Migration, Stagnation, or Procreation: Quantifying the Demographic Trilemma

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Demography and a Flourishing Society

In order for a society to flourish, many elements are required, but the one often overlooked and arguably most fundamental concerns demography. A numeric predominance of the young over the old is required for an innovative and buoyant economy, a creative and energetic culture, and for families to be able to look after themselves and not lean excessively on the support of the state. Of course, our elderly should be honoured and cared for, but when they come to predominate numerically, we find that the economy stagnates, creativity wanes, and ever more demands are made on the public purse. These are new and emerging problems because for effectively all of human history, people have had a sufficiently large number of children to replace themselves. Only since the 1970s in much of the developed world have family sizes shrunk, and it has taken until now for the consequences to be felt. Low total fertility rates (the average number of children born to each woman) can be seen across vast swathes of the earth and each year the problem intensifies.[1] Today, we have countries with fertility rates at barely one-third of what is required for a community to replace itself, which is a rate of 2.1 (one child to replace each parent, and 0.1 in case a child does not survive into adulthood and through childbearing years). Fertility rates have fallen below the replacement level in countries from Japan to Jamaica.

There is only one way to prevent plunging fertility rates from translating into shrinking workforces, ageing populations, and eventually overall declining population numbers, and that is to substitute childbearing with immigration. If we cannot or will not have our own children, we must import the children of others. There is no doubt that immigration has a role to play in many places and some level of movement of people is historically normal. But what is new is the use of migration on a massive scale to substitute the formation of families and childbearing. In countries like Germany, deaths are outstripping births and only migration is preventing the population from shrinking. But along with mass immigration comes ethnic and cultural change, dislocation, and very often political reaction. A degree of diversity may be welcomed, but ultimately in this scenario a country ceases to be a community and becomes a patchwork. Such a country loses all social cohesion and the sense of solidarity which has underpinned the social contract and welfare states in much of the developed world. As David Goodhart argued over 20 years ago, societies can be *too* diverse and come to lack the cohesion required to sustain the mutual obligations required for a good society.[2]

Our purpose in this paper is to frame the problem as a trilemma, a set of trade-offs between fertility, migration, and old-age dependency ratios—that is, the ratio of retirement age people (65 years old and above) to working age adults who are between 20 and 64 years old. We quantify these trade-offs and argue that the only path to a thriving society lies in being prepared to have significantly more children than people in the United Kingdom, and much of the rest of the world, have had for decades.

The Concept of a Trilemma

Dilemmas are ten a penny and familiar to us all. Either I do go to the party and I do not stay at home, or I do not go the party and I do stay at home. Either I take the trip to the Continent and spend the money, or I save the money and forgo the trip. These simple binary trade-offs are so common in life that they are barely worthy of a name at all. More interesting is the *trilemma*, where the choice is two out of three perceived goods. You can have any two, but you cannot have all three. An example of a trilemma was neatly formulated by the Slovenian thinker Slavoj Žižek. Living in a Communist country, you could be any two, but not all three, of *honest, loyal,* and *intelligent*. If you were honestly loyal to the regime, you were not intelligent (you might call it the "dense option"). If you were honest and intelligent, you could not be loyal (the "dissident option"). If you were loyal and intelligent, you could not be honest (the "dissembler option"). By being dense, a dissident, or a dissembler, you were choosing two and foregoing one of the virtues of honesty, intelligence, and loyalty.

The Demographic Trilemma

There is a trilemma in demography, similar in form but different in content to the one faced by the unfortunate residents of the former Eastern Bloc. The trilemma can be framed as a choice of any two of three things: low fertility; Gross Domestic Product ("GDP") growth, which we can characterise as "economic growth"; and the absence of rapid immigration, which we can characterise as "ethnic continuity". Choose low fertility and economic growth, and you must have rapid immigration and ethnic change. This we call the "mass migration" option. Choose low fertility and the ethnic continuity which requires low immigration, and you are saddled with "economic stagnation". If you want economic growth and ethnic continuity, then you must choose "more children".

To help illustrate these options, we have selected countries which embody each scenario through their choices and behaviours. The United Kingdom typifies the "mass migration" option, embracing high levels of immigration to substitute for home-grown births and to keep its economy moving forward. Japan typifies the "economic stagnation" option, accepting only limited migration and retaining its ethnic homogeneity, while paying the price through economic and social stagnation. Israel typifies the "more children" option, with the average woman having 50% more children than anywhere else in the developed world. Having more children allows for a low ratio of retirees to working-age adults, which is necessary for economic growth.

Let us start with the **"mass migration"** option, which the United Kingdom currently typifies. The United Kingdom aspires to have a buoyant economy and to keep its public services running. It has had below-replacement fertility rates (too few children born per woman to sustain the size of the population over the long term) for about half a century. This means that the net inflow into the workforce is dramatically smaller than it was when the late baby boom peak was working its way into the labour market in the early-to-mid 1980s. Back then, there were over 1.6 million more people in their early 20s than in their late 60s; today the excess is down to about 170,000.[3] This disparity has dramatically slowed the net number of new workers in a society in which, for all the talk of robots replacing people, the hunger for ever more labour has not abated. The old-age dependency ratio has increased dramatically in recent years after a period of stability between around 1978 and 2009. At the end of the 1970s, there were roughly four workers for every one retiree, and an old-age dependency ratio of around 25%. As of today, that ratio is over 30% according to United Nations' estimates and will be closer to 50% by 2050. The median age is up from the mid-30s in the early 1950s to the early 40s today and will be in the mid-40s within a couple of decades.

