

DEMOGRAPHY FACTS THAT ARE CREATING REGIONAL CONTEXT OF ECONOMIC ACTIVITIES

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Abstract

Regions and urban areas are the subject of analysis and descriptive statistics show their development. Regional development in terms of economic indicators rests on population changes. We borrow demography tools, namely ratios, to point out the context they create in economic activities. Two ratios were examined: (1) the dependency ratio and (2) the workforce ratio. One in five-year interval changes during the years 2005-2022 and the other in three-year interval changes during 1993-2019. Data was analysed for the Czech and Slovak Republic using R. Conclusions are in line with demography trends prevailing, especially the ageing of the population. Ageing issues occurring at the beginning of the twenty-first century are a consequence of behaviour (for instance change in birth rates) from previous decades. The paper discusses underlying statistics for the regional context of economic activities that are reflected in macroeconomic decisions. Macroeconomic decisions on the regional level cover retirement schemes, and age-friendly approaches linked to the company level of aged workforce management together with productivity.

Key words: urbanisation, region, dependency ratio

JEL Code: J08, J11, J14

Introduction

City-specific factors determining a city's productivity are split into intrinsic (natural) productivity growth factors and extrinsic productivity factors. In agglomeration economies the intrinsic factors are matching, sharing and learning (United Nations, 2020, p. 82). The demography factor is among the ones to influence productivity growth. The number of dependent children on one adult is decreasing in cities (Ibid.) Therefore, as a consequence, one can expect a decrease in urban regions' growth.

The paper provides a brief literature overview of regional development (often described with growth), in the scope of the middle Europe region, and its specific part of urban sprawl. A literature overview together with data analysis leads to a discussion of the results. It offers

partial recommendations that relate to economic activities in the region of the former federation of Czechia and Slovakia.

The regional context of economic activities is manifold. It involves production function factors, namely labour and capital as the basics. Building on the capacity of labour and capital, the innovations (Teixeira et al., 2019) are embedded in the production process that is the core of economic activities. The production has its localisation either in the urban or in the rural areas, but the economic activities are connecting these areas. This paper points out urban areas and uses descriptive statistics to show trends in the city's demography that influence a place to live and produce. Cities` development in terms of economic indicators could be narrowed to jobs because the human brain, imagination and hard work lead to complete products or services that the community appreciates. It could be narrowed; however, it is not only jobs, it is climate, food, birth rate, housing, electricity and the like. For this rich context of the indicators, we use databases of the World Bank, United Nations, International Labour Office and Eurostat in line with the methodology introduced in other publications, for instance (Gräbner, 2021).

1 Brief literature overview on urban sprawl

Urban sprawl (Cottineau et al., 2019; Kocourek et al., 2021) is a natural phenomenon but needs some regulation, especially concerning the climate. People like to see data on climate change be it good news or bad news. They know they are facing the issues and are involved in solutions. Each behaviour matters (for instance visiting parks (Tu et al., 2020)) and contributes to overall data. This data is not available as would be necessary and UN-Habitat strives to become a Global Centre for Data and Analytics of urban development and resilience (Richards, 2023). The document reasons the existence of the database and will build capacities for Data storage till 2025 and till 2029 it will be maintained. Similar ideas are expressed in the American continent (Jarmin, 2019).

The greater context of urbanisation is seen in IPAT models (Dehghan Shabani, 2024; Lennox et al., 2019) that combine the population variable with affluence or consumption per capita with technology and the impact on the environment. "Urbanization itself has a small impact on carbon dioxide (CO₂) emissions, and the main factors that can increase CO₂ emissions are factors such as population and economic development." (Lee & Zhao, 2023). In particular, the human capital threshold (Dehghan Shabani, 2024) is measured to enhance the use of renewable energy and efficiency in economic activities. It follows the answers that it is not by chance that economic agents with higher skills are concentrated in the larger cities

(Cottineau et al., 2019). These statistics will guide us to achieve goals that are equally important for all generations. The decrease in the dependent population can be a significant sign of a higher demographic dividend (Nguea, 2023).

