«Русский парадокс»: высокое образование/низкий человеческий капитал

Николас Эберштадт
(eberstadt@aei.org), Американский институт предпринимательства (AEI), Национальное бюро азиатских исследований (NBR), США.

«The Russian paradox»: high education/low human capital

Nicholas Eberstadt
(eberstadt@aei.org), Henry Wendt Chair in Political Economy at the American Enterprise Institute (AEI), National Bureau of Asian Research (NBR), U.S.A.

Abstract: *Some aspects of contemporary Russia's population profile — such as its depopulation and steady surfeit of deaths over births — once seemed distinctive, but are today increasingly common in both Europe and the UN's other «developed regions». But other aspects still remain highly distinctive. We examine one of those here: we call it Russia's «high education/low human capital paradox». Despite levels of schooling comparable to other European countries, and to developed countries in other regions, Russian adult mortality levels are no better than «Third World», and by some measures, actually look «Fourth World», e.g. in countries with the lowest level of socio-economic development. Furthermore, despite its sizeable cadre of highly educated men and women, Russia also appears to have serious problems with «knowledge creation». Projections suggest Russia's working-age adult mortality profile will remain unfavorable for decades to come, and that Russia's global share of highly educated manpower is set to decline over the coming generation. There are economic and potentially geopolitical implications to such trends. We conclude by noting similarities to Russia's high education/high adult mortality elsewhere in the former Soviet space.*

Keywords: *Russia, demographic projections, levels of schooling, adult mortality profile, «high education/low human capital paradox».*

Acknowledgments: *Thanks go to Patrick Norrick for his research assistance on this paper. Any remaining errors are the author's.*

Для цитирования: *Eberstadt N. (2024). «The Russian paradox»: high education/low human capital. Demographic Review, 11(4), 44-72. DOI: https://doi.org/10.17323/demreview.v11i4.24289*

Резюме: *Некоторые аспекты демографического профиля современной России — такие как ее депопуляция и устойчивый избыток смертей над рождаемостью — когда-то казались отличительными, но сегодня все чаще встречаются как в Европе, так и в других «развитых регионах» по классификации ООН. Но другие аспекты по-прежнему остаются весьма отличительными. Мы рассмотрим один из них здесь: мы называем его «парадоксом высокого образования/низкого человеческого капитала» России. Несмотря на уровень образования, сопоставимый с другими европейскими странами и развитыми странами в других регионах, уровень смертности взрослых в России не лучше, чем в странах «третьего мира», а по некоторым показателям даже выглядит как в «четвертом мире», в странах наименьшим уровнем социально-экономического развития. Кроме того, несмотря на значительные кадры высокообразованных мужчин и женщин, у России также, по-видимому, есть серьезные проблемы с «созданием знаний». Прогнозы предполагают, что профиль смертности взрослых трудоспособного возраста в России останется неблагоприятным в течение следующих десятилетий, и что глобальная доля России в высокообразованной рабочей силе будет снижаться в течение следующего поколения. У таких тенденций есть экономические и потенциально геополитические последствия. В заключение мы отмечаем, что похожее сочетание высокого уровня образования с высокой смертность взрослого населения не встречается в большинстве других стран бывшего советского пространства.*

Ключевые слова: *Россия, демографические прогнозы, уровень образования, профиль смертности взрослого населения, парадокс «высокое образование/низкий человеческий капитал».*

Благодарности: *Благодарю Патрика Норрика за помощь в написании данной статьи. Все оставшиеся ошибки принадлежат автору.*

For citation: *Эберштадт Н. (2024). «Русский парадокс»: высокое образование/низкий человеческий капитал. Демографическое обозрение, 11(4), 44-72. DOI: https://doi.org/10.17323/demreview.v11i4.24289*

Introduction

Contemporary Russia's adult mortality woes are well known. They are longstanding — tracing back to the 1960s and the «era of stagnation» in Soviet Russia, when rising death rates came to characterize most male and female cohorts of working age (Eberstadt 2010). Excess adult mortality has continued to plague Russia since the end of Communism. Despite improvements registered in the early 21st Century, Russia's age-standardized mortality level remains extremely high in relation to other European countries.

One aspect of Russia's mortality patterns has attracted curiously little attention, even though it is immediately apparent upon reflection. This is the extraordinary incongruence between the country's mortality level and its level of educational attainment. Educational attainment is widely recognized as a powerful predictor of mortality levels in our modern world, regardless of a country's level of socio-economic development (IHME–CHAIN Collaborators 2024). Yet in Russia, where educational attainment profiles are comparable to those of affluent Western societies in Europe and elsewhere, mortality levels — especially for adult men and women — remain far higher than the corresponding levels in the West. Indeed, by some measures, Russian mortality looks more «Fourth World» than «Third World».

And it is not only Russia's mortality levels that appear to be severely out of sync with the country's relatively high levels of schooling. By a variety of measures, what we might call «knowledge production» looks to be decidedly less robust than would be expected in a country with Russia's very sizeable population of highly educated working-age men and women. Russia is also a strikingly poor performer in service sector exports — i.e., international commerce in human skills.

Somehow, despite its considerable levels of schooling, Russia presents in important respects like a population with low levels of «human capital». This paradox may perhaps represent the most distinctive aspect of the Russian Federation's demographic profile at the present time. Certainly, it constitutes a feature that deserves further scrutiny.

This note will provide an introductory examination of this curious contradiction [1].

Russian depopulation and «net mortality»: no longer so distinctive for a European country

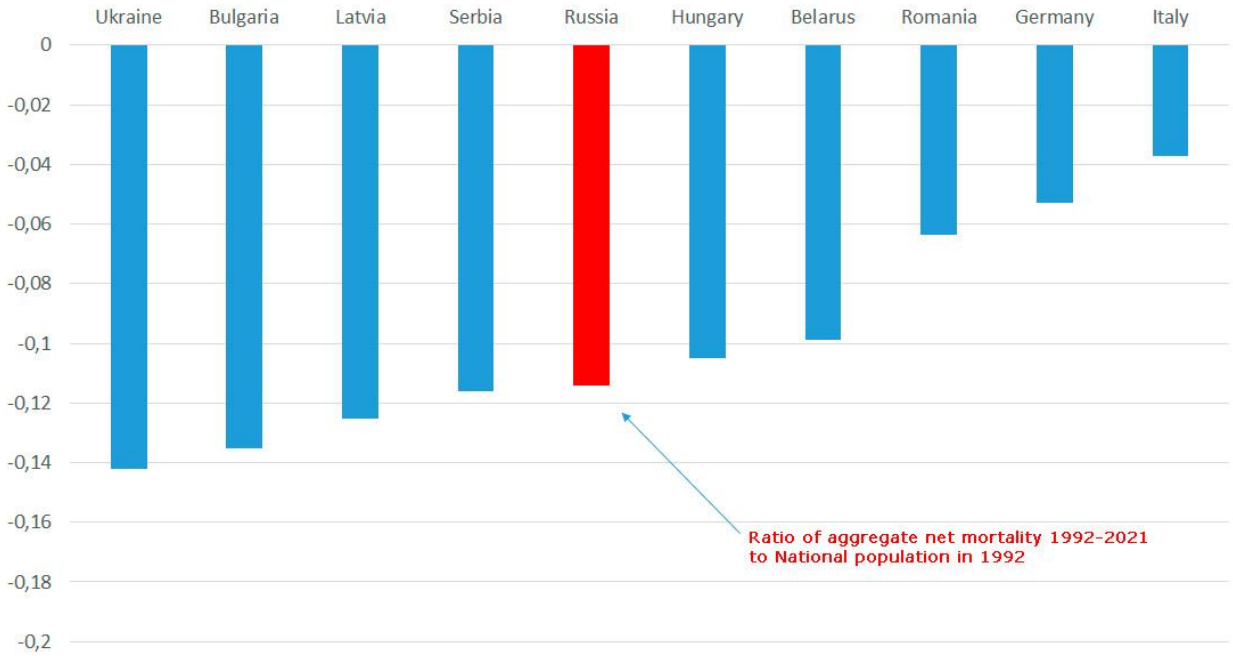
At the beginning of the post-Soviet era, Russia entered into long-term depopulation and became a net-mortality society during peacetime, evidencing steady and almost continuous surfeits of deaths over births. Initially, in the 1990s and 2000s, these were striking and unusual characteristics for a European country, or for a society designated by the United Nations as part of the world's «developed regions». But these are decidedly less distinctive today.

To be sure: over the three decades of the 1992–2021 period — before intensive military actions of Russia in Ukraine — deaths in Russia surpassed births by a cumulative 15.7 million, according to *Rosstat*. Russia's prolonged cumulative surfeit of deaths over births thus far has been proportionately larger than China's briefer, more extreme episode under Mao, in the wake of the disastrous «Great Leap Forward».

[1] Our focus will mainly be on the years before 2020, the period before the twin demographic shocks of COVID-19 and extensive military operations in Ukraine.

Even so: a number of other European countries also reported more deaths than births over those same decades (Figure 1). And Russia was not the most exceptional outlier, at least in proportional terms — though its closest company happened to be post-Communist states, too. By the reckoning of the U.S. Census Bureau, several post-Communist states more or less matched Russia proportionally in cumulative net mortality for 1992–2021, including Hungary and Belarus, while Ukraine and Bulgaria's ratios of net mortality to total population actually exceeded Russia's [2].

Figure 1. Net mortality to population ratio, 1992–2021



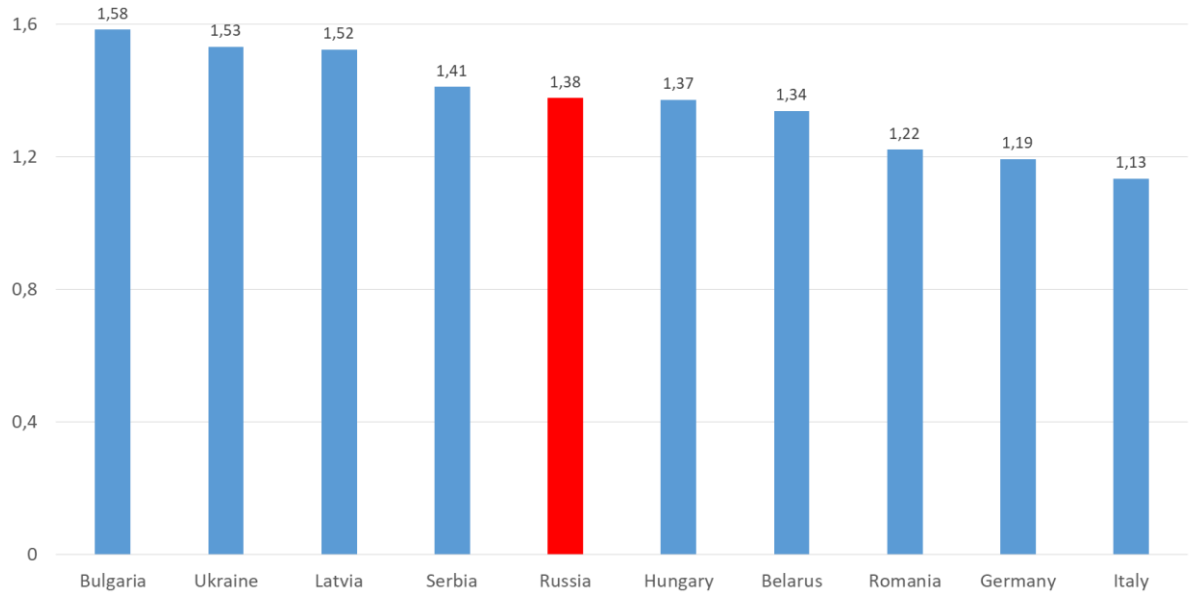
Source: (United States Census Bureau 2022).

Over the three decades of 1992–2021, Russia reported an average ratio of deaths to births of 137:100 (Figure 2). This long-term surfeit of deaths over births was striking for an urban and literate society during peacetime — although again not entirely unparalleled, and not unique to post-Soviet societies, as the examples of Germany and Italy attest.

Both population decline and high ratios of deaths to births are becoming characteristic of affluent societies under conditions of orderly progress, as their populations age and shrink. Both tendencies are increasingly familiar throughout Europe. In the years since 2012, the EU-27 as a whole has entered into «net mortality» (Eurostat 2024a), with a dozen successive years of more deaths than births at this writing, and no end in sight.

[2] Serbia's totals in Figure 1 would imply it would have been in the same proportional league as Russia—but it is excluded from comparison because it was not a peacetime society for the entirety of the period under consideration. Note as well the discrepancy between official Russian estimates of cumulative net mortality totals for Russia 1992-2021 and those of the U.S. Census Bureau's International Data Base: 15.7 million vs. 17.1 million. We do not attempt to reconcile those discrepancies here.

Figure 2. Ratio of deaths to births: top 10 net mortality countries, 1992–2021



Source: United States Census Bureau (2022).

Of the 40 countries for which Eurostat offers data concerning «natural change of population», furthermore, 25 reported more deaths than births in 2023 (Eurostat 2024a). Thus, far from standing out as an exception, net mortality in Russia today looks more like a characteristic comporting to a European norm. And as ever greater numbers of European and developed countries register population decline — twelve countries in the Eurostat database did so for 2023 (Eurostat 2024a) — Russia's depopulation trajectory will look less like an anomaly and more like the path of a pioneering trend-setter for the group.

Fertility and family formation in Russia: a «normal European country» (more or less)

In the wake of the collapse of Communism, Russian birth trends sustained extreme shocks. Births fell by over 50 percent between 1987 and 1999, then recovered appreciably between 1999 and 2014, before again resuming a more moderate decline.

The natality increase in Russia between 2008 and 2014 coincided with the Kremlin's pronatalist benefits program, leading the Kremlin (and some foreign observers) to call that effort a success. But by 2018–2019, Russian fertility levels (by the metric of total fertility rates, or TFRs) did not look appreciably different from some erstwhile Soviet bloc European states *without* big expensive pronatalist policies: such as the Baltic countries, Poland and Romania (Eurostat 2024a). In fact, some of these places were reporting higher fertility than the RF.