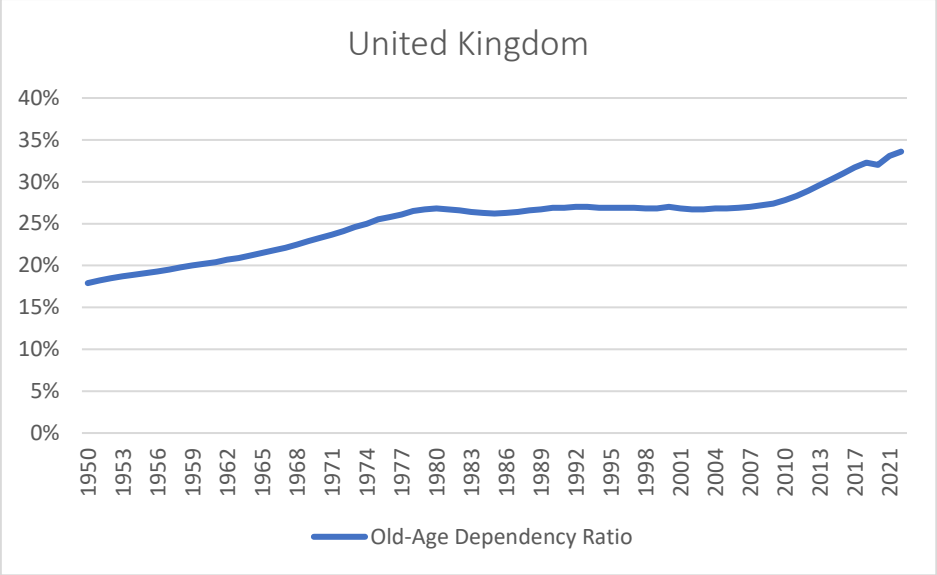

Figure 1. Source: OECD.

So, the citizens of the United Kingdom have been choosing to have small families, while at least keeping their economy more or less on a growth path. Since the old-age dependency ratio started increasing in 2009, most of this economic growth has been driven by an increasing labour force, with worker productivity largely stagnant.[4] What the United Kingdom has needed to achieve economic growth is mass immigration.

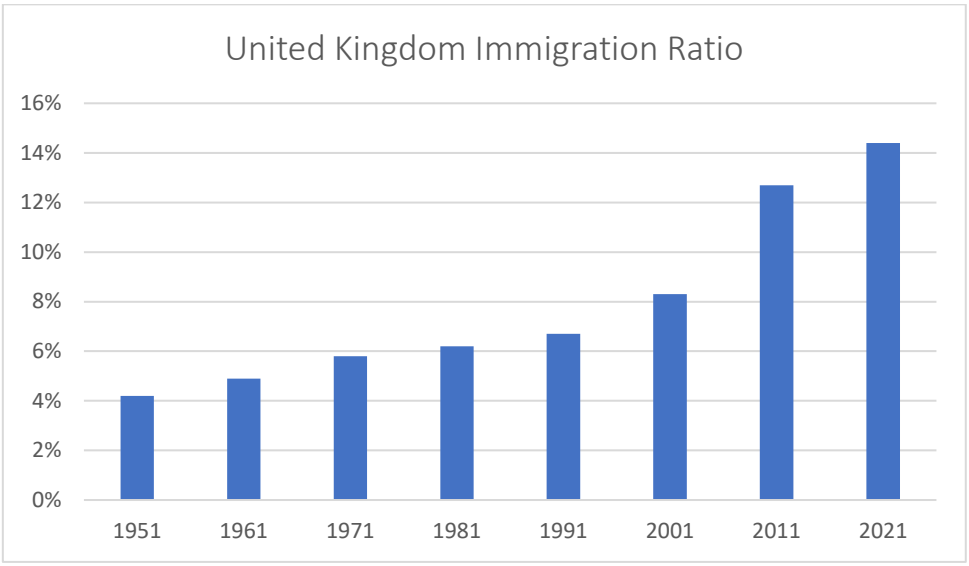

Figure 2. Source: ONS, Migration Observatory.

By most estimates, the country has had far more immigrants in the past 25 years than it had in the 900 years after the Norman Conquest of 1066. The share of population defining itself as "white" in England and Wales fell from 95.4% in 1981 to 81.7% in 2021.[5] Those self-defining as "white British" fell from 87.5% to 74.4% between 2001 and 2021. These trends are by a very long way the fastest ethnic change the country has seen, not since the Norman Conquests of the 11th century, but rather since the Anglo Saxons arrived in the 5th century, or maybe earlier still.[6] Without immigration at this level, rises in the median age and the old-age dependency ratio would have been much faster. The chart above shows the percentage of the population in the United Kingdom that is foreign born, or the "immigration ratio", since 1951.

