

Interdependency Between Demographics and the Construction of Housing as a Pivotal Factor of Society's Sustainable Growth

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ABSTRACT

Demographic decline and zoning restrictions are in an endogenous equilibrium with one another. That's why the research on how to amplify the positive feedback loops between those two areas is crucial. This is an econometric study of correlation between construction and demographics, with the subject matter being the integration between the EAEU and the Russian Federation. The result of our analysis is specific recommendations for boosting the demographics and construction in Russia and EAEU.

Keywords: population, housing demography, housing, construction, correlation, approximation, rate of construction, rate of demographic growth.

1. INTRODUCTION

Russia is at a major turning point in its technological and economic restructuring [1]. On 25 September, the United Nations General Assembly unanimously adopted the Resolution 70/1, Transforming our World: the 2030 Agenda for Sustainable Development. This historic document lays out the 17 Sustainable Development Goals, which aim to mobilize global efforts to end poverty, foster peace, safeguard the rights and dignity of all people, and protect the planet.

However, there's no specific objectives in UN's resolution.

It's a common idea that sustainable development is a new trend, but that's just not the case. Just recently the Russian government worked on the sustainable development of human potential program [3-8] (from 2000 to 2015, with 8 objectives). When that program ended, the UN created a new program, based on that old one, but with 7 additional objectives.

The research of scientific collective called «Methodological problems of the economic effectiveness of regional construction clusters as a self-ordering

system» was always focused on sustainability [9-10]. Realization of concepts on increasing the quality-of-life index [11-13], as well as innovation in construction of housing [14-16] is our forte. Institutional design of land use [17-20] and unification of organizational frameworks [21-24] are key. Based on the analysis of the rate of new construction [25,26], we outlined three scenarios to keep in mind if you're concerned about the future of construction, demographics and quality-of-life in Russia [27]. The degree of interdependency of the aforementioned is specifically defined in this article [28-29]. It's a scientific consensus at this point that the role of housing construction in demographics had been extremely undervalued until recently [30]. This article is a cornerstone for the future unified demographics-and-construction public policy of Russian Federation.

Applicability. In EAEU and Russia construction is relatively booming, while demographics are in decline, even despite the governmental monetary stimulus for young parents. That's quite a paradox. The uneven rhythm between the two is the main challenge of the Russian growth policy, both in terms of practice and theory. Turning a disproportionate relationship into a

proportionate one is the key to achieving sustainable growth.

Research objective: Defining the interdependency between the dynamics of growth in construction and population in EAEU and Russia.

Sub-objectives:

— define the degree of interdependency between renting and the annual average of population.

— make a model of the index of new construction and the index of correlation degree;

— formulate recommendations for the unified demographics-and-construction public policy of Russian Federation.

Object of research: Public amenities and sustainable development of society.

Subject of research: dynamics of growth in construction and population in EAEU and Russia.

Scientific novelty: the degree of interdependency is specifically outlined. The potential of further research in this area is proven.

2. MATERIALS AND METHODS

Correlational analysis, conventional econometrics.

3. RESULTS AND DISCUSSION

Based on [31], we have to outline the cycle of construction in Russia and EAEU. The trend line of new construction is described by the function $y = -0,1351x^2 + 5,2246x + 51,435$ with falsifiability of 87% and $R^2 = 0,8754$, in the year 2019 (99.1 million m^2) the volume of new construction is 5 million m^2 higher compared to the year 2018, when it was (93.8 million m^2). Because of that, the slow rate of volume increase in construction is expected in EAEU and Russia. By looking at the difference between the rates of growth in population and construction, we will forecast the time of getting to the deficit in housing.

As outlined in [32], in the year 2019 (105,8%) the rate of renting in Russia and EAEU increased by 8% compared to the year 2018 (97,8%). The pique of population growth was in the year 2015 (101,7%), after (100,4%) in 2014. [33].

Predictable waves of boom and bust exist in the cycle of demographics and population growth. Particularly huge disparities happen from 2005 to 2007 and from 2013 to 2014. In 2019 году an increase in renting is ahead of the increase in population, which is a good sign for the forecasted increase in housing affordability. However, the slow population growth creates an illusion that the ratio between population and construction growth is good. The slow population growth is the main reason

why the rate of increase in housing affordability seems good. The construction itself isn't getting sufficiently more robust as an industry. Worldwide, it's a common problem that a decrease in mortality isn't yet accompanied by a sufficient decrease in morbidity, thus leading to a less productive economy, additionally plagued with economic hurdles to a demographic increase, and, in turn, this all creates a negative feedback loop. This situation leads to an increase in living space per person (a decrease in population density). In Russian Federation, the objective is that there ought to be no less than 18 m^2 of living space per person. The standard numbers are 33 m^2 per one person, 42 m^2 for a family of two, and 18 m^2 per every family member once the number of family members is bigger than 3. Currently, a decrease in population leads to a decrease in construction, which creates a negative feedback loop because a profit in construction leads to an increase in population, while decrease in construction leads to a significant further decrease in population.