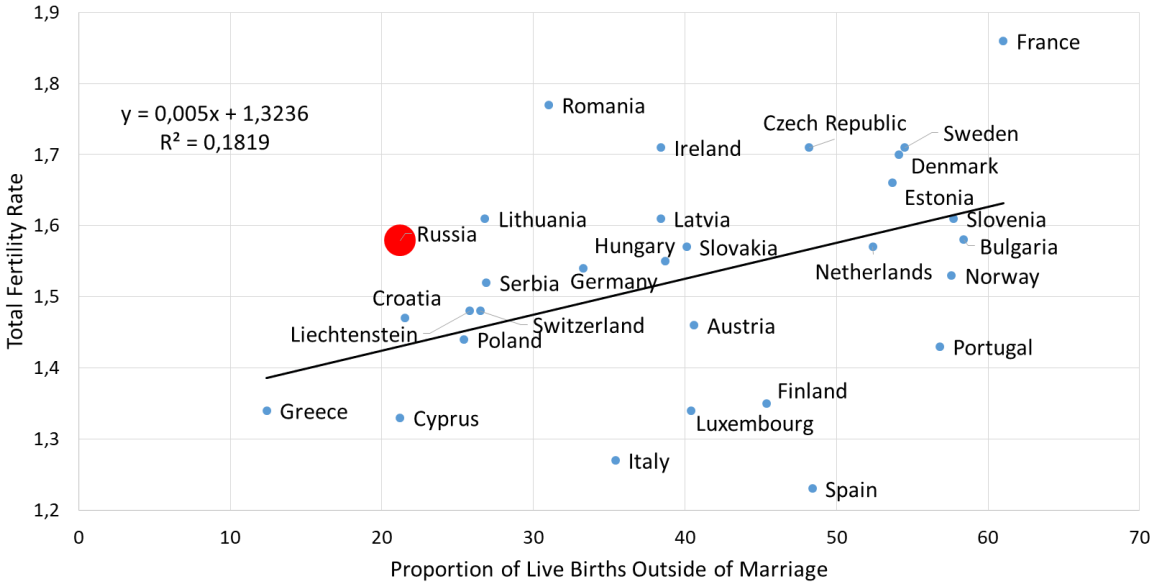
And that is precisely our point: from the standpoint of fertility and family formation, contemporary Russia's profile looks to be quite typically European in most important respects.

First, notwithstanding its initial post-Communist fertility gyrations, births in contemporary Russia, as in the rest of Europe, remained below the replacement level and are projected to stay below replacement.

Second, regional fertility differentials within the vastness of Russia today look quite «European». Whereas the national Net Reproduction Rate (NRR) averaged 0.75 in 2018, it was as low as 0.54 in the Leningrad *oblast* surrounding the city of St. Petersburg. On the other extreme, the 2018 estimated NRR for Chechnya was 1.24 — and almost 1.4 for Tuva. But intra-Russian fertility variations were akin to those registered within the EU-27 that same year. According to Eurostat, the European Union's statistical office, that area's 2018 NRR was 0.74, with net reproduction rates as low as 0.49 in Sardinia and 0.47 in the Canary Islands, and as high as 1.01 in Romania's Nord-Est.

Finally, it is worth emphasizing that childbearing and family formation patterns in the Russian Federation also look characteristically European. We can see this from a scatterplot showing TFRs against the proportion of births outside marriage for 2018–2019 for the RF and the 27 European Union countries plus the UK (Figure 3). In 2018, at 1.58 births per woman, Russia's TFR was almost identical to the EU's levels in 2018 (1.54 for EU-27, 1.56 if UK were still included). Its percentage of births outside marriage was lower than in most EU societies, although several European populations did report distinctly lower out of wedlock birth ratios.

Figure 3. TFR vs. percentage births outside of marriage: Russia (2018) and select European nations, 2019



Sources: Eurostat (2024b), Eurostat (2024c), (The World Bank 2022c), Rosstat (2017).

All in all, as a society with below replacement fertility and a bit less than one in four births occurring outside marriage, Russia's childbearing patterns in 2018 may be regarded as «typically European». The «second demographic transition» (Van De Kaa 1987; Lesthaeghe 2020), that European demographers first noted in Western Europe in the 1980s — characterized by an evolution toward higher rates of cohabitation and divorce, rising out-of-marriage childbearing, and a shift to indefinite sub-replacement fertility — appears to be very much underway in Russia nowadays as well.

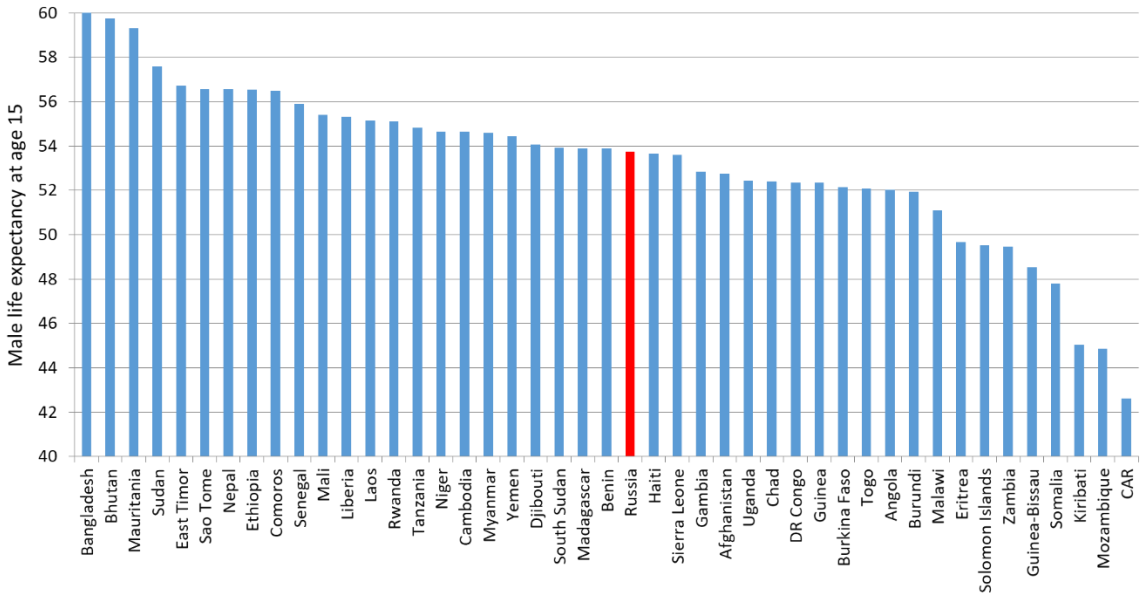
Russia's disastrous survival profile: tragically distinctive

Yet while Russia's childbearing patterns today look entirely European, its mortality patterns look Third World — actually, worse than Third World in important respects.

We can see this from «life tables» — actuarial computations tracking a population's survival trajectories — for Russia and the rest of the world from the World Health Organization (WHO) Global Health Observatory for the year 2019 (World Health Organization 2022a).

The year 2019 was a good one for life expectancy in Russia — in fact, higher than ever previously recorded. Thus 2019 seems particularly apposite for international comparisons, as it may offer an especially favorable benchmark from the Russian standpoint. Yet according to WHO estimates, Russia's life expectancy in 2019 for a 15-year-old male was essentially indistinguishable from Haiti's (Figure 4).

Figure 4. Male life expectancy at age 15: Russia vs. all least developed countries, 2019

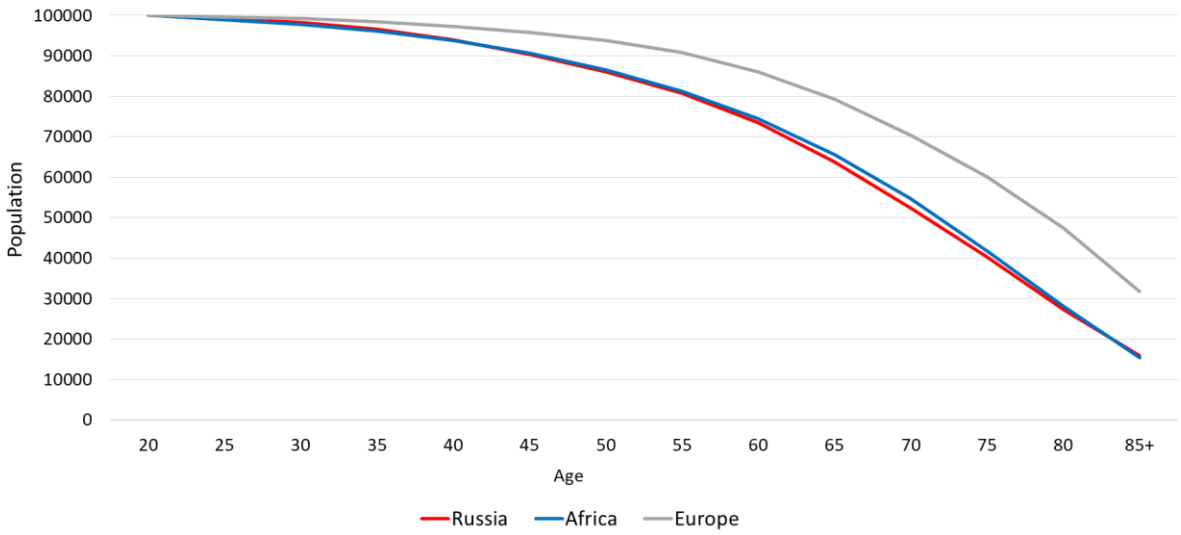


Sources: (World Health Organization 2022a).

This is not a typographical error. By WHO's reckoning, male life expectancy in 2019 in both Haiti and Russia stood at 53.7 years (rounding to the nearest decimal). That same year a 15-year-old youth stood worse estimated survival chances in Russia than in at least 23 of the 48 places the UN categorizes as «Least Developed Countries» (LDCs) — including such impoverished locales as Mali, Yemen, and even Afghanistan (UN DESA 2024). We say «at least 23» because the WHO does not estimate life tables for all the LDCs.

According to those same WHO data, the Russian Federation's mortality schedule for adult men in 2019 was remarkably similar to that for African males that same year. (The Africa data are continent - wide and thus include North Africa, not just the sub-Sahara) (Figure 5).

Figure 5. Survival schedule for male population at age 20: Russia vs. Africa and Europe, 2019



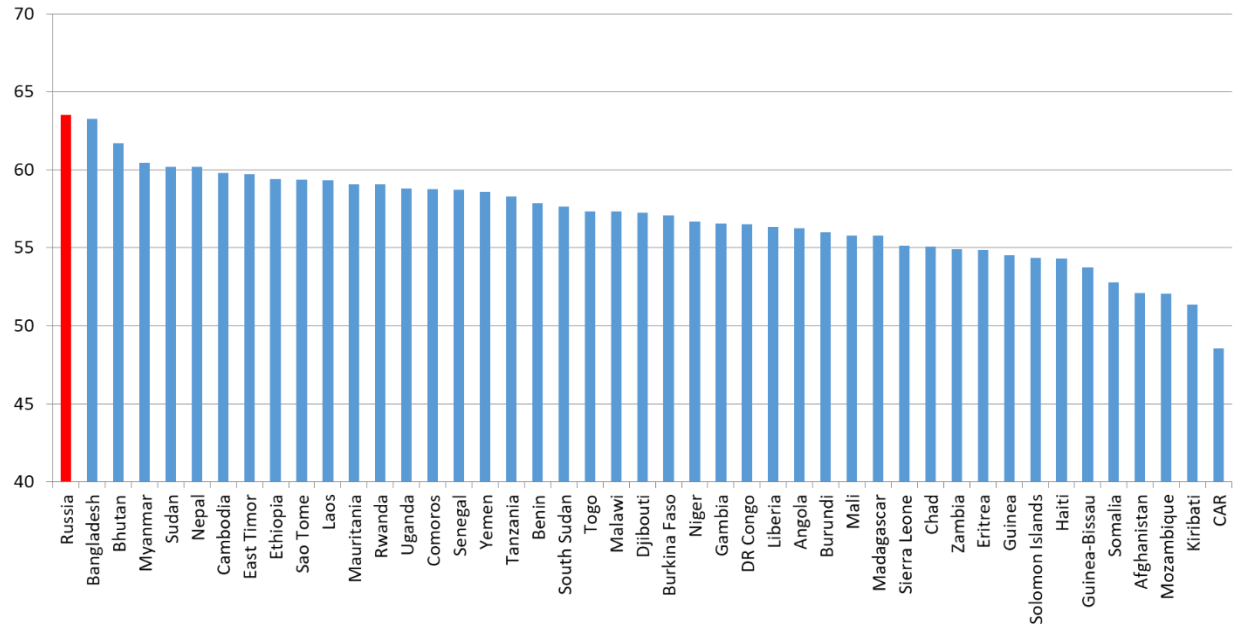
Source: (World Health Organization 2022).

On 2019 survival trajectories, over one in four of both Russia's and Africa's 20-year-old males would have died before their 60th birthday. The corresponding risk of death in WHO's Europe region is only half that high — and those European aggregates, remember, are distorted by dint of including Russia in them. Spain's risk was just a fourth of Russia's, for example. Further: after age 60, survival odds actually appear to be slightly better for African men than for Russian men. When one considers the tremendous socioeconomic advantages that Russians enjoy over Africans vis-à-vis income, education, housing, and other factors, these estimated Russian male mortality patterns are — there is no diplomatic word for it — shocking.