The population of Eastern European Metropolises has grown till 2020, the population reached 100.42 million people. Projections are that the average annual rate (AAGR) of 0,08% will be present between 2020 and 2035 (United Nations, 2020). Europe's population will stagnate and so will the labour force. It will be similar (AAGR of 0,775) in Western Europe and other States Metropolises.

This brief literature review is opening for analysing datasets for two countries, as for the data introduction, its key elements are population and ratios that describe the structure of the population. The method is a comparison of ratios that are suitable for noticing trends in the labour market and urbanization as well. The dependency ratio was calculated as a ratio of children and adults. The workforce ratio was calculated as the ratio of older over younger employees. The age that separates the two categories is 45 which already counts into the category of older employee.

In general: (1) The ratio is the relation of one subgroup (older) to another subgroup (younger), which is different from the proportion that relates a subgroup to the entire population. (2) Proportion focuses on structure as a share of the total, giving a complex view whereas ratio focuses on structure in a detailed perspective, giving a chance to compare easily with scalable measurement. Also, growth rate is used in the description of demography facts.

2 Population structure and urban area development

World Development Indicator data were downloaded by the API (Application Programming Interface) link of the World Bank. Indicators of urban population for the Czech Republic and Slovakia were considered for analysis between the years 2005-2022.

In Table 1 we compare the total population in different years and changes between them that are not substantial, the population rather stagnates. Concerning children new-born till the age of 14, the group of males in Czechia has risen from 771 495 to 871 932 from 2005 to 2022 respectively, while in Slovakia it downturn from 464 579 to 437 812 in the same years. Comparing the situation for females in Slovakia there is a drop from 442 087 to 417 124 in the years 2005 and 2022 respectively whereas in Czechia girl's population has risen from 730 573 to 830 535 in the same years. Those numbers allow us to present the dependency ratio in a subsequent part of the paper.

Tab. 1: Urbanization overview of population (in number of inhabitants)

Variable	Urbanisation total				
Year	2005	2010	2015	2020	2022
Czechia	7 515 659	7 673 029	7 748 928	7 922 941	7 937 601
Slovak Republic	2 985 293	2 948 302	2 922 832	2 934 665	2 928 203

Source (World Bank, 2022) and author's calculation.

Table 2 describes urbanisation in metropolises: Prague, Brno in the Czech Republic and Bratislava in Slovak Republic. United Nations data are provided as the Annual Population of Urban Agglomerations with 300,000 Inhabitants or More in 2018, 1950-2035 (thousands). As for Bratislava, the capital, there are predictions for 2025 to achieve the 444 thousand inhabitants. By 2035 it will reach 458 thousand inhabitants. Prague is predicted to achieve 1 352 thousand inhabitants and Brno 385 thousand. Brno can be better compared to Bratislava also the geographical proximity of the two cities plays a role in joining people of the two regions, cities..

Tab. 2: Urbanization overview of population in metropolises (inhabitants in thousands)

Variable	Urbanisation total				
Year	2005	2010	2015	2020	2022
Prague	1 199	1 234	1 269	1 306	1 312
Brno	377	377	378	378	379
Bratislava	426	414	422	435	439

Source:(United Nations, 2018)) and author's calculation.

Companies are attracted to major cities (Vachon, 2016). This typical phenomenon of suburban exodus is due to a lack of space for people and industry. "The economic challenges of mixed-use development relate to higher rates, highly restrictive regulations, and problems of conflicting interests between businesses and residents."(Geyer, 2024). To illustrate the difference in population that is reflected in the GDP we use data from the United Nations. The share of city GDP on the national GDP was 19,1 % in Bratislava, 33,5% in Prague and 6,5% in Brno in 2017 (UN=Habitat, 2022).

2.1 Dependency ratio and economic activities

Ageing in economic activities influences productivity with more skills and efficiency. However, the population is stagnating as noticed in the former part of the paper and workers become a scarce resource. As a consequence of this phenomenon, the economic growth is

suggested to reduce by 0.3 percentage points per year as calculated for the US during 1980-2010 (Maestas et al., 2023). Prediction for Europe is not necessary to add. This is a driver of investments in automation. Another driver for such investment is confirming the previous prediction with workforce ageing, i.e. the ratio of older to younger workers. Sometimes the settings in economic activities do not allow for gaining/induced capital deepening (Acemoglu & Guerrieri, 2008).