By contrast, Japan typifies the **"economic stagnation"** option, with a population estimated to be more than 98% ethnically Japanese.[7] This configuration has been achieved by severely restricting immigration, as Japan has prioritised ethnic homogeneity. And, like Britons, the Japanese have not been keen on large families for a long time. The Japanese fertility rate went sub-replacement at around the same time as the United Kingdom's, and for most of the past half century has been materially lower than the United Kingdom's: by between one-third and half a child per woman over the past three decades.[8] But by eschewing mass immigration and ethnic change, and by having a small number of children, the Japanese have experienced decades of sluggish economic growth. The economy grew at more than 2% per annum in every year but two in the heady decades of the 1960s, 1970s, and 1980s, but in the last three decades, as its workforce has declined, Japan has enjoyed growth of above 2% in only five years.[9] Since 1997, the Japanese labour force has contracted, partly offset by Japan's productivity growth, which has led to economic stagnation that, as time proceeds, seems to be worsening.

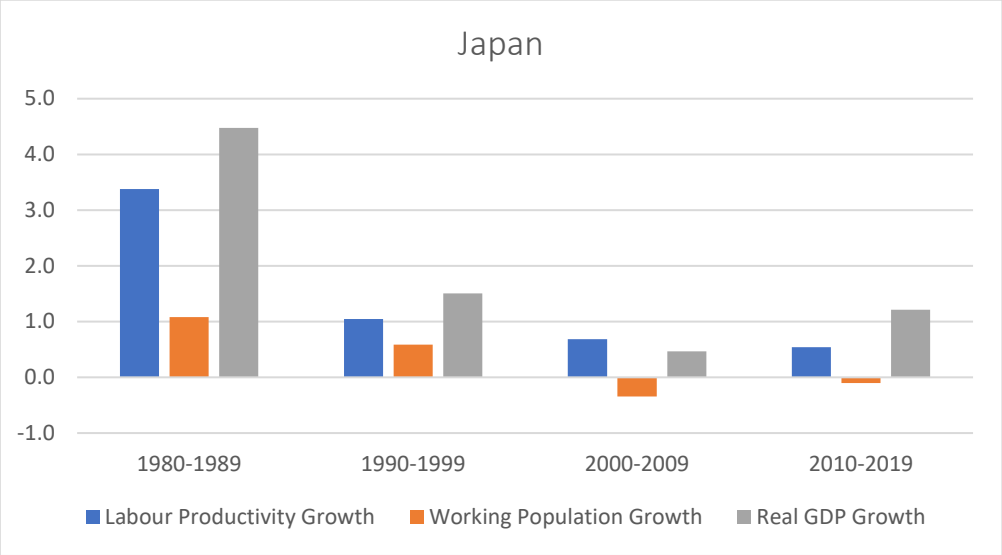

Figure 3. Sources: University of Groningen, OECD, World Bank.

The only country in the OECD that has chosen the **"more children"** option is Israel. At around three children per woman, Israel's fertility rate is close to double that of the European Union as a whole and not much below double that of the United States.[10] Israel has always been open to Jewish immigration, but the scope for Jewish immigration is significantly lower than it was when the state was founded in 1948. Back then, around 95% of Jews lived outside the country whereas now only little over a half do.[11] At the time of Israel's founding, millions of Jews lived precariously in countries from which they would be expelled or leave gladly if they could—specifically the Arab and wider Muslim Middle East and the Soviet Union and its satellites. Today, the vast majority of Jews outside Israel live in the United States where they are, at least for now, generally leading comfortable lives with little motive to depart.

In Israel, the Arab population has undergone a classic demographic transition with fertility rates falling from nine children per woman to three since the 1960s, and the Arab share of the population in Israel has now stabilised at around 20%.[12] Since 2000, Israel's net migration rate has been below the Organisation for Economic Co-operation and Development ("OECD") average, while its fertility rate has remained far above. If Israel wanted or needed immigrants, it would increasingly have to recruit them from the world's wider, non-Jewish population, thereby becoming a less Jewish country.[13] But Israel has not needed immigration to keep its economy flourishing because there are so many young recruits into the labour force, and there will be for decades to come. With its high fertility model, Israel has also seen persistently higher economic growth than rival models. This has especially been the case in recent years

when both the "mass migration" and the "economic stagnation" models have slipped into outright stagnation. Meanwhile, Israel's "more children" model continues to prosper.