Although survival prospects are distinctly better for women than men in Russia, WHO estimated life expectancy for 15-year-old Russian females in 2019 were comparable with Bangladesh, the healthiest of the UN's LDCs (Figure 6). The overall risk of dying between 15 and 60 years of age for males and females together in these national populations was appreciably higher in 2019 for Russia than Bangladesh: roughly 19% vs. roughly 12%. And combined male and female life expectancy at age 15 in 2019 was estimated to be over three years higher in Bangladesh than in Russia: 62.0 years versus 58.8 years. Contrast these Russian survival schedules with Switzerland's, where the corresponding estimated national risk of dying between 20 and 60 was roughly 4%, and life expectancy at 15 almost 69 [3].

[3] Combined survival schedules for the countries and regions in question for 2019 derived from (World Health Organization 2022a).

Figure 6. Female life expectancy at age 15: Russia vs. all least developed countries, 2019



Sources: (World Health Organization 2024a).

The Russian paradox: high levels of education, low levels of «Human capital»

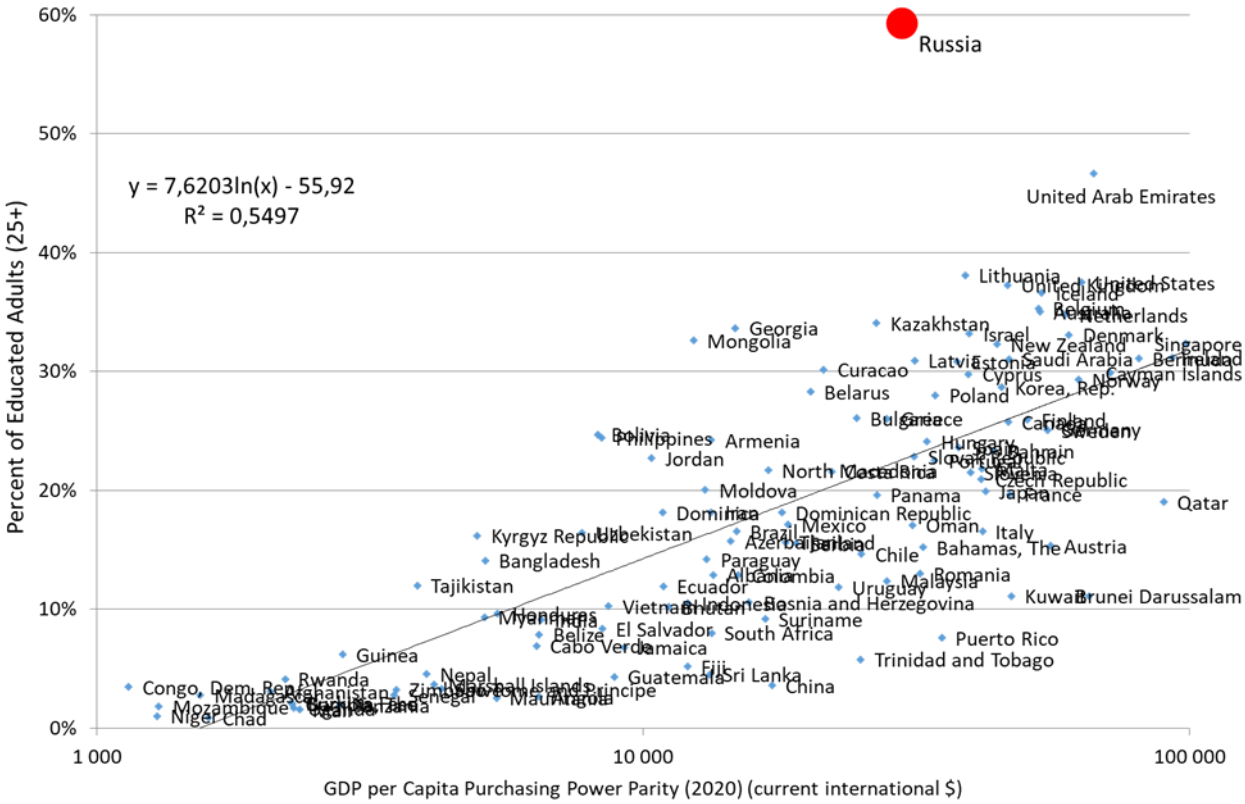
Unlike Bangladesh, Russia is an urbanized and literate society — seemingly, a highly educated society. By UNESCO estimates, the RF population ages 25 and older may have one of the very highest shares of men and women with some post-secondary or tertiary education in the contemporary world (Figure 7).

Of course, Russian higher education may be «diploma happy» — the RF and precursor Soviet educational systems may have granted higher degrees at lower levels of attainment than was customary in many counterpart countries. That apparent systemic bias notwithstanding, overall years of schooling in Russia nevertheless look to be quite comparable to those of Organization for Economic Cooperation and Development (OECD) societies.

We can see as much by comparing mean years of schooling (MYS) in the year 2010 for the population 15 years of age and older in the Russian Federation and the OECD country grouping, thanks to the Barro-Lee Database (Barro, Lee 2013), a project on global educational attainment directed by Professors Robert Barro of Harvard and Jong-Wha Lee of Korea University[4] (Figure 8). According to the Barro-Lee estimates, Russia's MYS for the 15+ population in 2010 averaged 11.5 years. Such a rating would have placed the RF squarely in the middle of the OECD's corresponding rankings. Russia's MYS would have been lower than those of the USA or Switzerland (both over 13) — but it would have been higher than for either France or Belgium (both 10.7) and more or less equivalent to those of Australia (11.5) or Japan (11.6).

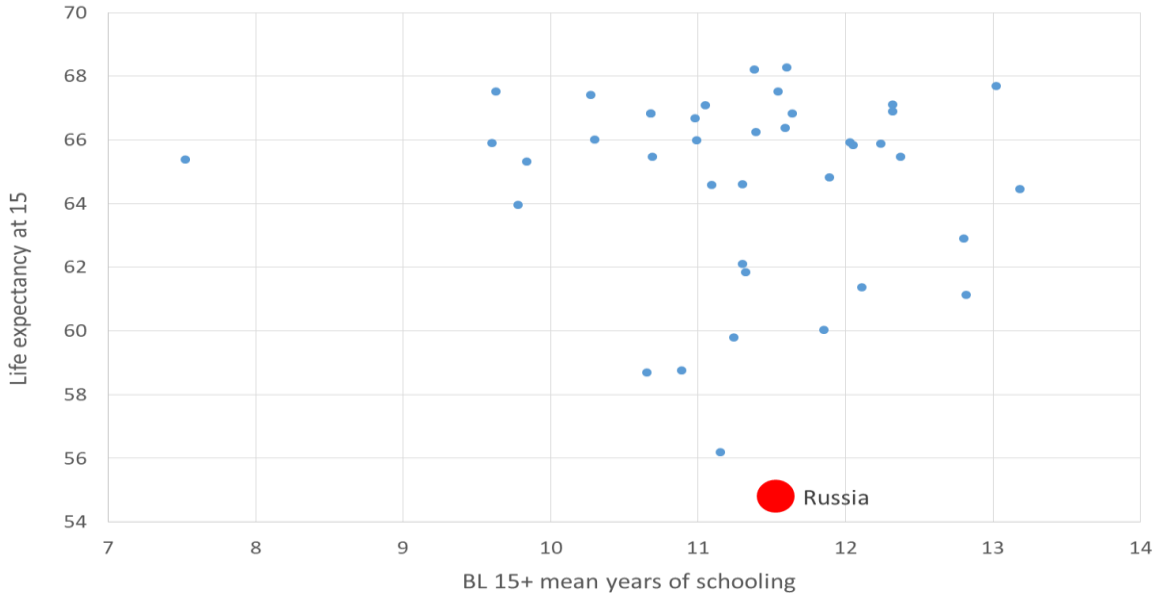
[4] MYS profiles for the 25+ populations are unlikely to have changed greatly over the past decade, given the gradual nature of population-wide changes in educational attainment.

Figure 7. Percent of adult population with bachelor's degree or higher (latest available 2009–2021) versus GDP per capita PPP (2000, current international $): Russia and selected other countries, 2020



Sources: (UNESCO Institute for Statistic 2022), (The World Bank 2022a).

Figure 8. Barro-Lee estimates of MYS at age 15 vs estimated life expectancy at 15, all 41 countries in the HMD Database, 2010



Sources: (Barro, Lee 2013), (University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany) 2022).

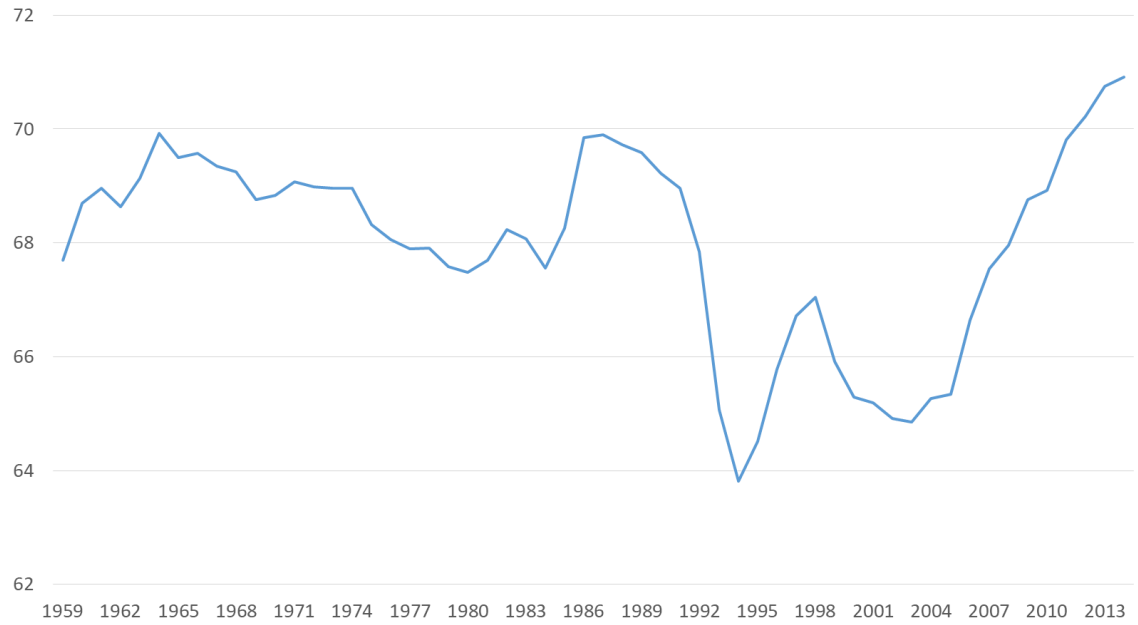
Herein lies a terrible Russian paradox and mystery: in one and the same country, internationally high levels of educational attainment seem to coincide with inexplicably low levels of «human capital». Despite Russia's nearly 12 estimated mean years of schooling for the 15+ population, life expectancy at age 15 is reportedly lower for RF males than for counterparts in Yemen or South Sudan — and lower for RF adults of both sexes than for Bangladesh or Sudan. Yet Barro-Lee estimates place MYS in 2010 for the 15+ population of Bangladesh at less than 6 years — and at just over 3 years for Sudan!

The Mystery of Russia's mortality structure

How does a country with an educational profile of a developed country end up with a least developed county's survival profile? «Attaining» such profiles — and during peacetime — is not that easy: in effect, it requires the development of extraordinary new causes of premature mortality. Alas: this is something Russia has «succeeded» at — for decades.

The Human Mortality Database (HMD) is a project, launched by demographers at the Max Planck Institute for Demographic Research in Germany and the University of California at Berkeley, examining international mortality data for internal inconsistencies, reconstructing long-term mortality trends, and presenting these in fully comparable fashion for over three dozen countries from the OECD, Asia, Latin America, and the NIS area. According to HMD reconstructions, life expectancy at birth for the RF for both sexes together was no higher in 2010 than it had been in 1961 (in the RF's predecessor republic within the USSR), half a century earlier. (Figure 9). Although life expectancy at birth for females was a bit higher in 2010 than it had been in 1961, male life expectancy was actually nearly a year lower in 2010 than it had been in 1961 — half a century earlier. As of 2010, according to HMD estimates, combined male and female life expectancy at birth in Russia had not yet broken the 70-year threshold.

Figure 9. Estimated Russian life expectancy at birth from the HMD, both sexes, 1959-2014

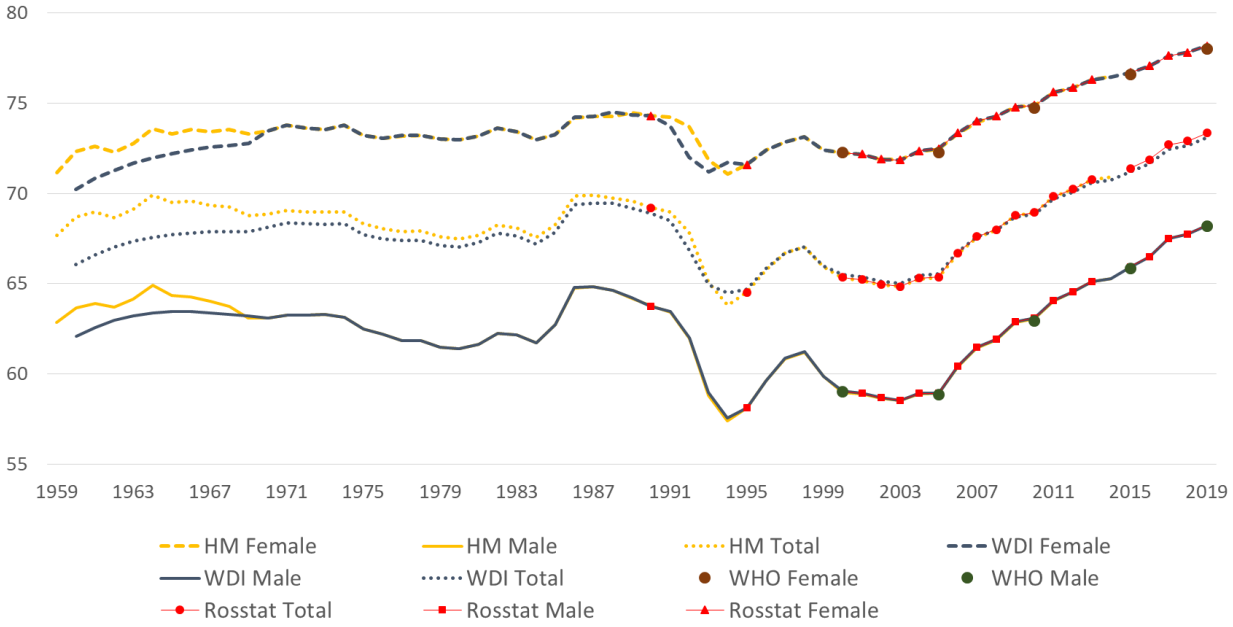


Sources: (University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany) 2022).

