# DEMOGRAPHIC INEQUALITIES AS DETERMINANTS AND CONSEQUENCES OF THE COVID-19 PANDEMIC IN LATVIA

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**Abstract.** Since early March 2020 Latvia is fighting the COVID-19 pandemic. Lessons learned from this crisis will be instrumental in shaping future public health policy. Any policy response to the pandemic must be tailored to the particular risks within population in order to avoid the unnecessary social and economic damage on a national and international scale. Available literature on the topic highlights region-specific demographic factors associated with elevated population vulnerability to the effects of the COVID-19 pandemic. This study aims to ascertain the role of a pre-existing demographic inequalities in Latvia in the onset and progression of COVID-19 pandemic and lay groundwork for projecting the impact of this pandemic on the demographic development of Latvia and its regions. Methods used in the study include literature review, as well as statistical and spatial analysis of the identified demographic parameters. The study is concluded by a discussion on the future demographic effects of the current pandemic. Data used in this study are obtained from Central Statistics Bureau of Latvia database and the information materials published by National Centre for Disease Prevention and Control. Initial conclusions indicate that demographic disparities among regions and municipalities make some of them more vulnerable to various effects of the pandemic. Economic stimulus measures implemented in response to COVID-19 crisis may have a positive effect in limiting the damage inflicted by the crisis to the demographic situation in the country. However, this positive effect may be mostly limited to the international migration processes.

**Keywords:** *demographic inequalities, demographic projections, coronavirus disease 2019, life transitions.*

JEL code: J11, J18, I38

## Introduction

Since the first confirmed infection cases in early March 2020 Latvia has joined other world nations in a struggle against the surge of COVID-19 pandemic. Lessons learned from this crisis will be instrumental in shaping national public health policy for years to come and should be studied in great detail in order to better prepare the country and its society for possible infectious disease outbreaks in the future. The nature of the COVID-19 pandemic has made it clear that any response to a wide-scale health emergency must be tailored to the particular population in order to avoid the unnecessary social and economic damage, while safeguarding lives and welfare of the public.

Long-term demographic effects of the pandemic itself as well as the implemented containment measures are also of great interest, as these may pose previously unforeseen challenges for population development long after the pandemic ends. These lasting effects will influence future international and inter-regional disparities in social, economic and population development.

Available literature on the topic highlights several region-specific demographic factors associated with elevated population vulnerability to the effects of the COVID-19 pandemic. (e.g. see Dowd et al, 2020 or Medford & Trias-Llimós, 2020) Particular attention is drawn to the disparities in the demographic structure of a population, intergenerational bonds and household models, as well as migration patterns and work culture. (Balbo et al, 2020) Some of these factors are crucial in estimating the transmission dynamics of the infection, while others help explaining the variations in case mortality rates among seemingly identical regions. It has been shown that even the infection Reproduction Number (R0) is not constant for all countries and regions but varies depending on a multitude of local factors. (e.g. see Yuan et al, 2020)

COVID-19 crisis in Latvia is far from over and its lasting psychological, social and economic effects will leave a substantial impact on the future population development of the country and its regions. Previous research (Dahs, 2017) has shown a clear causal link between key socio-economic indicators like employment and personal income and the demographic dynamics on the regional level. Furthermore, several recent studies from other EU member states have shown that uncertainty and scarcity (even perceived), fuelled by the pandemics and the associated restrictions, have a detrimentally negative impact on fertility plans, particularly for younger age groups. (e.g. see Luppi et al, 2020)

Considering all of the above, this study aims to ascertain the role of a pre-existing demographic situation in Latvia in the onset and progression of COVID-19 pandemic and lay some groundwork for projecting the impact of this pandemic on the demographic development of Latvia and its regions in the years to come. This is achieved by answering two key research questions:

1. What demographic characteristics make regions more vulnerable to the effects of COVID-19 pandemic?
2. Which dimensions of demographic development in Latvia will be affected most by COVID-19 crisis?