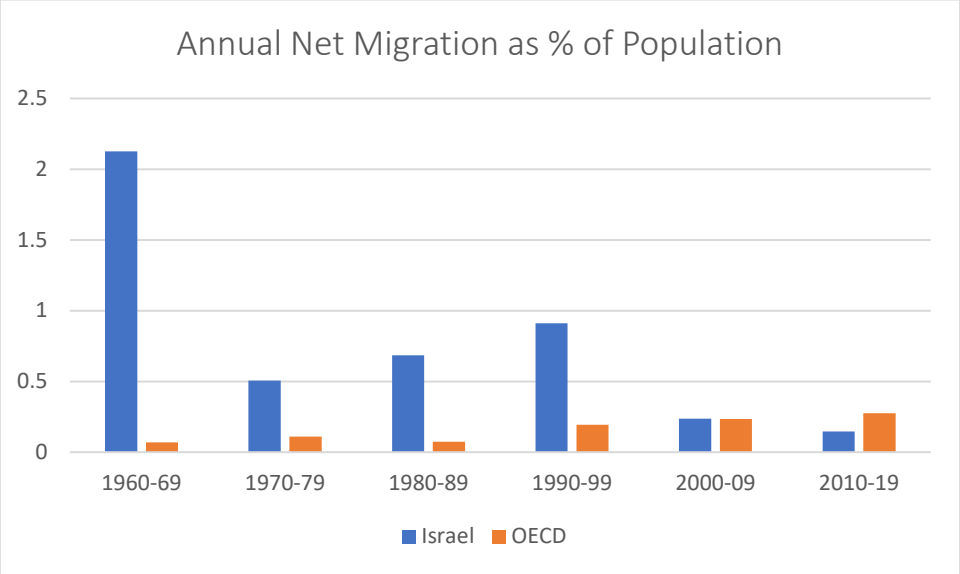

Figure 4. Source: World Bank.

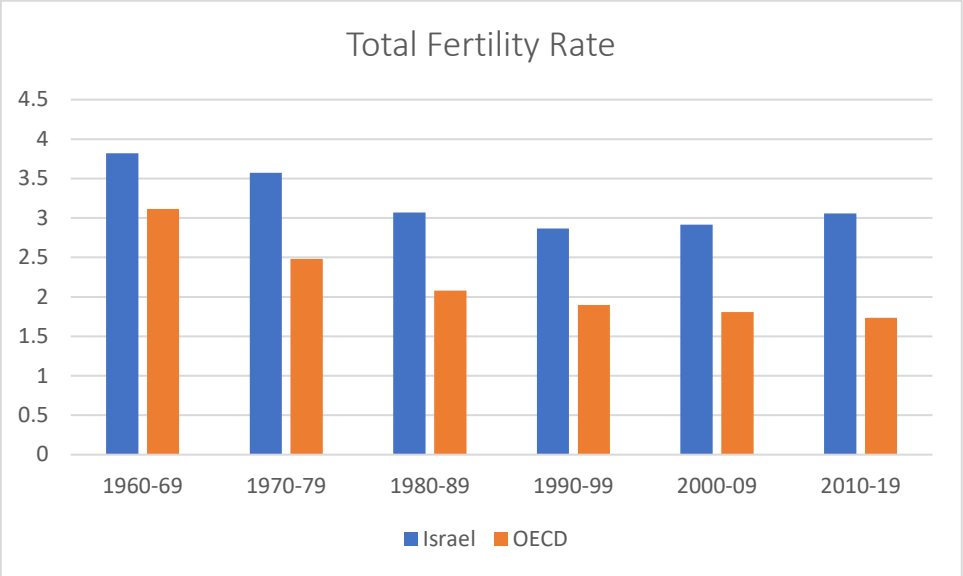

Figure 5. Source: World Bank.

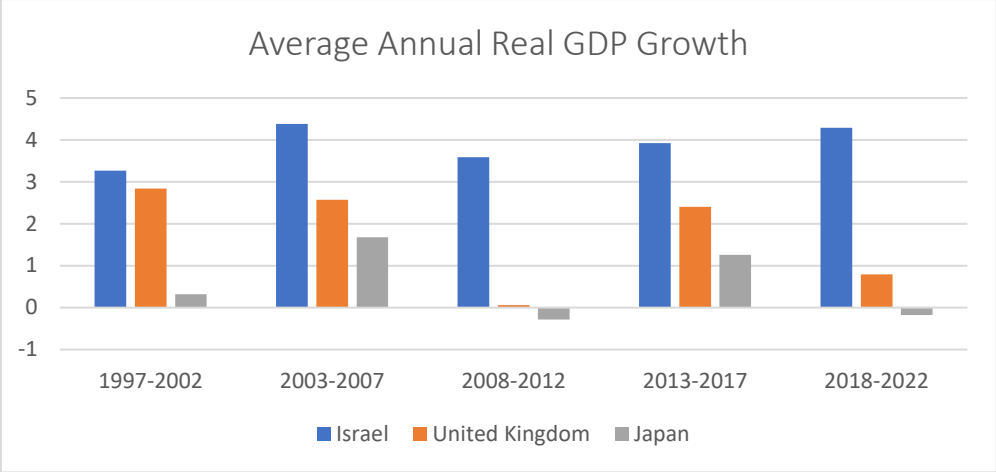

Figure 6. Source: World Bank.

