thus too simple, obscuring important patterns that reveal a trajectory of varying kinds of instability developing and peaking at different levels of economic development.

Keywords: Political instability, CNTS destabilization indices, economic development, GDP per capita, coups, anti-government demonstrations, sociopolitical destabilization, political development

JEL Classification: Z

## Introduction

The impact of economic development (measured by GNI or GDP per capita) on sociopolitical destabilization has already been a subject of substantial research. Many of respective studies are based on a seemingly plausible assumption that the higher a country's per capita income, the lower the probability of civil conflicts (see *e.g.*, Parvin, 1973; Weede, 1981; Nafziger & Auvinen, 2002; 2003: 30; Collier & Hoeffler, 2004; MacCulloch, 2004; Miguel, Satyanath & Sergenti, 2004; Hegre & Sambanis, 2006; Miljkovic & Rimal, 2008; MacCulloch & Pezzini, 2010; DiGiuseppe, Barry & Frank, 2012; Chapman & Reinhardt, 2013; Knutsen, 2014; see also Korotayev, Bilyuga & Shishkina, 2016, 2017a, 2017b for a detailed review of these works). On the other hand, as Mancur Olson (1963) and Samuel Huntington (Huntington, 1968) pointed out in their classical works, there is an inverted U-shaped relationship, not a negative correlation, between income level per capita and sociopolitical destabilization<sup>9</sup>. The strongest destabilization risks are observed neither for high-income countries nor for low-income ones. They are the most relevant for the middle-income polities<sup>10</sup>.

Already Mancur Olson (1963) suggested a rather comprehensive list of factors that produce a positive correlation between average per capita income and sociopolitical destabilization level among modernizing polities. Huntington provides the following rather concise and helpful summary of those factors specified by Olson::

### Rapid economic growth

- 1) disrupts traditional social groupings (family, class, caste), and thus increases 'the number of individuals who are déclassé... . . . and who are thus in circumstances conducive to revolutionary protests' (Olson, 1963: 532);
- 2) produces *nouveaux riches* who are imperfectly adjusted to and assimilated by the existing order and who want political power and social status commensurate with their new economic position;
- 3) increases geographical mobility which again undermines social ties, and, in particular, encourages rapid migration from rural areas to cities, which produces alienation and political extremism<sup>11</sup>;
- 4) increases the number of people whose standard of living is falling, and thus may widen the gap between rich and poor;
- 5) increases the incomes of some people absolutely but not relatively and hence increases their dissatisfaction with the existing order;
- 6) requires a general restriction of consumption in order to promote investment and thus produces popular discontent;
- 7) increases literacy, education, and exposure to mass media, which increase aspirations beyond levels where they can be satisfied<sup>12</sup>;
- 8) aggravates regional and ethnic conflicts over the distribution of investment and consumption;

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<sup>9</sup> Note that Huntington himself denoted it as a *bell-shaped* relationship (Huntington 1968: 43).

<sup>10</sup> See also: Urnov, 2008.

<sup>11</sup> Our own research on the topic confirms a very important role played by explosive urbanization in the destabilization of modernizing societies (Grinin & Korotayev, 2009).

<sup>12</sup> Note that our own research on the topic confirms an important role played by the education diffusion in the destabilization of modernizing societies (Korotayev & Zinkina, 2011a, 2011b, 2011c; Korotayev et al., 2012; Korotayev, Bilyuga & Shishkina, 2017b; Korotayev & Zinkina, 2011a, 2011b; Grinin & Korotayev, 2012).

9) increases capacities for group organization and consequently the strength of group demands on government, which the government is unable to satisfy (Huntington, 1968: 49–50).

We have found several further factors that stipulate a positive correlation between per capita income and sociopolitical destabilization in modernizing low- and middle-income economies. Some of these factors are characterized in our “trap at escape from Malthusian trap” model (Korotayev, Grinin et al., 2010, 2011; Korotayev, Khalturina et al., 2011; Korotayev, Malkov et al., 2012; Korotayev & Zinkina, 2010a, 2010b, 2011a, 2011b, 2011c, 2012a; Korotayev, 2012; Grinin & Korotayev, 2012; Korotayev & Malkov, 2014; Grinin, Issaev & Korotayev, 2015; Korotayev, Zinkina et al., 2011; Korotayev, 2014), that could be expressed in words by as follows<sup>13</sup>:

1) Starting to escape from the Malthusian trap<sup>14</sup> tends to bring about a precipitous death rate decline and, consequently, an explosive acceleration of the population growth rates (which in itself can lead to a certain increase in sociopolitical tensions).

2) The start of the escape is accompanied by especially strong decreases in infant and under-five mortality, which raises the proportion of the youth in the overall population (and especially in the adult population) – the so-called ‘youth bulge’.

3) This increases sharply the proportion of the population most inclined to radicalism.

4) The impetuous growth of the young population requires the creation of enormous numbers of new jobs, which is a serious economic problem, while the youth unemployment growth can have a particularly strong destabilizing effect, creating an ‘army’ of potential participants for various political upheavals, including civil wars, revolutions, and state breakdowns.

5) Escape from the Malthusian trap stimulates a vigorous growth of the urban population. Also, excessive population is forced out of the countryside by the growth of agricultural labor productivity. Massive rural-urban migration almost inevitably creates a significant number of those dissatisfied with their current position, as initially the rural-urban migrants are initially limited to unskilled low-paid jobs and low-quality accommodation.

6) Escape from the Malthusian trap is achieved through the development of new economic sectors and decline of the old ones. Such structural changes cannot proceed painlessly, as workers’ qualification lose their value, lacking the necessary new skills, these workers are obliged to take up low-qualified jobs, making them socially discontent.

7) Young people make up the majority of rural-urban migrants, so the ‘youth bulge’ and intensive urbanization factors act together, producing a particularly strong destabilizing effect. Not only does the most radically inclined part of the population increase in numbers, but it also becomes concentrated in major cities / political centers.

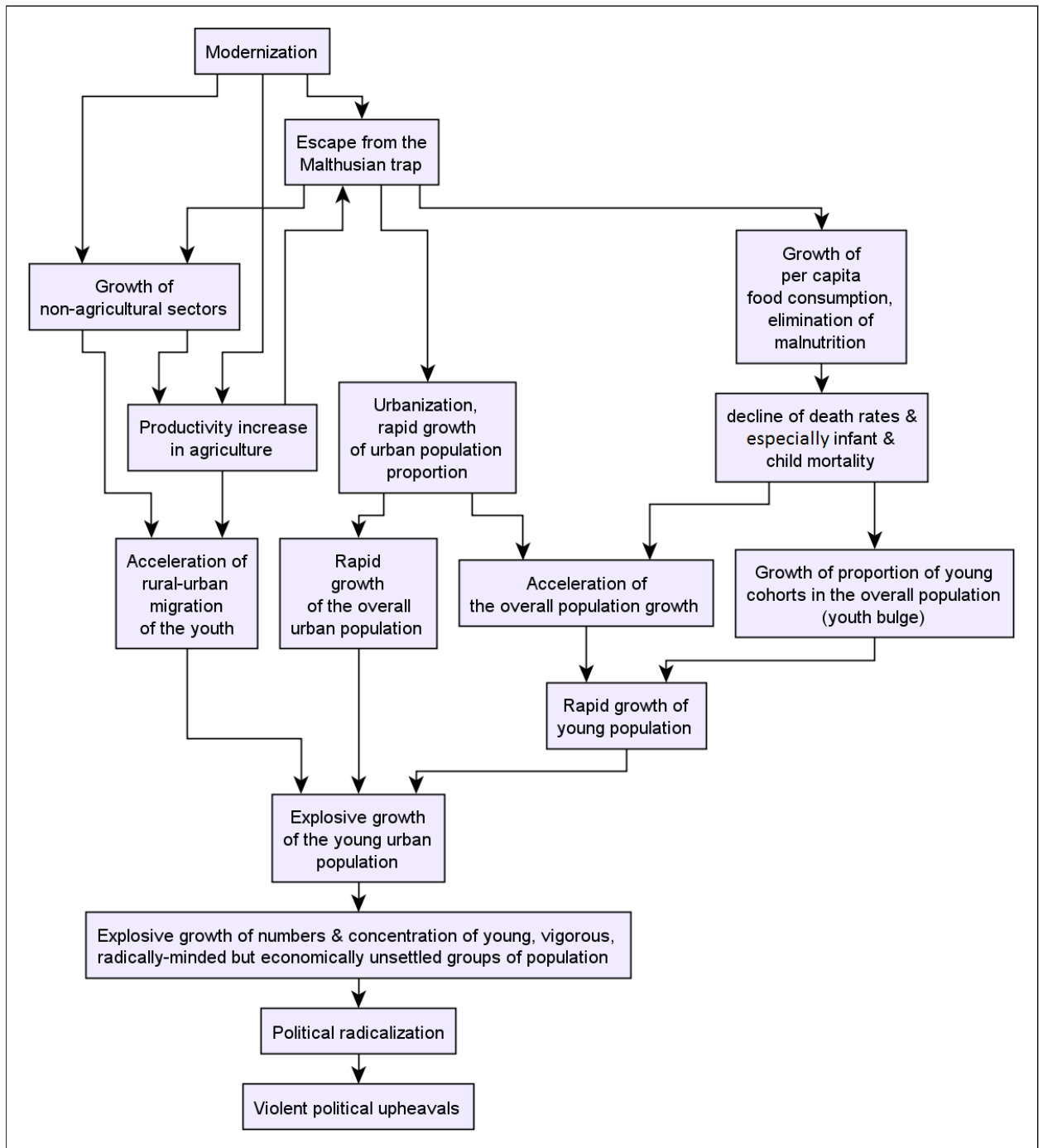
8) This can result in serious political destabilization even against the background of a rather stable economic growth (see **Fig. 1**). The probability of political destabilization naturally increases dramatically if an economic crisis occurs, or if the government loses its legitimacy due to any other causes (such as military defeats). However, the recent ‘Arab Spring’ events have

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<sup>13</sup> See cognitive scheme of the model below at Fig. 1.

<sup>14</sup> On the ‘Malthusian trap’ term see, e.g., Artzrouni & Komlos, 1985; Clark, 2007; Kögel & Prskawetz, 2001; Komlos & Artzrouni, 1990; Steinmann, Prskawetz & Feichtinger, 1998; Korotayev & Zinkina, 2015; Grinin et al., 2009; Grinin, Korotayev & Malkov, 2008, 2010; Korotayev & Zinkina, 2012a, 2013, 2014;.

demonstrated once again in a rather salient way that even this is not really necessary (see, *e.g.*, Korotayev & Zinkina 2011a, 2011c, 2012).



**Fig. 1.** ‘A trap at the escape from the Malthusian trap’. A cognitive model

Some other factors that determine a positive correlation between average per capita incomes and sociopolitical destabilization levels in low- and middle-income economies can also be suggested:

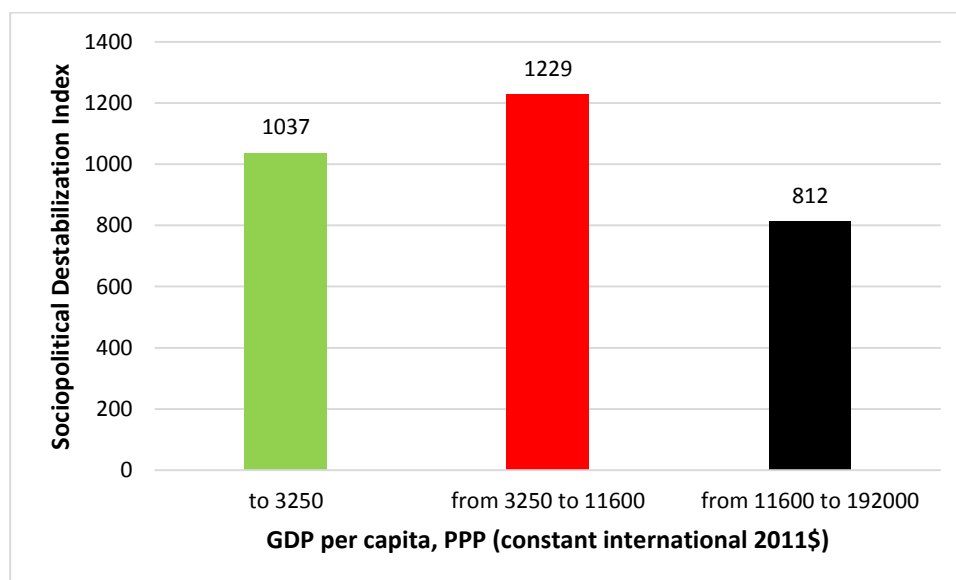
- 1) Per capita income growth in authoritarian regimes tends to lead an increase in pro-democracy movements (Lipset, 1959; Cutright, 1963; Moore, 1966; Dahl, 1971; Brunk, Caldeira &

Lewis-Beck, 1987; Rueschemeyer, Stephens & Stephens, 1992; Burkhart & Lewis-Beck, 1994; Londregan & Poole, 1996; Epstein et al., 2006; Boix, 2011), and, hence, to a certain destabilization of those regimes. And since in our database (as well as in reality) authoritarian states constitute a very high percentage of the number of states with the lowest values of per capita income, the effect of the growth of internal pressure on authoritarian regimes towards democracy with economic growth to some extent (but not completely) explains the positive correlation between average per capita income and the intensity of sociopolitical destabilization among the least developed and emerging societies. (Korotayev, Bilyuga & Shishkina, 2016, 2017a).

- 2) Direct transitions from consistent autocracy to consolidated democracy are not common. As a rule, initial incline towards democracy (especially among poorly developed economies) leads to the emergence of either a non-consistent autocracy or a partly democratic (i.e. intermediate) regime but not to a consolidated democracy. Consequently, there is a reasonably strong positive correlation between GDP per capita and intermediate regime facility among countries that share low per capita GDP indicators. Still, as it shown time and again, the very intermediate regimes are exposed to sociopolitical destabilization the most. Thus, as early as 1974 Gurr noted that semi-democracies are the type of regime most prone to destabilization. This observation was further developed in works based on the usage of mathematical apparatus and databases containing information on many countries of the world. This line of research resulted in the theory of an inverted U-shaped relationship between the regime type and the risks of sociopolitical destabilization. According to this theory, consistent democracies and autocracies are the more stable regimes, while the least stable ones are the intermediate regimes (non-consolidated democracies, inconsistent autocracies, and hybrid regimes) (Gates et al., 2000; Goldstone et al., 2000, 2010; Goldstone, 2014; Mansfield & Snyder, 1995; Marshall & Cole, 2008; Ulfelder & Lustik, 2007; Vreeland, 2008). The presence of this regularity has also been confirmed by a number of studies by Russian scientists (Grinin & Korotayev, 2012, 2013, 2014; Grinin, Issaev & Korotayev, 2015; Malkov et al., 2013; Korotayev, Issaev & Vasil'ev, 2015; Korotayev et al., 2016; Grinin & Korotayev, 2012, 2014; Korotayev et al., 2013, 2014; Korotayev, Issaev & Zinkina, 2015). Within middle and high intervals of per capita GDP one can observe a clear tendency of replacing intermediate regimes by democracies. Thus, an increased share of intermediate political regimes – the most unstable ones – is a characteristic of countries sharing middle-GDP range. It is one more factor to prove the inverted U-shaped relationship between per capita incomes and sociopolitical destabilization level.

Thus, economic growth has a tendency to increase the risks of sociopolitical destabilization up to a certain value of average per capita income. At high levels of economic development, a further increase in this parameter leads to a diminished risk of destabilization. As a result, a negative correlation between per capita income and the risk of sociopolitical destabilization characterizes higher values of per capita income while a positive correlation is shown at lower income values (Olson, 1963; Huntington, 1968: 39–50). Previous empirical tests with per capita GDP data have supported the presence of this inverted U-shaped relationship (Korotayev, Issaev & Vasil'ev, 2015; Korotayev, Bilyuga & Shishkina, 2016, 2017a, 2017b; Korotayev, Issaev & Zinkina, 2015).

However, as we demonstrated earlier (Korotayev, Bilyuga & Shishkina, 2017b), the general inverted U-shaped relationship between GDP per capita and integrative CNTS indicator of sociopolitical destabilization is not very impressive. Our previous straightforward test of this hypothesis generally supports the existence of a curvilinear inverted U-shaped relationship between per capita GDP and the integrative indicator of sociopolitical destabilization of CNTS<sup>15</sup>. The correlation is statistically significant, but rather weak (see **Fig. 2**).



**Fig. 2.** Average value of sociopolitical destabilization index for GDP (PPP) per capita tertiles during 1960-2014<sup>16</sup>

*Source:* Korotayev, Bilyuga & Shishkina, 2017b.

In addition, U-shaped relation is asymmetric: the negative correlation between GDP per capita and sociopolitical destabilization that is observed for the second and the third tertiles ( $t = 2,617$ ,  $p = 0,0045$ <sup>17</sup>) is considerably higher than the positive correlation for the first and the second tertiles ( $t = 1,775$ ,  $p = 0,038$ <sup>18</sup>). ANOVA-analysis provides similar results. In the whole, economically developed countries of the upper tertile are considerably less exposed to sociopolitical destabilization (by 34%) at an average than emerging economies of the medial tertile at an unequivocally significant level. However, average level of sociopolitical destabilization among middle-income societies of the medial tertile is moderately higher (by 18,5%) than among the low-income societies of the lower tertile. The last difference is marginally significant statistically.

So, are Olson and Huntington essentially wrong? Is economic development a powerful factor of destabilization among emerging societies? It turns out that substantially it is a weak point hardly satisfying statistical significance criterion. As it would be shown hereinafter, such assumption should be regarded as a premature and inaccurate one.

<sup>15</sup> Description of materials and methodology for index computing is provided in Appendix.

<sup>16</sup> Note:  $F=5,109$ ,  $p = 0,006$ .

<sup>17</sup> 1-tailed.

<sup>18</sup> 1-tailed.



## TESTS

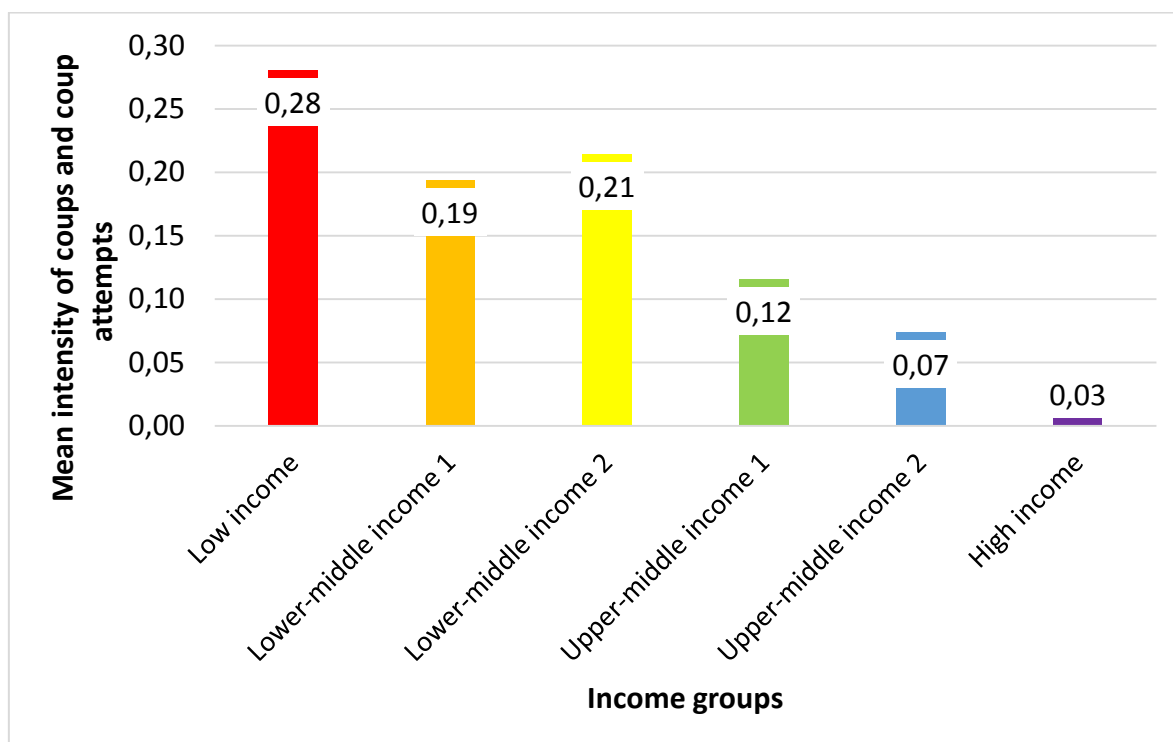
The point is that the integral CNTS index of socio–political destabilization which we used earlier in some respects may be viewed as a sort of “tyranny of averages”, as its various components often turn out to be directed oppositely and it is not infrequent when the very weak inverted U-shaped correlation between the overall correlation of the integral CNTS index of sociopolitical destabilization and the GDP per capita can hide behind itself rather impressive correlations between per capita GDP and various components of the CNTS integral index.

Let us start from the point that only some components of the integral index have an inversed U-shaped relationship with GDP per capita, and those that demonstrate this correlation have their inflection point located in the different parts of the overall spectrum of per capita GDP.

The main exception is “*Coups and coup attempts*” (*domestic7*)<sup>19</sup>, which will be examined below in more details.

### *Coups and coup attempts*

This variable shows a clearly negative correlation with GDP per capita (see **Fig. 3**).

