

How far should inflation targets move with demographics?

The demographic floor on lower bound risk

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Abstract

This paper measures how gradual demographic change moves the risk that monetary policy reaches its lower bound, and what this implies for stabilization policy. We do not rebuild the macroeconomic model: we adopt the New Keynesian overlapping generations model of Bielecki *et al.* (2023) and extend it on the demographic side, where our contribution lies. We treat demography as several interacting forces rather than a single ageing trend: fertility intensity, the postponement of first births, baby boom cohorts, rising longevity and migration.

These forces move saving behaviour, labour supply and capital accumulation. Through them, they move the natural real rate and the distance to the bound. The model admits a transparent summary, $\Pr(\text{ZLB}_t) = \Phi(-(\bar{r} + \pi_t + \text{EDF}_t)/\sigma_R)$. The Enhanced Demographic Factor (EDF) is a linear index that reproduces the natural rate of the full model ($R^2 \approx 0.90$). The only non-linearity is the Gaussian tail. The loadings are pinned down by the structural model. Ageing raises the annual *demographic floor* on ZLB risk. This floor reaches about 5% to 7% in the euro area and France by the end of the century, and stays below 2% in the younger, more open United States and United Kingdom. Switzerland shows that the inflation regime can dominate demography: with a favourable age structure but realised inflation near 0.5%, its total exposure is the highest outside Japan, and the negative floor of its central bank buys most of it back. Realised ZLB frequency can exceed the floor when tail crises strike while the buffer is thin, as in 2008 and 2020.

Two policy messages follow. First, the inflation buffer needed to keep the demographic floor low is modest, about 1.2% to 1.7%, close to current targets: ageing alone does not justify much higher inflation targets. Second, the real danger is the slow drift of the natural rate into negative territory, where the bound becomes a lasting regime; only Japan reaches this case in our sample. Against this drift, migration is the most effective instrument. One extra percentage point of net migration moves the natural rate by about as much as a fifty six point change in the dependency ratio, while the timing of births and longevity act slowly and are hard to reverse. The framework turns demographic projections into a single statistic relevant for policy, the Prospective Secular Stagnation Index. It is designed to support the comparison of monetary regimes and of balance sheet tools, which we pursue in companion work.

Key words: zero lower bound (ZLB), overlapping generations (OLG), demographic dynamics, population ageing, dependency ratio, secular stagnation

7 Conclusion

Demographics are a key driver of ZLB risk, but the size of that risk depends on how it is measured. It is much smaller when the link from the age structure to the natural rate comes from a full model, rather than from assumed coefficients. We build on the model of Bielecki *et al.* (2023) and extend it with a multidimensional demographic state: the level and timing of fertility, baby boom cohorts, longevity and migration. We show that this demographic state maps into the natural rate through a simple and almost linear index, the Enhanced Demographic Factor, which reproduces the natural rate of the full model ($R^2 \approx 0.90$). The key non-linearity of ZLB risk is not in the index, but in the Gaussian tail through which it works.

These magnitudes are much smaller than alarmist estimates. Across the major advanced economies, demographic ageing over the next decades raises the annual demographic floor on ZLB risk to a few percent. Total realised frequency also reflects tail crises that strike when this floor is high and the buffer thin (Section 5.3). The floor reaches 5% to 7% in the euro area and France by the end of the century, but stays below 2% in the younger and more open United States and United Kingdom. It does not reach near certainty. There is no demographic “tipping point” in the dependency ratio. The Swiss case completes the picture from the monetary side: a favourable demography does not protect an economy whose inflation regime leaves no nominal buffer, and a credible floor below zero can substitute for the missing buffer, as the SNB demonstrated for 7 years. The inflation target needed to cap this risk is modest, about 1.2% to 1.7%, close to current targets. Migration is a very effective tool: 1 pp of net migration offsets about 56 pp of ageing measured by the dependency ratio, in terms of the natural rate. Episodes stay short as long as the natural rate is positive. The real danger is the slow fall of the natural rate into lasting negative values, where the lower bound becomes permanent. In our sample, the model reaches this regime only for Japan, where it becomes singular.