The Demographic Context: The Demographic Transition

Countries which have passed through their (first) demographic transition are the only ones that face the demographic trilemma. During the demographic transition, as classically defined, a country progresses from a situation of high fertility and high mortality (the Malthusian condition), through a period of high fertility and falling mortality (involving rapid population growth), through a period of falling fertility and continued falling mortality (involving a slower population growth), to a state of replacement level fertility and low mortality with a high but more or less stable population.[14] This is essentially a material process or, more precisely, a process driven by the material forces of economic development. The position of a society progressing through the transition is largely determined by factors such as industrialisation, income per capita, urbanisation, and levels of education. Material progress lengthens life expectancy and drives a set of choices that lower fertility rates. Wealthier, better educated, and urban people live longer and choose to have fewer children. This is not to suggest that individuals in these circumstances are subject to the whims of factors outside their control, but merely to observe strong correlations. Social science is built on observing correlations of this type. For example, we know that men are more likely to be violent criminals than women, but that does not mean that men who are violent have no choice or control over the matter.

The transition—an approximation like all such models but broadly a good description of what has happened or is happening in most of the world—has progressed in different places at different paces at different times. The United Kingdom was arguably the first off-the-block with spiralling population growth (despite mass emigration) in the course of the 19th century. But its fertility rate fell to three children per woman by the outbreak of the First World War and down to two by the outbreak of the Second. Much of Europe and then the rest of the world followed, although spikes have occurred along the way such as the post-war baby boom.

The question then arises: what next? When the first demographic transition is complete, does the population simply stabilise and fertility remain at replacement levels forever? There has been a suggestion that there is a *second* demographic transition that follows in which social norms of marriage and early childbearing break down, and fertility rates fall below replacement levels.[15] It is only in the context of the ending of the first demographic transition that the trilemma applies. For countries still going through their first transitions, the task is above all to reduce mortality rates through health programmes and rising incomes. But as the world's economic development continues to progress in leaps and bounds, more and more of humanity is coming into a condition of low mortality (which

equates to long life expectancy) and low fertility rates. This is even true of countries that are still relatively economically undeveloped. Egypt, for example, has a per capita income of under $4,000, which is less than 5% of that of the United States. Its life expectancy is only seven years shorter, and its fertility rate a little over a child higher than America's.[16] This is a great change to the situation in the 1960s when Egyptians lived about 25 years fewer than Americans and had more than three more children than Americans.[17]

The argument here is that, contra the second demographic transition narrative, a society with low family formation and in which people pursue personal projects over familial ones, is not an inevitability. Rather, once infant mortality has largely been conquered and people can expect to live into old age, there are still some choices which individuals and societies can make. Fortunately for human beings, there is more richness and diversity in human reality than the theorists of the second demographic transition suggest. The trilemma takes place as a condition of demographic "post-modernity". If the Malthusian condition is *pre-modern* and the (first) transition *modern*, then *post-modernity* is the situation in which the processes of material advance have occurred, fertility is reduced, and life expectancy is extended. People are then able to make decisions in a context where what matters more than material conditions are norms of culture, ideology, values, and religion.[18]

Limitations: The "Mass Migration" Model

The United Kingdom, which typifies the "mass migration" model, continues to have more births than deaths each year, albeit at a fraction of the level experienced three or four decades ago. Therefore, it does not require *current* immigration to keep the population growing. But it does rely on *past* immigration. It is only due to the slightly higher fertility rate and younger profile of immigrant communities that births are not already outstripped by deaths in the United Kingdom; the number of people defining themselves as "white British" declined by 700,000 between the censuses of 2011 and 2021.[19]

While the British economy has certainly outperformed that of Japan in the past three decades, weak productivity growth has meant that increasingly the United Kingdom's economic growth has depended on a rising number of workers rather than on more productive ones. The pledges of successive UK governments to reduce net migration to tens rather than hundreds of thousands have not been remotely met.[20] Despite slow economic growth, decades of low fertility rates have translated into depleted inflows into the workforce; only immigration has, effectively, kept the economy growing. Special measures such as raised wages in a particular sector can deal with labour shortages, but this cannot be a general solution to labour shortages.

In order to keep the economy on a sustainable path, and to reconcile economic growth with low fertility rates, the United Kingdom relies on a high level of immigration. Those who identify as "white British" are predicted to become a minority group in the United Kingdom around 2070 according to some estimates, which shows the extent of these immigration levels.[21] So far this has not given rise to a strong far right party but concerns about immigration levels arguably contributed to Brexit.[22]