To answer these questions, we begin by reviewing the limited available literature dealing with the demographic implications of the current pandemic. This is followed by a statistical analysis of the identified demographic disparities on the national and regional level in the context of implemented epidemiological safety measures. The study is concluded by a discussion on the lasting demographic effects of the current pandemic. Data used in this study are obtained from Central Statistics Bureau of Latvia database and the materials published by National Centre for Disease Prevention and Control.

Initial conclusions indicate that population age and structure in Latvia may not have a significant role in the onset of the pandemic, while the evident demographic disparities among regions and municipalities make them either more or less vulnerable to its progression and various effects of the pandemic, including hospitalisation and death rates. Regional demographic factors like elderly economic activity, predominant household size and pre-existing health profile may be significant in terms of COVID-19 infection spread or impact, and therefore, can be used in planning future nationwide or regional epidemiological response.

Previous studies and evidence from other EU countries allow the author to conclude that economic stimulus measures implemented in response to COVID-19 crisis may have a positive effect in limiting the damage inflicted by the crisis to the demographic situation in the country. This positive effect, however, may be mostly limited to the international migration processes, as the economic stimuli may not be able to overcome the negative impact of unemployment, social restrictions, uncertainty and perceived scarcity on the fertility plans of younger population groups.

## Literature Review

It is important to note that at the time of writing this paper (October 2020), the number of available peer-reviewed material on COVID-19 pandemic is very limited. Some of the studies referenced in this paper are either still in press or undergoing final review. Nevertheless, evidence-based reports of the uneven COVID-19 infection spread and elevated mortality risks among people of various age, ethnicity and social status have sparked active interest among demographic researchers, providing a substantial number of discussion papers, reports and provisional studies on the related topics in a short period of time.

Many studies and reports focus on the relation between demographic structure and COVID-19 impact or infection spread dynamics within the countries most affected by the pandemic. For example, Population Europe report "Demography and the Coronavirus Pandemic" prepared by Balbo et al (2020a) looks at a number of empirical studies and highlights several important observations:

- In case of the uncontrolled spread of the disease, it is possible to predict the number of expected critical or fatal cases, by considering age structure of a country or region. (see Verhagen et al, 2020)
- Progression of the pandemic is influenced by a variety of factors including spatial factors, prevalence of groups with specific comorbidities, as well as differences in socioeconomic status or particular living and housing arrangements. (see Kashnitsky and Aburto, 2020)
- There is some evidence that regions where people have stronger social ties (either personal or professional) seem to have higher transmission rates of COVID-19. (see Mogi and Spijker, 2020)

Ryohei Mogi and Jeroen Spijker in their 2020 paper "The influence of social and economic ties to the spread of COVID-19 in Europe" argue that socially and economically vibrant factors have a strong and positive association with COVID-19 transmission. The correlation of infection rates with population density and traditional factors was low during the initial stages of the pandemic but rose quickly with its progression. (Mogi and Spijker, 2020) This correlates well with the assumptions on the initial spread of infection among economically active population and later re-transmission through family and intergenerational ties.

Francesca Luppi, Bruno Arpino and Alessandro Rosina have conducted a study "The impact of COVID-19 on fertility plans in Italy, Germany, France, Spain and UK" (Luppi et al, 2020), which has found that the possible effect of the COVID-19 epidemic and the subsequent economic crisis cannot be merely interpreted under the same mechanisms in all European countries. Previous economic and demographic conditions seem to shape the COVID-19 effects on the fertility plans of the young populations.

A good summary for the COVID-19 crisis impact on a human life course is provided by Richard A. Settersten Jr. *et al* (2020) in the recent paper "Understanding the effects of Covid-19 through a life course lens". The authors provide an argument that the effects of the pandemic will likely depend on ages or life stages that are more or less vulnerable or sensitive to certain effects. They also argue that pandemic-era changes will likely manifest in the family transitions, such as the postponement of cohabitations, marriages, fertility or accelerated separations and divorces.