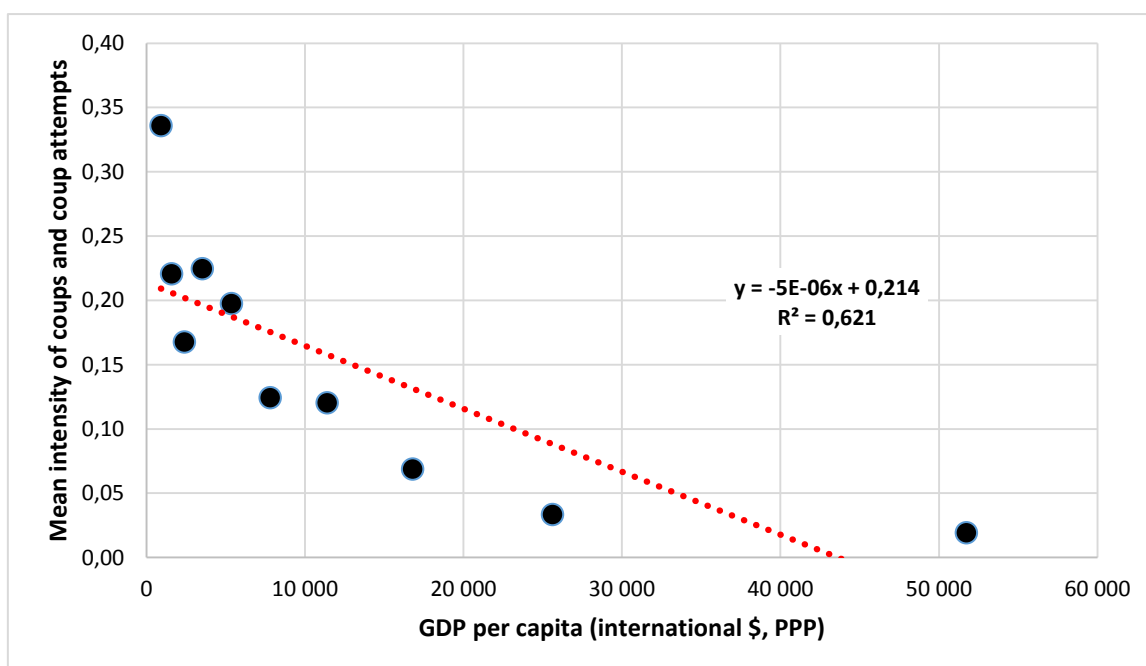


**Fig. 3.** Mean intensity of coups and coup attempts by income groups, 1960 – 2015

Data source: CNTS, 2016; World Bank, 2016.

<sup>19</sup> Note that in CNTS itself this variable is defined as *Revolutions*. However, this is defined as «any illegal or forced change in the top government elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government» (Wilson, 2017: 13). It is easy to notice that this definition covers not only and not so much revolutions as coups and coup attempts, and our analysis of specific events which CNTS includes under this label clearly indicates that the number of recorded coups and coup attempts surpasses manifold not only the number of revolutions per se but also the one of national liberation uprisings / secessionist rebellions. Thus, the dynamics of CNTS *domestic7* primarily reflects the dynamics of coups and coup attempts.

As we see, one can notice a pronounced tendency toward the decline of intensity of coups and coup attempts with the growth of per capita GDP<sup>20</sup>. However, the point we are dealing with here has a really strong negative correlation becoming obvious after the subdivision of the available dataset into deciles rather than sextiles (see **Fig. 4**).



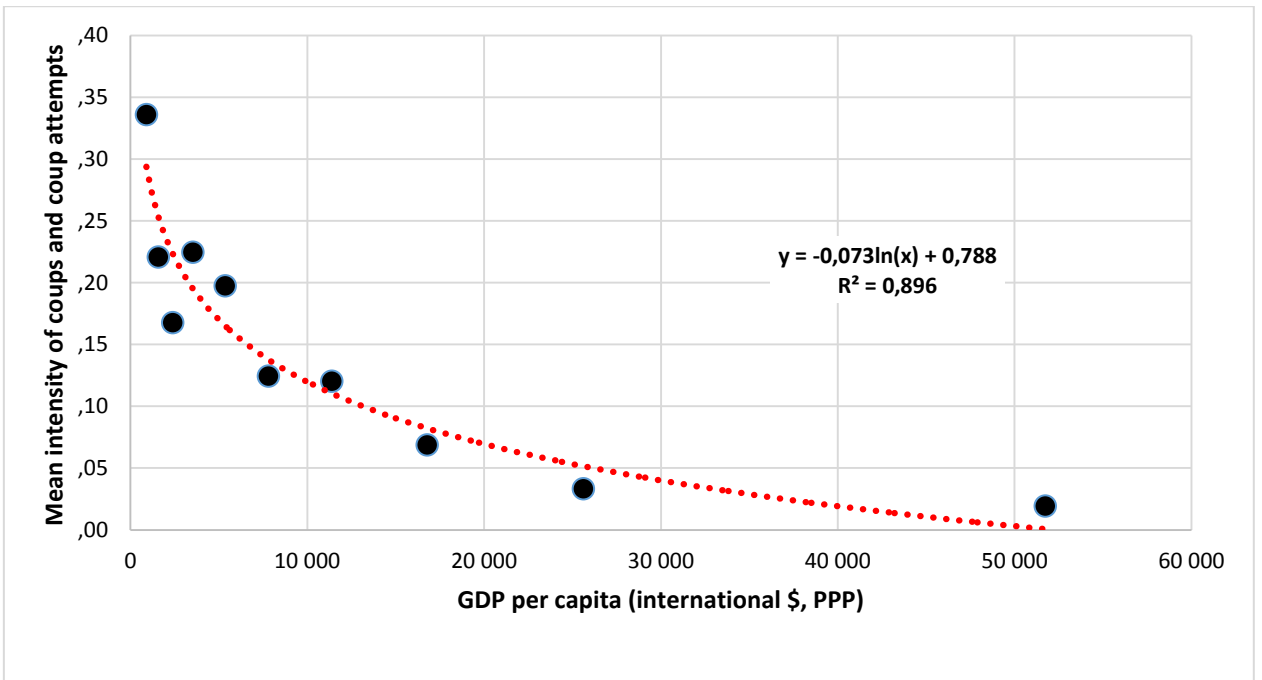
**Fig. 4.** Correlation between GDP per capita (2011 international dollars at purchasing power parities [PPP]) and intensity of coups and coup attempts in respective years, 1960 – 2015 (scatterplot with a fitted linear regression line)

*Data source:* CNTS, 2016; World Bank, 2016.

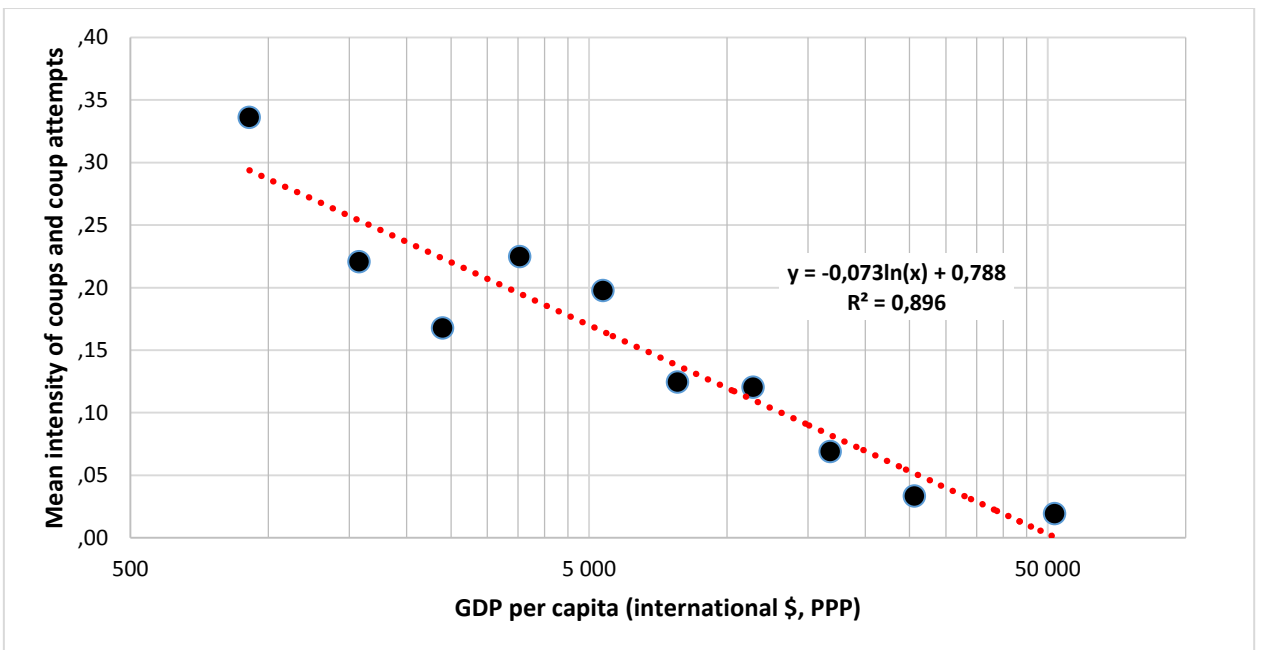
*Note:*  $r = -0,768$ ,  $p = 0,007$ , the deciles by GDP per capita are characterized by the following values: the 1st decile – from the minimum up to \$1 294; the 2nd decile – from \$1 294 to \$1 933; the 3rd decile – from \$1 933 to \$2 890; the 4th decile – from \$2 890 to \$ 4 325; the 5th decile – from \$4 325 to \$6 475; the 6th decile – from \$6 475 to \$9 340; the 7th decile – \$9 340 to \$13 760; the 8th decile – from \$13 760 to \$20 480; the 9th decile – from \$20 480 to \$32 275; the 10th decile – more than \$32 275.

As we can notice, there is a strong negative linear correlation between the level of GDP per capita and intensity of governmental coups and coup attempts. However, it should be noted that in this case the linear regression significantly understates the real strength of the negative correlation, since a more detailed analysis indicates that the coup intensity actually correlates not with the natural value of GDP per capita but with its logarithm (see. **Fig. 5**).

<sup>20</sup> Note, that the existence of this correlation has already been found in two earlier studies (Belkin & Schofer, 2003; Bouzid, 2011).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

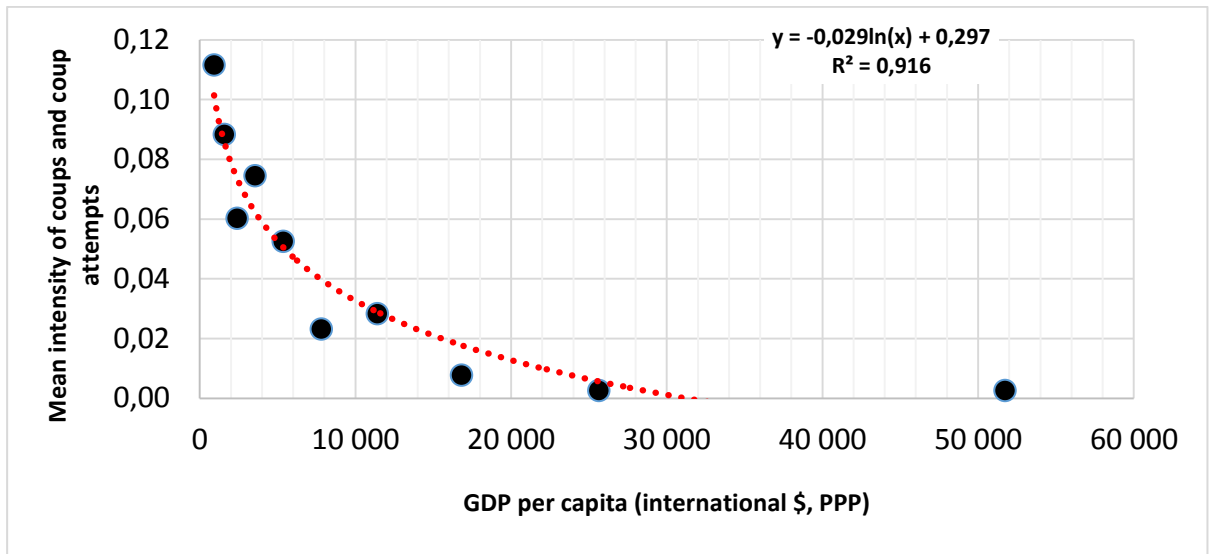
**Fig. 5.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of coups and coup attempts in respective years, 1960 – 2015 (scatterplot with a fitted logarithmic regression line)

*Data source:* CNTS, 2016; World Bank, 2016.

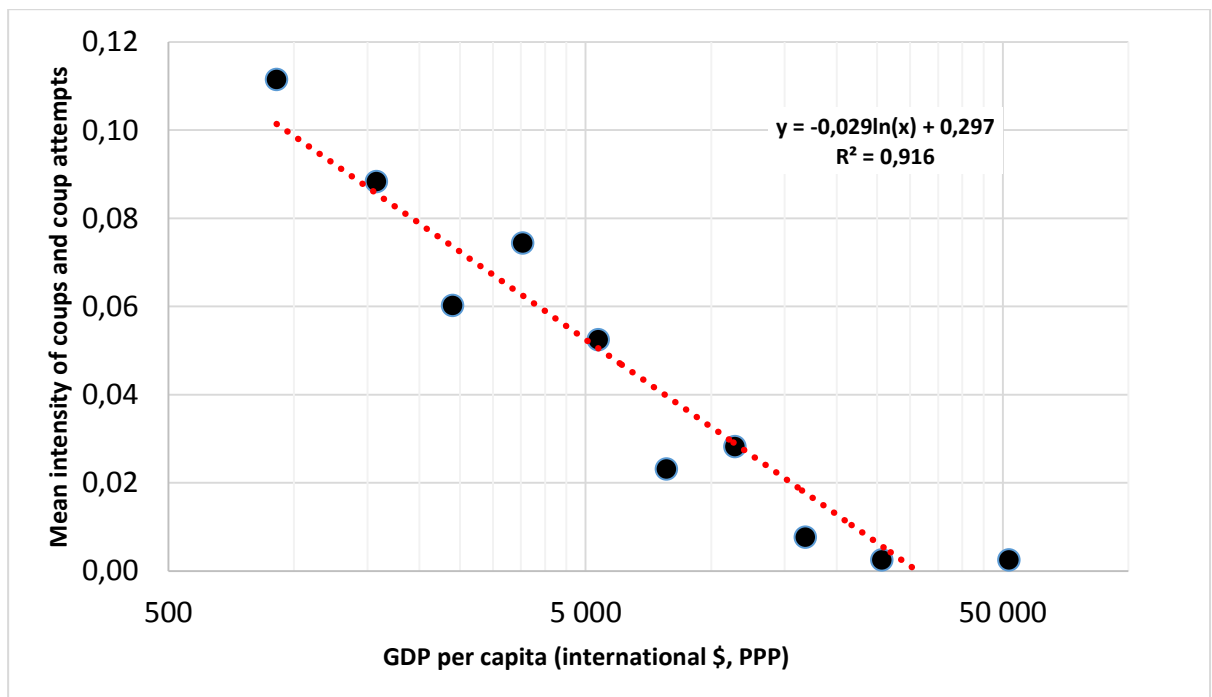
*Note:*  $r = -0,946$ ,  $p < 0,001$ . Mean values of intensity of coups and coup attempts per decile.

It is noteworthy that our attempt to verify the existence of this pattern using another database (Center for Systemic Peace, 2016) yields a surprisingly similar correlation. With the dataset above, intensity of coups and coup attempts also demonstrates a strong negative

correlation with GDP per capita logarithm; wherein the strength of correlation in the test performed with the latter database below (Center for Systemic Peace, 2016) turns out to be even higher ( $R^2 = 0,916$ ) than in the previous test where CNTS database is used ( $R^2 = 0,896$ ) (see **Fig. 6**).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 6.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of coups and coup attempts in respective years, 1960 – 2015 (scatterplot with a fitted logarithmic regression line)

*Data source:* Center for Systemic Peace, 2016; World Bank, 2016.

*Note:* Mean values of intensity of coups and coup attempts per decile.

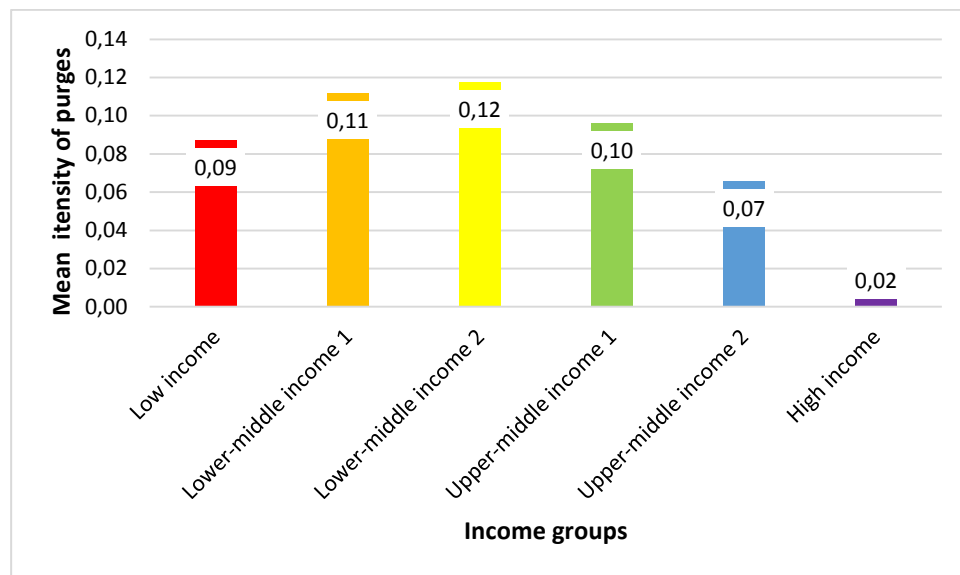
For sure, in this case we are dealing with a very interesting pattern. Indeed, it is not accidental that, unlike almost all other forms of socio-political destabilization, intensity of governmental coups shows a very pronounced tendency towards decline against the background of modernization and economic growth. After all, coups are an extremely archaic form of socio-political destabilization which are widely attested in pre-state societies (see, for example: Earle, 1997), — in contrast to other forms, such as purges and antigovernment demonstrations which only emerge in the process of modernization. The negative correlation which we have identified certainly deserves special investigation, which, however, goes beyond the scope of this work. For us, what is essential here is the fact that this negative correlation makes a very significant contribution to the weakening of the inversed U-shaped relationship between GDP per capita and the overall CNTS index of socio-political destabilization. It is largely due to the fact that during the development of the scheme to calculate values of the integral CNTS socio-political destabilization index its authors gave coups and coup attempts the maximum weight (see Appendix). This weight is significantly bigger than any other destabilization component received.

As a result, there are grounds to maintain that the negative correlation which we have observed above significantly reduces the effect of the positive correlation in the left part of the spectrum of GDP per capita, and considerably increases the strength of the negative correlation on the right site of the graph. This creates an effect of a pronounced asymmetry of the inversed U-shaped relationship, when the positive correlation between GDP per capita and the CNTS integral sociopolitical destabilization index for low and middle income societies is much weaker in comparison with the negative correlation for high income states. At the same time, as we will see, for the mass socio-political destabilization of the central collapse type, the character of asymmetry turns out to be strictly opposite.

There is another CNTS component of the integral index of sociopolitical destabilization which makes additional contribution to the above mentioned asymmetry; this is — “*purges*”.

## Purges

The distribution of intensity of “purges” (*domestic5*)<sup>21</sup> among six income groups can be seen at **Fig. 7**.



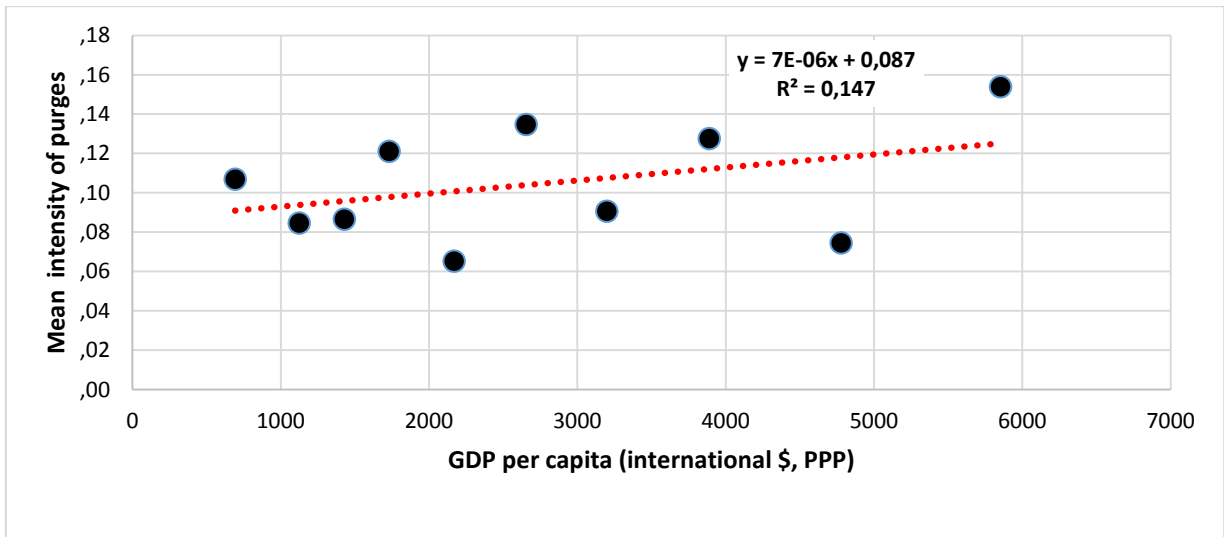
**Fig. 7.** Mean intensity of purges by income groups, 1960–2015

*Data source:* CNTS, 2016; World Bank, 2016.