The HMD project's most recent update of its Russian Federation trends at this writing (August 2024) come from 2016, offering life table for the country only through 2014. But Rosstat reports on Russian life expectancy at birth are very close to HMD reconstructions for the many decades both series cover — so we can probably take official Russian estimates from 2014 to 2019 as reasonably reliable indicators.

By these numbers, Russia enjoyed steady improvement in life expectancy at birth for its entire population over the near decade and a half between 2005 and 2019, with a jump in overall life expectancy of nearly 8 years overall, and of nearly a decade for men. This may have been the most sustained and significant improvement in Russian life chances since the death of Stalin (Figure 10).

Figure 10. Russian Federation life expectancy at birth, 1959-2019



Sources: (University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany) 2022), (World Health Organization 2022a), (The World Bank 2022b), Rosstat (2022b), http://www.demoscope.ru/weekly/2022/0939/rossia01.php.

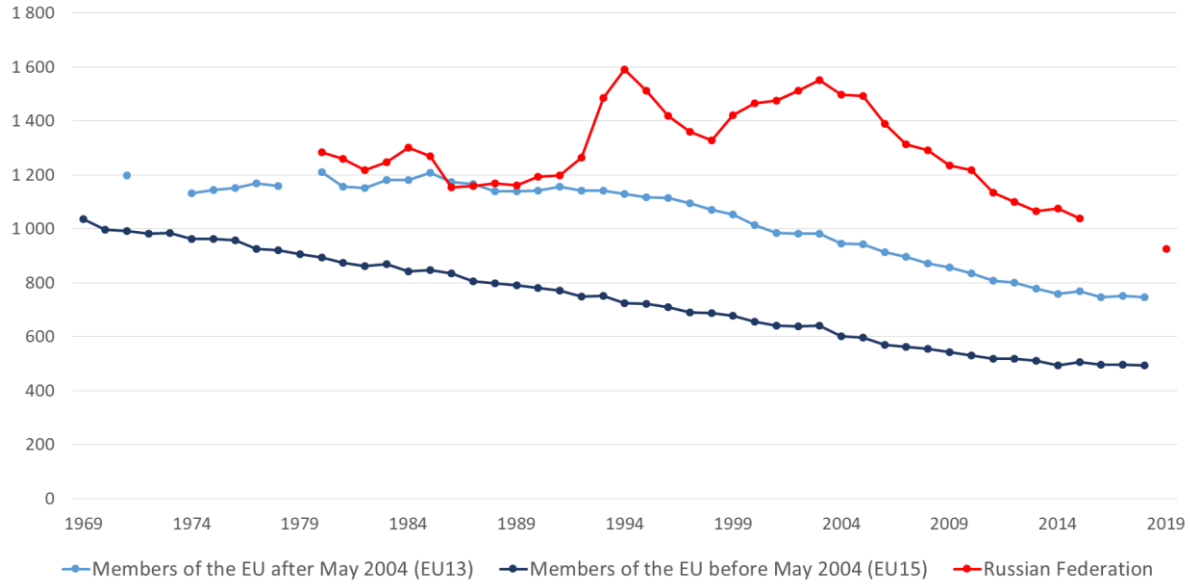
Exhibiting mortality trends more consonant with a «normal country» is a new development in modern Russia, one to be welcomed. But some qualification is nevertheless necessary here.

Since steady health improvements are the norm rather than the exception in the rest of the world, Russia's recent improvements still leave the country well behind peers of comparable income level. Russia's officially reported 2019 overall life expectancy at birth of almost 74 years would have been roughly a year higher than the UN Population Division (UNPD) estimate for *global* life expectancy that same year — a decade and a half of (for Russia) exceptional health progress only brought the country back up barely above the world average. Even at its 2019 peak, life expectancy in Russia was still about two and a half years lower than the average for other countries in the World Bank «Upper Middle Income» grouping (Hammadeh et. al. 2022), and over seven years below the designated «High Income» countries (UN Population Division 2024).

How could a country whose overall life expectancy at birth was (just) above average in global terms, as Russia's was in 2019, also suffer from the woeful survival patterns we have highlighted? The contradiction is explained by Russia's mysterious mortality structure. While death rates for Russian infants and children are close to First World, death rates for Russia's working age population are Fourth World. And generating Fourth World death rates in a literate urban society during peacetime requires very different causes of death from those that impose similarly brutal survival trajectories on the world's least developed populations today.

We can examine this mystery with the aid of age-standardized mortality rates, which adjust a country's death rates against a fixed and unchanging notional population structure, so as to avoid misleading inferences that might be drawn if one society had an unusually youthful population and another had an unusually «grey» population (Figure 11).

Figure 11. WHO-HFA age-standardized death rates for all causes and all ages: Russia vs. «old» and «new» EU members, 1969-2019



Sources: (WHO – Europe 2022).

Figure 11 relies upon the WHO–Europe «Health for All Database» (HFA-DB) (WHO – Europe 2022) for age-standardized mortality estimates, adjusted against a «European» model age structure. We present their estimates for the Russian Federation (and its predecessor republic within the USSR), the «old EU» (the 15 original EU countries comprising all of Western Europe apart from Norway and Switzerland — now 14 countries, given Brexit), and the «new EU» (states that joined in 2004 or later — all of them formerly Soviet-bloc or onetime parts of Communist Yugoslavia, excepting only tiny Malta and Cyprus).

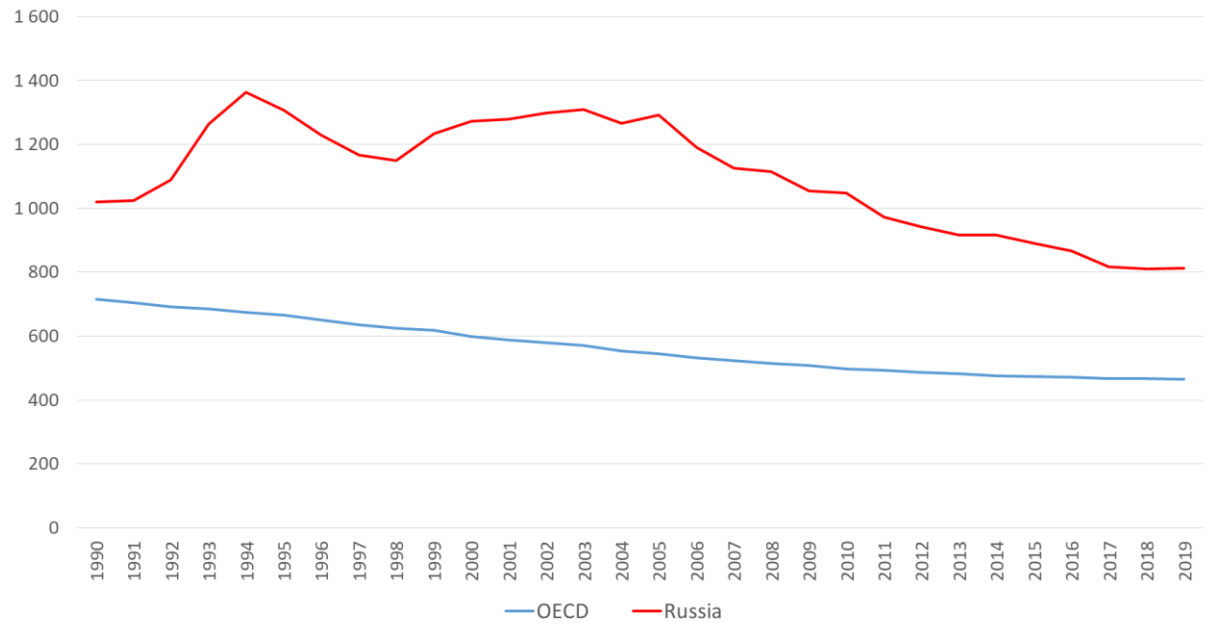
Over the decades under consideration, Western Europe's mortality levels have undergone a smooth and continuing decline. The same is true for the post-Communist societies represented in this «new EU» grouping — at least since the end of Communism. But Russia is a gruesome exception to these European tendencies. Its mortality level — both under Communism and since — has been erratic and unstable, with improvements in one period tending to be erased by mortality upswings in the next.

As is well known, Communist Europe had much poorer public health performance than non-Communist Europe in the final decades of the Cold War Era. In 1990, mortality levels for what are now the «new EU» countries were on average 46% above those of the «old EU»; RF mortality levels were about 53% higher. This means mortality levels in Russia and much of the rest of Communist Europe were fairly similar at the end of the Soviet era. After that, however, the mortality gap between Russia and those former Soviet bloc states widened. Evidently, whatever ails Russian public health cannot be attributed solely to a legacy of Soviet-style Communism.

When Russia's life expectancy headed into a phase of sustained (albeit now interrupted, given the COVID-19 episode) improvement after 2005, age-standardized mortality likewise reached a turning point, dropping sharply thereafter. The standardized mortality differential between Russia on the one hand and both «old» and «new» EU countries on the other narrowed — but only to a degree. By 2015 (the most recent year for which the WHO–HFA dataset has numbers for all three places in question) age-standardized mortality was still 35 percent higher than in the «new» EU countries, and a bit over twice as high as in the «old» EU countries. Those differentials narrowed further, through 2019, before splaying out again.

The relative improvements in overall Russian mortality from 2005 up to 2019 can be seen in Figure 12, which draws on estimates from the University of Washington's Institute of Health Metrics and Evaluation (IHME), and compares age-standardized mortality in Russia to that of the OECD countries since 1990 (Figure 12). Remember that the OECD now includes a number of countries that were once members of the Soviet bloc.

Figure 12. Age standardized death rates, all causes, Russian Federation vs. OECD, 1990-2019



Sources: (Institute for Health Metrics Evaluation 2022).

By these estimates, age-standardized mortality dropped more dramatically between 2005 and 2019 in Russia than the OECD — but because RF mortality trends over the previous decade and a half had been so awful, the death mortality gap separating Russia and the OECD was actually wider in 2019 than it had been in 1990, in the last days of Soviet Communism.

In 1990, Russian age-standardized death rates were around two fifths higher than those of (current) OECD countries. Nearly three decades later in 2019, they were almost three fourths above OECD levels. According to IHME, the EU-Russia mortality differential doubled between 1990 and 2019 — from a 37% surfeit for Russia in 1990 to a 74% surfeit in 2019[5].

In «least developed countries», foreshortened life is typically due to the collision of malnutrition and communicable disease (tuberculosis, malaria, cholera and other «diseases of poverty»). Although Russia's TB and HIV problems are very real, estimates from WHO-Europe and IHME nevertheless suggest that differences in death rates from infectious and parasitic diseases account for only a tiny share — around one fiftieth — of the vast chasm separating all-cause age-standardized mortality levels in Russia and the EU. Instead, Russia's terrible new killers are cardiovascular disease (or CVD — heart attacks, strokes, and the like) and injuries (homicides, suicides, traffic fatalities, deadly accidents).

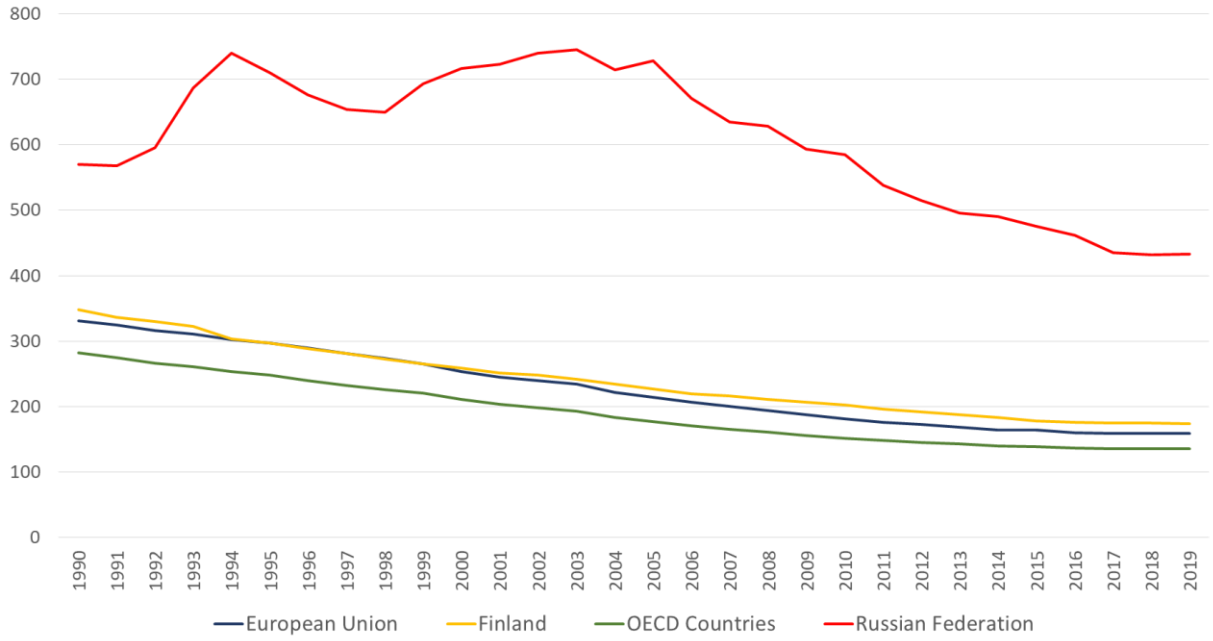
For decades — year-in, year-out —Russia's death rates from CVD were higher than the highest levels ever recorded in any Western country (i.e. Finland, circa 1970). As late as 2008, according to WHO estimates, working-age Russian men had the worst CVD death levels of any country covered by the WHO (The World Bank 2022b, World Health Organization 2022b). Indeed, male CVD mortality levels for the Russian Federation that year were about three and a half times higher than would have been predicted on the basis of the country's income (The World Bank 2022b, World Health Organization 2022b).