As we look at the dynamics between demographics and construction in Russia, (Drawing 1. The diagram is made according to the EAEU statistics from 2005 to 2019 (EAEU statistics: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Pages/population.aspx)), we see a general similarity between Russia and other EAEU members. However, there's some important differences: First of all, the periods when the new housing gets its first owners and tenants are particularly stark. The trajectory is upward. The years of boom were 2007-2008, with 61,2 and 64,1 million m^2 of housing. The second boom was 2014-2015, with 84,2 and 85,3 million m^2 of new housing. From 2015 to 2019, it's trending downward: yearly median is 75,7 million m^2 . We forecast an upwards trend in 2020.

When it comes to the population growth, the dynamics are less positive, though overall there's some growth and stabilization from 2015 to 2019. However, we forecast a decrease here. Russia has Correl = 0,728, while EAEU has Correl = 0,853. Kazakhstan and Kyrgyzstan, the EAEU members, have such a high demographic potential that together they raise the non-weighted arithmetic mean value way up.

There were years of new housing boom with the size of 20% increase compared to the previous year: in 2007 and in 2014. However, not even once in 15 years the rate of population increase had been higher than 2% compared to the previous year. For the first and second child, the monetary stimulus for parenting that the Russian government provides had been proven as sufficient. However, that stops at the third child. Why? Because of the housing problem. Housing assistance is absolutely necessary if the government wants Russians to have 3 or more kids. Housing assistance should exist both in a sense of stimulating the supply of housing and the direct monetary assistance to parents.

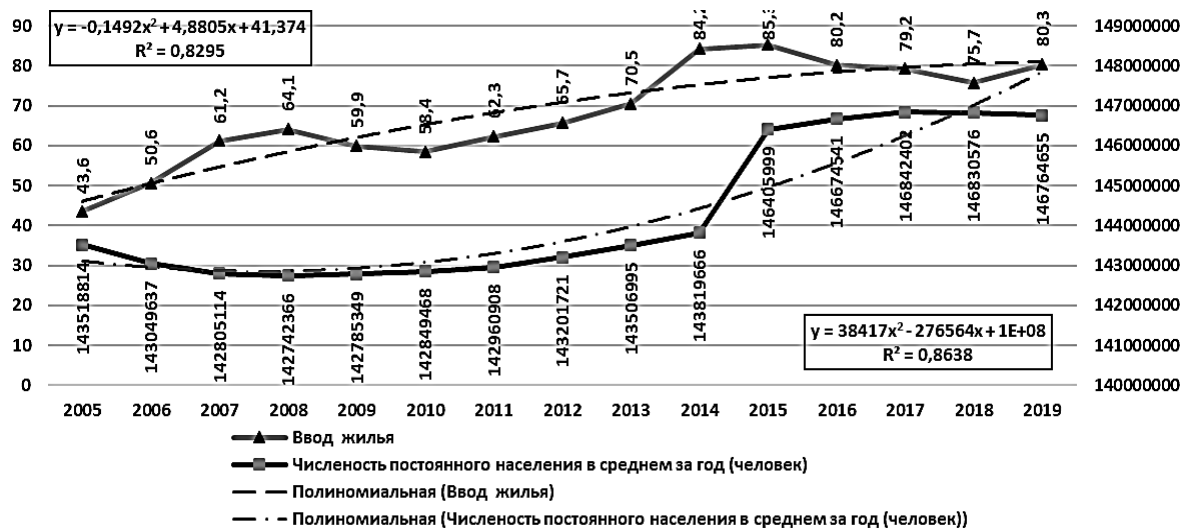


Figure 1 New construction (million m²) и the number of annual average population (persons) in Russia, where: ввод жилья - housing commissioning, Численность постоянного населения в среднем за год (человек) - Average resident population per year (people), полиномиальная (ввод жилья) - polynomial (housing input), полиномиальная (Численность постоянного населения в среднем за год (человек)) - polynomial (Number of resident population on average per year (people)).

4. CONCLUSION

We defined the degree of interdependency between renting and the annual average of population. Developed a model of the index of new construction and the index of correlation degree. Formulate recommendations for the unified demographics-and-construction public policy of Russian Federation.