As we see, a very weak positive correlation is typical for this specific indicator of socio-political destabilization in the range of low values of GDP per capita (from the minimum up to \$6 400 – \$6 500, which roughly corresponds to a boundary between lower middle and upper middle income countries); on the other hand, we find a strong negative correlation for higher values, which, of course, further reduces the overall inverted U-shaped relationship, as it significantly increases its asymmetry and at the same time moves it in the direction of the general negative correlation.

All in all, per decile analysis of the interval from the minimum to \$6 425 yields the following results (see **Fig. 8**).

<sup>21</sup> CNTS domestic 5 = “Purges”. The CNTS provides the following definition for *purges* (*domestic5*): “any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition” (Wilson 2017: 13).



**Fig. 8.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of purges in respective years in the interval from the minimum to \$6 425,<sup>22</sup> 1960 – 2015 (scatterplot with a fitted linear regression line)

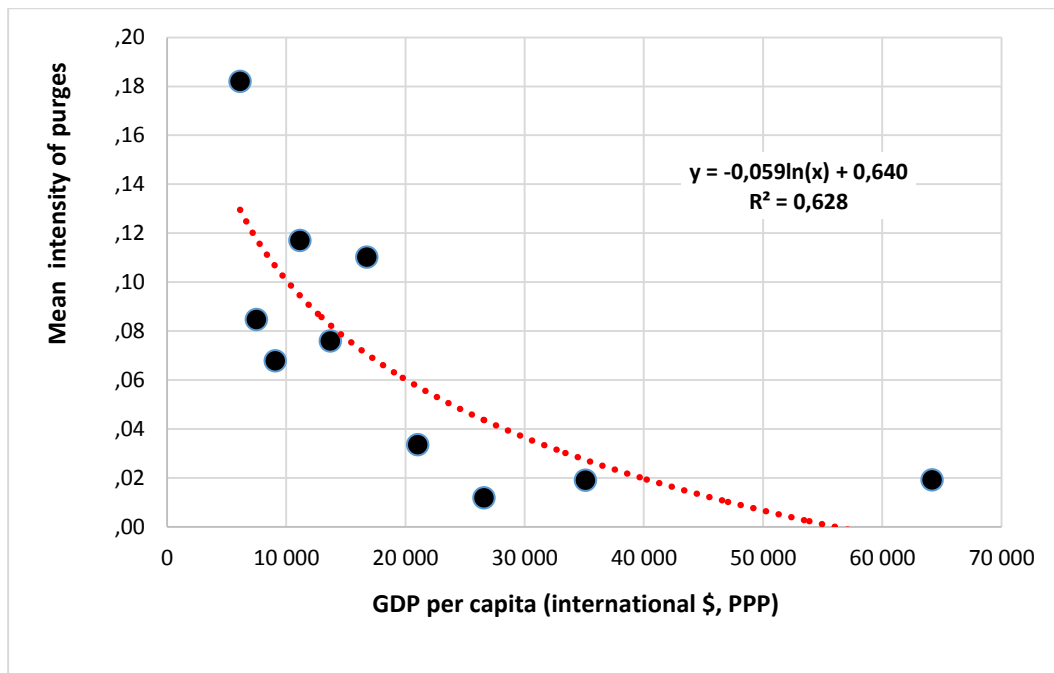
*Data source:* CNTS, 2016; World Bank, 2016.

*Notes:*  $r = 0,34$ ,  $p = 0,337$ . Mean values of intensity of purges per decile in the interval from the minimum to \$6 425. Per capita GDP deciles for the interval from the minimum to \$6 425 have the following characteristics to their boundaries: the 1st decile: from the minimum to \$926; the 2nd decile – from \$926 to \$1 299; the 3rd decile – from \$1 300 to \$1 551; the 4th decile – from \$1 552 to \$1 938; the 5th decile – from \$1 938 to \$2 400; the 6th decile – from \$2 400 to \$2 915; the 7th decile – from \$2 915 to \$3 492; the 8th decile – from \$3 492 to \$4 322; the 9th decile – from \$4 322 to \$5 305; the 10th decile – from \$5 305 to \$6 425.

As we can see, for low and middle income countries where GDP per capita is less than \$6 425 we have identified a very weak insignificant positive correlation between per capita GDP and intensity of purges. Although, this correlation is statistically insignificant, it still has its logic, because, as we shall see, at this interval, one can notice a growth of almost all the indicators of socio-political destabilization, which quite logically leads to intensification of repressive actions by authorities.

For higher GDP per capita values (within the interval of about \$5 500 – \$6 500) we observe a totally different correlation (see **Fig. 9**).

<sup>22</sup> Which corresponds to deciles from 1 to 5 of the general population of the database cases.



**Fig. 9.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of purges in respective years in the interval from \$4 324 to the maximum<sup>23</sup>, 1960 – 2015 (scatterplot with a fitted logarithmic regression line)

*Data source:* CNTS, 2016; World Bank, 2016.

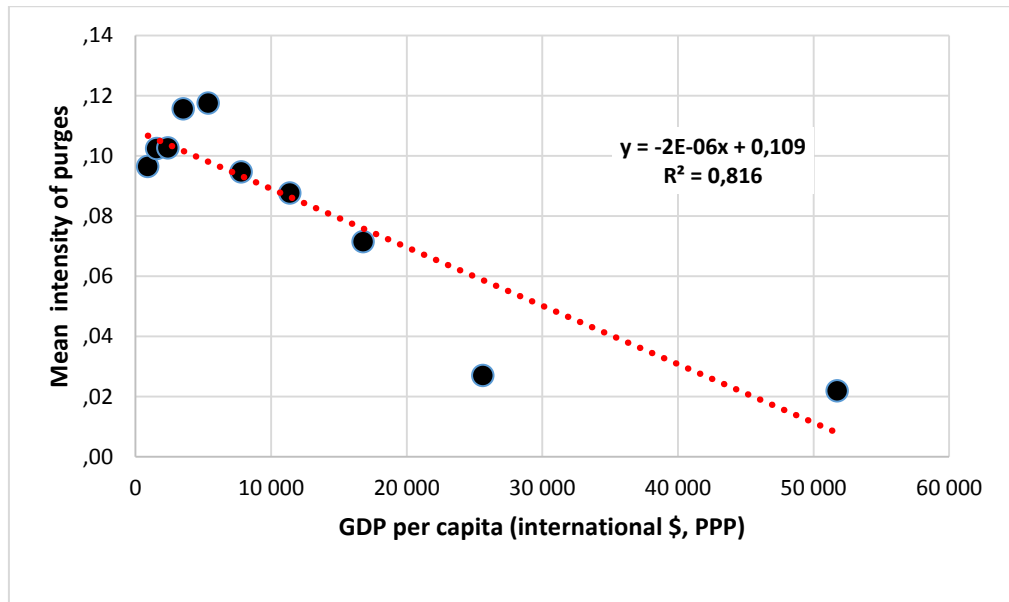
*Notes:*  $r = -0,793$ ,  $p = 0,006$ . Mean values of intensity of purges per decile for the interval from \$5 526 to the maximum. The deciles by per capita GDP on the fragment from \$5 526 to the maximum have the next characteristics to their boundaries: the 1st decile – from \$5 526 to \$6 715; the 2nd decile – from \$6 715 to \$8 140; the 3rd decile – from \$8 140 to \$10 120; the 4th decile – from \$10 120 to \$12 330; the 5th decile – from \$12 330 to \$15 060; the 6th decile – from \$15 060 to \$18 660; the 7th decile – from \$18 660 to \$23 565; the 8th decile from \$23 565 to \$30 350; the 9th decile – from \$30 350 to \$40 630; the 10th decile – from \$40 630 to the maximum.

The point is that for middle income and high income countries (starting from the interval of \$5 500 – \$6 500), we observe a strong statistically significant negative correlation between GDP per capita (2011 international dollars, PPP) and intensity of purges. Thus, starting from this level, further growth of per capita GDP is accompanied with a fairly steady tendency toward the decline in intensity of purges.

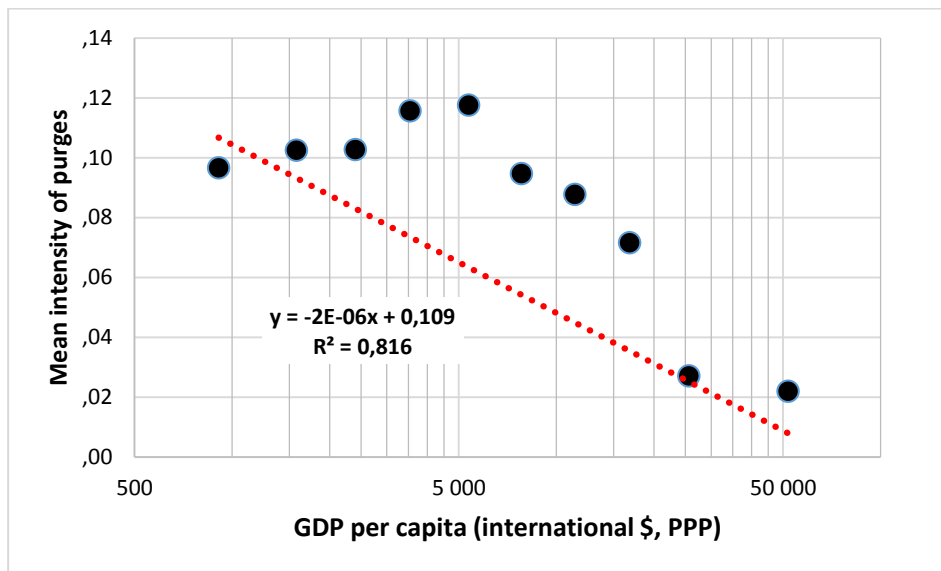
Thus, quite a weak positive correlation for the interval up to \$5 500 – \$6 500 (on the left part of **Fig. 10**) is combined with a very strong negative correlation at the interval starting from \$6 000 – \$6 500 (located in the right part of **Fig. 10**). As a result, a strong negative correlation in the right part of the chart outweighs a weak positive correlation in the left part, so along the whole range of GDP per capita values one can notice a strong statistically significant negative correlation (see **Fig. 10**).

<sup>23</sup> Which corresponds to deciles from 6 to 10 of the general population of the database cases.





(a) with a natural X-axis scale



(a) with a logarithmic X-axis scale

**Fig. 10.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of purges in respective years, 1960 – 2015 (scatterplot with a fitted linear regression line)

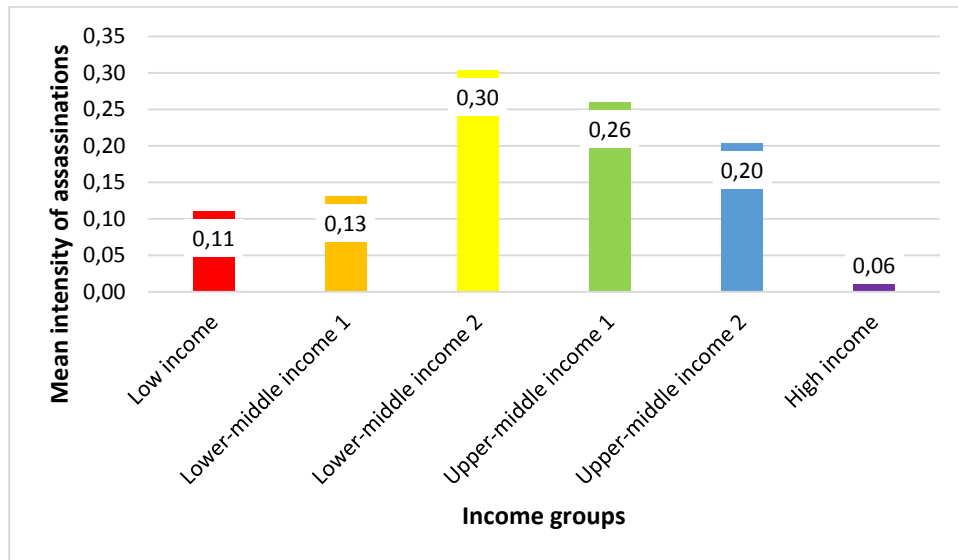
*Data source:* CNTS, 2016; World Bank, 2016.

*Note:*  $r = -0,903$ ,  $p < 0,001$ . Mean values of intensity of purges per decile.

However, a positive correlation in the left part of the spectrum is considerably stronger for the other indicators of socio-political destabilization.

## Assassinations

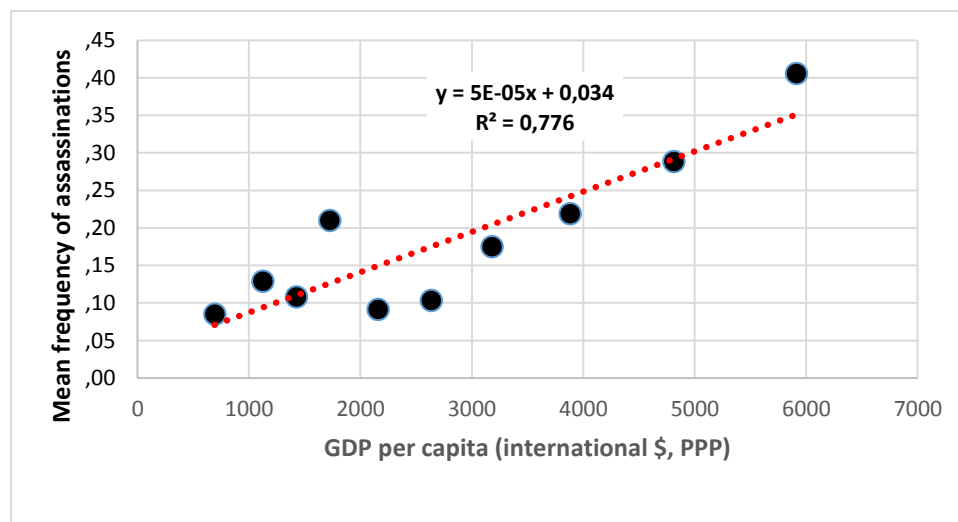
For *assassinations*<sup>24</sup> a strong positive correlation is observed for the fragment between lower middle and upper middle income (about \$6 500), (see **Fig. 11**).



**Fig. 11.** Mean frequency of assassinations by income groups, 1960–2015

Data source: CNTS, 2016; World Bank, 2016.

Per decile analysis of correlation between per capita GDP and frequency of assassinations for the interval of GDP per capita values from the minimum to about \$6 500 yields the following results (see **Fig. 12**).



**Fig. 12.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and

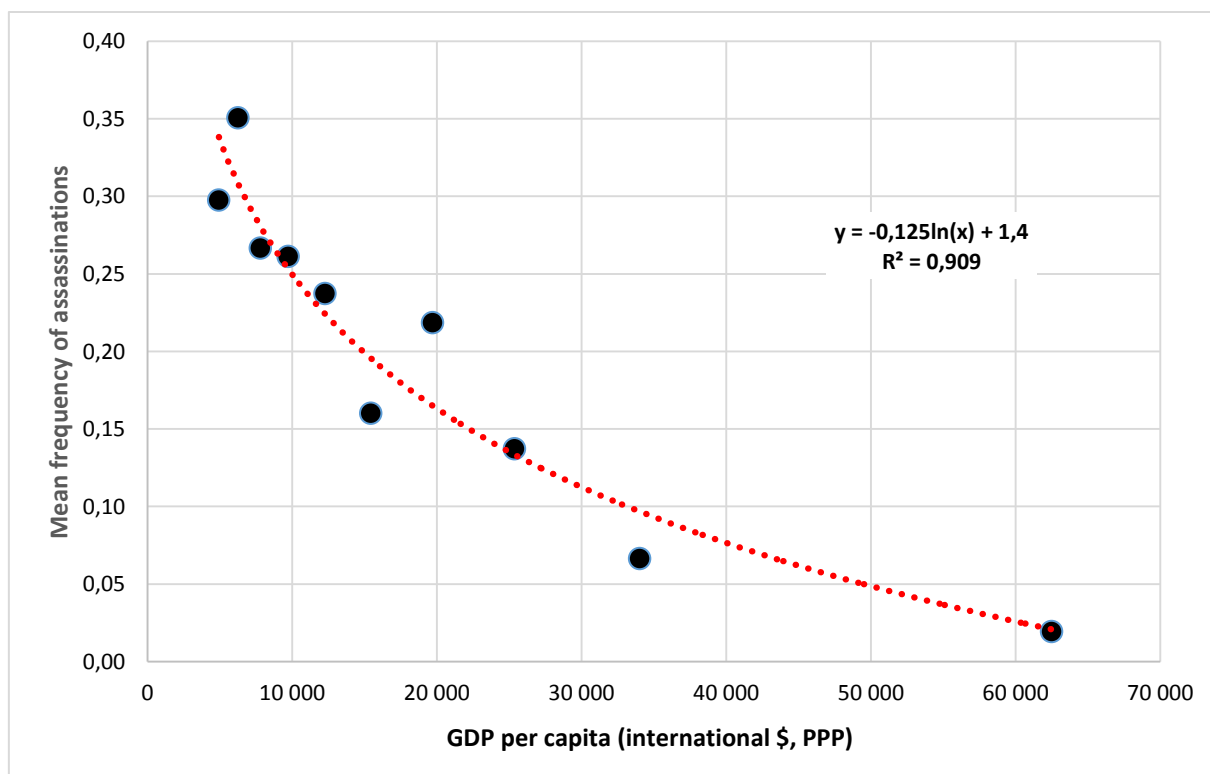
<sup>24</sup> CNTS domestic 1 = *Assassinations*. The CNTS provides the following definition for “*Assassinations*” (domestic1): “any politically motivated murder or attempted murder of a high government official or politician” (Wilson 2017: 12).

frequency of assassinations in respective years in the interval from the minimum up to \$6 471,<sup>25</sup> 1960 – 2015 (scatterplot with a fitted linear regression line)<sup>26</sup>

Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = 0,881$ ,  $p = 0,001$ . Mean values of frequency of assassinations per decile for the fragment from the minimum to \$6 471. The deciles by per capita GDP for the fragment from the minimum to \$6 471 have the following characteristics to their boundaries: the 1st decile – from the minimum up to \$925; the 2nd decile – \$925 to \$1 295; the 3rd decile – from \$1 295 to \$1 550; the 4th decile – from \$1 550 to \$1 933; the 5th decile – from \$1 933 to \$2 385; the 6th decile – from \$2 385 to \$2 890; the 7th decile – from \$2 890 to \$3 485; the 8th decile – from \$3 485 to \$4 325; the 9th decile – from \$4 325 to \$5 345; the 10th decile – from \$5 345 to \$6 471.

As we can see, from the minimum up to the interval of \$5 500 – \$6 500 the growth of GDP per capita is accompanied by a quite pronounced tendency towards intensification of assassinations frequency. On this fragment (corresponding to low and lower middle income), there is a strong ( $r = 0,881$ ) and statistically significant ( $p = 0,001$ ) correlation between per capita GDP and frequency of assassinations. However, a directly opposite correlation can be traced starting from the level of about \$6 500 (which just corresponds to the boundary which separates the countries with lower middle income from those with upper middle income) (see Fig. 13).



**Fig. 13.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of assassinations in respective years in the interval from \$4 324 to the maximum<sup>27</sup>, 1960–2015

<sup>25</sup> Which corresponds to deciles from 1 to 5 of the general population of the database cases.

<sup>26</sup> Mean values of intensity of assassinations per decile in the interval from the minimum to \$6 471.

<sup>27</sup> Which corresponds to deciles from 6 to 10 of the general population of the database cases.

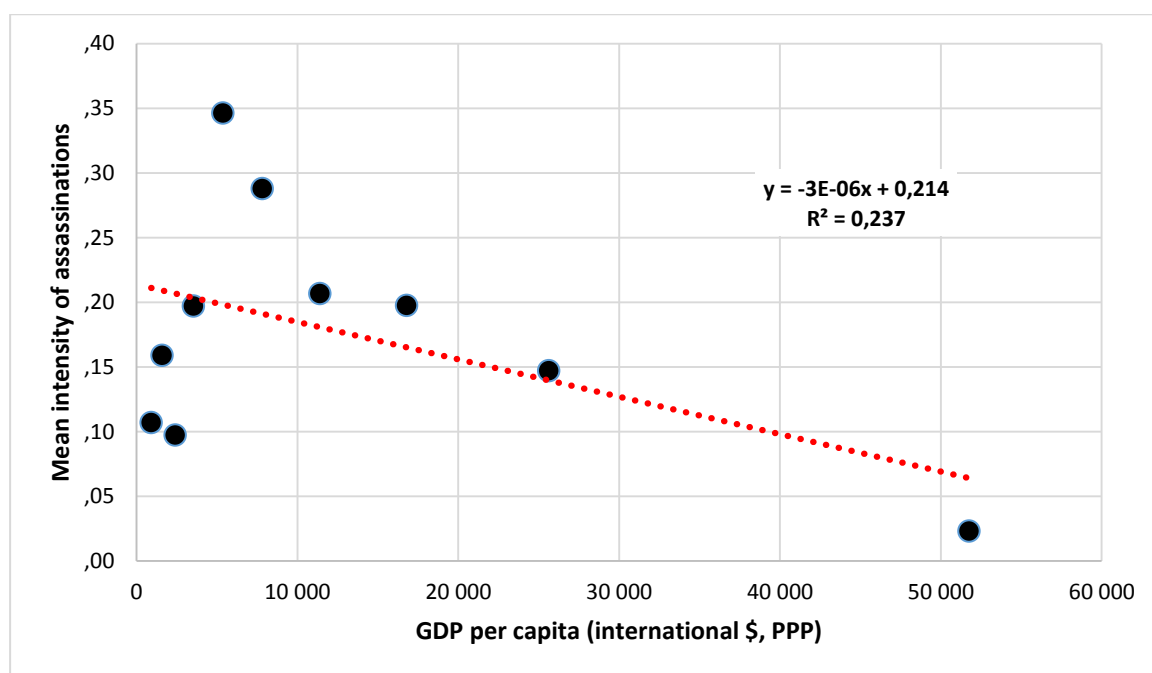
(scatterplot with a fitted logarithmic regression line)<sup>28</sup>

Data source: CNTS, 2016; World Bank, 2016.