# Research results and discussion

Since the beginning of the local COVID-19 outbreak in March and April 2020 (so called – "First wave") until the rapid surge in cases since late September 2020 (so called - "Second wave"), Latvia was able to maintain relatively low infection rates. At the same time, other indicators like case-hospitalisation and case-fatality rates in Latvia during the First wave period were on par with similar EU member states. Unfortunately, the infection rates have quickly started leaning towards the EU average levels during the "Second wave" period.
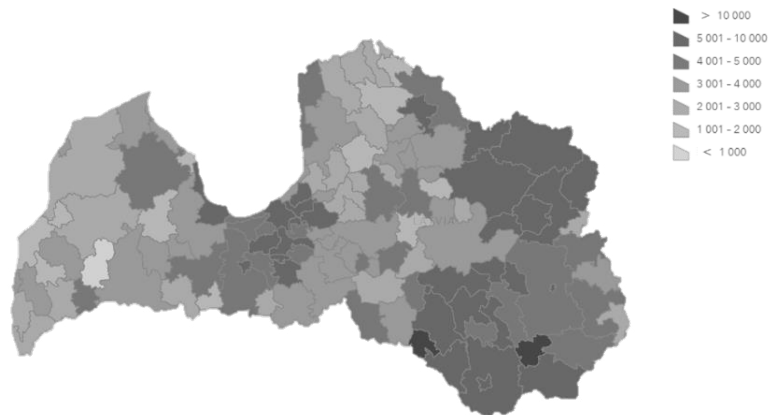


*Source: CDPC, 2021*

Fig. 1. **Confirmed COVID-19 cases per 100 000 residents in Latvian municipalities (15.03.2021 data)**

Available data (see Figure 1) shows that the number of confirmed COVID-19 cases is not equally distributed among municipalities and statistical regions of Latvia. This presents an opportunity for the evaluation of risks and response measures on a local / regional level. It should be noted that Figure 1 presents data according to the number of declared residents which may somewhat differ from the estimated factual population numbers in some municipalities.

Table 1

**Changes in passenger traffic and number of deaths in Latvia, 2019 and 2020 (%)**

| | *2020, Q2 compared to Q1* | *2020, Q3 compared to Q2* | *2020, Q4 compared to Q3* | *2020 Q4 compared to 2019 Q4* |
|---|---|---|---|---|
| **Number of passengers** | | | | |
| *Rail* | -37.61 | 75.76 | -35.70 | -40.11 |
| *Bus* | -56.01 | 91.79 | -18.82 | -43.78 |
| *Tram and Trolleybus* | -64.27 | 119.73 | -15.34 | -39.51 |
| *Arrivals in Airport Riga* | -93.92 | 557.97 | -58.33 | -88.90 |
| **Number of deaths **** | | | | |
| *LATVIA* | 6.89 | -5.44 | 12.43 | 20.32 |
| *Riga capital city* | 9.78 | -6.28 | 16.85 | 32.69 |
| *Pieriga region* | 5.38 | -5.78 | 15.07 | 14.35 |
| *Vidzeme region* | -3.81 | 0.41 | 3.13 | 10.64 |
| *Kurzeme region* | 5.44 | -2.48 | 4.87 | 14.17 |
| *Zemgale region* | 1.85 | -5.45 | 20.07 | 18.09 |
| *Latgale region* | 15.25 | -9.13 | 8.26 | 17.36 |

** Quarterly approximations based on weekly data

Source: Authors' elaboration based on CSB, 2021 and CDPC, 2021

Table 1 shows the change dynamics in passenger traffic and number of deaths in Latvia. It is evident that population mobility has been greatly reduced since the First wave of the pandemic. Although there is slight increase in the number of deaths in Q2 2020 in comparison with the previous year, it is too early to attribute this figure to the direct or indirect effects of the pandemic at this point.

Regional Demographic Factors

Following the discussion pattern established by the literature review, this sub-section looks at the relevant statistical data for Latvia and its regions to explore their potential demographic vulnerabilities to the pandemic.

