

This doctoral thesis presents four articles analysing labour force and its productivity. It utilises simulation modelling to assess the impacts of demographic changes, migration or shifts in productivity determinants on public finances and the economies in the Czech Republic and the USA, as well as statistical modelling to evaluate determinants behind workplace productivity. The first three studies assess the topic from a high-level perspective, providing economy-wide projections for the future decades. They also utilise the same core simulation model, an overlapping generations (OLG) framework coded in MATLAB, which is further developed for the particular use in each study. The fourth study, on the other hand, approaches the topic from the opposite direction, analysing the individual-level factors affecting productivity.

Specifically, the first article deals with demographic changes -- population ageing and shrinking -- in the context of the Czech pension system. The findings show that the existing system can provide pensions increasing at the rate of change in nominal wages, be financially sustainable in the long term, or increase the default retirement age by only two years in the next decades -- but only two of these three objectives can be achieved at the same time. On the contrary, a structural change towards an alternative, partially funded pension scheme may provide a better balance in the three outcomes without putting an excessive debt burden on the next generations.

The second article broadly builds on the previous one by analysing the economic impacts of demographic changes in the Czech Republic, yet it extends the scope of the analysis to (un)anticipated migration and sectoral effects. This is done by introducing a computable general equilibrium (CGE) side of the simulation model with a detailed representation of individuals of different ages, educational attainment and occupations, as well as interrelations among industrial sectors in producing intermediate and final outputs. The results show that the annual net immigration would need to increase by at least 8 thousand individuals on average in the 2020-2035 period and by 17 thousand individuals in the 2036-2050 period to offset the negative effects of the projected demographic changes in the long term.

The third study investigates economic implications of later high school start times in the United States by assessing the effect on educational attainment and, in turn, on human capital accumulation on one hand and on car accidents, one of the leading causes of death among teenagers, on the other. The benefit–cost projections of this study suggest that delaying school start times would be a cost-effective population-level strategy with potentially a significant positive impact on public health and the US economy.

Finally, the last study analyses productivity determinants at the individual level by examining data on 31,950 employees in the UK using structural equation modelling. The analysed factors comprise socioeconomic characteristics, lifestyle, commuting, physical and mental health, well-being, and job and workplace environment. The study finds that, controlling for personal characteristics, mental and physical health cover more than 84% of the direct effects on productivity loss. In addition, 93% of the indirect influences are mediated through mental and/or physical health, meaning that even job or workplace factors, such as job satisfaction, support from managers or feeling isolated ultimately affect productivity through mental and/or physical health.