Notes:  $r = -0,953$ ,  $p < 0,001$ . Mean values of frequency of assassinations by deciles for the interval from \$4 325 to the maximum. The deciles by GDP per capita for the fragment from \$4 325 to the maximum have the following characteristics of their boundaries: the 1st decile – from the minimum up to about \$4 235 to \$5 595; the 2nd decile – from \$5 595 to \$7 022; the 3rd decile – from \$7 022 to \$8 582 dollars; the 4th decile – from \$8 582 to \$10 830; the 5th decile – from \$10 830 to \$13 760; the 6th decile– from \$13 760 to \$17 285; the 7th decile – from \$17 285 to \$22 300; the 8th decile – from \$22 300 to \$28 900; the 9th decile – from \$28 900 to \$38 935; the 10th decile – from \$38 935 to the maximum.

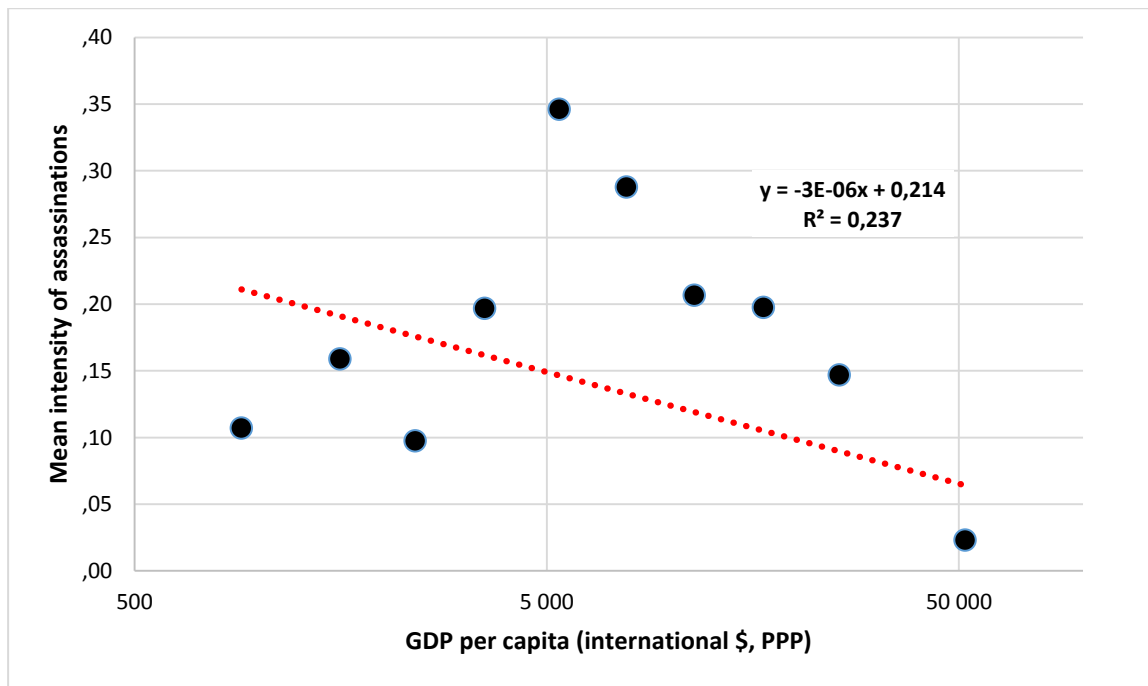
Thus, for the countries with upper middle and high income we observe an even more pronounced trend of decline of assassinations frequency and a growth of GDP per capita at the same time. As we can see, on the right side of the spectrum there is even stronger ( $r = -0,953$ ) and statistically significant ( $p < 0,001$ ) negative correlation between per capita GDP and frequency of assassinations.

As a result, a full per decile analysis of correlation for the whole spectrum of GDP per capita values which we are interested in provides us with the following results (see **Fig. 14**).



(a) with a natural X-axis scale

<sup>28</sup> Mean values of frequency of assassinations per decile in the interval from \$4 325 to the maximum.



(a) with a logarithmic X-axis scale

**Fig. 14.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of assassinations in respective years, 1960– 2015 (scatterplot with a fitted linear regression line)

Data source: CNTS, 2016; World Bank, 2016.

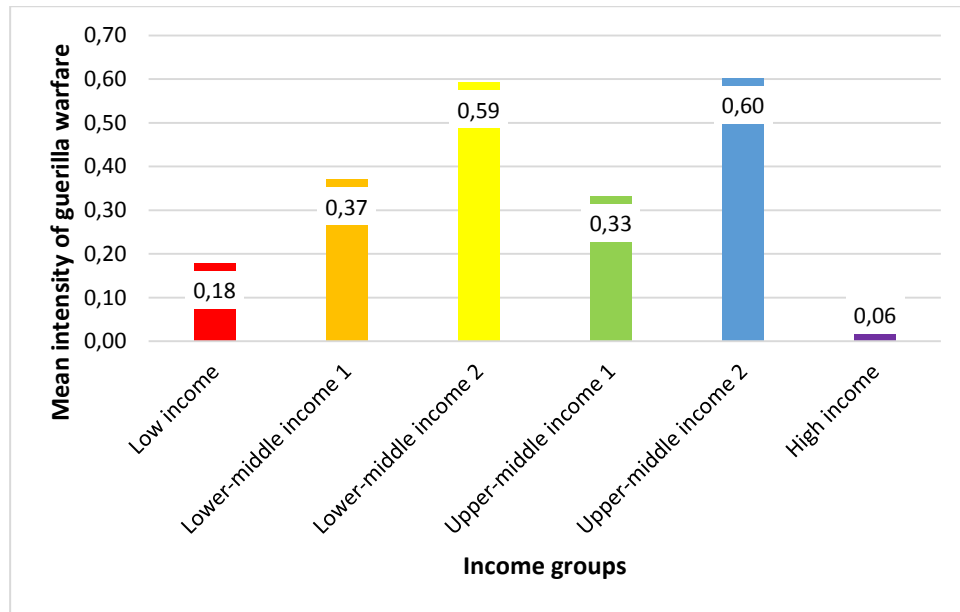
Note:  $r = -0,487$ ,  $p = 0,153$ . Mean values of frequency of political assassinations per decile.

So, for the assassination index, a negative correlation in the right part of the spectrum (for the countries with upper middle and high income) outweigh a positive correlation of the left part of the spectrum (for the countries with low and lower middle income). All in all, along the whole spectrum we have noticed a fairly weak insignificant negative correlation.

### *Guerrilla warfare*

A statistically significant positive correlation in the interval up to the boundary between lower middle and upper middle income (about \$6 500) can be traced for “*guerrilla warfare*” (*domestic3*)<sup>29</sup> index (see **Fig. 15**).

<sup>29</sup> CNTS domestic 3 = *Guerrilla Warfare*. The CNTS provides the following definition for “*Guerrilla Warfare*” (*domestic3*): “Any armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces and aimed at the overthrow of the present regime.” (Wilson, 2017: 13).

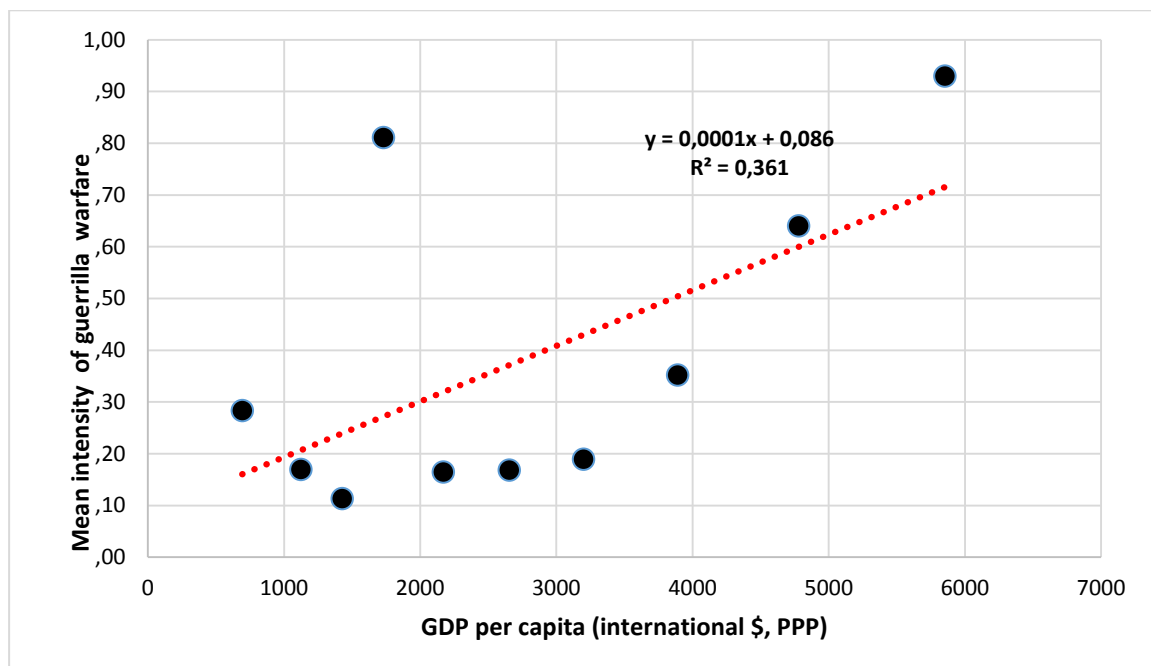


**Fig. 15.** Mean intensity of guerrilla warfare by income groups, 1960 – 2015

*Data source:* CNTS, 2016; World Bank, 2016.

At the same time, as we can see, the second (and even slightly higher) peak of guerrilla warfare intensity is located on the second interval of upper middle income countries (\$12 000 – \$23 000).

Let us now pay attention to correlation between guerrilla warfare of the left and right parts of the spectrum of GDP per capita in more details. We start with the left side of the spectrum of GDP per capita values, the correlation can be seen at **Fig. 16**.



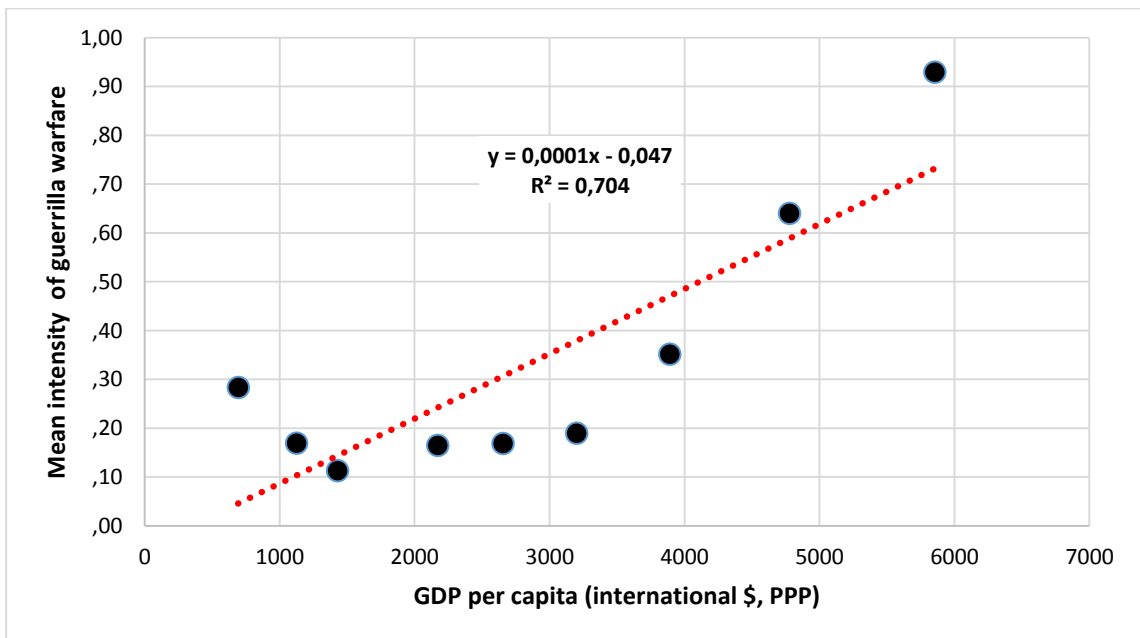
**Fig. 16.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of guerrilla warfare for respective years in the interval from the minimum to \$6 425,

1960 – 2015 (scatterplot with a fitted linear regression line)<sup>30</sup>

Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = 0,603$ ,  $p = 0,033$  (one-tailed significance test). Mean values of intensity of guerrilla warfare per decile for the interval from minimum to \$6 425. The deciles by GDP per capita on the fragment from the minimum to \$6 425 have the following characteristics to the boundaries: the 1st decile – from the minimum up to \$926; the 2nd decile – from \$927 to \$1 299; the 3rd decile – from \$1 300 to \$1 551; the 4th decile – from \$1 552 to \$1 938; the 5th decile – from \$1 938 to \$2 400; the 6th decile – from \$2 400 to \$2 915; the 7th decile – from \$2 915 to \$3 492; the 8th decile – from \$3 492 to \$4 322; the 9th decile – from \$4 322 to \$5 305; the 10th decile – from \$5 305 to \$6 425.

As we can see, in relation to guerrilla warfare intensity one can notice quite a pronounced tendency toward the increase of GDP per capita growth in the interval. This increase is almost similar to that on which a stable positive correlation between per capita GDP and intensity of guerilla warfare is recorded. This is about the lower (left) part of the spectrum, where values of GDP per capita up to interval of \$5 500 – \$6 500 are located (which corresponds to the countries with low and lower middle income). However, with regard to intensity of guerrilla warfare we observe a positive correlation strong enough to be only marginally statistically significant. On the other hand, it should be noted that the current high, to certain extent, correlation ( $r = 0,603$ ) can be explained by the presence of the outlier which can be noticed in the range of about \$1 500 – \$2 000 (the nature of such an outlier we will have to determine in future). After taking the outlier from the account we deal with an unambiguously strong statistically significant correlation (see **Fig. 17**).



**Fig. 17.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of guerrilla warfare for respective years in the interval from the minimum to \$6 424,<sup>31</sup>

<sup>30</sup> Mean values of intensity of guerilla warfare per decile in the interval from the minimum to \$6 425.

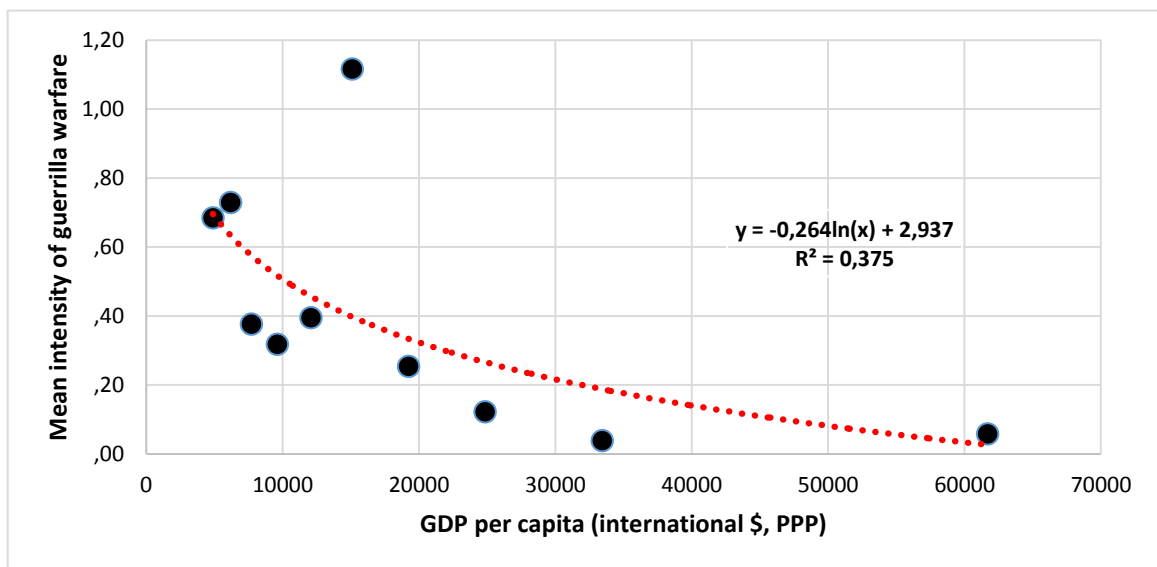
<sup>31</sup> Which corresponds to deciles from 1 to 5 of the general population of the database cases.

1960 – 2015 (scatterplot with a fitted linear regression line)<sup>32</sup>, **excluding outlier**

Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = 0,841$ ,  $p = 0,005$ .

As we can see, for the countries with middle and high income, one can observe quite a pronounced statistically significant trend of decline of guerrilla warfare with the process of GDP per capita growth. This trend can be traced starting from the interval of around \$5 500 – \$7 000



which can be seen at **Fig. 18**.

**Fig. 18.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of guerrilla warfare for respective years for the interval from \$4 325 to the maximum,<sup>33</sup> 1960 – 2015 (scatterplot with a fitted logarithmic regression line)<sup>34</sup>

Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = -0,616$ ,  $p = 0,029$  (one – tailed significance test). Mean values of guerrilla warfare intensity per decile for the interval from \$4 325 to the maximum. The deciles by GDP per capita on the fragment from \$4 325 to the maximum have the following characteristics to their boundaries: the 1st decile – from \$4 325 to \$5 521; the 2nd decile – from \$5 521 to \$6 905; the 3rd decile – from \$6 905 to \$8 500 dollars; the 4th decile – from \$8 500 to \$10 695 dollars; the 5th decile – from \$10 695 to \$13 485; the 6th decile – from \$13 485 to \$16 950; the 7th decile – from \$16 950 to \$21 725; the 8th decile – from \$21 725 to \$28 310; the 9th decile – from \$28 310 to \$39 000; the 10th decile – from \$39 000 to the maximum.

However, it should be noted that the maximum value of guerrilla warfare intensity is still fixed on the range of around \$13 500 – \$17 000. As a result, it can be stressed that we deal with a kind of a bimodal distribution where maximum intensity of guerrilla warfare can be observed, on the one hand, among the upper echelon of countries with lower middle income and on the other, among the upper echelon of countries with upper middle income (in this case, this intensity is even slightly higher among the representatives of the second group than among the

<sup>32</sup> Mean values of intensity of guerrilla warfare per decile in the interval from the minimum to \$6 425.

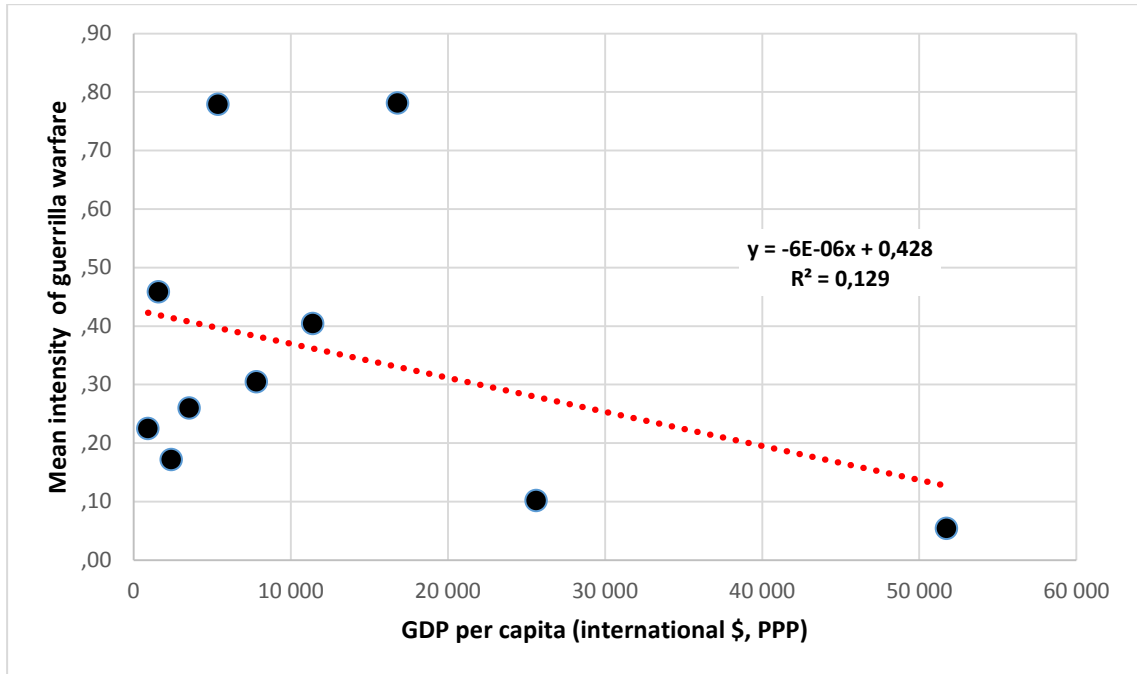
<sup>33</sup> Which corresponds to deciles from 6 to 10 of the general population of the database cases.

<sup>34</sup> Mean values of intensity of guerrilla warfare per decile in the interval from \$4 325 to the maximum.