It has been established in previous studies that Latvia has a high level of regional disparity in terms of population age and economic activity. The regional disparity is also reflected quite strongly by the rates of economic activity among senior population. (see Krumins et al, 2019) Figures below show the estimated share of population in the 65+ age group, as well as the share of economically active senior population on the municipal level in Latvia (municipal structure before 2020 administrative-territorial reform is used).
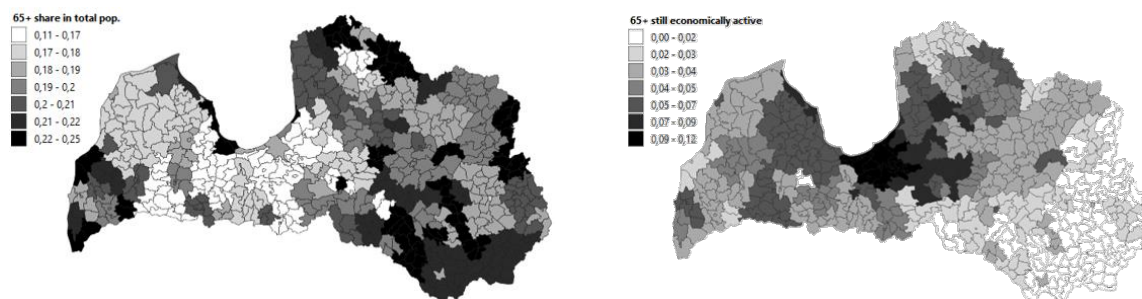


Source: Krumins et al, 2019

Fig. 2. **Share of population in the 65+ age group and share of economically active senior population on the municipal level in Latvia according to 2011 census data**

The observations on regional age disparities remain valid even if we consider the changes introduced by the latest administrative-territorial reform. In fact, new administrative-territorial structure highlights the divergence of population ageing trends even more clearly. (see Krumins et al, 2020)

Table 2

**Population ageing indicators in the new Latvian municipalities in 2019**

**(top five and bottom five results shown in comparison with the capital city – Riga)**

| Municipality (2020 reform nomenclature) | Mean age | Proportion of aged 65+, % | Ageing index, (65+/0-14)*100 | Population in 2019 |
|---|---|---|---|---|
| Krāslavas novads | 46.5 | 23.8 | 208 | 22 429 |
| Augšdaugavas novads | 46.1 | 23.2 | 208 | 26 334 |
| Valkas novads | 45.6 | 25.2 | 183 | 7 664 |
| Ludzas novads | 45.1 | 22.2 | 183 | 22 494 |
| Balvu novads | 44.3 | 21.5 | 165 | 19 595 |
| Rīga | 42.6 | 20.4 | 132 | 633 071 |
| Salaspils novads | 40.0 | 17.5 | 93 | 22 612 |
| Ādažu novads | 39.2 | 15.5 | 77 | 20 138 |
| Ropažu novads | 39.0 | 14.8 | 75 | 29 454 |
| Ķekavas novads | 37.9 | 14.8 | 67 | 29 119 |
| Mārupes novads | 34.7 | 10.7 | 41 | 31 967 |

Source: authors' elaboration based on Krumins, J. et al 2020

From the maps and table above one can see that there is a number of (mostly peripheral) administrative units that are at high risk of age-related COVID-19 mortality due to the high number of population in the 65+ age group. Maps also demonstrate that in majority of cases senior citizens in the regions with highest proportions of the 65+ age group maintain low economic activity. Exceptions are mostly observer in and around the big cities and some regional development centres. Comparing data presented in Figure 1 with the information from Figure 2, one can easily identify areas of high concern.

Low economic activity of senior citizens diminishes the infection transmission risk associated with professional and economic activity (e.g. daily commute, workplace infections etc.) for the rural areas and most municipalities located in Latgale statistical region. However, this makes personal (family and social ties) the main focus of preventive measures for these particular areas. From the perspective of limiting COVID-19 mortality, this helps to differentiate municipalities where stronger restrictions on economic activity would be more effective against those where social and intergenerational ties should be addressed.

