

Long-term demographic factor of political unrest in contemporary states

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Abstract

The paper is an attempt to estimate the influence of long-term structural-demographic factor on political stability in contemporary transitive states as Ukraine. Interpretation of this synergetic factor is lean on the modified "structurally-demographic" approach of A.Korotayev and J.Goldstone. The synergetic order parameter, which determines the unrest of the political process in modern transitive states is defined. It is proposed to consider the rate of annual growth in the number of young people mostly with higher or incomplete higher education in large and medium cities as such parameter. The actual index of this order parameter for Ukrainian political process of the first and second decade of the twenty-first century should be considered an annual growth rate of urban youth age range 21 - 25 years. It is stated that the background of its influence is a rapid annual increase in coverage of the population by means of effective communication not mediated by government intervention (mobile communications, and especially a cable and mobile Internet). The structure of the author's model of political instability in Ukraine, based on the abovementioned grounds, is described. The model reflects the period from 1989 and provides the possibility to give the prognosis of a threat to political stability till 2039. Algorithm for computing the function of political unrest depends on the rate of growth of urban youth were built in such a way that in the result a conditional integer status indicator of political stability was obtained. The author's forecast of political instability in Ukraine until 2039 is described.

Key words: forecast of political unrest, structurally-demographic modeling, synergetic parameter of stability, Ukraine

Introduction

One of the main characteristics of the political process is always political stability. Almost every political regime seeks to achieve and maintain political stability, although it often puts a slightly different meaning in this period. Stability is the normal functioning of the political system, all its structures and institutions, the absence of crashes in the mechanisms of state power, its certain authority. The antitheses of stability are an unrest and instability. Unrest is becoming one of the most important markers of the modern era.

An unrest has many interpretations and definitions. The general feature of these definitions is the lack or incompleteness of the necessary balance or level of cooperation between the various elements of the political system. It should be noted that in the problem of political unrest the most interesting part is the time of its occurrence or, from the point of view of the forecast, the time of the onset of the danger of the emergence of unrest. Consequently, constructing a model that could help predict the onset of periods of political unrest seems quite important.

Obviously, the onset of political unrest is determined by many factors. It is often difficult to detect the relative weight of each of these factors. Therefore, a promising direction in constructing such models is a structural-demographic approach based on long-term demographic dynamics. This approach has applications to events of past but is rarely used to analyze and forecast the onset of instability in modern political process.

The aim of the paper is to describe the author's model of forecasting political unrest and describe the forecast of political stability in Ukraine until 2039. The model is based on the

structural-demographic approach.

The key features of the base structural-demographic approach

The most well-known and high developed models of social and political processes that allows to receive prognoses about the periods of political unrest, are, in our opinion, the models of structurally-demographic dynamics, going back to the works of J. Goldstone, P. Turchin, A. Korotayev, S. Nefedov, D. Halturina, L. Grinin, S. Malkov etc. [1; 2; 3, p. 5]. These researchers position themselves as supporters of mathematical history. They have built a series of very interesting models of historical and political processes. These models associate socio-political development of a separate states and their groups with a dynamics of a certain parameters of demographic development.

One of the first models of this series is a model of structurally-demographic cycles of J. Goldstone. Pivotal idea of J. Goldstone model, devoted to the analysis of the interconnection between demographic and political changes, is the thesis about a decisive influence of demographic development of the country on its socio-political development [4, p. 11-12]. Building on idea of neo-malthusianism theory that limitation of resources in traditional societies periodically led to overcrowding and crises, J. Goldstone suggested that population growth causes a crisis of the state indirectly by influencing on the social institutions which, in their turn, affect the social stability [4, p. 11 - 12]. Such approach was developed in the works of S. Nefedov and P.V. Turchin, who suggested several mathematical models that are based on cognitive model of "structurally-demographic cycles" of J. Goldstone [5; 1].

Basic concepts of "structurally-demographic cycles" based on the thesis that "the main force that destroys the state is a population growth, which leads to a gradual decline in per capita income until the excess is insufficient to satisfy the ruling class despite a hungry existence" [1, p. 196]. The second most important thesis may be considered the idea that "the collapse of the state caused by fractional struggle among the elite, which opens the way for a popular uprising" [1, p. 196]. P.V. Turchin formulates this idea as follows: the number of elites grows when per capita income is greater than a certain threshold rate required for the preservation and reproduction of one aristocrat [1, p. 189]. Thus, structurally-demographic crises are, according to scientists quoted, are as a result, the resource crises. Naturally, political manifestation of such crises is a period of political unrest. And the intensity of unrest depends on several additional causes.