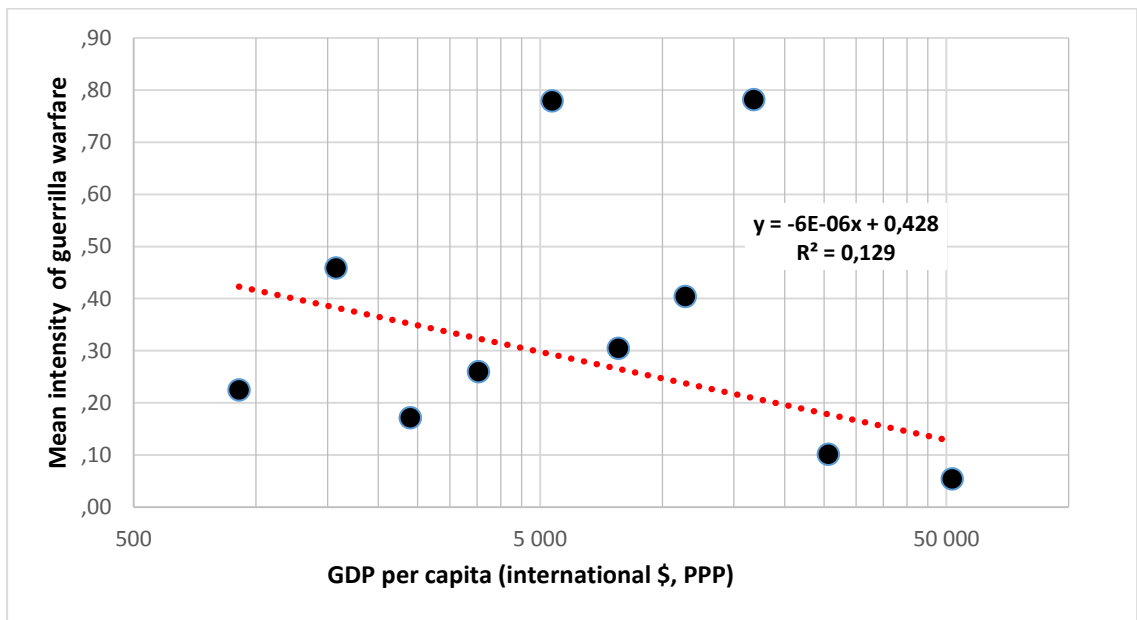


ones of the first<sup>35</sup>). Of course, it is difficult not to consider this fact as one of the formation factors of the so called "trap of average income".

In general, regarding guerrilla warfare, a negative correlation in the right part of the spectrum of GDP per capita values still outweighs a positive correlation in its left part, and in general along the whole spectrum we see a statistically weak, insignificant negative correlation (see Fig. 19).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

<sup>35</sup> However, this difference cannot be characterized as statistically significant.

**Fig. 19.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of guerrilla warfare for respective years, 1960 – 2015 (scatterplot with a fitted linear regression line)

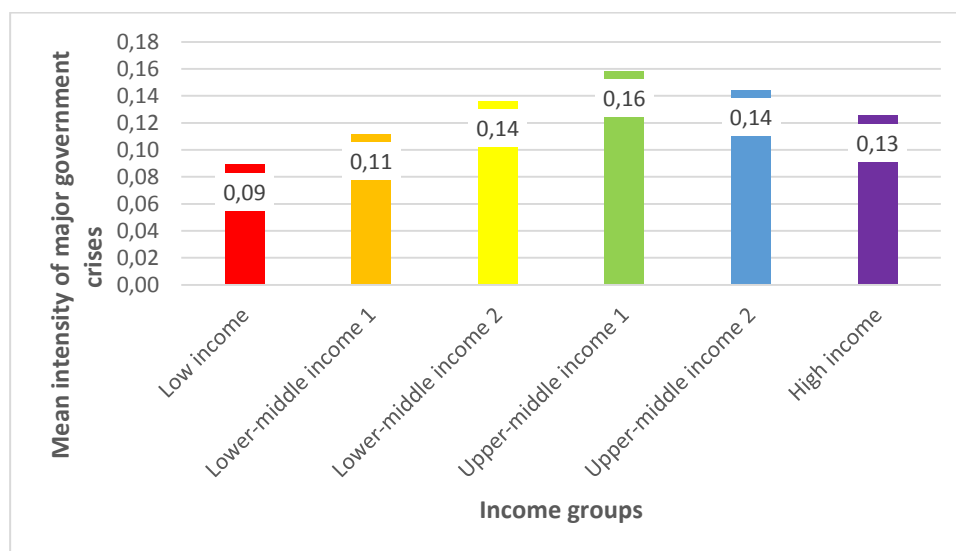
Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = -0,359$ ,  $p = 0,309$ . Mean values of guerrilla warfare intensity per decile.

There can also be observed a significantly stronger correlation in the left part of the spectrum of GDP per capita values regarding to major government crises.

### Major Government Crises

The distribution of intensity of “major government crises” (*domestic4*)<sup>36</sup> among the six income groups can be seen at **Fig. 20**.

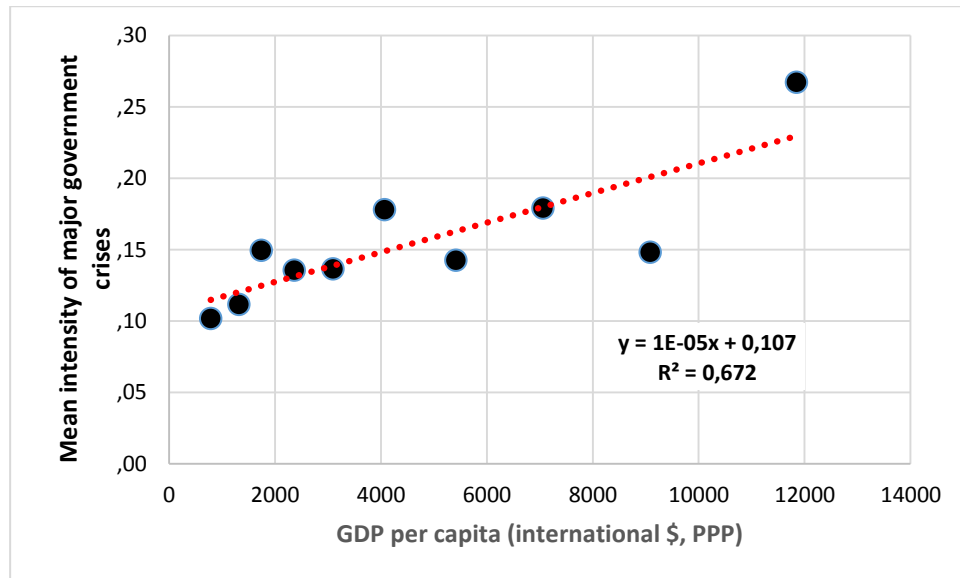


**Fig. 20.** Mean intensity of major government crises by income groups, 1960 – 2015

Data source: CNTS, 2016; World Bank, 2016.

Per decile analysis of the left part of the spectrum of GDP per capita values yields the following results which can be seen at **Fig. 21**.

<sup>36</sup> CNTS domestic 4 = “Major government crises”. The CNTS provides the following definition for *Major government crises* (*domestic4*): “any rapidly developing situation that threatens to bring the downfall of the present regime – excluding situations of revolt aimed at such overthrow.” (Wilson, 2017: 12).



**Fig. 21.** Per decile correlation between GDP per capita, PPP (international \$, 2011), and intensity of major government crises in respective years in the interval from the minimum to \$13 482,<sup>37</sup> 1960 – 2015 (scatterplot with a fitted linear regression line)<sup>38</sup>

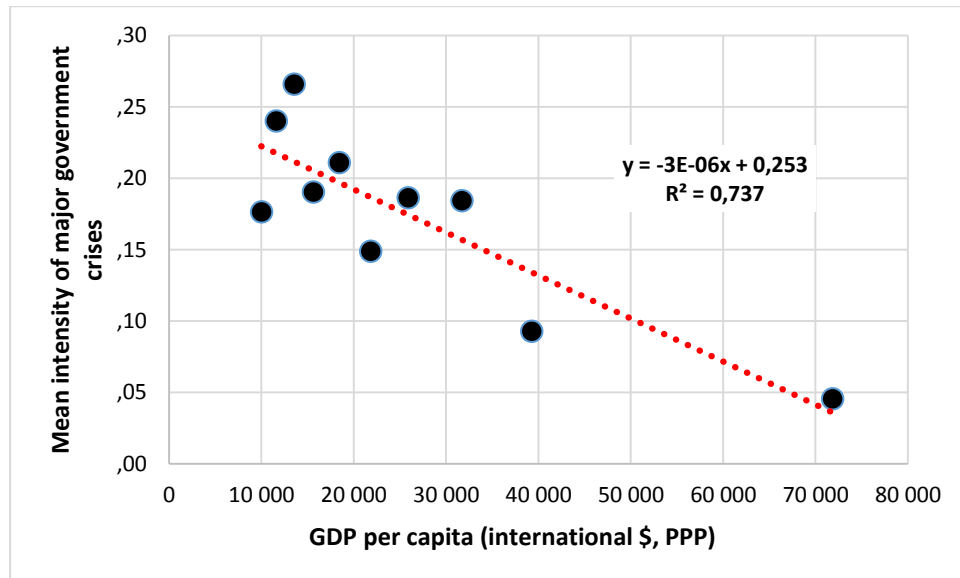
*Data source:* CNTS, 2016; World Bank, 2016.

*Notes:*  $r = 0,82$ ,  $p = 0,004$ . Mean values of intensity of major government crises per decile for the interval from the minimum to \$3 482. The deciles by GDP per capita on the fragment from the minimum up to \$13 482 have the following characteristics to their boundaries: the 1st decile – from the minimum up to \$1 094; the 2nd decile – from \$1 095 to \$1 511 dollars; the 3rd decile – from \$1 511 to \$2 037 dollars; the 4th decile – from \$2 037 to \$2 720; the 5th decile – from \$2 720 to \$3 495; the 6th decile – from \$3 495 to \$4 685; the 7th decile – from \$4 685 to \$6 191; the 8th decile – from \$6 191 to \$7 926; the 9th decile – from \$7 926 to \$10 290; the 10th decile – from \$10 290 to \$13 482.

As is shown on **Fig. 21**, on the left side of the spectrum of GDP per capita values up to the interval of about \$10 500 – \$13 500 there is a strong ( $r = 0,82$ ) and statistically significant ( $p = 0,004$ ) positive correlation between GDP per capita and intensity of major government crises. Starting from the range of \$12 500 – \$14 500 we see an opposite correlation (see **Fig. 22**).

<sup>37</sup> Which corresponds to deciles from 1 to 7 of the general population of the database cases.

<sup>38</sup> Mean values of intensity of major governmental crises per decile in the interval from to \$13 482.



**Fig. 22.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of major government crises in respective years in the interval from \$9 228 to the maximum,<sup>39</sup> 1960 – 2015 (scatterplot with a fitted logarithmic regression line)<sup>40</sup>

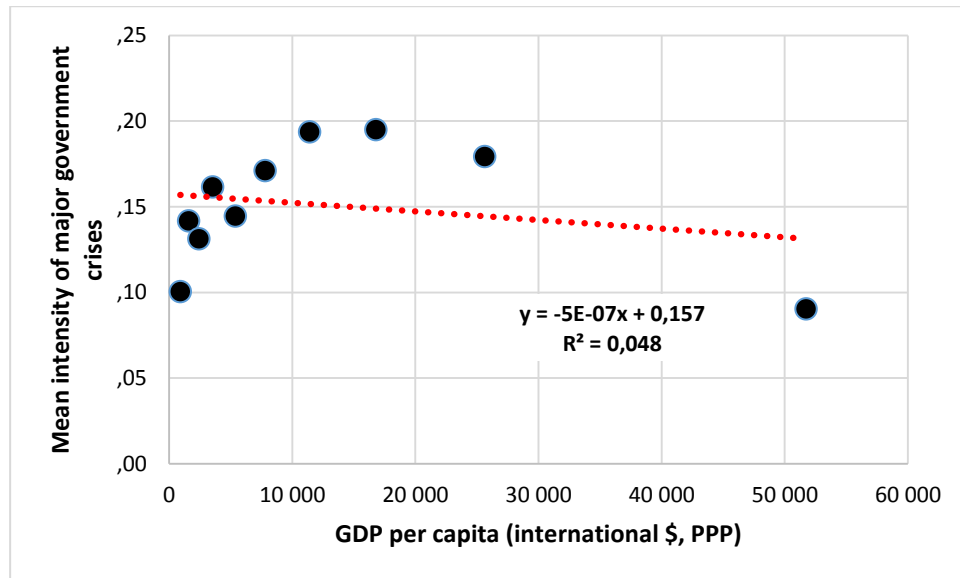
*Data source:* CNTS, 2016; World Bank, 2016.

*Notes:*  $r = -0,855$ ,  $p = 0,002$ . Mean values of intensity of major government crises per decile for the interval from \$9 228 to the maximum. The deciles by GDP per capita for the fragment from \$9 228 to the maximum have the following characteristics of their boundaries: the 1st decile – from \$9 228 to \$10 695; the 2nd decile – from \$10 695 to \$12 540; the 3rd decile – from \$12 540 to \$14 537; the 4th decile – from \$14 537 to \$16 950; the 5th decile – from \$16 950 to \$19 980; the 6th decile – from \$19 980 to \$23 800; the 7th decile – from \$23 800 to \$28 310; the 8th decile – from \$28 310 to \$35 200 dollars; the 9th decile – from \$35 200 to \$43 895; the 10th decile – from \$43 895 to the maximum.

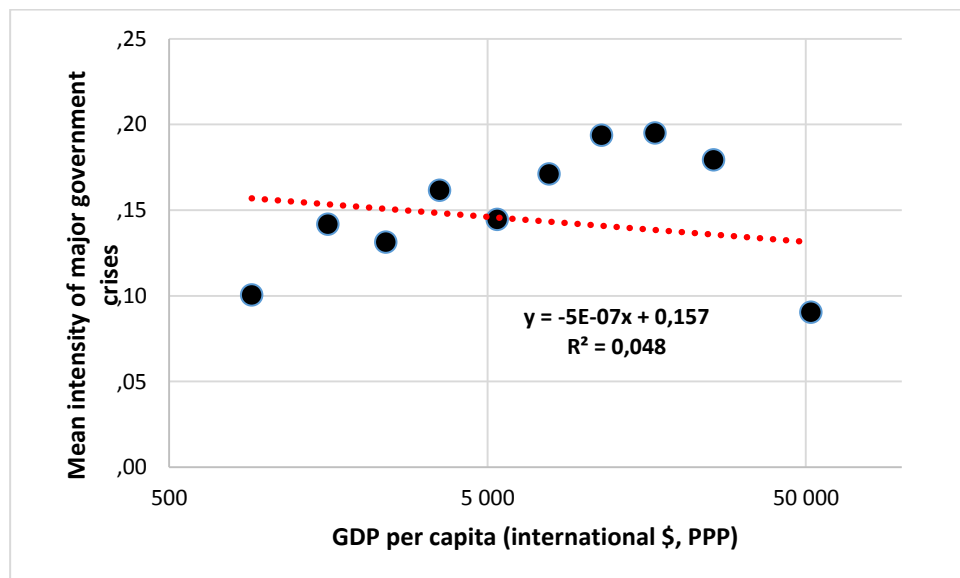
As we see, a negative correlation in the right part of the spectrum of GDP per capita values in this case is only slightly stronger than a positive correlation in the left part. As a result, in the output for the full range of GDP per capita values we get a weak statistically insignificant negative correlation (see **Fig. 23**).

<sup>39</sup> Which corresponds to deciles from 8–10 of the general population of the database cases.

<sup>40</sup> Mean values of intensity of major governmental crises per decile in the interval from \$9 228 to the maximum.



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 23.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of major government crises in respective years, 1960 – 2015 (scatterplot with a fitted linear regression line)

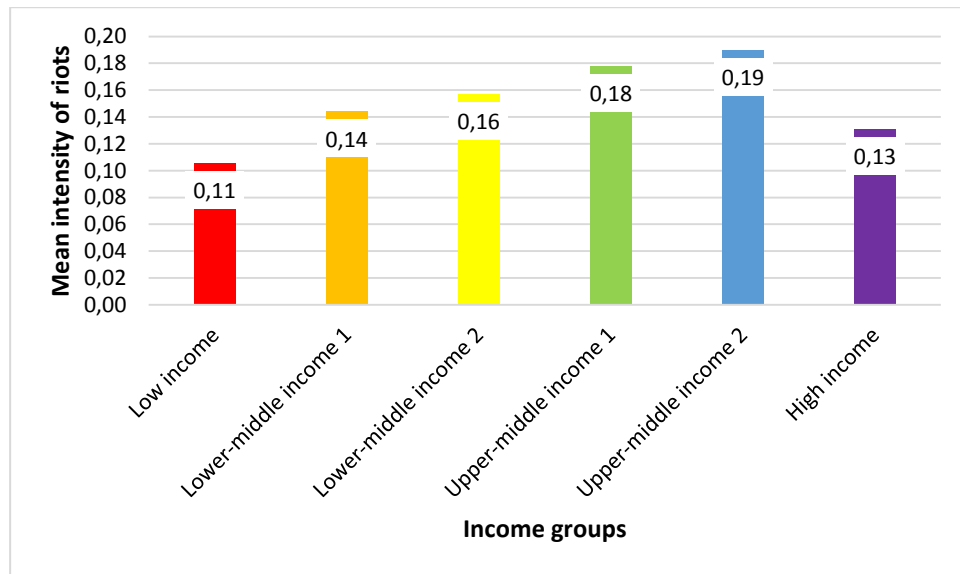
*Data source:* CNTS, 2016; World Bank, 2016.

*Note:* Mean values of intensity of major government crises per decile.

On an even more extended fragment of the spectrum of GDP per capita values we observe a statistically significant positive correlation between per capita GDP and intensity of riots – another important index of socio-political destabilization.

### ***Riots***

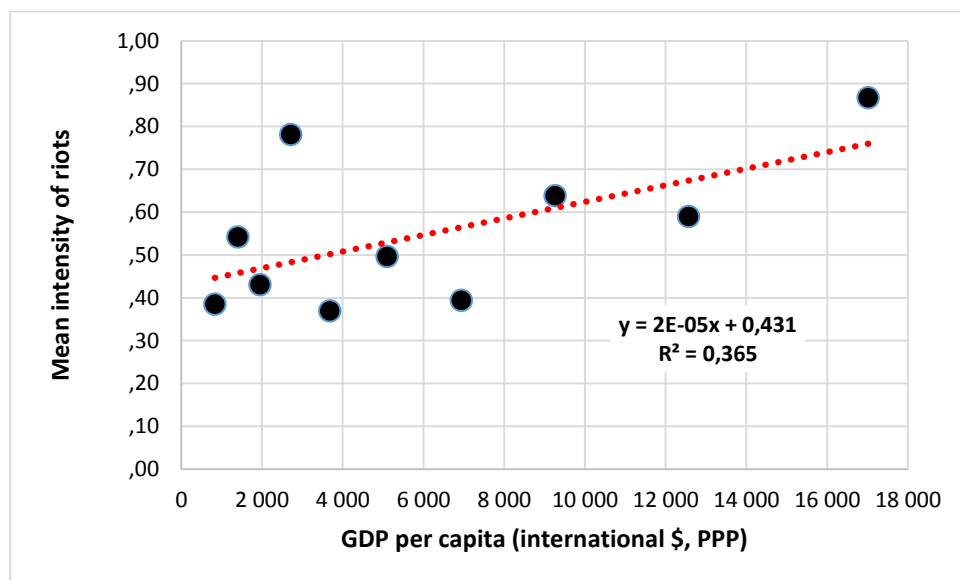
The distribution of intensity of “riots” (*domestic6*)<sup>41</sup> among the six income groups can be seen at **Fig. 24**.



**Fig. 24.** Mean intensity of riots by income groups, 1960 – 2015

Data source: CNTS, 2016; World Bank, 2016.

The per decile analysis of the positive correlation in the left part of the spectrum of GDP per capita values provides us with the following results (see **Fig. 25**).



**Fig. 25.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of riots for respective years in the interval from the minimum to \$19 960,<sup>42</sup> 1960–2015

<sup>41</sup> CNTS domestic 6 = “Riots”. The CNTS provides the following definition for *Riots* (domestic6): “any violent demonstration or clash of more than 100 citizens involving the use of physical force.” (Wilson, 2017: 13).

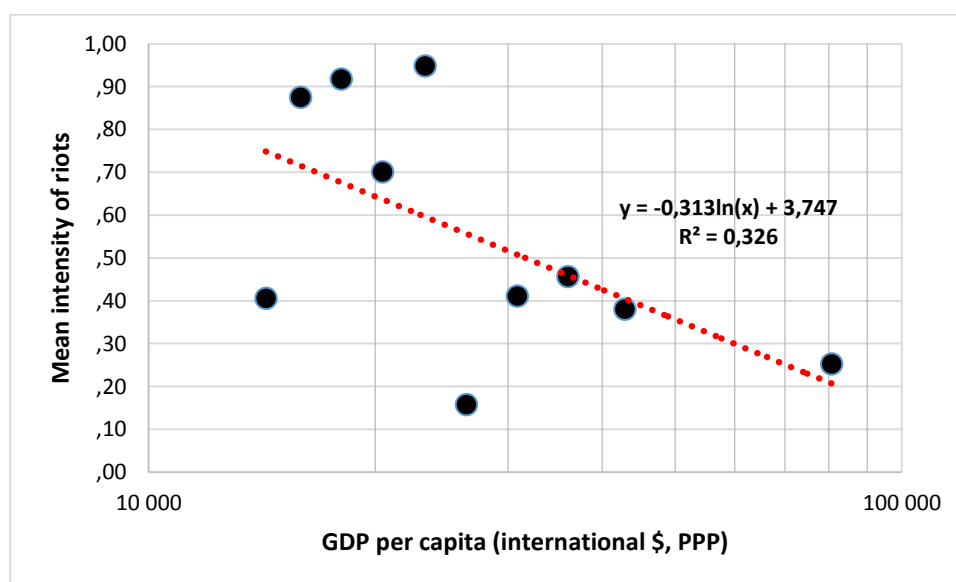
<sup>42</sup> Which corresponds to deciles from 1 to 7 of the general population of the database cases.