Additional useful information can be found in the regional health profiles elaborated for the statistical regions of Latvia by the National Centre for Disease Prevention and Control. (CDPC, 2015) This document highlights the inter-regional disparities and shows that the rapidly ageing population of Latgale region is the most at-risk of the COVID-19 effects due to several factors, including:

– Highest mortality from circulatory system diseases.

– Highest mortality from diabetes.

– Lowest self-perceived health status.

These observations further support the conclusion on high regional disparities in terms of vulnerability to the pandemic.

Household infections and COVID-19 spread due to intergenerational living arrangements can be analysed with the help of household statistics. For example, Table below shows share of households per number of residents in statistical regions of Latvia in 2019.

Table 3

**Households by number of members in Latvia in 2019 (%)**

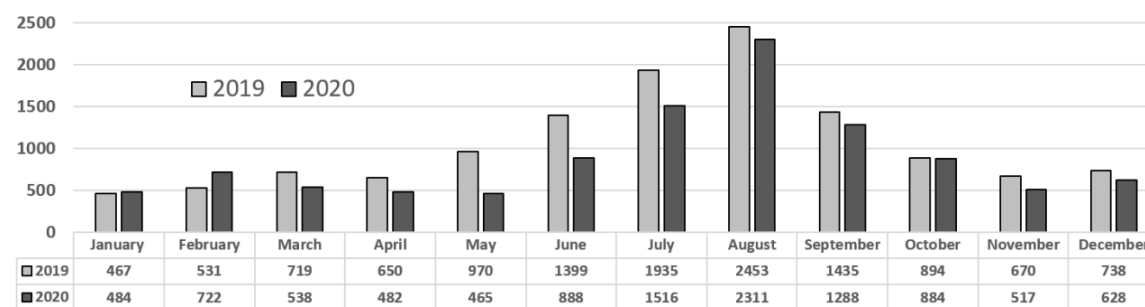| | *One person* | *Two persons* | *Three persons* | *Four persons* | *Five or more persons* | *Three or more persons* |
|---|---|---|---|---|---|---|
| *Riga* | 38.6 | 32.0 | 17.2 | 8.6 | 3.6 | **29.4** |
| *Latgale* | 35.7 | 33.8 | 15.3 | 9.3 | 5.9 | **30.5** |
| *Kurzeme* | 32.8 | 33.1 | 15.5 | 10.7 | 7.8 | **34.0** |
| *Vidzeme* | 39.0 | 26.9 | 17.1 | 9.9 | 7.1 | **34.1** |
| *Zemgale* | 32.6 | 26.9 | 18.0 | 14.3 | 8.2 | **40.5** |
| *Pieriga* | 29.2 | 28.5 | 18.3 | 13.9 | 10.1 | **42.3** |

Source: Authors' elaboration based on CSB, 2020

Table demonstrates that the majority of households throughout the country consist of only one or two individuals. Region with highest proportion of 65+ population (Latgale) has the second smallest share of households with three or more individuals, preceded only by the capital city Riga. The inter-regional differences are quite substantial and indicate the elevated case-number impact of household transmission of COVID-19 in Pieriga and Zemgale region. When considered together with the number of children per household (e.g. see CSB, 2020), these data help estimate the risks of not closing or reopening schools and pre-schools in the particular municipalities.

Expected Demographic Consequences

In this section we look at the available data representing impact of the pandemic on social and economic processes, while discussing the future demographic implications of these changes.