Age-standardized Russian CVD mortality fell by two fifths between 2005 and 2019 in the IHME's reckoning. Even so, 2019 CVD mortality was two and a half times higher in Russia than Finland — with similar disparities for both males and females. According to IHME, progress since 2005 notwithstanding, 2019 Russian CVD rates were still 2.7 times EU levels, and 3.2 times overall levels for the OECD — this despite the roughly equivalent levels of educational attainment in Russia, the EU, and the OECD (Figure 13).

As for injuries and poisonings, the WHO estimated death rates in 2008 for working-age Russian men were four times higher than would have been predicted by their income levels — with absolute levels of violent death exceeded only in a handful of places: civil war-riven Iraq and Sri Lanka among them (The World Bank 2022b, World Health Organization 2022b). Violent death, of course, is overwhelmingly a male problem (as opposed to a female problem) more or less everywhere, but in Russia general levels are so shockingly high that for a time the country managed to achieve a dubious gender-equality «crossover». For much of the first decade of the 21st Century, according to IHME, age-standardized death rates from injuries and poisonings were higher for Russian *women* than for EU or OECD *men* (Figure 14).

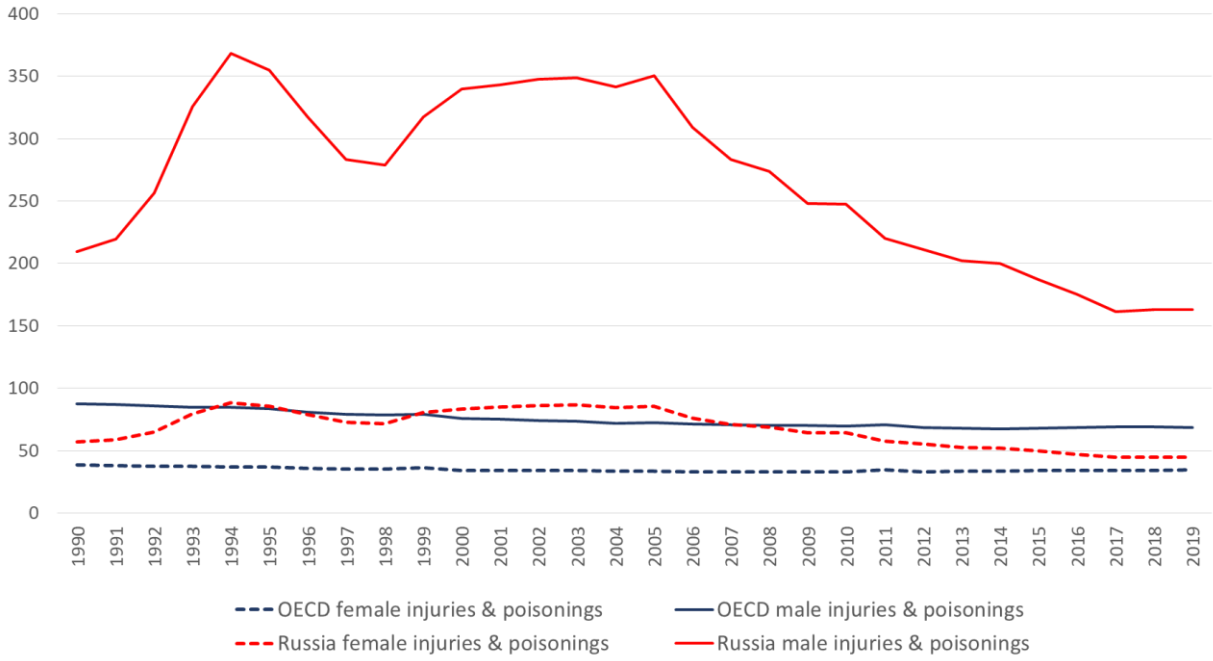
[5] The IHME and WHO-HFA standardization «models» are slightly different, so figures from the two databases are not directly comparable.

Figure 13. Age standardized death rates, cardiovascular disease: Russian Federation vs. OECD, EU, and Finland, 1990-2019



Sources: (Institute for Health Metrics Evaluation 2022).

Figure 14. Age standardized death rates, injuries and poisoning: Russian Federation vs. OECD, 1990-2019

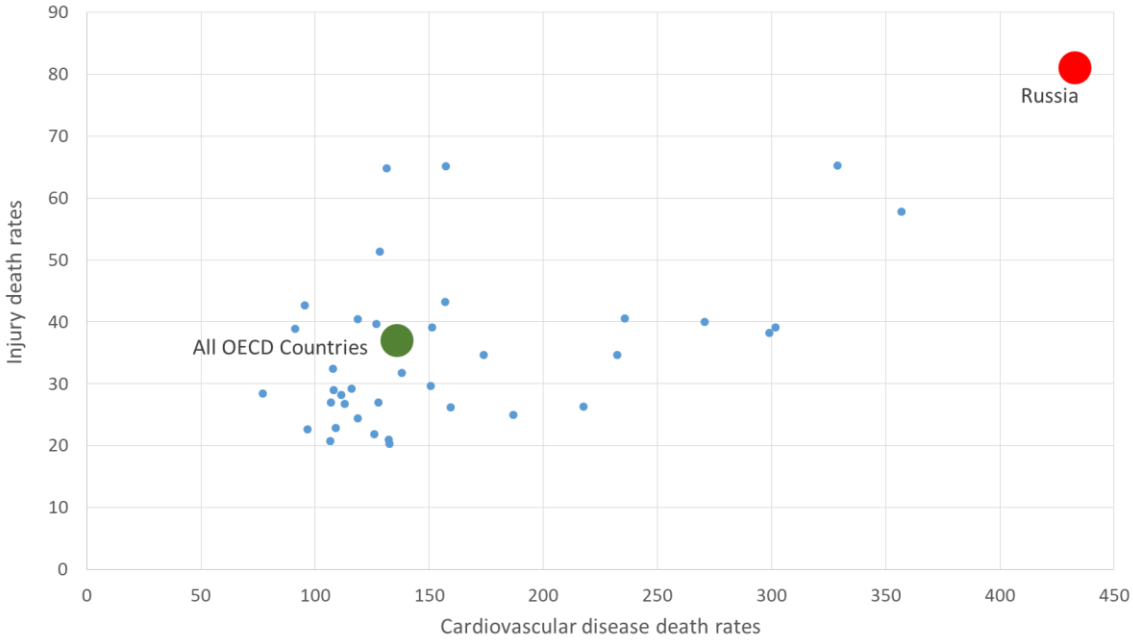


Sources: (Institute for Health Metrics Evaluation 2022).

Between 2005 and 2019, Russia reportedly managed to cut mortality from injury and poisonings by more than half—a highly meaningful achievement. Even so, 2019 Russian injury and poisoning death levels remained over twice as high as in the OECD, and over two and a half times higher than in the EU.

While the mortality gap between Russia and the West (whether by that we mean the EU or the broader OECD grouping) narrowed between 2005 and 2019, it remained imposing in scale —and its basic structure was unchanged. In 2019, as earlier, almost all of Russia's mortality excess was attributable to its much higher level of adult mortality, and its much higher rates of death from non-communicable disease (NCD) — specifically, cardiovascular disease and injuries/poisonings. These two killers accounted for 94% of the overall difference in Russia/EU death rates in 2019, and for 98% of the death gap separating Russia and the OECD. As Figure 15 demonstrates, even in a «peak health» year like 2019, Russia remained an outlier in the structure of its cause-of-death structure (Figure 15).

Figure 15. Age-standardized death rates from cardiovascular disease and from injuries Russia and OECD countries, 2019



Sources: (Institute for Health Metrics Evaluation 2022).

We have merely identified the mystery of Russia's mortality structure for the reader here; explaining that mystery stands as a major task in its own right, one far beyond the scope of this paper.[6] Russia's notorious romance with vodka and its distinctive patterns of binge drinking (such as the notorious *zapoi*) may play a role — so too those syndromes that researchers are now designating as «psychosocial stress» in Russian lifestyles. Other factors and dynamics doubtless play a part as well. Far too much still remains unknown about Russia's awful adult mortality patterns, much less how to heal these afflictions and help Russia finally develop the health profile of a «normal country».

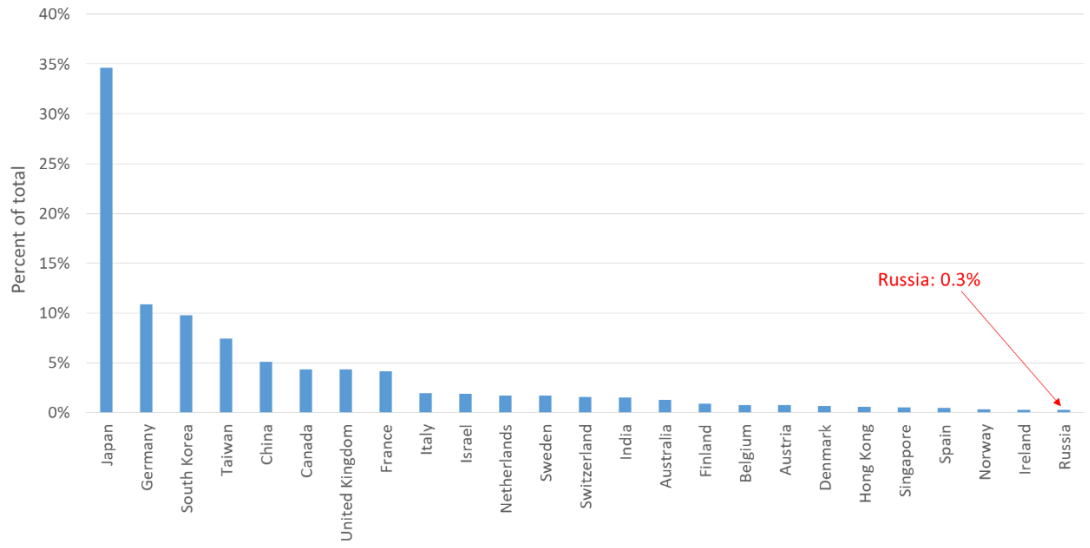
[6] For an initial foray, see «The Mystery of Russian Mortality» Chapter 4 in Eberstadt (2010).

Russia's «knowledge production» and «knowledge economy» problems

Russia's «high education, low human capital» paradox does not end with health: it shows up acutely in the country's «knowledge production» and «knowledge economy» deficits, too. Nowadays long-term economic progress depends critically on improving productivity through knowledge — but this is something Russia appears oddly ill-equipped to do.

America's Patent Office (now known as the U.S. Patent and Trade Office or PTO) was established in the 1830s, but nearly half of its total patent awards and well over half of its awards to foreign inventers have been granted just since the year 2000. Of the 2.5 million such overseas patents awarded between 2000 and 2020, applicants from Russia took home fewer than 6,600 — a mere 0.3% of the overseas total, and in fact a smaller fraction of total international patents than Washington had earlier awarded to the former USSR during the Soviet era. In the 2002 – 2020 period, Russia — the country with the world's ninth largest population — ranked 25th in the PTO's award tally: behind places like tiny Norway and Finland, and only just ahead of New Zealand. (Figure 16).

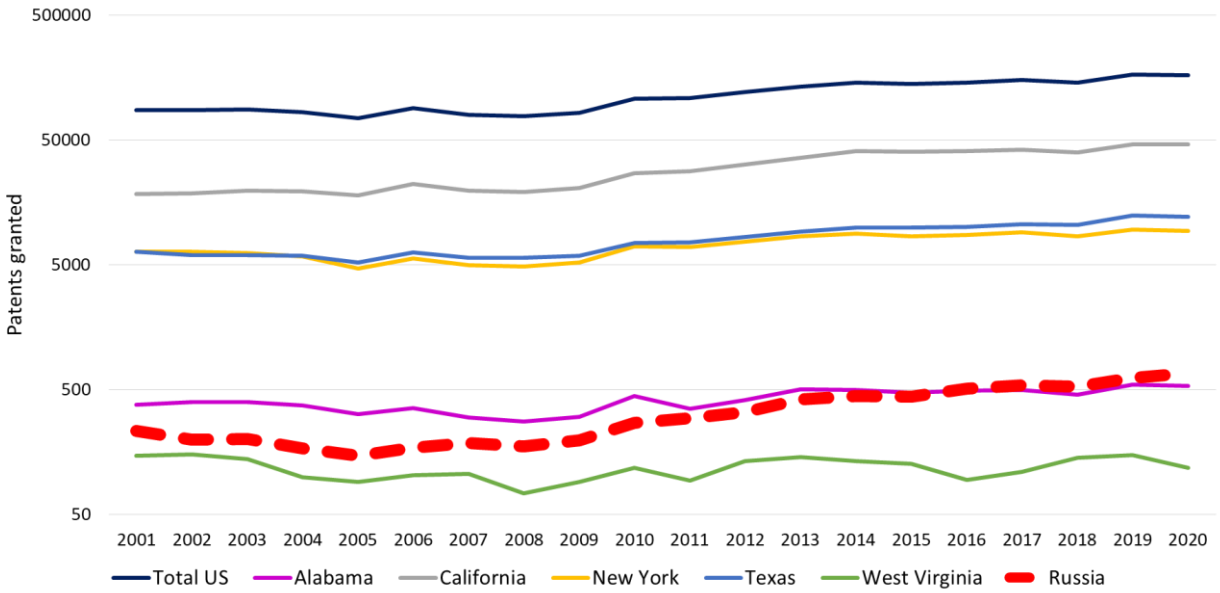
Figure 16. International patent awards by USPTO 2000-2020 percentages by country, %



Sources: USPTO (2020).

