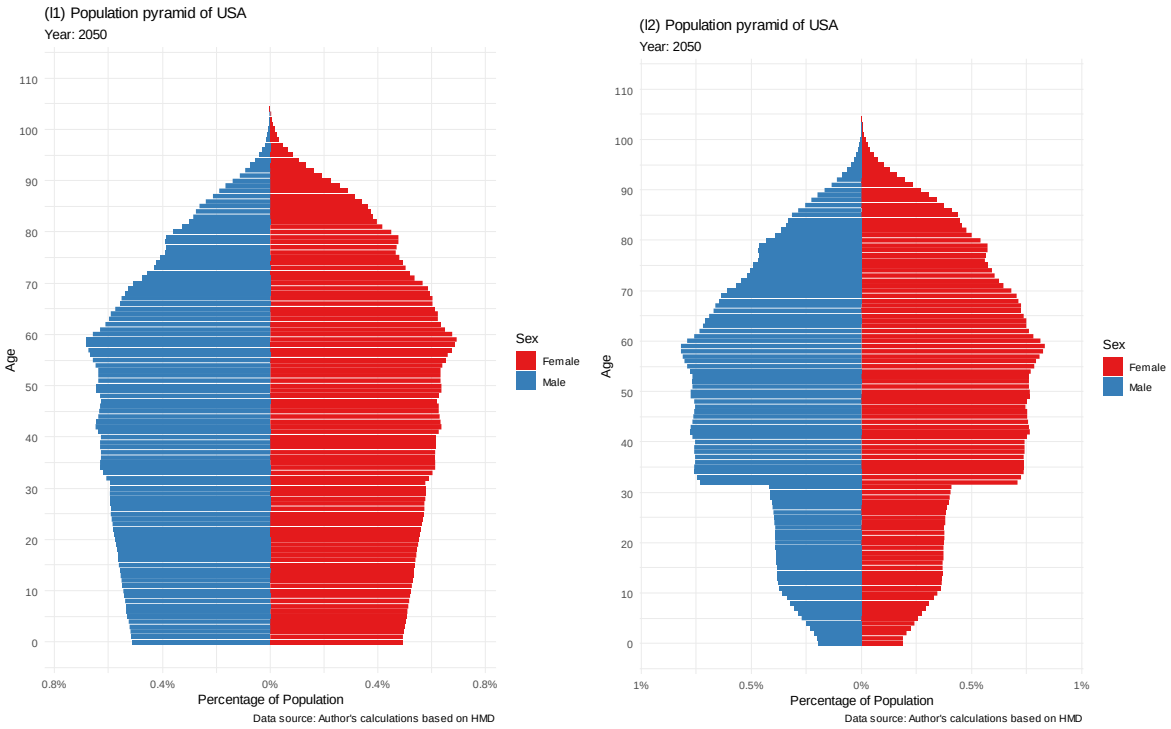
DEMO2002 W9 Tutorial



The above figure depicts population projections (as population pyramids) based on the USA. The left is the ordinary figure without altered parameters. In the right figure, the line data has zero listed for every age except for the interval [20,29], where fertility is 0.2 in this range.

By default, the left figure exhibits a stationary and aged population. It is not experiencing rapid growth, but there is a very substantial portion of middle-aged people in the diagram. The US's projection resembles the demographic transition stage identified by low death rate and declining birth rate, since the sides are slightly convex.

As one would expect from the drastic change in parameters, the right figure is an exaggeration of a contracting population. The first collapse in the population happens immediately after 2019 (the starting year), and this horizontal chasm ages along with the rest of the population, which we now see has reached ~30 years old by 2050. The second sloped decline in the population corresponds to when that post-shock cohort experienced our "new" fertility window; in a sense, the shrinkage is self-reinforcing.

In experimenting with population pyramids, I think it would be interesting to depict a visual separation of the contribution of immigration and immigrant fertility. One wonders how fertility adapts to immigration. Anyawie, Lichter and Qian (2025) found that growing diversity "placed upward pressure on fertility", but that has been offset by downward pressures from other accompanying trends during cultural assimilation.

References

Anyawie, M., Lichter, D.T. and Qian, Z. (2025) 'Immigration and Fertility in the United States', *International Migration Review*, p. 01979183251325189. Available at: https://doi.org/10.1177/01979183251325189.