The pandemic is changing the familiar social and economic interactions, removing economically active residents from their usual work environments and social support networks. Working parents face new challenges with remote education and limited childcare. Many adults are attempting to conduct their work activities remotely, which can also increase stress through instant availability, high demands, the need to provide care for children and infirm relatives, and the blurring of work and non-work boundaries. (Settersten et al, 2020) As supported by the literature review, these circumstances will have a detrimental effect on the life-course events and family planning.
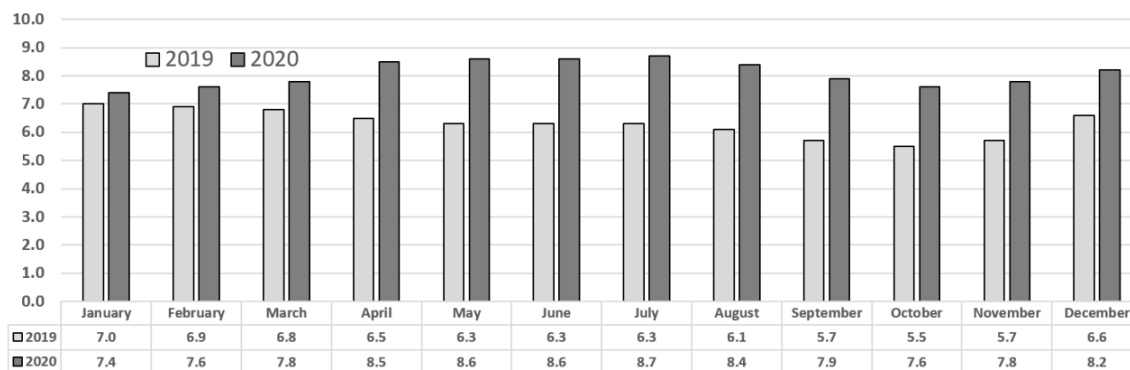


| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 467 | 531 | 719 | 650 | 970 | 1399 | 1935 | 2453 | 1435 | 894 | 670 | 738 |
| 2020 | 484 | 722 | 538 | 482 | 465 | 888 | 1516 | 2311 | 1288 | 884 | 517 | 628 |

Source: Authors' elaboration based on CSB, 2021

Fig. 3. **Number of marriages per month in Latvia – 2019 and 2020 comparison**

Available statistical data for Latvia confirms these predictions – data show growing postponement of marriages in Latvia in comparison with the 2019 and early 2020 dynamics (see Figure 3). At the moment it is difficult to speculate, whether these postponements of life transition events

are temporary and will the dynamics recover in the years to come. However, it is quite safe to assume that the severity of the impact in this regard will depend highly on the duration of the pandemic and the associated safety measures.

From the economic perspective, crisis caused by COVID-19 is quite different from the one experienced in 2008-2011. While massive recovery and economic support measures maintain stable personal income levels, the long-term structural uncertainties and lack of organised international response threaten employment stability and future opportunities in many affected sectors. (e.g. see. Tooze, 2020 or Danielsson et al, 2020.)
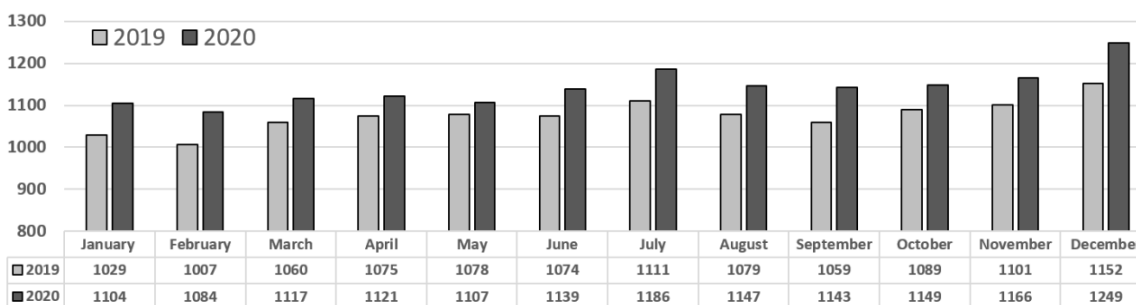
| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 7.0 | 6.9 | 6.8 | 6.5 | 6.3 | 6.3 | 6.3 | 6.1 | 5.7 | 5.5 | 5.7 | 6.6 |
| 2020 | 7.4 | 7.6 | 7.8 | 8.5 | 8.6 | 8.6 | 8.7 | 8.4 | 7.9 | 7.6 | 7.8 | 8.2 |

*Source: Authors' elaboration based on CSB, 2021*

Fig. 4. **Unemployment levels (15-74) per month in Latvia – 2019 and 2020 comparison**

Previous model-based studies conducted for Latvia and its regions have demonstrated that the income indicators like average collected income tax can be significant predictors for the population growth on the local level (natural increase and migration), while unemployment levels appeared to be most significant for the increase of young population. (Dahs, 2017). This is also corroborated by many European studies focusing on the demographic implications following 2008 financial crisis. (see Adsera, 2011 or Goldstein et al, 2013) In terms of fertility plans, observations from these studies point to the fact that - job stability and long term perspectives are valued more than current income levels.