Table 3 examines the change in dependency ratio the drop is noticeable in 2010 as the women from a strong population year around 2010 were giving birth. After that, the ageing is obvious as the dependency ratio is higher for both countries reaching 0,252 or 0,234. It could be different after adding up the 65-plus people to the calculation, which has not been done here.

Tab. 3: Dependency ratio (children aged 0-14 over the working-age population)

Variable	The dependency ratio for the sum of male and female				
Year	2005	2010	2015	2020	2022
Czechia	0,206	0,205	0,229	0,250	0,252
Slovak Republic	0,236	0,214	0,217	0,235	0,234

Source: (World Bank, 2022)) and author's calculation.

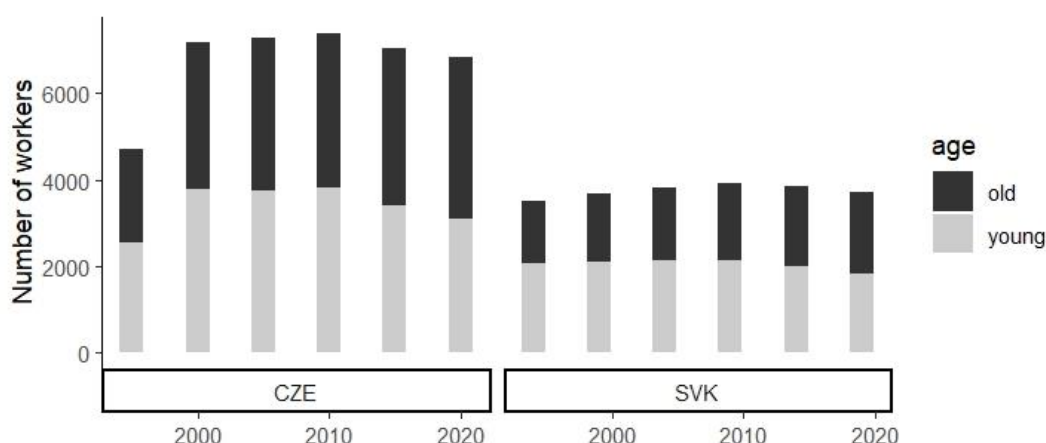
Macroeconomic policy does not consider the dependency ratio, it has been long obscured (Gahan et al., 2017). Some fiscal burden is eased by older workers postponing their retirement. Sometimes it is motivated by the position (rather prestigious) older workers already achieved and are not willing to leave. This leads to intergenerational competition for status.

2.2 Workforce ageing and jobs

Ageing is a disease everyone faces. Prevention is to keep oneself in shape, i.e. mental and physical activity, and training (see the below discussion). This means that sometimes age according to the date of birth is not the only criterion to statistically match the older age group. Nonetheless, this criterion is the only one that is used here.

Figure 1 illustrates a structure in the workforce that was created based on ILO data, that distinguishes ten age bands from age 20 to 65 in five-year intervals. The bands were merged to two groups, i.e. young and old. The problem was where to draw a line between young and old. The decision was made that since age 45 the worker belongs to a group of old.

Fig. 1: Workforce structure comparison in two countries over decades



Source: own, based on data from (ILO, 2024)

The workforce ratio is also increasing which is in line with the aforementioned trend and it would trigger doubts about either calculation or the data collection if it had not increased as well. Table 4 is evidence derived from the ILO data. The ratio was in favour of the young, especially in the Slovak Republic until 2014, but for Czechia only until 2009.

Tab. 4: Workforce ratio (older to younger)

Variable	Workforce ratio for the sum of male and female					
	1994	1999	2004	2009	2014	2019
Czechia	0,86	0,89	0,93	0,93	1,06	1,21
Slovak Republic	0,69	0,75	0,79	0,83	0,94	1,05

Source: (ILO, 2024; World Bank, 2022)) and author's calculation.