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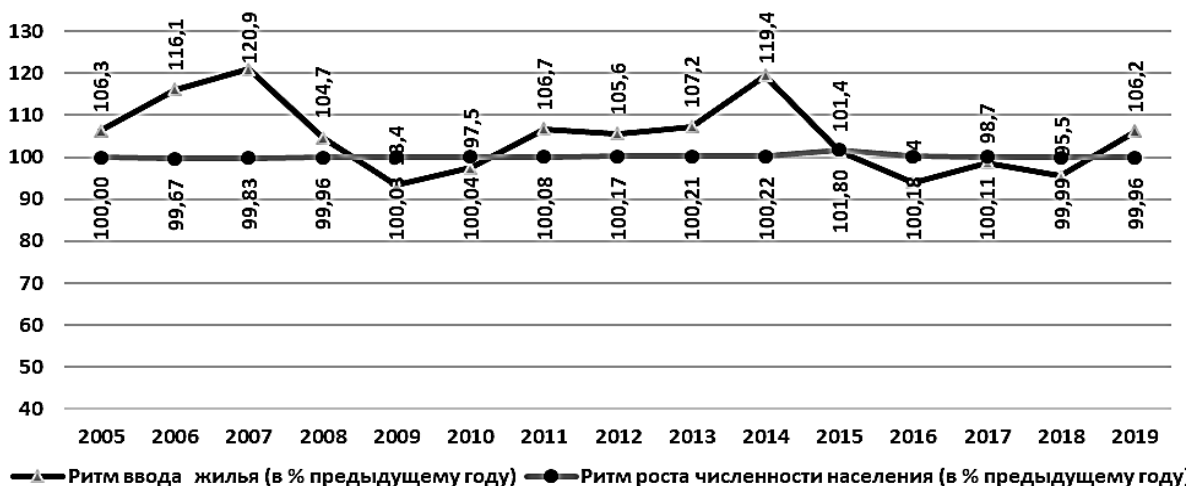


Figure 2. Rhythm of the introduction of new construction and the increase of population (in % relative to the previous year). According to Rosstat, from 2005 to 2019, where: ритм ввода жилья (в % предыдущему году) - the rhythm of housing commissioning (in% of the previous year), ритм роста численности населения (в % предыдущему году) - population growth rate (in% of the previous year)

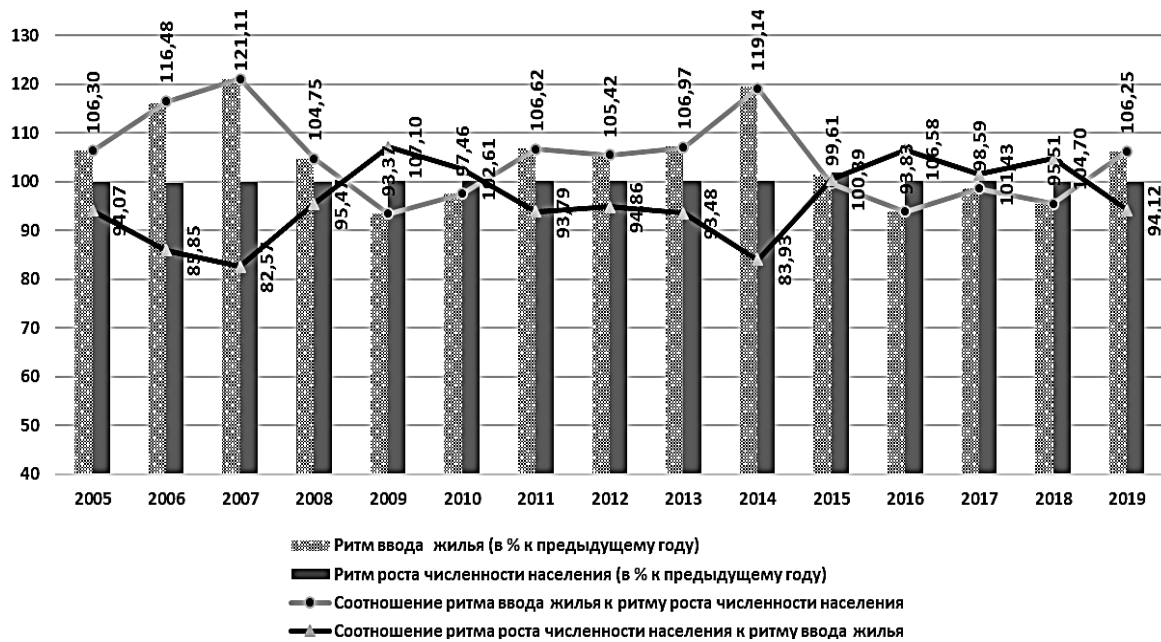


Figure 3. Endogeneity between construction and demographics. According to Rosstat, from 2005 to 2019, where: ритм ввода жилья (в % предыдущему году) - the rhythm of housing commissioning (in% of the previous year), ритм роста численности населения (в % предыдущему году) - population growth rate (in% of the previous year), соотношение ритма ввода жилья к ритму роста численности населения - the ratio of the rhythm of housing commissioning to the rhythm of population growth, соотношение ритма роста численности населения к ритму ввода жилья - the ratio of the rhythm of housing commissioning to the rhythm of population growth

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