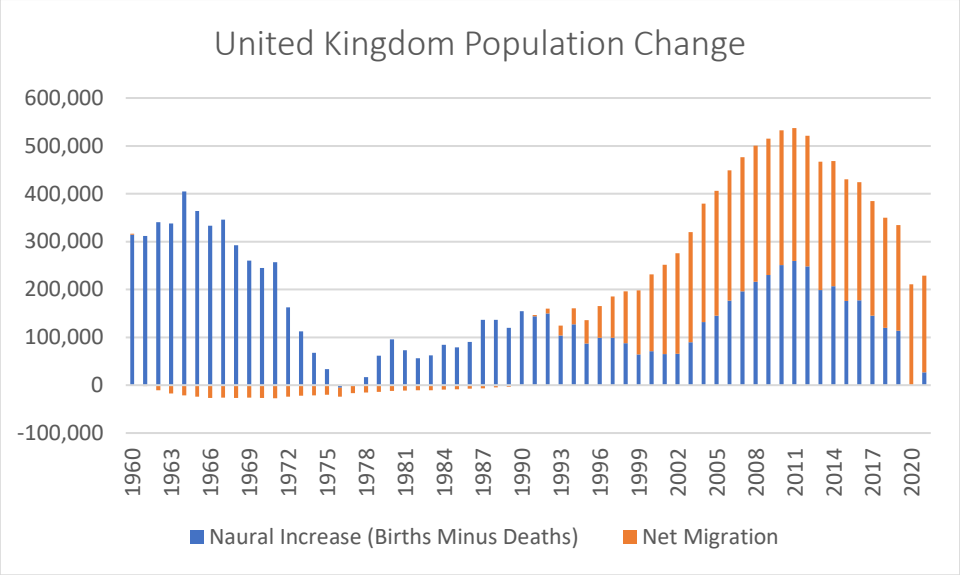

Figure 7. Source: World Bank.

Another potential shortcoming of the UK model is a limitation on immigration itself. There were more than three million Poles in their early twenties in Poland in the year 2000, natural recruits to the British labour market at an age when binding ties have not yet been made and movement is easy. Twenty years later, there were fewer than two million.[23] Meanwhile, the wage gap between Poland and the United Kingdom has narrowed. Increasingly in the future, in order for rich countries to attract immigrant labour, they will need to draw from the last places with high fertility rates and low wages. Since these are places where educational and productivity levels are lower than in places like Poland, we can expect the impact in the United Kingdom to be decreasing levels of labour productivity.

But the most substantial objection to this model is the sort of society it ultimately creates. The first issues that come to mind are cultural and linguistic. Foreign born residents may not have a strong grasp of the native language, and this can lead to ghettoization and potential social tension. Similarly, the cultures of foreign-born residents may be at odds with the native culture, and this too can lead to social frictions. Another issue may be that foreign-born residents from different cultural or ethnic groups that clash with one another may bring those conflicts with them to the new country. The larger the share of foreign-born persons in the population at any given time, the more likely these sources of social tension are to manifest. As we have suggested, the solidarity that underpins a cohesive society is lost.

Foreign-born workers tend to be less well-educated and therefore less well-paid relative to native workers. In the United States, for example, a 2016 study showed that 51.3% of immigrants did not have a level of education above a high school certificate, while this number was only 37.3% for native born residents.[24] These disparate education levels are reflected in wages, with foreign born workers earning only 86.9% of their native-born equivalents' income in 2022.[25]

The picture in the United Kingdom is somewhat different. It has managed, until recently at least, to attract migrants with higher-than-average levels of education. This is likely accounted for by the opening of the former Soviet bloc countries after the end of the Cold War. As of 2021, the largest population of immigrants by nationality in the United Kingdom were from Poland. Making up 11.6% of the non-national population, the Poles are far ahead of the next largest group from the Republic of Ireland who make up 6.2% of the non-national population.[26]

This highly educated flow of migrants from Europe, however, was never going to last forever. The collapse of the Soviet Union was a one-off event that released highly educated, low-wage workers into

European countries. The United Kingdom's exit from the European Union has only accelerated a reduction in European immigration, with migrants from the European Union falling from just under 57% of total migrants in December 2020 to just over 14% in December 2022.[27] However, so far, the United Kingdom has managed to replace highly educated immigration from Europe with highly educated and highly skilled immigration from non-European Union countries. Data from 2015 suggested that European Union immigrants were about twice as likely to have been educated to the age of 21 or above than UK residents, but non-European Union immigrants scored slightly higher still.[28] Data from 2020 suggests that immigrants to the United Kingdom from India were more highly skilled than those from the European Union, and that even those from sub-Saharan Africa were more likely to count as highly skilled than people born in the United Kingdom.[29]

So, while many have bemoaned the impact of Brexit on the United Kingdom's ability to attract highly educated migrants, the data does not point in this direction. And the dependence on the European Union for highly skilled labour would eventually have come to an end with or without Brexit. We would expect the average educational ability of immigrants to fall through time, as the per capita GDP of those countries providing high-skilled labour to the United Kingdom now, whether inside or outside the European Union, converges with per capita GDP in the United Kingdom, reducing the economic attraction of coming to Britain.

We believe, therefore, that the United Kingdom will soon start to experience what most other countries see: migrants arriving with less education than the native population and who are therefore paid less. This results in what we might call the "feudalisation" of the society that is affected by it. As lower-educated migrants become a larger portion of the population, they give rise to a relatively larger amount of poorly paid jobs; often this takes the shape of the newly arrived immigrants "serving" the wealthier and ageing native population. These dynamics cause income inequality to worsen and society to become more stratified. The chart below shows the change in the foreign-born percentage of the population of American states between 1990 and 2019, together with the change in the Gini Coefficient, a measure of income inequality. As we can see, despite income inequality being a highly complex variable to explain, there is a visible correlation between the change in the foreign-born population and the change in income inequality.