Implications of the COVID-19 crisis become self-evident if we look at the current unemployment and average income dynamics in Latvia (Figures 4 & 5). With the income level maintained at the pre-crisis or higher levels, Latvia has a good chance to avoid the new wave of out-migration. While rising unemployment levels and employment uncertainties will undoubtedly further damage the natural population increase.

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 1029 | 1007 | 1060 | 1075 | 1078 | 1074 | 1111 | 1079 | 1059 | 1089 | 1101 | 1152 |
| 2020 | 1104 | 1084 | 1117 | 1121 | 1107 | 1139 | 1186 | 1147 | 1143 | 1149 | 1166 | 1249 |

*Source: Authors' elaboration based on CSB, 2021*

Fig. 5. **Average pre-tax income per month in Latvia – 2019 and 2020 comparison**

Australian population expert, Dr Liz Allen has explained that in pure demographic terms, the ingredients required for births are being disrupted by the pandemic. Relationships are especially affected, meaning we are not going to see the formula needed to result in births. (Brook, 2020)

Like the marriage dynamics discussed previously, it is difficult to predict weather the COVID-19 pandemic and the associated socioeconomic crisis will result in postponement or abandonment of the fertility plans. One empirical study has shown, that differences in fertility plans arise between and within countries according to the socio-demographic characteristics of the individuals - in countries where the previous economic and labour market situation was more positive (i.e. Germany and France) the proportion of those abandoning the fertility plans for 2020 is much lower than in other countries. (Luppi et al, 2020)

However, in terms of fertility, one similarity can be drawn with the 2008 crisis - fertility plans are less likely to change dramatically for older population groups (30+). A possible explanation is suggested by F. Luppi et. al. (2020) – that those in their 30s - and especially women - are more prone to preserve their pre-crisis fertility plans at least at the beginning of the crisis.

Considering all of the above, we can conclude that income stimulus measures planned and implemented in response to COVID-19 crisis in Latvia combined with heavy economic losses in other EU countries, may limit the damage inflicted by the pandemic in terms of international out-migration. At the same time, reduced employment opportunities together with negative impact of social restrictions, uncertainty and perceived scarcity will have a significant negative effect on the on the fertility plans of younger population groups.

## Conclusions

1. Literature review, as well as the evident regional demographic disparities in Latvia induce active use of the regional demographic indicators in planning and application of the policy measures aimed at containing spread and limiting impact of COVID-19 pandemic.

2. Depending on the regional circumstances, determinants like elderly economic activity, household size and health profile may significantly affect COVID-19 infection incidence and consequences.

3. Demographic disparities between territorial units make some of them more vulnerable to the spread of infection and its various effects, including hospitalization and mortality.

4. The variation of demographic indicators suggest that municipalities have different risk factors in terms of transmission rates and mortality, which means that from demographic perspective, application of tailored COVID-19 preventive measures on the regional level is advisable.

5. COVID-19 pandemic has already left a major impact on socio-demographic behavior of population in Latvia, demonstrated by the reduced mobility and postponement of marriages. Currently, it is too early to conclude if this temporary setback in life and family transitions and reproductive intensions, or a long-lasting effect.

6. Previous model-based studies and the experience of other EU countries allow to assume that economic measures implemented in response to COVID-19 crisis may have a positive effect in limiting the damage inflicted by the crisis to the demographic development. However, this positive influence may be limited to the international migration processes, as the economic stimuli may not be able to overcome the negative impact of reduced employment opportunities, social restrictions, uncertainty and perceived scarcity on the reproductive plans of younger cohorts.

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