The productivity of the younger generation (especially the age group 25-44 influences productivity) rests in their creativity, and it means value added for countries with lower workforce ratios (Lo & Yang, 2024). Lo and Yang, who built up their results on Krugman (1987) and Dornbusch, Fischer and Samuelson (1977), concluded that the demography structure influences the comparative advantage of a region.

3 Discussion on ratios in demography trends

Continuing the idea of Lo and Yang (2024), the productivity of the younger generation is surpassing the one of the older, only under the assumption that the young generation is brought up with a correct approach, and attitude towards hard work. In the Czech Republic, some research on attitudes has been done, for instance by Večerník (2006) or in the Slovak Republic Vecci and Želinský (2019). The correct attitude towards hard work could be the case in China

that Lo and Yang are referring to. One could question (in another paper) the working attitudes as a preassumption for modelling the consequences of the proportion of young people in the workforce. Moreover, if the index of cumulative experience (Krugman, 1987) is explained in time.

The paper provides underlying statistics for the regional context of economic activities reflected in the macroeconomic decisions. An obvious limitation of the paper is that it observes only two countries with common history. It should be evident that the workforce ratio will soon drop back to the level of the year 1994 when the young were scarce. The dependency ratio will drop as well. This will be reflected in intergenerational issues. Intergenerational issues arising from different mindsets lead towards changes in the working environment. This means that Generation X and Y must communicate under the condition that Generation X is usually the senior manager while Generation Y is in the position of freshman. Most of the freshmen need coaching, mentoring or self-development strategies, in line with author Legnerová (2014). Another approach towards coping with ageism is intergenerational learning, digital learning solutions (Ranasinghe et al., 2024) or intergenerational coexistence and retirement pathways referring to ageing workforce management on a regional level (Katirae et al., 2024).

Microeconomic and macroeconomic consequences in brief: The welfare system will be unstable after the ageing population (which is greater in number than the young population) reaches retirement and the labour force will suffer a shortage in almost all positions, except the one where robots can substitute human work. “Age-friendly work environment”, giving older workers access to skills training will raise the cost of labour (Nagarajan & Sixsmith, 2023).

This paper points out the urban areas of Prague, Brno and Bratislava and uses descriptive statistics to show trends in the city's development (Gencer, 2010) as a place to live and produce. It is worth adding that the city “vibe” should prepare for the older population, meaning and re-phrasing again offer an “age-friendly city environment”. It does not mean that Prague, Brno or Bratislava will become cities of spa and wellness character, but have two lines to live a life: (1) fast lane: the vibe of quick rock-and-roll and (2) slow lane: the vibe of an elegant Viennese waltz. Good governance is to support the new rule of the game, namely bridging all generations living in one geographical unit. The new rule would be better if it is halfway supported by households and culture as a rooted institution typical for every geographical unit.

Conclusion

The New Urban Agenda was discussed during the conference already in 2016. Having 175 proclamations emphasising environmentally sustainable urban development it becomes a common ground for all states. The reasons to relocate a household or business are several: population increases, higher demand for water, higher demand for a clean environment, higher energy demand to provide both water and cleanness or sustainable issues to govern these needs.

The aggregate demand serves the needs of the population while working part of the same population creates values and aggregate supply. Theories of economic growth explain the role of population, technology and already achieved economic growth. The growth is considered to be a success of society. It used to be prioritised until nations perceived the scarcity of sources and climate change caused by economic activity.

Population development is linked with nature. Nonetheless, governs its behaviour according to economic rules instead of natural rules. This imbalance of rules could be the beginning of a new version of economic activities and growth in an endogenous way. The structure of the labour force changes and we can expect a decrease in creativity, productivity and growth. To outweigh this decrease there might be various policies or strategies that society will choose, in discussion there are mentioned several ideas of how to prepare for this change. One strategy in progress is the building of a better database mentioned above (UN-Habitat) was supported by publishing here this modest analysis of two countries.

Papers conclusion is that researching population growth in context is informative for companies and healthcare institutions, especially when it comes down to ageing. New forms of cooperation between different age groups in the same companies will become frequent. The society that handles labour with more care than its technology shall be the society that people would prefer to live in.

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