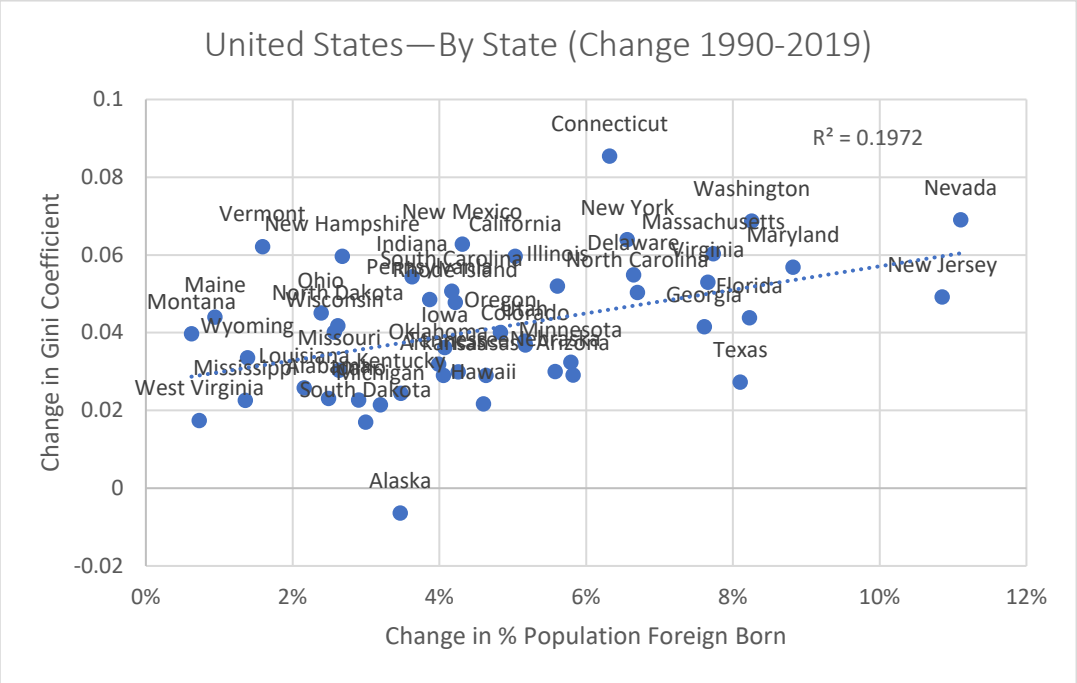

Figure 8. Source: Migration Policy Institute, Laura Langer, US Census Bureau.

While debates around migration are often framed in terms of compassion, the evidence shows that the actual impact of very large increases in migration is to create income inequality and a stratified society. This is in addition to and reinforces the potential, mentioned above, for social tensions and instability. When we look at data that shows dramatically higher numbers of foreign-born persons as a percentage of the population, we should remember that this implies much higher levels of social stratification, less social mobility, and the feudalisation of our societies.

Limitations: The "Economic Stagnation" Model

The "economic stagnation" model, typified by Japan, involves low fertility, low immigration, and demographic and economic decline. On the surface at least, all appears well in Japan. This is not just *a* functioning society; it is by some measures *the* functioning society. Whatever the opposite of a failed state is, Japan is it. The trains and buses run. The electricity flows reliably. There is an adherence to the law and an orderliness which are exemplary and the envy of many Western societies. For example, the murder rate in Japan is around one-three-hundredth of the world's worst performer, El Salvador, and about one-twentieth of that of the United States.[30] The reasons for the peaceable nature of Japanese society are multiple, varied, and partly cultural. But they are also partly demographic; there is a clear link between being an ageing society and being a peaceable and crime-free one.[31]

But all is not well in Japan. First, as already shown, its economy has been seriously eclipsed over recent decades. Once seen as likely to take over as the world's leader, Japan's economy is now waning. At the start of the current century, Japan's economy was around half of the size of America's; today it is little more than one-fifth of the size.[32] While that is not fully reflected in per-capita comparisons, it nevertheless does represent an undeniable drop in prestige and power. While Japan can be proud of its exceptional life expectancy—at 85, the highest of any country—it is struggling to look after its elderly. Already, Japanese companies find it difficult to recruit new hires and the Japanese prime minister speaks of impending social collapse.[33] Japanese governments have spent decades trying to breathe life into an economy lacking human vitality and spending more than they received as the old-age dependency ratio worsens; the result is by far the highest government debt-to-GDP ratio in the developed world at more than 250%.[34]