(scatterplot with a fitted linear regression line)<sup>43</sup>

Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = 0,607$ ,  $p = 0,032$  (one-tailed significance test). Mean values of intensity of mass riots per decile for the interval from the minimum to \$19 960. The deciles by GDP per capita for the fragment from the minimum up to \$19 960 have the following characteristics to their boundaries: the 1st decile – from the minimum to \$1 167 dollars; the 2nd decile – from \$1 167 to \$1 615; the 3rd decile – from \$1 615 to \$ 2 310; the 4th decile – from \$2 310 to \$3 130; the 5th decile – from \$3 130 to \$4 322; the 6th decile – from \$4 322 to \$5 970; the 7th decile – from \$5 970 to \$7 926; the 8th decile – from \$7 926 to \$10 695; the 9th decile – from \$10 695 to \$14 535; the 10th decile – from \$14 535 to \$19 960.

As we can see, this positive correlation is not particularly strong, but it is statistically significant and can be traced from the minimum to the level of around \$20 000. It must be stressed that a negative correlation cannot be distinguished by a high strength either in the right part of the spectrum of GDP per capita values which, moreover, can only be described as a marginally statistically significant trend (see Fig. 26).



**Fig. 26.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of riots for respective years in the interval from \$13 485 to the maximum,<sup>44</sup> 1960–2015 (logarithmic scale: scatterplot with a fitted logarithmic regression line)<sup>45</sup>

Data source: CNTS, 2016; World Bank, 2016.

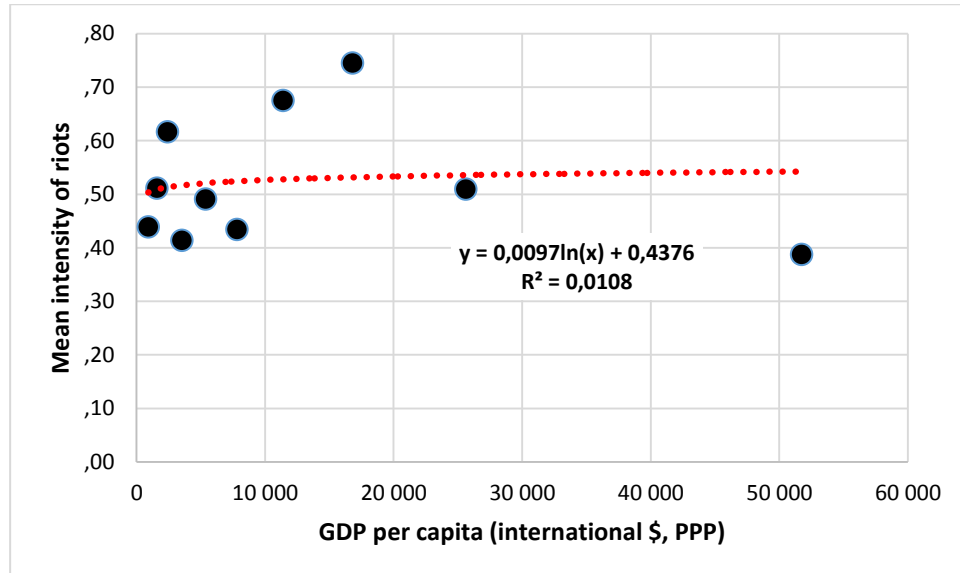
Note:  $r = 0,575$ ,  $p = 0,082$  (one-tailed significance test). Mean values of intensity of riots per decile for the interval from \$13 485 to the maximum. The deciles by GDP per capita on the fragment from \$13 485 to the maximum have the following characteristics of their boundaries: the 1st decile – from \$13 485 to \$15 055; the 2nd decile – from \$15 055 to \$16 950; the 3rd decile – from \$16 950 to \$19 110; the 4th decile – from \$19 110 to \$21 728; the 5th decile – from \$21 728 to \$24 800; the 6th decile – from \$24 800 to \$28 310 dollars; the 7th decile – from \$28 310 to \$33 400; the 8th decile – from \$33 400 to \$39 100; the 9th decile – from \$39 100 to \$48 300; the 10th decile – from \$48 300 to the maximum.

<sup>43</sup> Mean values of intensity of mass riots per decile in the interval from the minimum to \$19 960.

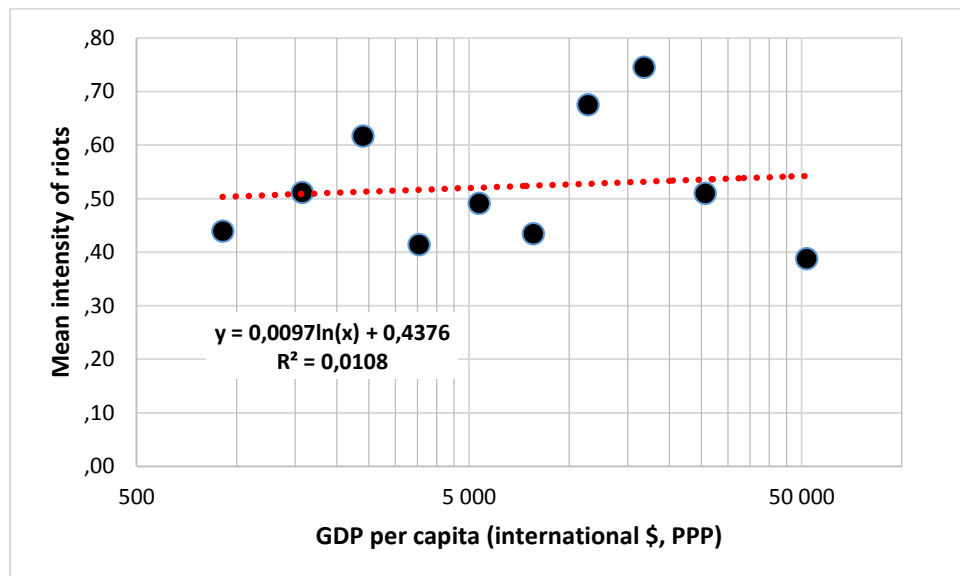
<sup>44</sup> Which corresponds to deciles from 8 to 10 of the general population of the database cases.

<sup>45</sup> Mean values of intensity of mass riots per decile in the interval from \$13 485 to the maximum.

Nevertheless, the positive correlation in the left part of the spectrum of GDP per capita values is slightly stronger than the negative correlation in the right part and there is an extremely weak (slightly different from zero) positive correlation throughout the whole spectrum (see Fig. 27).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 27.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of riots in respective years, 1960 – 2015 (scatterplot with a fitted logarithmic regression line)

Data source: CNTS, 2016; World Bank, 2016.

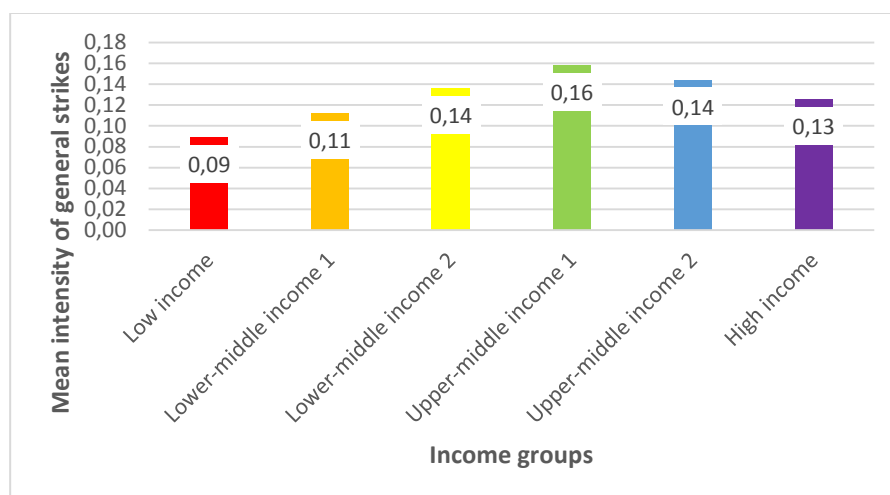
Note:  $r = 0,104$ ,  $p = 0,775$ . Mean values of intensity of riots per decile.



A much stronger positive correlation in the left part of the spectrum of GDP per capita values is observed for such a significant type of sociopolitical destabilization as general strikes.

### *General strikes*

The positive correlation between GDP per capita and intensity of “*general strikes*” (*domestic2*)<sup>46</sup> is rather clear and it is attested in a rather wide interval (meanwhile, the positive correlation in the left part of the spectrum is much more pronounced than the negative one in the right) (see **Fig. 28**).

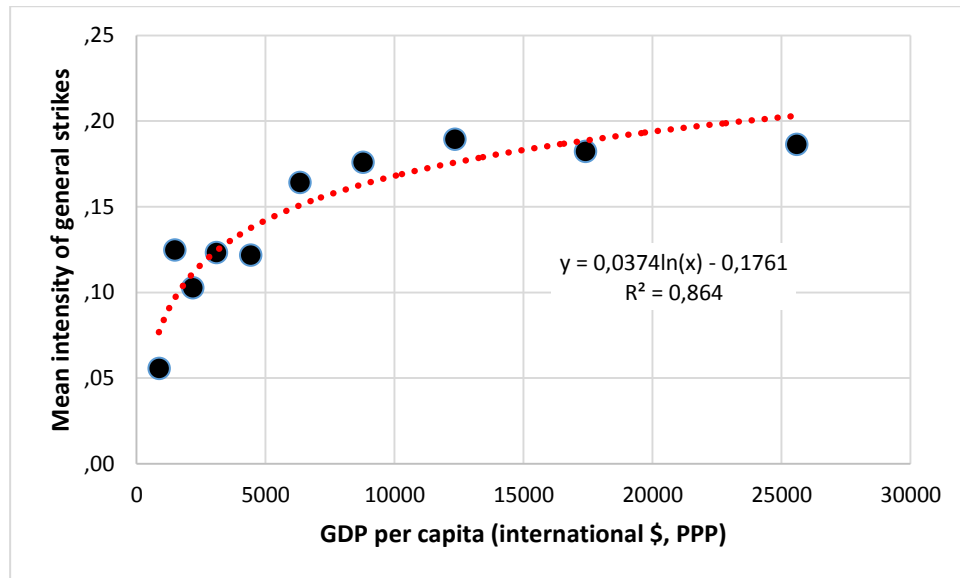


**Fig. 28.** Mean intensity of general strikes by income groups, 1960 – 2015

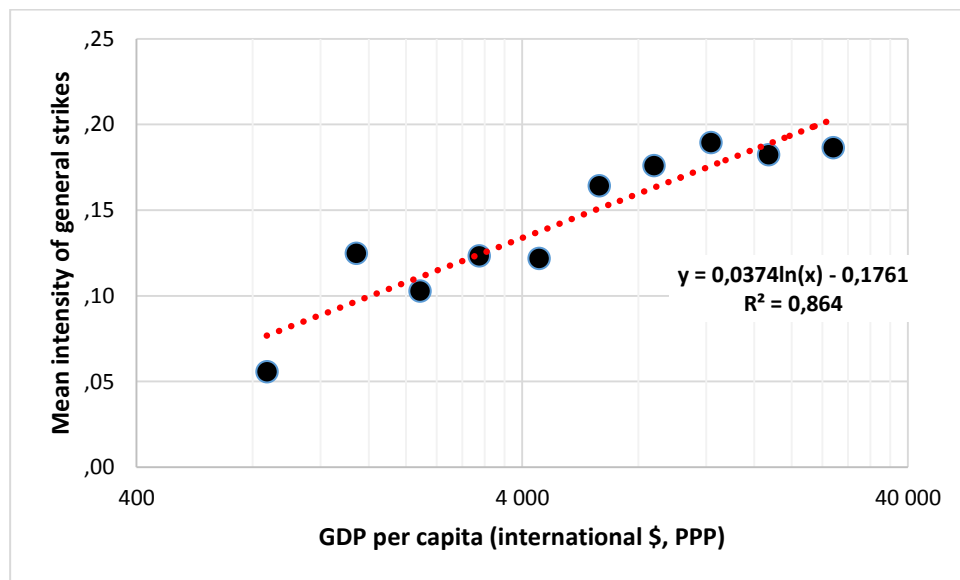
*Data source:* CNTS, 2016; World Bank, 2016.

Per decile analysis of the left part of the spectrum of GDP per capita values yields the following results (see **Fig. 29**).

<sup>46</sup> CNTS domestic 2 = *General Strikes*. The CNTS provides the following definition for *general strikes* (*domestic2*): „any strike of 1 000 or more industrial or service workers that involves more than one employer and that is aimed at national government policies or authority” (Wilson, 2017: 12).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 29.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of general strikes in respective years in the interval from the minimum to \$31 671<sup>47</sup>, 1960–2015 (scatterplot with a fitted linear regression line)<sup>48</sup>

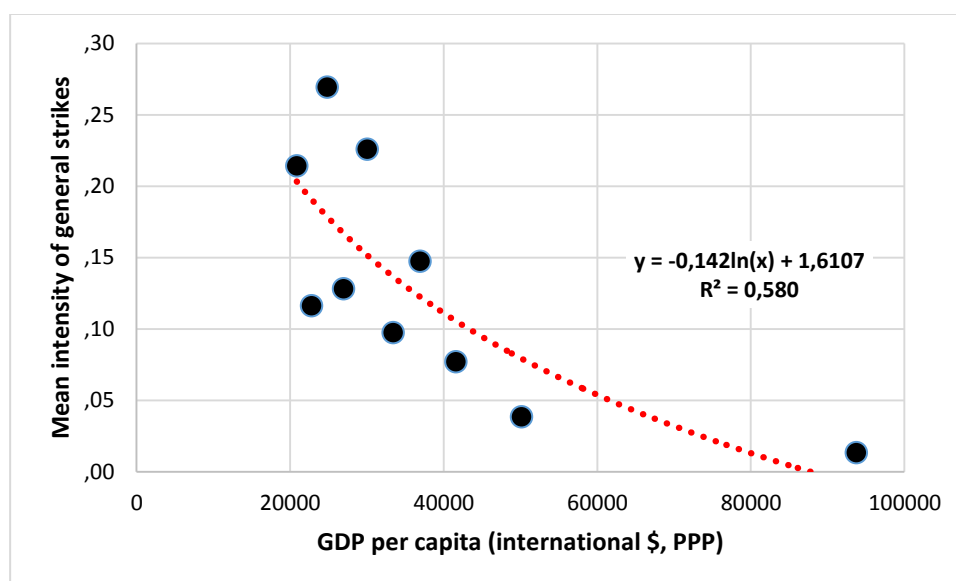
*Data source:* CNTS, 2016; World Bank, 2016.

*Note:*  $r = 0,93$ ,  $p < 0,001$ . Mean values of intensity of political strikes per decile in the interval from the minimum to \$31 671. Per capita GDP deciles for the interval from the minimum to \$31 671 have the following characteristics to their boundaries: the 1st decile – from the minimum to \$1 230; the 2nd decile – from \$1 230 to \$1 761; the 3rd decile – from \$1 761 to \$2 599; the 4th decile – from \$2 599 to \$3 639; the 5th decile – from \$3 639 to \$5 307; the 6th decile – from \$5 307 to \$7 472; the 7th decile – from \$7 472 to \$10 290; the 8th decile – from \$10 290 to \$14 535; the 9th decile – from \$14 535 to \$20 875; the 10th decile – from \$20 875 to \$31 671.

<sup>47</sup> Which corresponds to deciles from 1 to 9 of the general population of the database cases.

<sup>48</sup> Mean values of intensity of purges per decile in the interval from the minimum to \$31 671.

As may be seen above at the **Fig. 29**, in the left part there is a very strong ( $r = 0,93$ ) and statistically significant ( $p < 0,001$ ) positive correlation between the logarithm of GDP per capita and intensity of general strikes. That is to say that in this interval (which includes the majority of human societies) the higher the mean level of economic prosperity, the higher the intensity of general strikes. Moreover, the analysis indicates that in fact the growth of GDP per capita is accompanied by the growth of strike intensity right up to the interval of \$10 500 – \$14 500, after it, as we will explore below, within the interval of \$10 500 – \$26 000 the mean level of strike intensity remains very high but within this range the growth of GDP per capita is not accompanied by any further growth of strike intensity. Starting from the interval \$24 000 – \$26 000, the further growth of GDP per capita is accompanied by a definite tendency towards a decline in strike intensity (see **Fig. 30**).



**Fig. 30.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of general strikes in respective years in the interval from \$19 969 to the maximum<sup>49</sup>, 1960–2015 (scatterplot with a fitted linear regression line)<sup>50</sup>

*Data source:* CNTS, 2016; World Bank, 2016.

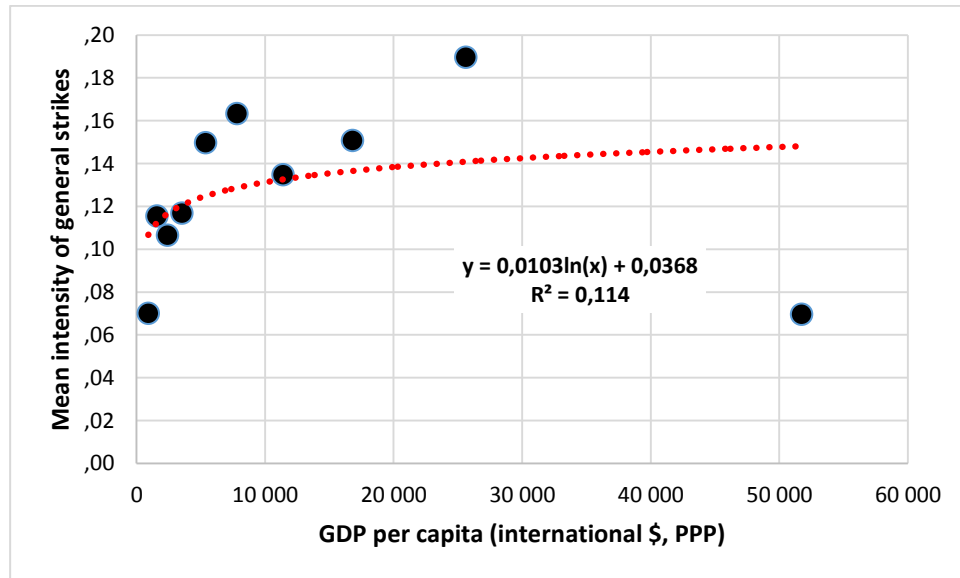
*Note:*  $r = -0,77$ ,  $p = 0,01$ . Mean values of intensity of general strikes per decile in the interval from \$19 969 to the maximum. Per capita GDP deciles for the interval from \$19 969 to the maximum have the following characteristics to their boundaries: the 1st decile – from \$19 969 to \$21 725; the 2nd decile – from \$21 725 to \$23 725; the 3rd decile – from \$23 725 to \$25 780; the 4th decile – from \$25 800 to \$28 310; the 5th decile – from \$28 310 to \$31 675; the 6th decile – from \$31 675 to \$35 200; the 7th decile – from \$35 200 to \$39 100; the 8th decile – from \$39 100 to \$43 895; the 9th decile – from \$43 895 to \$63 600; the 10th decile – from \$63 600.

One may note that in the right part of the spectrum of GDP per capita values (corresponding mainly to high income countries) there is a rather strong ( $r = -0,77$ ) statistically significant ( $p = 0,01$ ) negative correlation between the logarithm of GDP per capita and intensity

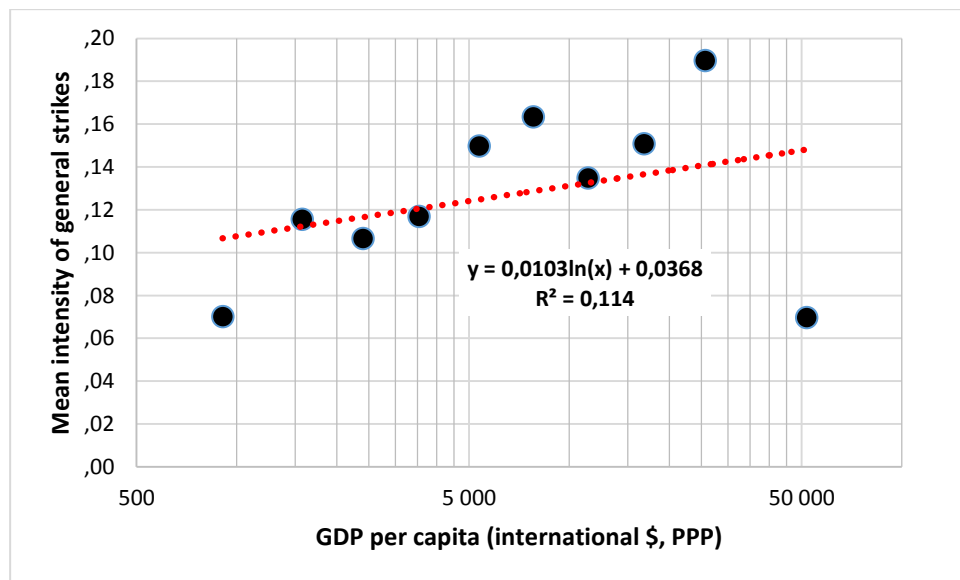
<sup>49</sup> Which corresponds to deciles from 9 to 10 of the general population of the database cases.