Various modifications of this model have been reproduced by S. Nefedov, L. Grinin, S. Malkov, A. Korotayev and some other scholars on the historical and political material for a long period of time from the Ancient Empires of the East until the early twentieth [6; 7; 2; 8; 9; 10; 11; 12; 13].

Unfortunately, prognostic potential of cited models is slightly limited by time and societies: such models could be used in pure form only for societies in which the action of demographic and resource order parameters inherent to traditional societies, is not corrected or is not substantially corrected by other factors such as industrial production or computer social networking. As absolutely true the cited authors claim, currently it is considered proven that a stage of danger of a Malthusian Trap (the essence of this trap inherent to the pre-industrial societies, that population growth periodically outstrips the growth of food production), more or less is successfully passed by most countries of the world except perhaps some countries of tropical Africa [14, p. 189]. Consequently, these models help to clarify the political past, but require substantial modification for use in prediction of political future.

An interesting modification of the structural-demographic model with the aim if its modernizing was proposed by A. Korotayev (which is co-author of the Malthusian Trap theory) and U. Zinkina. The essence of the model of A. Korotayev and U. Zinkina is

expressed with the phrase "trap at the way-out from the Malthusian Trap." Recognizing the problem of Malthusian Trap, recognizing also the existence of a certain political measures for the least painful way out of this trap, A. Korotayev and U. Zinkina go further and say that the way-out of the Malthusian Trap the appropriate country faces a new danger that also known as "trap at the way-out of the Malthusian Trap" [15].

The mechanism of this new "trap" seems for quoted authors as follows. At the beginning of the way-out from "Malthusian Trap" the mortality sharply decreases, which leads to a rapid acceleration of population growth in case of enhancement in health care and life quality improvement in general. This acceleration is accompanied by a particularly strong decline in child mortality, which leads to a harsh increase of the number of youth in the general population. This phenomenon is known as so-called "Youth hill" on the demographic pyramid. An abrupt increase in the ratio of that part of a population that is most prone to aggression and radicalism, is often a crucial factor of political destabilization. Add to that the inability for timeous provision of this young population by a sufficient number and quality of jobs, and a country in which there is a similar demographic situation, faced with a whole army of young unemployed who are potential members of any political unrest. So far as usually the way out from Malthusian Trap is accompanied with (or rather, was accompanied with) the rapid growth of urban population, added with marginalization of huge former peasant masses who are no longer farmers, but the locals of "second class" who are forced to work in the worst conditions for lowest salary. The additional factors of political instability for all the above-mentioned conditions may become a military defeat or protracted economic crisis [15, p. 102].

In the case of the above-described development the major factor of social and political stability of the country is the growth rate of the number of urban youths. According to scientists cited, if the number of urban youth is increasing with a speed of more than 30% for a five years, we should expect serious political shocks inside the country, if the growth rate of urban youth begins to exceed 45% for a five years, these political problems are almost insurmountable [15, p. 102].

Needless to say, that neither the events in Egypt and in the rest of the "Arab spring" countries nor Maidan in Ukraine in 2013-2014 were not predicted by mentioned scientists and/or their disciples.

As is evident from the foregoing the structural-demographic models of political stability tend to the type of synergetic models. It means, that unlike a multivariate approach those models try to consider a few factors – order parameters – that affect the components of the state vector of the system (and that, in turn, affect the order parameters). Thus, synergetic method requires figuring out that nonlinear order parameter which dynamics leads to the risk of a bifurcation point in the political process. Indeed, precisely the model reproduction and further study of the dynamics of this order parameter allows to provide the forecast of danger for the political stability in the country.

Mentioned above the main factors of political dynamics, invented by our predecessors, are in a rather narrow gap around demographic and resource indicators. The argument presented in the fundamental work of academician S. Kapitsa [16, p. 189-193], also confirms the fidelity of searching of the order parameter among demographic factors. It is known that S. Kapitsa formulated and substantiated so-called Demographic Imperative, according to which large-scale social, economic, cultural and political processes adapt to the dynamics of population size. It is this value plays a leading role of synergetic slow variable - the order parameter of socio-political development [16, p. 189 - 193].