To situate Russia's performance within the context of America's fifty states, the Russian Federation's total annual PTO awards, though gradually increasing, are currently only on par with the state of Alabama (Figure 17). But Alabama's population is just 5 million — while Russia's is over 140 million, very nearly 30 times larger. Although it boasts of some fine research facilities, Alabama is not one of America's «knowledge production» hubs. The contrast between Russia and California, for example, is telling. Russia's population is over three and a half times larger, but in 2020 California produced over 80 times more patents — meaning that on a per capita basis Californians generated 300 times more U.S. patents than Russians.

Figure 17. Annual USPTO patents awarded 2001-2020: select US states and Russia, patents granted



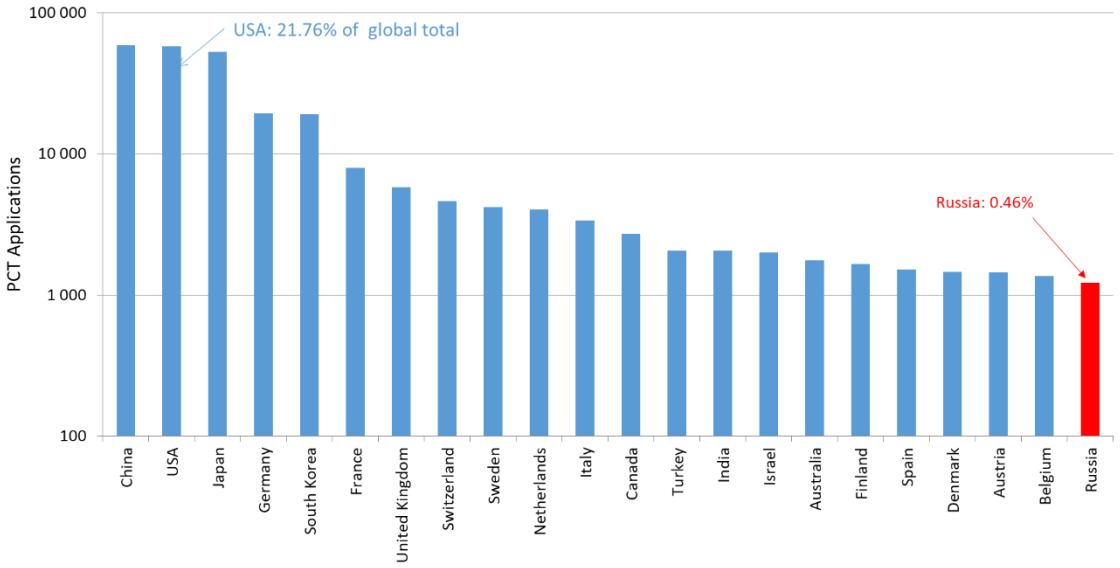
Sources: USPTO (2020), USPTO (2015).

Perhaps some harbor suspicions that the U.S. patent regime is biased against Russia (although that would also beg the question of how the old Soviet system managed to fare better than the new Russian Federation in US PTO grants). So another take on the Russian knowledge creation problem can be drawn from the international Patent Cooperation Treaty (PCT), the global system for tracking these out-of-country applications. Once again, Russia's performance is extremely poor. In 2019, according to the UN World Intellectual Property Organization, Russia came in number 22 — after Austria and Belgium — racking up less than 0.5% of the world's total. (Figure 18).

And Russia's record here is worse than this comparison implies. Russia has over 12 times Belgium's population and 16 times Austria's, but the share of adults with university/tertiary education is even higher, as we saw in Figure 7. This means Russia's «yield» of international patent applications per university educated working age adult would be all the lower.

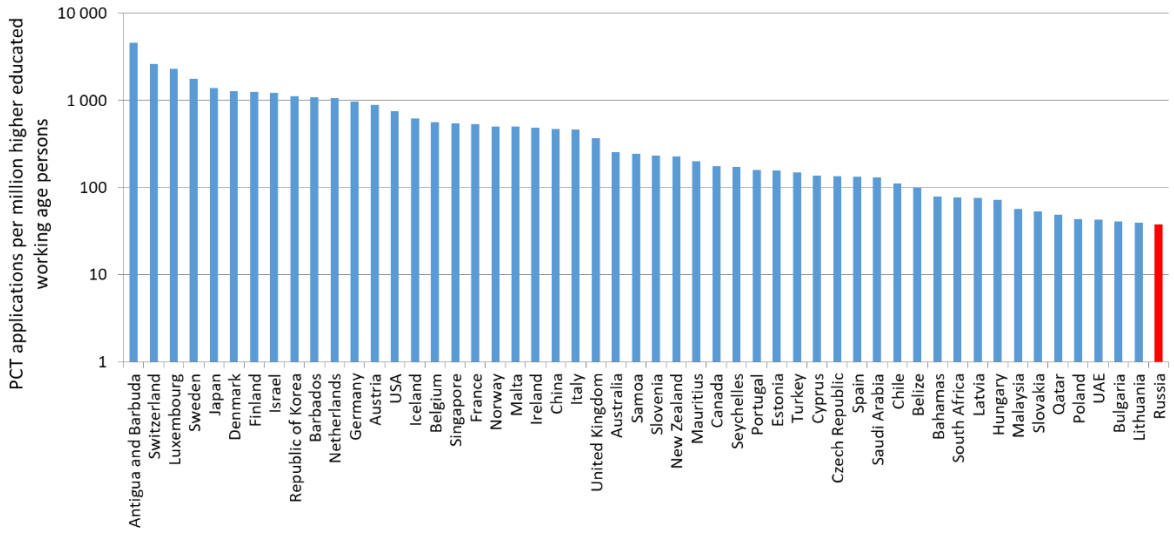
We can get a better sense of the magnitude of Russia's global underperformance in international patent applications with the help of educational attainment estimates from the Wittgenstein Centre for Demography and Human Capital in Austria (Wittgenstein Centre for Demography and Global Human Capital 2024), a dataset akin the aforementioned Barro-Lee database. Using 2020 as the benchmark year for national totals of working age people with university or tertiary education, Belgium's 2020 «yield» of international patent applications would have been 15 times higher than Russia's; Austria's 23 times higher (Figure 19). By this reckoning, over 50 countries in 2020 — not just Western countries, and China, but also places like Saudi Arabia and South Africa — registered higher patent application yields per million working-age persons with higher education than Russia.

Figure 18. International patent applications under patent cooperation treaty (PCT) by country of origin, 2019, PCT applications



Sources: (The World Intellectual Property Organization 2022a).

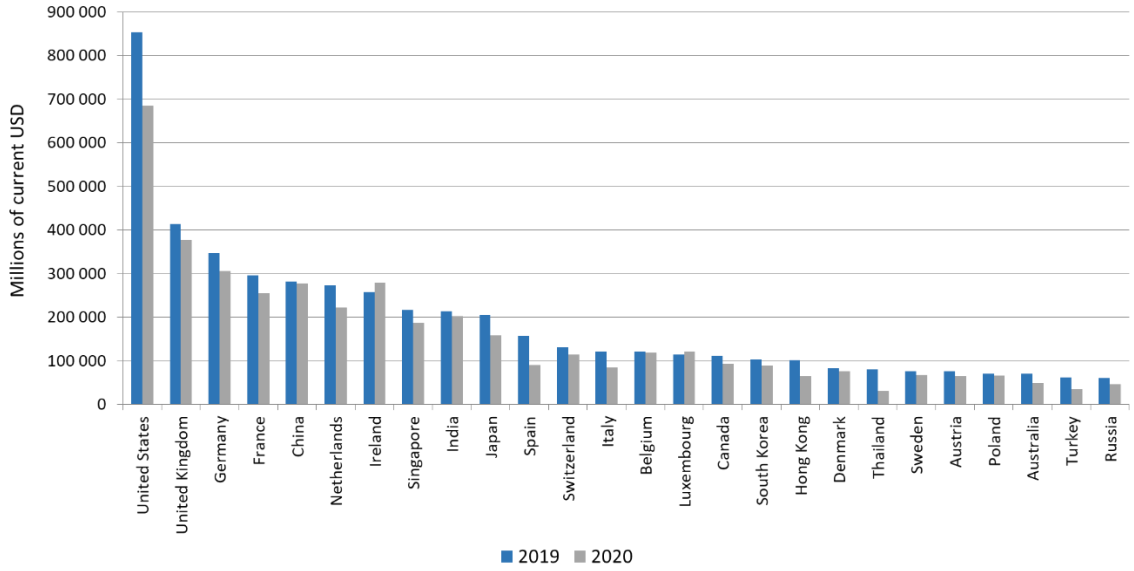
Figure 19. PCT applications (2020) per 1 million post-secondary education of working age 15-64 (2020)



Sources: (The World Intellectual Property Organization 2022b), (Wittgenstein Centre for Demography and Global Human Capital (2024).

Structurally, Russia performs like a knowledge-poor economy. As of the year 2019, the Russian Federation accounted for about 2% of the world's population. By the estimations of the World Bank, Russia's PPP-adjusted share of global economic output that same year was half again as large (3.1%) (The World Bank 2022b). Yet in 2019, according to the World Trade Organization, Russia generated only 1% of total global service-sector exports (Figure 20).

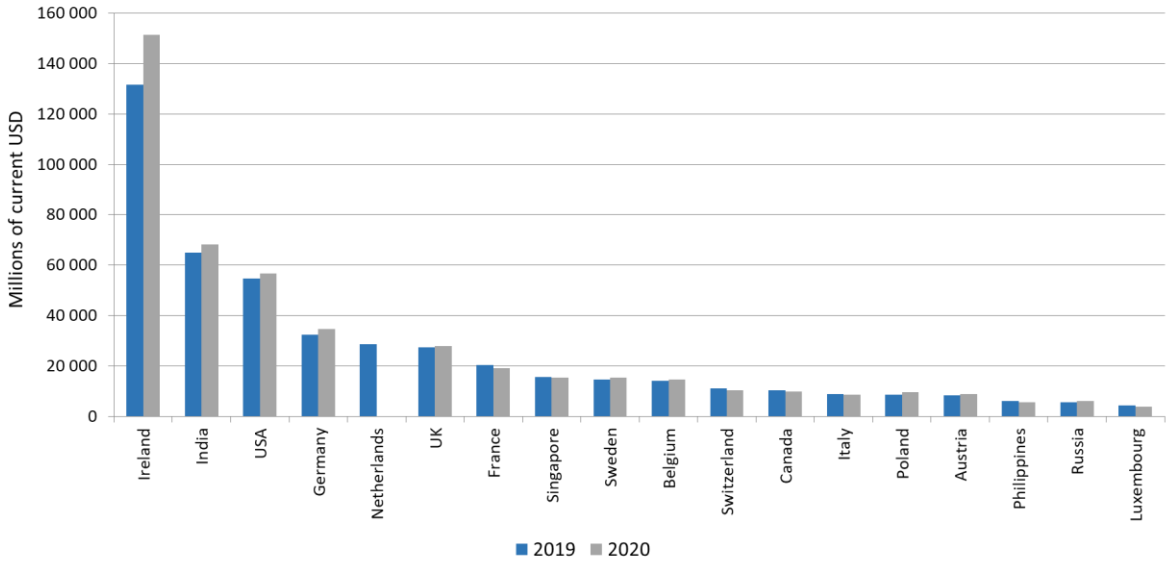
Figure 20. Top global commercial service exporters, 2019 – 2020, (current $US millions)



Sources: (World Trade Organization 2022a).

Note that international service exports are a trade in human skills — unlike merchandise trade, which is a commerce in commodities or natural resources and thus less generally «skills-intensive». Curiously, given Russia's well-known expertise in this particular realm, RF even fares poorly in information technology service exports, where its 2020 share of the global market was only slightly ahead of the Philippines (Figure 21).

Figure 21. Top global computer and information service exporters, 2019 - 2020, (current $US billions)



Sources: (World Trade Organization 2022b).

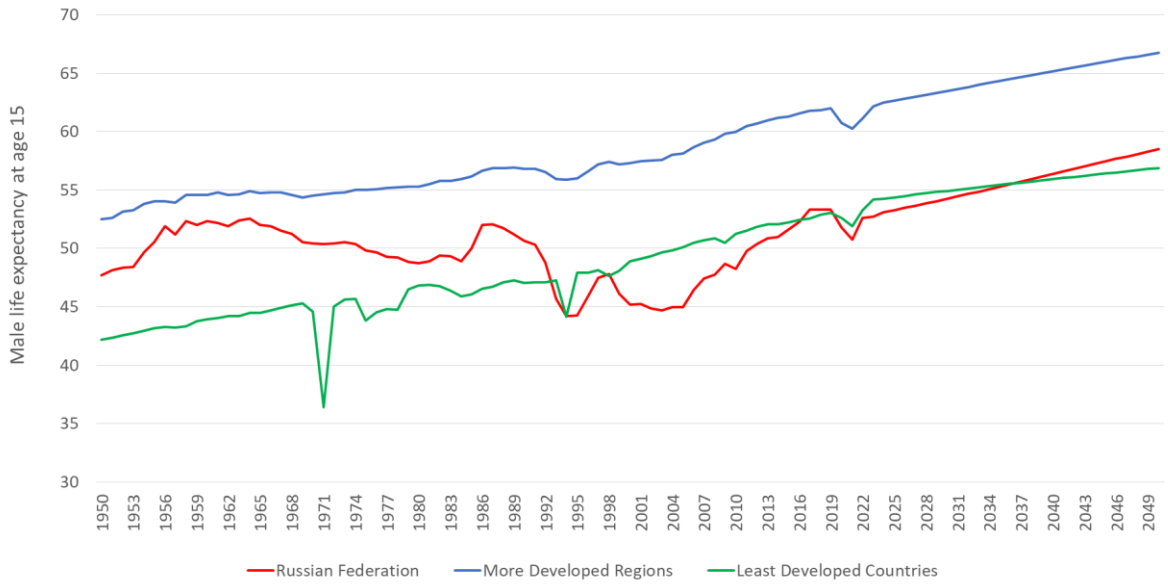
Outlook and implications

There is reason to expect this «Russian paradox» to continue into the future — abating only gradually over the decades immediately ahead.