<sup>50</sup> Mean values of intensity of general strikes per decile in the interval from \$19 969 to the maximum.

of general strikes. Thus, unlike low and lower-middle income countries where the growth of GDP per capita tends to be accompanied by the growth of intensity of general strikes, in high income countries the tendency is that the further growth of the latter is accompanied not by the growth, but by the decline in strike intensity. However, the positive correlation in the left part of the spectrum of GDP per capita values is much stronger than the negative correlation which is observed in the right part. As a result, the weak statistically insignificant positive correlation is attested for all the spectrum of GDP per capita values (see **Fig. 31**).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 31.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of general strikes in respective years, 1960 – 2015 (scatterplot with a fitted logarithmic regression line)

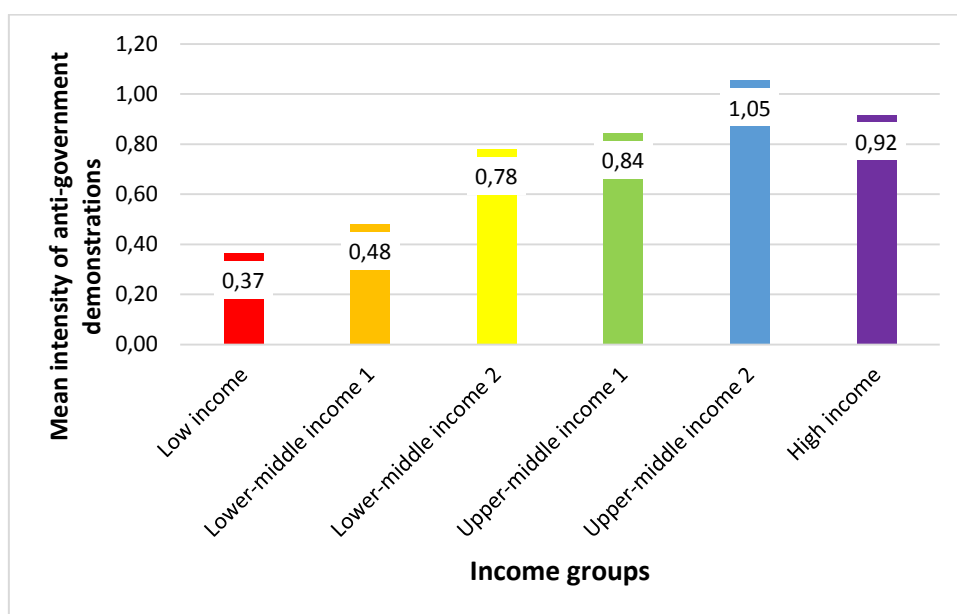
Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = 0,338$ ,  $p = 0,34$ . Mean values of intensity of general strikes per decile.

In general, the positive correlation between GDP per capita and intensity of general strikes with respect to low and middle income countries is extremely strong ( $r = 0,93^{51}$ ). However, there is another type of sociopolitical destabilization to which the positive correlation with GDP per capita in the left part is much stronger. This is anti-government demonstrations.

### *Anti-government demonstrations*

Distribution of intensity of “*anti-government demonstrations*” (*domestic8*)<sup>52</sup> by six income groups becomes as follows (see **Fig. 32**).



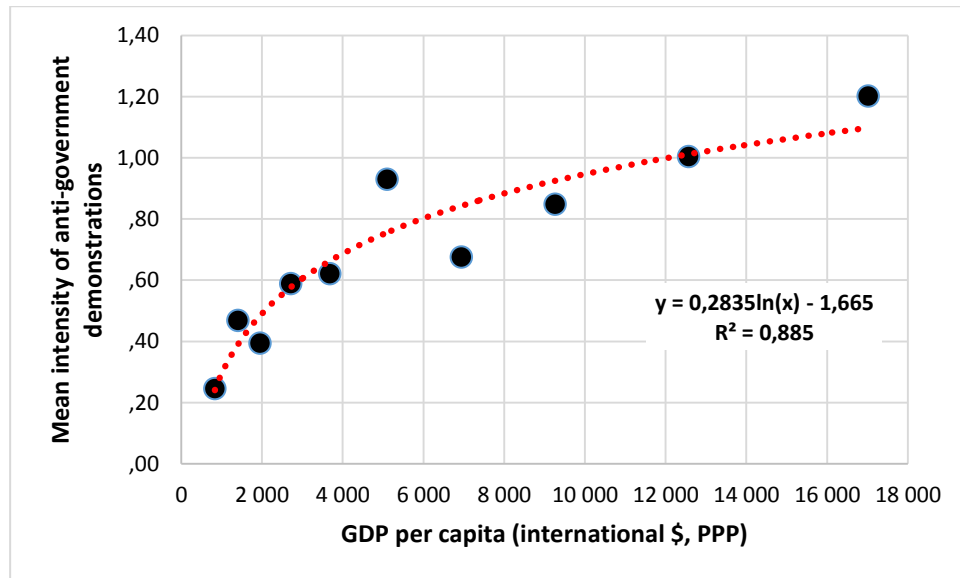
**Fig. 32.** Mean intensity of anti-government demonstrations by income groups, 1960 – 2015

*Data source:* CNTS, 2016; World Bank, 2016.

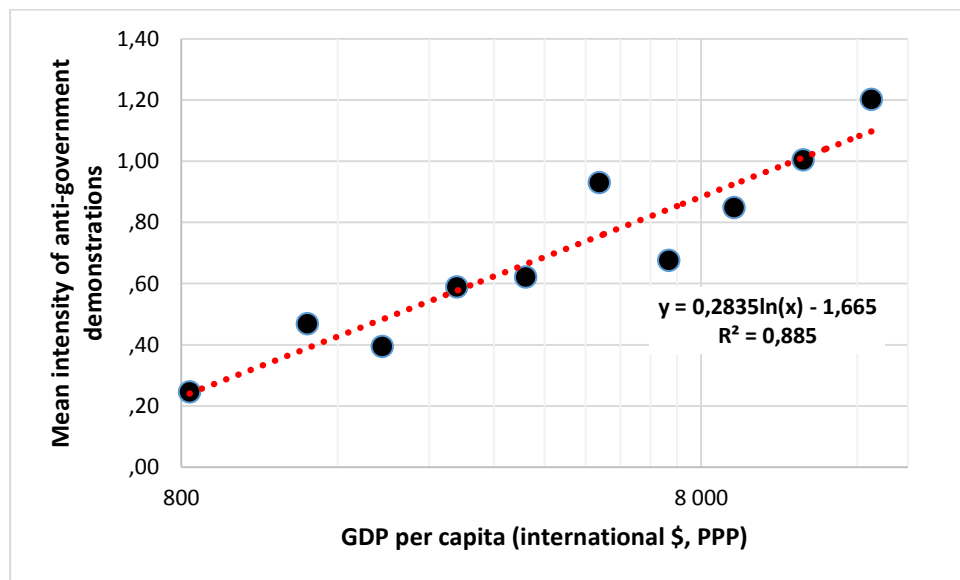
As we have revealed earlier (Korotayev, Bilyuga & Shishkina, 2016, 2017a, 2017b; Korotayev, Vaskin & Bilyuga, 2017), there is an extremely strong positive correlation between GDP per capita and intensity of anti-government demonstrations within the interval of GDP per capita values up to the level of \$20 000. This conclusion is proved by our new tests using the latest data (see **Fig. 33**).

<sup>51</sup> A logarithmic regression.

<sup>52</sup> CNTS domestic 8 = *Anti-government demonstrations*. The CNTS provides the following definition for *anti-government demonstrations* (domestic8): „any peaceful public gathering of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies or authority, excluding demonstrations of a distinctly anti-foreign nature” (Wilson 2017: 13).



(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 33.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of anti-government demonstrations in respective years in the interval from the minimum to \$19 960<sup>53</sup>, 1960–2015 (scatterplot with a fitted linear regression line)<sup>54</sup>

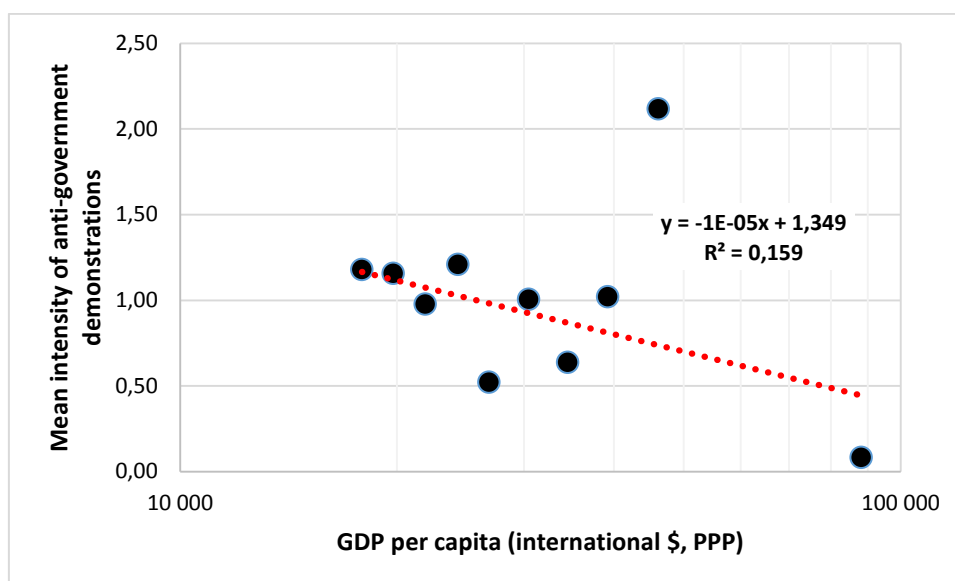
Data source: CNTS, 2016; World Bank, 2016.

Note:  $r = 0,941$ ,  $p < 0,001$ . Mean values of intensity of riots per decile in the interval from the minimum to \$19 969. Per capita GDP deciles for the interval from the minimum to \$19 969 have the following characteristics to their boundaries: the 1st decile – from the minimum to \$1 167; the 2nd decile – from \$1 167 to \$1 615; the 3rd decile – from \$1 615 to \$2 310; the 4th decile – from \$2 310 to \$3 130; the 5th decile – from \$3 130 to \$4 322; the 6th decile – from \$4 322 to \$5 970; the 7th decile – from \$5 970 to \$7 926; the 8th decile – from \$7 926 to \$10 695; the 9th decile – from \$10 695 to \$14 535; the 10th decile – from \$14 535 to \$19 960.

<sup>53</sup> Which corresponds to deciles from 1 to 8 of the general population of the database cases.

<sup>54</sup> Mean values of intensity of riots per decile in the interval from the minimum to \$19 969.

At the same time, anti-government demonstrations are an exceptional type of sociopolitical destabilization in the sense that (taking into account the latest data) there is no statistically significant negative correlation in the right part of the spectrum of GDP per capita values (see **Fig. 34**).



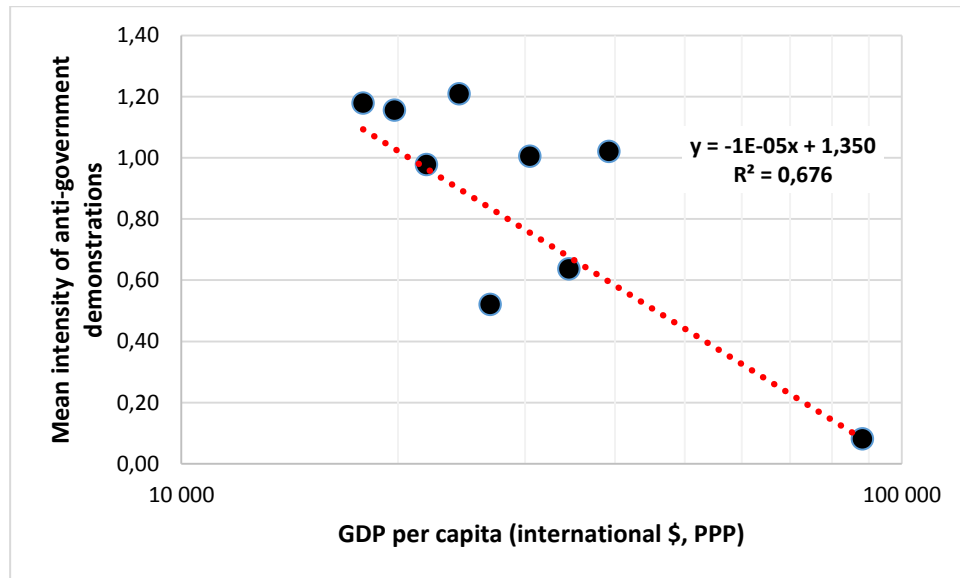
**Fig. 34.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of anti-government demonstrations in respective years in the interval from \$17 000 to the maximum, 1960–2015 (scatterplot with a fitted linear regression line)<sup>55</sup>

*Data source:* CNTS, 2016; World Bank, 2016.

*Note:*  $r = -0,399$ ,  $p = 0,253$ . Mean values of intensity of riots per decile in the interval from \$17 000 to the maximum. Per capita GDP deciles for the interval from \$17 000 to the maximum have the following characteristics to their boundaries: the 1st decile – from \$17 000 to \$18 750; the 2nd decile – from \$18 750 to \$20 800; the 3rd decile – from \$20 800 to \$23 000; the 4th decile – from \$23 000 to \$25 500; the 5th decile – from \$25 500 to \$28 500; the 6th decile – from \$28 500 to \$32 500; the 7th decile – from \$32 500 to \$36 500; the 8th decile – from \$36 500 to \$42 200; the 9th decile – from \$42 200 to \$55 250; the 10th decile – from \$55 250 to the maximum.

However, a more accurate analysis indicates that the negative correlation is made here insignificant by the 9<sup>th</sup> decile, whereas this is connected with the fact that this decile contains the USA which, is characterized by unusually high (for an economically highly developed country) intensity of demonstrations (as we see, a sort of “American exceptionalism” can be observed even here). With this outlier omitted, the negative correlation becomes considerably stronger and statistically significant (see **Fig. 35**).

<sup>55</sup> Mean values of intensity of riots per decile in the interval from \$17 000 to the maximum.



**Fig. 35.** Per decile correlation between GDP per capita (2011 international dollars, PPP) and intensity of anti-government demonstrations in respective years in the interval from \$17 000 to the maximum, 1960–2015 (scatterplot with a fitted linear regression line)<sup>56</sup>, **excluding the outlier.**

*Data source:* CNTS, 2016; World Bank, 2016.

*Note:*  $r = -0,822$ ,  $p = 0,007$ .

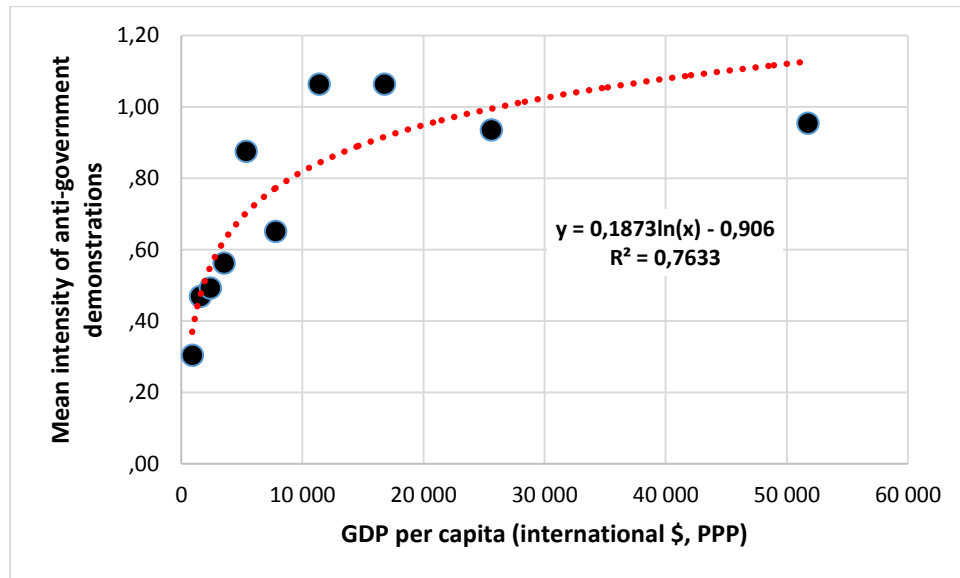
However, evidently, the USA is too significant an “exception” to be ignored.

All in all, the following interpretation of the obtained results appears the most relevant: right up to the level of \$20 000 there is a very strong positive correlation between GDP per capita and intensity of anti-government demonstrations – that is, the growth of GDP per capita in this interval involves a distinct tendency towards the growth of intensity of anti-government demonstrations. Whatever the case, in this interval the fact is that the better people live, the more they take to the streets holding anti-government demonstrations (the result is paradoxical but not surprising in view of what has been mentioned in the first part of this article). At the same time, after reaching the GDP per capita threshold of about \$20 000, the further growth of GDP per capita is accompanied by a tendency toward the decrease in intensity of anti-government demonstrations, but this tendency cannot be regarded unequivocally as statistically significant.

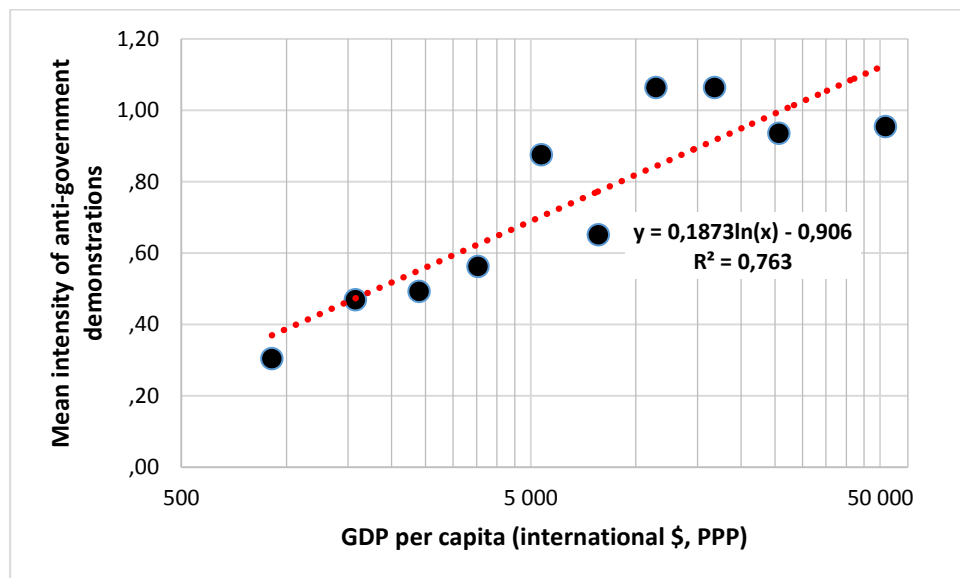
Anyway, with respect to anti-government demonstrations, the combination of the extremely strong positive correlation within the interval up to \$20 000 with the statistically insignificant negative correlation within the subsequent interval leads to the fact that we observe a very strong statistically significant positive correlation between GDP per capita and intensity of anti-government demonstrations throughout all the spectrum of GDP per capita values (see **Fig. 36**).

<sup>56</sup> Mean values of intensity of riots per decile in the interval from \$17 000 to the maximum.





(a) with a natural X-axis scale



(b) with a logarithmic X-axis scale

**Fig. 36.** Correlation between GDP per capita (2011 international dollars, PPP) and intensity of anti-government demonstrations in respective years, 1960–2015 (scatterplot with a fitted logarithmic regression line)

Data source: CNTS, 2016; World Bank, 2016.

Note: Mean values of intensity of anti-government demonstrations per decile.

## DISCUSSION

Finally, there are some results of implemented tests. Firstly, we examine the characteristics of a positive correlation in the left part of the spectrum of GDP per capita values (see **Table 1**).

**Table 1.** Characteristics of positive correlations in the left part of the spectrum of GDP per capita values

<b>Types of sociopolitical destabilization</b>	<b>Up to which interval (\$) there is a continuous positive correlation</b>	<b>Strength of a positive correlation (<math>r</math>)</b>	<b>Statistical significance of a positive correlation (<math>p</math>)</b>
Coups and Coup Attempts	No positive correlation in the left part		
Purges	5 300–6 400	0.34*	0.337
Assassinations	5 300–6 400	0.881*	0.001
Guerrilla Warfare	5 300–6 400	0.603*	0.033
Riots	14 500–20 000	0.607*	0.032
General Strikes	10 300–14 500	0.93**	< 0.001
Anti-government Demonstrations	14 500–20 000	0.941**	< 0.001

\* linear regression.

\*\* logarithmic regression.

Different types of sociopolitical destabilization vary considerably among themselves in these characteristics. At the same time, in the opposite poles there appear coups and coup attempts (for which there is no positive correlation in the left part of the spectrum) and anti-government demonstrations (for which there is an extremely strong [ $r = 0,941!$ ] positive correlation in the left part of the spectrum). Next to coups and coup attempts there are purges for which a positive correlation in the left part of the spectrum is marked, even though it is very weak, statistically insignificant and observed in a limited interval that in turn corresponds to low and lower-middle income countries, but not to upper-middle income ones.

In the same limited interval there is also a positive correlation with intensity of assassinations and guerrilla warfare. However, concerning these two types of sociopolitical destabilization, the positive correlation is statistically significant (furthermore, in the case of assassinations there is an extremely strong correlation).