The authors structural-demographic model for the forecast of political stability

Delighted with the approach and models of A. Korotayev and J. Goldstone we

developed own model of political stability in Ukraine, which reflects the period from 1989, and provides the possibility to give the prognosis of a threat to political stability till 2039. The first version of the model was presented in [17, p. 217-244].

In view of aforementioned reasons, our model based on the hypothesis that the order parameter, which determines the stability of the political process in modern Ukraine, is the rate of annual growth in the number of young people mostly with higher or incomplete higher education in large and medium cities on the background of rapid annual increase in coverage of population by means of effective communication not mediated by government intervention (mobile communications, and especially the Internet). The actual index of this order parameter for Ukrainian political process of the first and second decade of the 21st century should be considered an annual growth rate of urban youth age range 21 - 25 years. Let emphasize the basic differences of the model from predecessors: 1) annual demographic data is taken, rather than the five-year average; 2) the age range of "risk groups" is specified.

The model was verified for the conditions of the Internet penetration less than 50% (relatively to all population) and mobile penetration of more than 50% (also relatively to the total population). On the verbal level this means that the youth of large and medium cities are the "firewood" which support the fire of mass street political participation.

So, the synergetic model of the political instability in contemporary Ukraine with the proposed parameter of order can be described by the following functional relationship:

$$IPS = f(GR_{uy}), \{ \Delta JR \rightarrow \text{const}, IpL \in 5 \div 50 \%, MPL > 50 \% \}, \quad (1)$$

where IPS – indicator of political stability;

ΔJR – the annual change of unemployment rate in a country (by the conditions of the model it has to fluctuate around a constant level)

IpL – the level of Internet penetration in state;

MPL – the mobile penetration level (by the model's conditions it has to be higher than 50%);

GR_{uy} – the annual growth rate of urban youth aged 21 to 25 years old, which is calculated by the next formula:

$$GR_{uy} = \frac{NUY_t - NUY_{t-1}}{NUY_{t-1}} \cdot 100\%, \quad (2)$$

where NUY – number of urban youths in the corresponding year (t).

Algorithm for computing the function of political stability depend on the rate of growth of urban youth was built in such a way that in the result a conditional integer status indicator of political stability was obtained. The value of indicators of political stability condition possible in the model could vary from 0 (minimum level of political instability) to 10 (maximum level of political instability in the country, for example social revolution). For contemporary Ukraine it will not be more than 6 even theoretically.

For the model the next scheme determining an indicator of political stability (IPS) was verified:

$$\begin{aligned} GR_{uy} < 0 &\rightarrow IPS = 0 \\ 0 \leq GR_{uy} < 2\% &\rightarrow IPS = 1 \\ 2\% \leq GR_{uy} < 4\% &\rightarrow IPS = 2 \\ 4\% \leq GR_{uy} < 6\% &\rightarrow IPS = 3 \\ 6\% \leq GR_{uy} < 8\% &\rightarrow IPS = 4 \\ 8\% \leq GR_{uy} < 10\% &\rightarrow IPS = 5 \\ 10\% \leq GR_{uy} &\rightarrow IPS = 6 \end{aligned}$$

Verification of the model

The demographic materials of 1990 – 2010 years helped us to find out that spurts in growth rate of urban youth aged 21-25 years in large and medium cities of more than 2% per year were related to periods of political instability associated with mass political participation (Tabl. 1). That is a model coordinated with already well-known events: growth rate of over 4% accompanied the Orange Revolution and, at the same time, almost zero growth rate in 2001 did not give any chance for winning of the action “Ukraine without Kuchma” [17, p. 238].

Table 1

Retro-forecasted values of the growth rate of urban youth and the corresponding indicator of political stability in Ukraine*

Year	The value of the growth rate of urban youth, %	Retro-forecast of the value of indicator of political stability
1990	-2,9	0
1991	-2,0	0
1992	1,6	1
1993	2,1	2
1994	1,9	1
1995	0,4	1
1996	0,6	1
1997	-0,5	0
1998	-0,4	0
1999	-1,6	0
2000	0,3	1
2001	0,2	1
2002	0,7	1
2003	0,9	1
2004	2,9	2
2005	4,6	3
2006	3,4	2
2007	1,0	1
2008	1,3	1
2009	-1,2	0
2010	-4,0	0
2011	-4,6	0
2012	-4,6	0
2013	-6,0	0
2014	-4,0	0
2015	-6,8	0
2016	-7,7	0
2017	-7,3	0
2018	-7,3	0

* Source: [18] Data is given as of January 1 of the respective year except 2002: for 2002 the information is provided according to the data of the population census as of December 5, 2001.