Projections by both the Barro-Lee Educational Attainment Database and the Wittgenstein Centre for Demography and Human Capital anticipate continuing increases in educational attainment in Russia over the next several decades (Barro, Lee 2013; Wittgenstein Centre for Demography and Global Human Capital 2024). Even so, the 2024 revisions of the UNPD's World Population Prospects suggest that Russia will continue to struggle to achieve improvements in adult mortality.

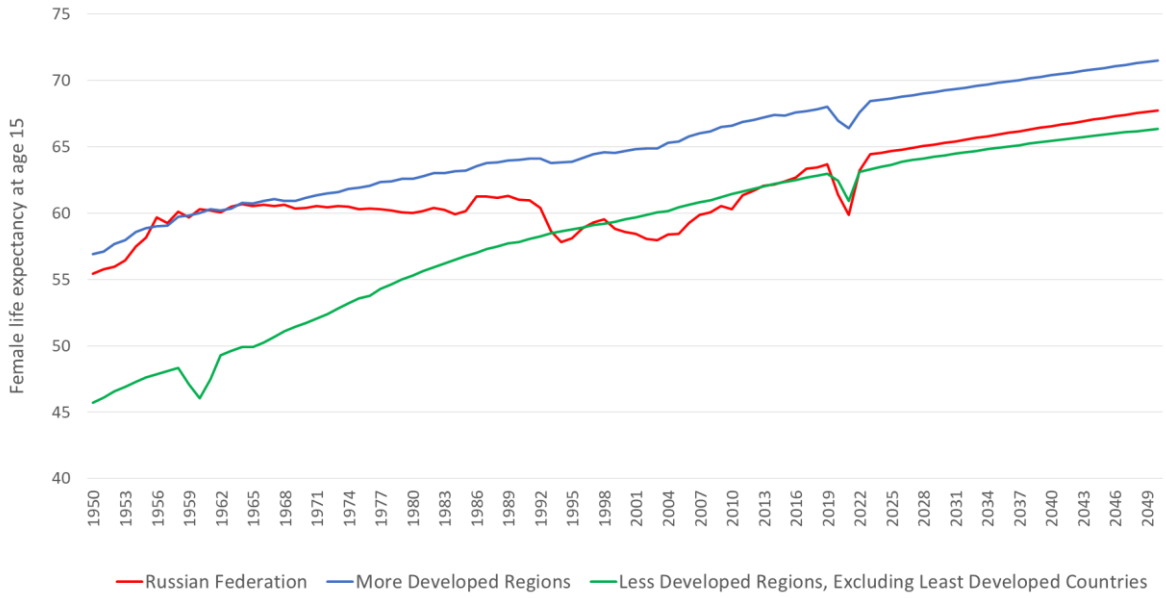
Figures 22 and 23 underscore this unforgiving outlook. The UNPD currently projects that Russian male life expectancy at age 15 will closely track levels for the least developed country grouping through the year 2050. Prospects for Russia's 15+ females is projected to be somewhat more favorable — but even here Russia's projected trend is scarcely different from that of the developing country grouping. Adult mortality for Russian men and women alike is seen as remaining far below levels for developed countries (including developed counterparts in Europe) (Figures 22 and 23).

Figure 22. Male life expectancy at age 15 1950-2050: estimated and projected, Russia and select other country groupings



Sources: (UN Population Division 2024).

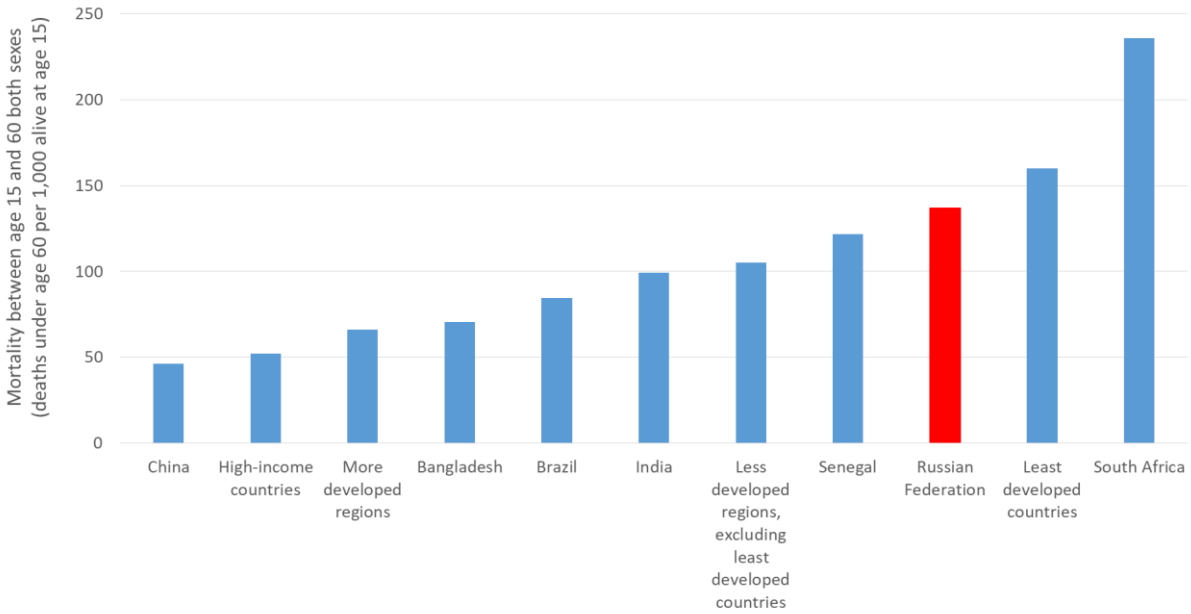
Figure 23. Female life expectancy at age 15 1950-2050: estimated and projected, Russia and select other country groupings



Sources: (UN Population Division 2024).

In the UNPD's projections, in fact, the mortality outlook for Russia's working age population remains relatively unfavorable through at least the year 2050. The 2024 revisions of UNPD's World Population Prospects illustrate the problem with their projections for the risk of mortality between ages 15 and 60 (a serviceable if imperfect proxy for working age manpower) (Figure 24).

Figure 24. Projected probability of dying between ages 15 and 60 (both sexes) in 2050: Russia and selected countries and regions, deaths under age 60 per 1,000 alive at age 15

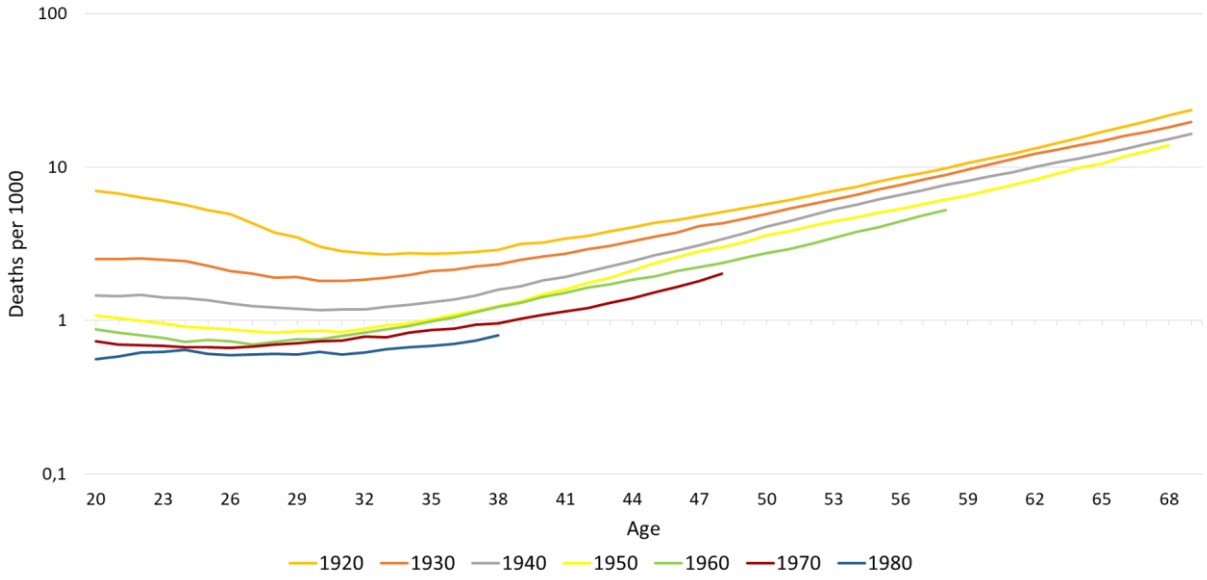


Sources: (UN Population Division 2024).

By the UNPD projections, the 2050 mortality level for Russia's 15-60 population would be over two and a half times that of the high-income countries — and substantially higher as well than the developing regions (omitting the least developed countries). In 2050 Russia's working age mortality levels would be far higher than China's and Brazil's — but perhaps surprisingly, also much higher than India's: half again as high as India's in fact. And although 2050 RF working age mortality would be lower than for the least developed countries *in toto*, some from the current roster of least developed countries — Bangladesh and Senegal among them — are nonetheless projected to have lower working age mortality than Russia.

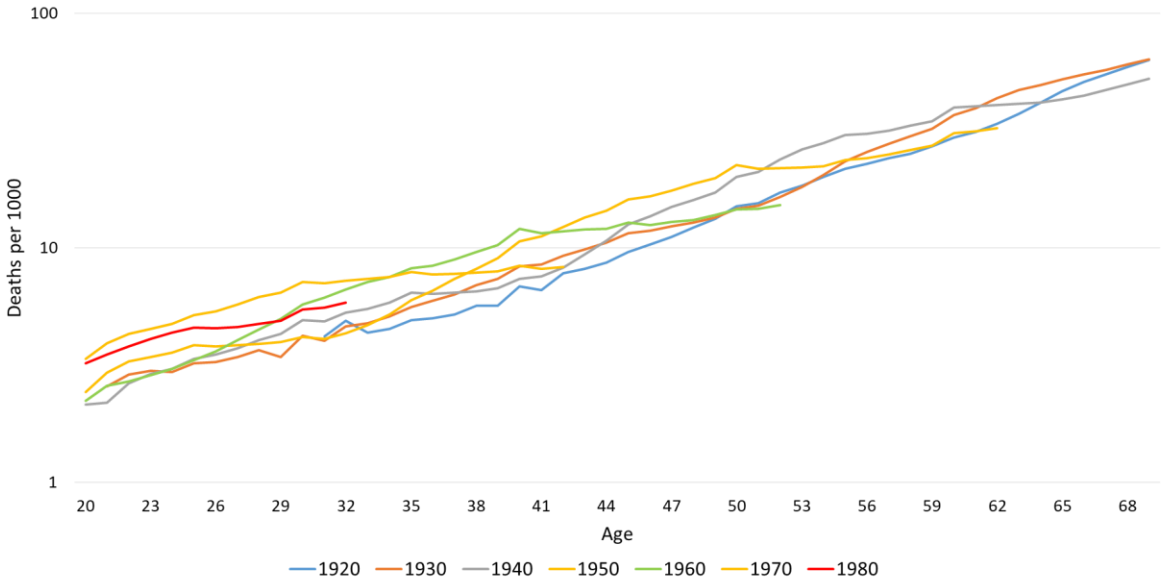
Could survival schedules in Russia improve substantially more rapidly that the UNPD currently projects? Perhaps. But prospects for long-term improvements in mortality may be somewhat more constrained than some might first assume. The reason is that mortality trends are «cohort-dependent», following the life course of the men and women in question. Russia's current cohorts have a significant measure of «negative health momentum» in their population structure, as may be seen by comparison with counterparts in Japan (Figures 25 and 26). This matter of «negative momentum» is one reason the UNPD's projections for Russia's life expectancy are so cautious for the decades immediately ahead.

Figure 25. 25 Male mortality ages 20-69: Japan, selected birth cohorts 1920–1980, deaths per 1000



Sources: (University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany) 2022).

Figure 26. Male mortality ages 20-69: Russia, selected birth cohorts 1920–1980, deaths per 1000



Sources: (University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany) 2022).

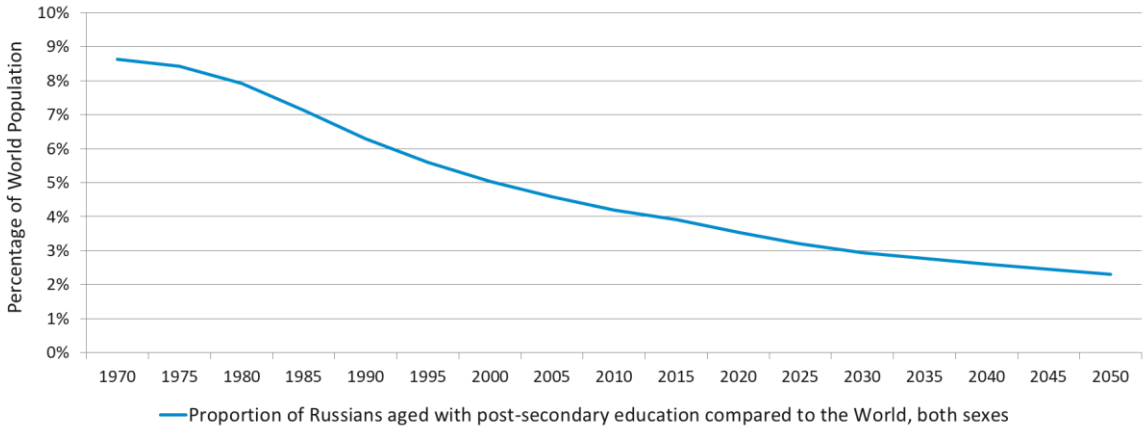
Note: 1980 cohort is from 1980-1984, while the other cohorts include 10 years.