Near another pole, there are major government crises, with respect to which a statistically significant strong positive correlation is marked not only for low and lower-middle income countries, but also for the lower echelon of upper-middle income countries. In a longer interval (including not only the lower echelon of upper-middle income countries, but also the upper one) there is a statistically significant (but not very strong) positive correlation between GDP per capita and intensity of riots.

Next to the pole opposite to coups and coup attempts there are general strikes, as they show (in the left part of the spectrum) an extremely strong ( $r = 0,93!$ ) statistically significant positive correlation. However, it is observed in a shorter interval than in case of riots or anti-government demonstrations.

It is anti-government demonstrations that constitute the pole directly opposite to coups and coup attempts – due to the extremely strong positive correlation ( $r = 0,941!$ ) and the long interval on which this correlation is observed (in the equally long interval a positive correlation of the left part of the spectrum occurs solely for riots, but in the latter case there is a much weaker correlation).

Let us consider the characteristics of a negative correlation in the right part of the spectrum of GDP per capita values (see **Table 2**).

**Table 2.** Characteristics of negative correlations in the right part of the spectrum of GDP per capita values

<b>Types of sociopolitical destabilization</b>	<b>Starting from which interval (\$) there is a continuous negative correlation</b>	<b>Strength of a negative correlation (<math>r</math>)</b>	<b>Statistical significance of a negative correlation (<math>p</math>)</b>
Coups and Coup Attempts	There is a negative correlation throughout the whole spectrum of GDP per capita values	-0,946**	< 0,001
Assassinations	5 600–7 000	-0,953**	< 0,001
Purges	5 500–6 700	-0,793**	0,006
Major Government Crises	12 500–14 500	-0,855**	0,002
Guerrilla Warfare	13 500–17 000	-0,616**	0,029
Riots	21 700–24 800	-0,575**	0,082
General Strikes	23 000–25 000	-0,77**	0,01
Anti-government Demonstrations	There is no statistically significant negative correlation in the right part of the spectrum. After \$20 000 there is not any statistically significant correlation between GDP per capita and intensity of anti-government demonstrations		

\* linear regression.

\*\* logarithmic regression.

It is easy to see that we are dealing here mainly with some kind of a “mirror image” of the left part of the spectrum. Short intervals of a positive correlation correspond to longer intervals of a negative correlation, lower values of a positive correlation coefficient correspond to higher values of a negative correlation coefficient (although there are certain exceptions).

In one pole, there are again coups and coup attempts, for which an extremely strong ( $r = -0,946$ ) negative correlation is observed throughout all the spectrum of GDP per capita values. Next to them there are purges and assassinations, with regard to which a strong negative correlation (especially strong for assassinations) is marked starting from rather low intervals (lower-middle income countries).

Major government crises are characterized by an intermediate position. With respect to them a negative correlation appears only from a rather high interval (corresponding to the upper echelon of upper-middle income countries), but at the same time there is an unambiguously strong ( $r = -0,855$ ) correlation (other types of sociopolitical destabilization demonstrate much lower values of a negative correlation coefficient). Regarding guerrilla warfare, a correlation is observed starting from the even higher interval (and it is much lower [ $r = -0,616$ ]). From the even higher interval (from the boundary between upper-middle income countries and high income ones) there is a negative correlation with riots; in this case we are dealing with a rather weak and significant correlation. Finally, a negative correlation between GDP per capita and intensity of general strikes is marked only for high income countries (however, the correlation is strong and statistically significant).

The pole directly opposite to coups and coup attempts is formed again by anti-government demonstrations as there is no statistically significant negative correlation in the right part of the spectrum.

Let us examine what intervals of GDP per capita are characterized by the maximum values of intensity of different types of sociopolitical destabilization – this index should be considered separately since in some cases (because of bimodality of a distribution) it is not identical with the interval up to which a continuous positive correlation is found.

**Table 3.** Intervals with maximum values of intensity of the corresponding types of sociopolitical destabilization

<b>Types of sociopolitical destabilization</b>	<b>Interval with the maximum value</b>	<b>Corresponding income group</b>
Coups and Coup Attempts	min – \$1 300	Low income countries
Purges	\$5 300 – \$6 400	Upper echelon of lower-middle income countries
Assassinations	\$5 300 – \$6 400	Upper echelon of lower-middle income countries
Major Government Crises	\$10 300 – \$14 500	Lower echelon of upper-middle income countries
Guerrilla Warfare	\$13 500 – \$17 000	Upper echelon of upper-middle income countries
Anti-government Demonstrations	\$17 000 - \$19 100	Upper echelon of upper-middle income countries
Riots	\$21 700 – \$24 800	Upper echelon of upper-middle income countries
General Strikes	\$23 000 - \$25 000	Upper echelon of upper-middle income countries – lower echelon of high income countries

As usual, coups and coup attempts occupy here a special position (their maximum intensity is observed in the lowest income countries); they are followed by purges and assassinations, maximum intensity of which is observed for the upper echelon of lower-middle income countries; then major government crises are marked – their maximum intensity is found for the lower echelon of high income countries. The upper echelon of upper-middle income countries is characterized by the maximum intensity of four types of sociopolitical destabilization – guerrilla warfare, anti-government demonstrations, riots and general strikes. From our point of view, this fact must be taken into account when explaining the phenomenon of the “middle income trap”.

A curvilinear relationship cannot be measured by linear correlations. However, as described earlier, the general characteristics of a linear relationship with respect to the whole spectrum of GDP per capita values may be regarded as characteristics of the asymmetry of a curvilinear relationship when a positive correlation may be considered an indicator of the left-side asymmetry (in the case that a positive correlation in the left part outweighs a negative correlation in the right one of the spectrum of GDP per capita values) and a negative one – an indicator of the right-side asymmetry (see **Table 4**).

**Table 4.** Parameters of correlations between per capita GDP and intensity of the different types of sociopolitical destabilization marked throughout the whole spectrum of GDP per capita values

<b>Type of sociopolitical destabilization</b>	<b>Sign and power of a correlation (<i>r</i>)</b>	<b>Statistical significance of a correlation (<i>p</i>)</b>
Coup and Coup Attempts	-0,946**	< 0,001
Purges	-0,903*	< 0,001
Assassinations	-0,487*	0,153
Guerrilla Warfare	-0,359*	0,309
Major Government Crises	-0,219*	0,544
Riots	0,104*	0,775
General Strikes	0,338**	0,34
Anti-government Demonstrations	0,874**	0,001

\* a linear regression.

\*\* a logarithmic regression.

The summary table of the characteristics of the correlation with GDP per capita for different types of sociopolitical destabilization is presented as follows (see **Table 5**).

**Table 5.** Summary table of the characteristics of a correlation with GDP per capita for the different types of sociopolitical destabilization

Types of sociopolitical destabilization	Characteristics of a positive correlation in the left part of the spectrum of GDP per capita values			Characteristics of a negative correlation in the right part of the spectrum of GDP per capita values			Intervals (\$) with maximum intensity of the correspondent types of sociopolitical destabilization	A correlation in the whole spectrum of GDP per capita values	
	Up to which interval (\$) there is it	<i>r</i>	<i>p</i>	Starting from which interval (\$) there is it	<i>r</i>	<i>p</i>		<i>r</i>	<i>p</i>
Coup and Coup Attempts	No positive correlation in the left part of the spectrum			A negative correlation is observed throughout all the spectrum	-0,946**	< 0,001	min – 1 300	-0,946**	< 0,001
Purges	5 300–6 400	0,34*	0,337	5 500–6 700	-0,793**	0,006	5 300–6 400	-0,903*	< 0,001
Assassinations	5 300–6 400	0,881*	0,001	5 600–7 000	-0,953**	< 0,001	5 300–6 400	-0,487*	0,153
Major Government Crises	10 300–13 500	0,82*	0,004	12 500–14 500	-0,855**	0,002	10 300–14 500	-0,219*	0,544
Guerrilla Warfare	5 300–6 400	0,603*	0,033	13 500–17 000	-0,616**	0,029	13 500–17 000	-0,359*	0,309
Riots	14 500–20 000	0,607*	0,032	21 700–24 800	-0,575**	0,082	21 700 – 24 800	0,104**	0,775
General Strikes	10 300–14 500	0,93**	< 0,001	23 000–25 000	-0,77**	0,01	23 000–25 000	0,338**	0,34
Anti-government Demonstrations	14 500–20 000	0,941**	< 0,001	No statistically significant negative correlation in the right part of the spectrum			17 000–19 100	0,874**	0,001

\* a linear regression

\*\* a logarithmic regression

To sum up, among the given eight types of sociopolitical destabilization, coups and coup attempts are specifically prominent. It is the sole type for which the inverted U-shaped relationship between GDP per capita and intensity of sociopolitical destabilization is not shown. We are dealing here with the strongest negative correlation between GDP per capita and intensity of coups and coup attempts which is observed throughout the whole spectrum of GDP per capita values. The maximum intensity of this index occurs in lowest income countries. Thus, for coups and coup attempts throughout the whole spectrum of GDP per capita values, there is a strong tendency towards a decrease in their intensity as GDP per capita grows.

Next to coups and coup attempts there are purges, for which in the left part of the spectrum of GDP per capita values in a very limited interval (including low and lower-middle income countries) there appears an extremely weak statistically insignificant positive correlation and in the rest of an interval there is a strong negative correlation. As a result, we are dealing here with the weakly marked asymmetric inverted U-shaped relationship with the strongest right-side skew when the strong negative correlation in the right part of the spectrum outweighs the weak positive correlation in the left one. Consequently, for purges there is a very weak tendency towards an increase as GDP per capita grows in low and lower-middle income countries and a strong tendency towards a decrease in intensity of purges as GDP per capita grows in upper-middle and high income countries.

In the case of assassinations, we are dealing with a definite inverted U-shaped relationship still with the prominent right-side asymmetry. There is a positive correlation in the left part of the spectrum in that interval as before (including low and lower-middle income countries), however, there is a strong and statistically significant positive correlation here. Nevertheless, this time the negative correlation in the right part of the spectrum (with respect to upper-middle and high income countries) is much stronger than the positive correlation in its left part. In other words, regarding assassinations in low and lower-middle income countries, there is a marked tendency towards the increase in their intensity as GDP per capita grows. However, in upper-middle and high income countries there is an even more marked tendency towards the decrease in intensity of assassinations as GDP per capita grows.

Major government crises demonstrate virtually the symmetric inverted U-shaped relationship from GDP per capita with a strong correlation in the left part as well as in the right part of the spectrum. The peak of intensity is found here in the lower echelon of upper-middle income countries.

Such an important type of sociopolitical destabilization as guerrilla warfare is also characterized by strong symmetry – there is not a very strong correlation in either the left part or the right part of the spectrum. However, the peak of intensity occurs here in a much higher interval of GDP per capita values described in the upper echelon of upper-middle income countries.

The other types of sociopolitical destabilization demonstrate (though to a different extent) rather the left-side asymmetry of the inverted U-shaped relationship.

With regard to riots the positive correlation in the left part of the spectrum is just a little stronger than the negative correlation in its right part. However, there is a positive correlation here in the very long interval from low income countries to the upper echelon of upper-middle income countries with the peak of intensity observed in the very high interval which is next to the joint between the upper echelon of upper-middle income countries and high income countries. In other words, an obvious (but not very marked) tendency towards the increase in intensity of riots as GDP per capita grows is observed right up to the upper echelon of upper-middle income countries (inclusive). A tendency towards the decrease in intensity of riots as GDP per capita grows is found only among high income countries, but this tendency is not very strong.

General strikes are characterized by an extremely strong positive correlation in the left part of the spectrum (up to the upper echelon of upper-middle income countries). A negative correlation in the right part of the spectrum is also pronounced but it is much weaker than a positive correlation and observed only among high income countries. Furthermore, the peak of the intensity occurs at the very joint between the upper echelon of upper-middle income countries and high income countries. That is, in the interval up to \$14 500 there is a very marked tendency towards the increase in intensity of general strikes as GDP per capita grows; then, in the interval \$14 500 - \$23,000 the intensity of general strikes remains at the high level but does not show a definite tendency towards either the increase, or the decrease; the intensity of general strikes reaches the maximum at the joint with high income countries, at the same time, among high income countries, there is a rather strong tendency towards the decrease in intensity of general strikes as GDP per capita grows further (however, this tendency is not as marked as an opposite one observed among low and middle income countries).

Finally, in the pole opposite to coups and coup attempts there are anti-government demonstrations. Among the former, a negative correlation dominates – some kind of an absolute right-side skew, among the latter, there is also no inverted U-shaped relationship, but with a left-hand skew close to absolute. Indeed, in the left part of the spectrum, in the interval up to \$20 000 (that corresponds to low and middle income countries) the strongest positive correlation ( $r = 0,941!$ ) with GDP per capita is observed, however, in the right part of the spectrum there is any statistically significant correlation. In other words, among low and middle income countries, we see the most pronounced tendency towards the growth of intensity of anti-government demonstrations as GDP per capita grows. Among high income countries, this tendency is not marked, but there is not a significant opposite tendency as well, that is, intensity of anti-government demonstrations remains very high on average.

## Conclusion

Our empirical tests support Olson – Huntington hypothesis of the curvilinear inverted U-shaped relationship between the level of economic development and the level of sociopolitical instability. Up to certain values of per capita incomes, economic growth is accompanied by an increase in risks of sociopolitical destabilization. After per capita income reach high values, further increases in the levels of economic development are accompanied by a decrease in risks of sociopolitical destabilization. Thus, higher values of income per capita are characterized by a negative correlation between income per capita and risks of sociopolitical destabilization, while less values is characterized by a positive correlation.

Our analysis demonstrates that the curvilinear relationship has a different nature for different indices of sociopolitical destabilization. However, there are two important exceptions. Firstly, there is not a curvilinear, but marked negative correlation between GDP per capita and intensity of coups and coup attempts; at the same time, there is a particularly strong negative correlation between this index and the logarithm of GDP per capita. The growth of GDP per capita is accompanied by the pronounced decrease in intensity of coups and coup attempts throughout the whole spectrum of GDP per capita values. This fact renders the above mentioned curvilinear relationship less marked with respect to the integral index and contributes to formation of its asymmetry (when the negative correlation between GDP per capita and sociopolitical instability among richer countries appears much stronger than the positive correlation for poorer countries).

Secondly, another exception is anti-government demonstrations for which there is a marked tendency towards growth of intensity as GDP per capita grows for low and middle income countries. However, there is not an opposite tendency for high income countries.

Furthermore, our analysis reveals that for other indices of sociopolitical destabilization there is a very curvilinear inverted U-shaped relationship denoted by Olson and Huntington's hypothesis. Concerning such indices as general strikes, riots and anti-government-demonstrations, we deal with asymmetry directly opposite to the above mentioned one – with the asymmetry when a positive correlation between GDP per capita and instability for poorer countries is much stronger than a negative correlation for richer countries. This asymmetry is marked specifically for intensity of anti-government demonstrations.

Thus, we arrive at the following conclusions. (1) Different types of political instability events have different functional relationships to changing levels of GDP/capita. Some do have a curvilinear response, others have a monotonic one. They also are more frequent at certain ranges of GDP/capita that are not the same, but rather are particular to certain types of events. (2) These findings show that certain types of events are more common at lower levels of income and political development, while others are more common at mid-levels, and yet others (anti-government protests, strikes) are more common at higher levels. (3) The functional relationships are most often linear in rising stages, but exponential or logarithmic in their declines. There are thus generally strong asymmetries in how such events react to changes in GDP/cap in the lower vs. upper ranges. (4) The overall notion of a curvilinear relationship between instability and GDP/capita is thus too simple, obscuring important patterns that reveal a trajectory of varying kinds of instability developing and peaking at different levels of economic development.



## METHODS AND MATERIALS

### Cross National Time Series (CNTS)

The Cross National Time Series (CNTS) database is a result of data compilation and systematization started by Arthur Banks (Banks & Wilson, 2015) in 1968 in the State University of New York – Binghamton. The work was based on generalizing the archive of data from *The Statesman's Yearbooks*, published since 1864. It also contains approximately 200 indicators for more than 200 countries. The database contains yearly values of indicators starting from 1815 excluding the periods of World Wars I and II (1914–1918 and 1939–1945).

CNTS database is structured by sections, such as territory and population, technology, economic and electoral data, internal conflicts, energy use, industry, military expenditures, international trade, urbanization, education, employment, legislative activity, etc.

In our paper we take a close look at the data describing internal conflicts (*domestic*). This section includes data starting from 1919 based on the analysis of events in 8 various subcategories, which are used to compile general **Index of Sociopolitical Destabilization** (domestic9). In building the general Index, the compilers of CNTS database give each category a certain weight (see **Table A1**).

**Table A1.** Weights of subcategories used in compiling the Index of Sociopolitical Destabilization

Subcategory	Variable name	Weight in the Index of Sociopolitical Destabilization (domestic9)
<b>Assassinations</b>	domestic1	25
<b>General Strikes</b>	domestic2	20
<b>Guerrilla Warfare</b>	domestic3	100
<b>Government Crises</b>	domestic4	20
<b>Purges</b>	domestic5	20
<b>Riots</b>	domestic6	25
<b>Revolutions</b>	domestic7	150
<b>Anti-Government Demonstrations</b>	domestic8	10

To calculate the Index of Sociopolitical Destabilization (*Weighted Conflict Measure*, domestic9) the numerical values of each subcategory are multiplied by their corresponding weights, the results of the multiplications are summed up, then the sum is multiplied by 100 and divided by 8 – see formula (1).

$$domestic9 = \frac{25 domestic1 + 20 domestic2 + 100 domestic3 + 20 domestic4 + 20 domestic5 + 25 domestic6 + 150 domestic7 + 10 domestic8}{8} * 100 \quad (1)$$

## Description and methodology of calculating of independent variables

Yearly GDP per capita (2011 international \$, PPP) were used according to the World Bank *World Development Indicators* database (World Bank, 2016a).

For restoring data from 1960 until 1990, the index of GDP per capita was used (World Bank, 2016b). For testing hypotheses, data from 1960 until 2015 were used.

Groups of countries by income were aggregated by GDP per capita (PPP) values (based on optimization of the World Bank's methodology (World Bank, 2016c, 2016d) to the index).

In fiscal year 2016, the World Bank distinguished among the following groups of countries by a criterion of income per capita:

- *low-income economies/countries* – with GNI (gross national income) per capita up to \$1 045<sup>57</sup>;
- *lower middle-income economies/countries* – with GNI (gross national income) per capita from \$1 046 to \$4 125;
- *upper middle-income economies/countries* – with GNI (gross national income) per capita from \$4 126 to \$12 735;
- *high-income economies/countries* – with GNI (gross national income) per capita more than \$12 735 (World Bank, 2016d, 2016e).

However, using this widely acknowledged classification in our research was connected with two following challenges:

1) unlike the data on GDP, in the World Bank database there were too many omissions for GNI prone not to be restored (especially for the period until 1980); for this reason, it was more expedient in our case to take as a basis the data not on GNI per capita, but on GDP per capita (that we managed to restore for the overwhelming majority of countries over the whole period of 1960-2015);

2) division of countries by the abovementioned World Bank classification is rather uniform. Indeed, both high income countries and low income countries contain approximately a milliard people each (that corresponds to a notion of the “golden billion” popular in Russia and Collier’s “bottom billion” (Collier, 2007). Middle income countries contain the rest of the world’s population – about 5 milliards people! This problem was partially solved by the World Bank by dividing middle income countries into two categories: “lower-middle countries” and “upper-middle countries”. Even this procedure solved the problem only partially as either of two categories contained more population than high and middle income countries altogether.

For solving this problem, we classified countries (more precisely, “country-years”) of the period of 1960-2015 into the following six sextiles by GDP per capita (2011 international dollars, PPP):

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<sup>57</sup> Note that the calculation is made using a special method, known as the *Atlas method* (for description of the method see: World Bank, 2016c).

The 1st sextile – up to \$1 660  
The 2nd sextile – \$1 660 – \$3 280  
The 3rd sextile – \$3 280 - \$6 470  
The 4th sextile – \$6 470 - \$12 100  
The 5th sextile – \$12 100 - \$23 600  
The 6th sextile – from \$23 600

In 2014, the correlation between our sextiles and the groups of countries by income according to the World Bank classification was as follows (see **Table A2**).

**Table A2.** Correlation between two classifications

	Groups of countries by GNI per capita distinguished by the World Bank				Total
	Low income	Lower-middle income	Upper-middle income	High income	
Sextiles of countries by GDP per capita					
the 1st	17	0	0	0	17
the 2nd	10	15	0	0	25
the 3rd	0	16	5	0	21
the 4th	0	12	17	0	29
the 5th	0	0	26	10	36
the 6th	0	0	3	42	45
Total	27	43	51	52	173

As we see, between the groups of countries by GNI per capita distinguished by the World Bank and our six sextiles of countries by GDP per capita there is a very strong correlation (when calculating its power by means of Spearman's rank correlation coefficient, its level reaches 0.924). In general, all countries of the 1st sextile belong to the group of low income countries by the World Bank classification, the majority of countries of the 2nd and the 3rd sextiles – to the group of lower-middle income countries, the majority of countries of the 4th and the 5th sextiles – to the group of upper-middle income countries, almost all the countries of the 6th sextile – to the group of high income countries.

This enable us to assign to our sextiles the following notations keeping some appropriate conformity with the World Bank widely accepted classification of world economies into income groups:

- the 1st sextile = low income countries;
- the 2nd sextile = the lower echelon of lower-middle income countries;
- the 3rd sextile = the upper echelon of lower-middle income countries;
- the 4th sextile = the lower echelon of upper-middle income countries;
- the 5th sextile = the upper echelon of upper-middle income countries;
- the 6th sextile = high income countries.

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