So, making a retro-prognosis we can confidently assert that the actual base of the Orange Revolution, its main performers, were young people in age from 21 - 25 years, which growth rate in the capital was 3.8% in 2003 and 5.5% in 2004, that was significantly faster

than previous and the following years. Should be recalled that the closest previous "splash" of such rapid annual growth of the youth population in Kyiv (about 4 % as of January 1, 1992) falls in 1991 well known for its turbulence.

Thus, the data of our model confirm almost thorough certainty of getting modern Ukraine to the phase of political instability in case of increase of over 3% per year growth rate of urban youth. And since a major role in serious political unrest that can at least change the ruling elite play events in the capital city, increased political instability potentially possible in the case of a local increase in the growth rate of young people in the capital. As they say, the revolutions are made in the capitals. Ukraine in this regard has an additional risk factor, because Kyiv has more than 20% of the students of the country. And this figure is growing: in 2004/2005 academic year in Kiev attended 21% of all Ukrainian students and in 2010/2011 year - more than 25% and in 2017/2018 it stabilized at the level around 24% [19; 20].

We devoted special paper to the case of the EuroMaidan in Ukraine 2013-2014 [21]. It was not predicted by the first variant of the model created 2011 because absence of any demographic possibilities for its arising. But we are far from the idea that the unpredictability of the appearance and victory of EuroMaidan is evidence of its artificiality or instrumentality – of its American or, on the contrary, Russian origins. We propose to explain an uprising and further victory of the EuroMaidan mainly with tactical wrong steps of the team of V.Yanukovych.

Forecast of political unrest in Ukraine to 2039 determined by the long-term demographic factor

Statistical data on urban population of different age groups in Ukraine [18] made it possible to calculate the forecast growth rate of urban youth in the whole of Ukraine aged 21 - 25 years, and build a forecast dynamics of political stability for the period until 2039 (Tabl. 2).

Table 2

Prognosed values of the growth rate of urban youth and the corresponding indicator of political stability in Ukraine*

Year	The forecasted value of the growth rate of urban youth, %	Prognosis of the value of indicator of political stability
2019	-6,4	0
2020	-6,0	0
2021	-6,0	0
2022	-5,5	0
2023	-6,3	0
2024	0,3	1
2025	1,8	1
2026	4,5	3
2027	4,3	3
2028	5,1	3
2029	4,4	3
2030	4,8	3
2031	3,5	2
2032	2,7	2
2033	1,4	1
2034	1,8	1
2035	-0,3	0
2036	0,0	0

2037	-0,5	0
2038	-1,6	0
2039	-3,8	0

* Source: [18] Data is given as of January 1 of the respective year except 2002: for 2002 the information is provided according to the data of the population census as of December 5, 2001.

It was stated that since the growth rate of urban youth is always negative to 2024 inclusive, then *ceteris paribus* in Ukraine for the period 2011 - 2025 will not predict serious political problems caused by the demographic internal order parameter. However, a harsh increase in the growth rate of urban youth in 2026 - 2034 years will necessarily become the detonator of serious political perturbations associated with mass political participation in Ukraine (Tabl. 2). We believe that even the failure of the model's forecast in the case of a Euromaidan does not negate the likelihood of forecasted increased instability in Ukraine in 2026-2034.

Conclusions

Structural-demographic approach have enough for prognostication of the danger of political unrest even in contemporary states. The author's model verified for Ukraine, shows sufficient prognostic capabilities. Retro prognosed data of the model is coherent with the majority of successful and unsuccessful events in contemporary Ukraine of the last 28 years – unrest of 1991, 2001 and 2004.

We insist that the long-term structural and demographic factor should be considered when forecasting political instability in modern political processes. However, in today's fast-paced world, it is necessary to consider not five-year average demographic data, but annual ones. That said, the case of EuroMaidan showed, that the methods of structurally-demographic dynamics could not be totally reliable in construction of forecasts of political unrest. The case of EuroMaidan requires for additional accounting of non-demographic, more variable factors to build more accurate predictions of threats to political stability.

The possibility of using the proposed model not only on transitive states, but also on ordinary democracies – such as EU countries – requires additional verification.

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