Severe and enduring adult mortality troubles stand to reduce Russian worker productivity not only directly, but perhaps also indirectly — by adversely influencing the returns on investments in education and other aspects of human capital that only pay off over the longer run, and consequently also influencing decision making about committing to such long-run investments.

There are both economic and possibly geopolitical implications to the loss of national economic potential here. Note furthermore that Russia's relative economic potential is being squeezed by the rapid worldwide growth of skilled manpower pools, the «Russian paradox» entirely notwithstanding. Russia's global share of working age manpower with secondary education, and with post-secondary education, is on track to decline rapidly over the coming decades (Figure 27).

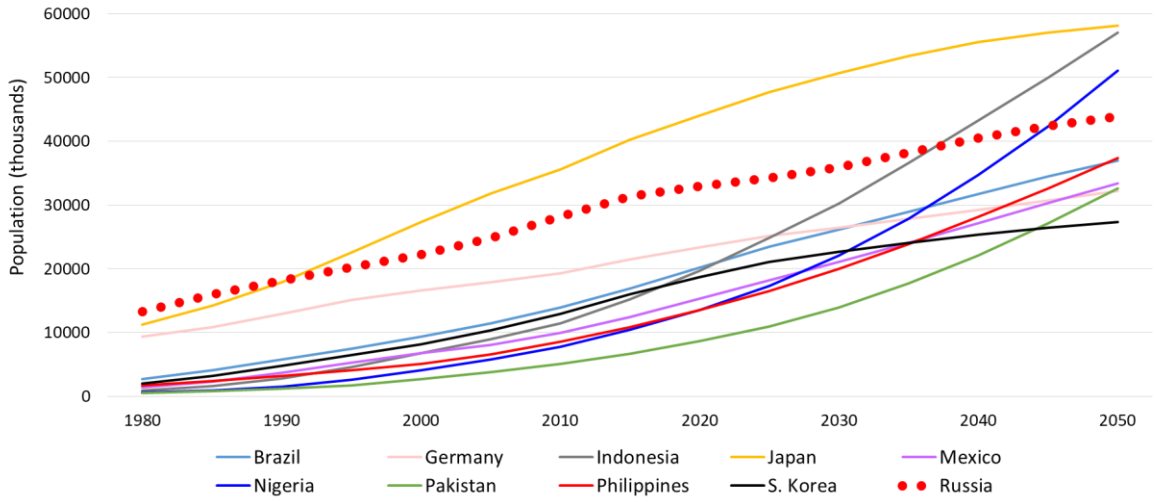
Wittgenstein Center projections envision Russia as accounting for barely a fortieth of the world's highly educated working age manpower by 2050—not only trailing distantly behind the U.S., China and India, but also lagging behind countries such as Japan, Indonesia, and Nigeria by 2050 (Figure 28).

Figure 27. Proportion of population (both sexes) with post-secondary education: Russia as percentage of world total, 1990-2050, %



Sources: (Wittgenstein Centre for Demography and Global Human Capital 2024).

Figure 28. Post-secondary education in elect «Middle sized» countries, thousands



Sources: (Wittgenstein Centre for Demography and Global Human Capital 2024).

Unless the «Russian paradox» is resolved, such changes could conduce to further relative diminution of Russia's international standing in «knowledge production».

Concluding observations and questions

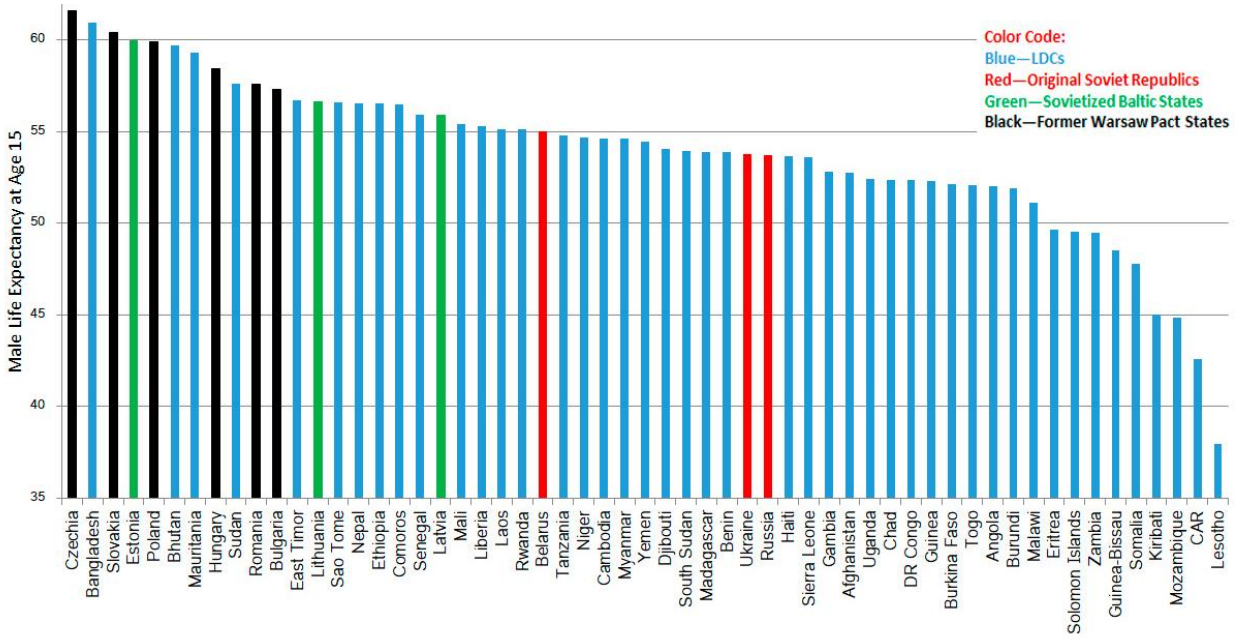
While education is widely observed to confer health benefits in the modern world, Russia seems in important respects to be a troubling exception to this global rule. Further, despite an adult education profile (in terms of mean years of schooling) comparable to those of affluent European OECD states, Russia seems strangely incapable of competing in «knowledge production». Russia's share of the global trade in services — that highly human-skills-intensive sector of the world economy — is drastically smaller than one would expect for a population with such an ostensibly high level of schooling.

We may conclude by observing that although Russia's poor performance in human capital metrics despite relatively high levels of educational attainment is highly distinctive, it is not unique. To the contrary: numerous other countries historically subject to the experience of Soviet

rule also seem to lag today in adult life expectancy, knowledge production, and service sector exports.

As we see in Figure 29, «least developed country»-style life expectancy at age 15 was characteristic in 2019 not only of the Russian Federation, but of Ukraine and Belarus from the European portions of the original Soviet state; of the Baltic countries, which succumbed to Sovietization in 1939-1940; and of a number of European countries that were incorporated into the Warsaw Pact zone after World War II (Figure 29).

Figure 29. Male life expectancy at age 15: former Soviet zone countries versus least developed countries, 2019



Sources: (World Health Organization 2022a).

It is intriguing that these states should all commonly underperform with respect to adult male life expectancy, despite commonly high levels of adult educational attainment.

Is this a consequence of their shared Soviet legacy? Of other shared geographic, cultural, or historical similarities? Of other as yet unidentified factors: be these behavioral, environmental, or psychosocial?

The answers to these and many other questions pertaining to the «Russian paradox», are waiting to be discovered — mainly because they have not yet been asked. We hope this oversight will be redressed in due course. As we hope we have demonstrated this is a topic worthy of considerable further investigation.

References

Barro R.J., Lee J.W. (2013). A new data set of educational attainment in the world, 1950-2010. *Journal of Development Economics*, 104, 184-198. https://www.nber.org/papers/w15902

Eberstadt N. (2010). *Russia's Peacetime Demographic Crisis: Dimensions, Causes, Implications.* Seattle, WA: National Bureau of Asian Research https://www.nbr.org/publication/russias-peacetime-demographic-crisis-dimensions-causes-implications/

Eurostat (2024a). *Population change – Demographic balance and crude rates at national level*. https://doi.org/10.2908/demo_gind

Eurostat (2024b). *Total fertility rate (tps00199)*. https://doi.org/10.2908/TPS00199

Eurostat (2024c). *Live births by mother's age and legal marital status*. https://doi.org/10.2908/DEMO_FAGEC

Hammadeh N., Rompaey C., Metreau E., Eapen Sh. (2022). *New World Bank country classifications by income level: 2022-2023*. World Bank Blogs https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2022-2023

Institute for Health Metrics Evaluation (2022). https://ghdx.healthdata.org/gbd-results-tool

IHME–CHAIN Collaborators (2024). Effects of education on adult mortality: A global systematic review and meta-analysis. *The Lancet*, 9(3), E155-E165, March https://doi.org/10.1016/S2468-2667(23)00306-7

Lesthaeghe R. (2020). The second demographic transition, 1986-2020: sub-replacement fertility and rising cohabitation – a global update. *Genus*, 76 (10). https://doi.org/10.1186/s41118-020-00077-4

Rosstat (2022b). Life Expectancy at birth in the Russian Federation, 1990-2020. https://rosstat.gov.ru/folder/12781

Rosstat (2020-2021a). General Results of the Natural Movement of the Population of the Russian Federation. https://rosstat.gov.ru/storage/mediabank/2021_edn12.htm

Rosstat (2020b). *Births, deaths and natural population growth.* https://rosstat.gov.ru/storage/mediabank/progn5.xls

Rosstat (2020c). Population Change by forecast options. https://rosstat.gov.ru/storage/mediabank/progn1.xls

Rosstat (2019-2021a). *De jure population of Russia as of January 1.* https://eng.rosstat.gov.ru/

Rosstat (2019b). Vital Movement of the Population Conditions of the Russian Federation – 2020 (archive) [edn12_2020k.xlsx, tab 1] https://rosstat.gov.ru/storage/mediabank/wxWlqMlx/edn2020.rar

Rosstat (2019c). *The Demographic Yearbook of Russia*. General Population Replacement Indices. http://www.gks.ru/bgd/regl/B19_16/Main.htm

Rosstat (2019d). *The Demographic Yearbook of Russia*. Table 2.8. Net Reproduction Rate. https://www.gks.ru/bgd/regl/B19_16/Main.htm

Rosstat (2017). *Demographic Yearbook of Russia*. Table 4.5. Live births by mothers marital status. http://www.gks.ru/bgd/regl/B17_16/Main.htm

Rosstat (2006). *The Demographic Yearbook of Russia*. Table 2.8. Net Reproduction Rate. http://www.gks.ru/bgd/regl/B06_16/Main.htm

Rosstat (2019). *The Demographic Yearbook of Russia 2019*. http://www.gks.ru/bgd/regl/B17_19/Main.htm

United Nations DESA (2024). *The Least Developed Country Category: 2024 Country Snapshots*. United Nations Department of Economic and Social Affairs. https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/2024-Snapshots.pdf

UNESCO Institute for Statistic (2022). *Educational Attainment Rate*, completed Bachelor's or equivalent education or higher, population 25+ years, both sexes (%). https://sdg4-data.uis.unesco.org/

UN Population Division (2024). *World Population Prospects 2024*, Online Edition, Medium Variant. https://population.un.org/wpp/Download/Standard/Population/

United States Census Bureau (2022). *International Database*. *Components of Population Growth 1992-2012.* https://www.census.gov/data-tools/demo/idb/

University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany) (2022). *Human Mortality Database*. www.mortality.org

USPTO (2020). *Calendar Year Patent Statistics, 2016-2020*. https://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports_stco.htm

USPTO (2015). *Patents by Country, State, and Year – Utility Patents, 2002-2015*. https://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.html

Van De Kaa C.F. (1987). Europe's Second Demographic Transition. *Population Bulletin*, 42(1), 1-59.

The World Intellectual Property Organization (2022a). *WIPO Statistics Database, International Applications by Origin*. https://www.wipo.int/export/sites/www/pressroom/en/documents/pr_2020_848_annexes

The World Intellectual Property Organization (2022b). *WIPO Statistics Database. 1 – PCT Applications by filing date, (Total PCT Applications selected for shown countries)*. http://www.wipo.int/ipstats/en/statistics/pct/

Wittgenstein Centre for Demography and Global Human Capital (2024).*Wittgenstein Centre Data Explorer Version 2.0.* http://www.wittgensteincentre.org/dataexplorer

The World Bank (2022a). *World Development Indicators, GDP per Capita, PPP (Current International $)*. http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

The World Bank (2022b). *World Development Indicators*. https://databank.worldbank.org/reports.aspx?source=world-development-indicators

The World Bank. (2022c). *Fertility rate, total (births per woman)*. https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=RU

World Health Organization (2022a). *Global Health Observatory Data Repository, Life Expectancy, Life tables by country.* https://apps.who.int/gho/data/node.main.LIFECOUNTRY

World Health Organization (2022b). *Global Health Observatory Data Repository, Disease and injury country estimates, 2008: By sex and age, Data by country,* http://apps.who.int/gho/data/node.main.1006?lang=en.

WHO – Europe (2022). European Health for All database (HFA-DB). https://gateway.euro.who.int/en/datasets/european-health-for-all-database/

World Trade Organization (2022a). *Time Series of International Trade*, Trade in commercial export services, Commercial services exports by main sector – BOP6 SOX. http://stats.wto.org/StatisticalProgram/WSDBViewData.aspx?Language=E

World Trade Organization (2022b). *Time Series of International Trade*, Trade in Telecommunications, computer, and information services – BOP6 – SI. http://stats.wto.org/StatisticalProgram/WSDBViewData.aspx?Language=E