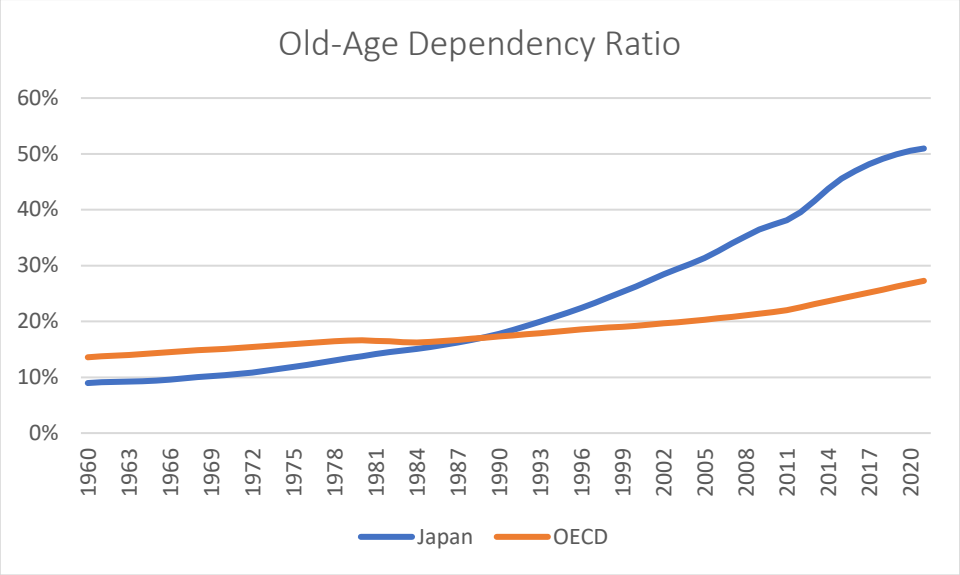

Figure 9. Source: World Bank.

The human geography of Japan is being rewritten, year in, year out. A shrinking population plus ongoing moves to a central belt mean that villages are being abandoned and soon towns will be too. Wild boars ravage farmland for lack of a local population to keep them down. Bear attacks are on the increase. Nature is reclaiming vast tracks. Environmentalists might welcome these developments, but it means essentially a different country is emerging—one in which vast and growing tracts of land are peopled only by the ageing and the dying, and then by no people at all.[35] The Japanese pattern is far from unique. Its fertility rate has been lower longer than in most places, but there are places with even lower fertility rates such as Puerto Rico, South Korea, and Macedonia.

With its population already contracting at around 0.5% a year, Japan would suffer something we could call "demographic drag" even if it managed to turn around its fertility rate. When historic population growth has happened, there were many young women in the population to give birth, even if each had a small number of children; meanwhile there were relatively few older people dying, because the old represent a small share of the population. For that reason, we get "demographic momentum", meaning that a population carries on growing years or even decades after fertility rates have dropped to sub-replacement levels. But the reverse holds. A high fertility rate in Japan today would apply to a relatively small cohort of women, while much larger cohorts are in old age and liable to die. In other words, in this scenario a country could have fertility rates above replacement level while deaths outnumbered births and the populations went on shrinking for a long time.

It should be noted that so far Japan has managed to avoid one key macro-economic effect of a rapidly rising dependency ratio: inflation. Economists argue that the natural consequence of a rising dependency ratio is a rise in the rate of long-term inflation.[36] The reason for this is simple enough: if there are fewer people of working age relative to the overall population, then there will be more consumption per worker and so more pressure on resources. This strain will drive up the demand for labour relative to supply, wages will rise, and inflation will follow.[37] The reason that Japan has so far avoided this catastrophic economic outcome is because it has succeeded, through its idiosyncratic system of worker compensation, to engage in wage suppression. The Japanese worker compensation system is unusually bonus-heavy with about 20% of the average salary in Japan being given as a bonus. This system was introduced to increase worker productivity but now allows employers to moderate any wage demands by slashing worker bonuses when wages and inflation trend upwards.[38] However, it is highly unlikely that workers in other developed countries would accept wage suppression. And so higher levels of inflation are the likely outcome if the Japanese model is replicated elsewhere.

Limitations: The "More Children" Model

The "mass migration" model typified by the United Kingdom ultimately results in an alienated and unequal society. It is far from obvious that most people desire this sort of society, and it may ultimately be challenged by the forces of democracy. The "economic stagnation" model as typified by Japan is going to prove testing insofar as managing an ageing and declining population while retaining services and eventually institutions will be challenging. On the face of it, the "more children" model as typified by Israel appears to be more sustainable. It does not involve population decline or mass immigration. Israel is already a fairly overcrowded country, and it is likely to become more so in the future. But it is not one of the world's most densely populated countries yet. Malta, for example, has more than four times as many people per square kilometre. And for most countries, a pursuit of population growth should not have to contend with any absolute lack of space. Fear of the world ending up with no standing room is quite misplaced, with 95% of humans living on just 10% of the earth's surface.[39]

The problem for Israel is that, although its secular and moderately religious populations have a relatively high fertility rate, the super-charged growth rate among ultra-Orthodox Jews is changing the complexion of the country. In 2015, those categorised as "Haredi" constituted 11% of the population but 18% of the children, which demonstrates the growth dynamic at work.[40] With their continuing high fertility rate and their ability to retain most of each generation within their ranks, by the end of this century they are forecast to be a majority population in the country.[41] It is difficult to see Israel surviving as an economically successful democracy if this happens. Already high tensions have been seen in the spring of 2023, when a largely secular crowd of protestors opposed the judicial reforms proposed by the country's government, in which ultra-Orthodox parties were a key element. There is evidence too of the Haredi vote moving towards the parties of the extreme nationalist right, even though their leadership has traditionally been less than fully enthusiastic about the project of settling the West Bank and in many cases even lukewarm about Zionism itself.[42]

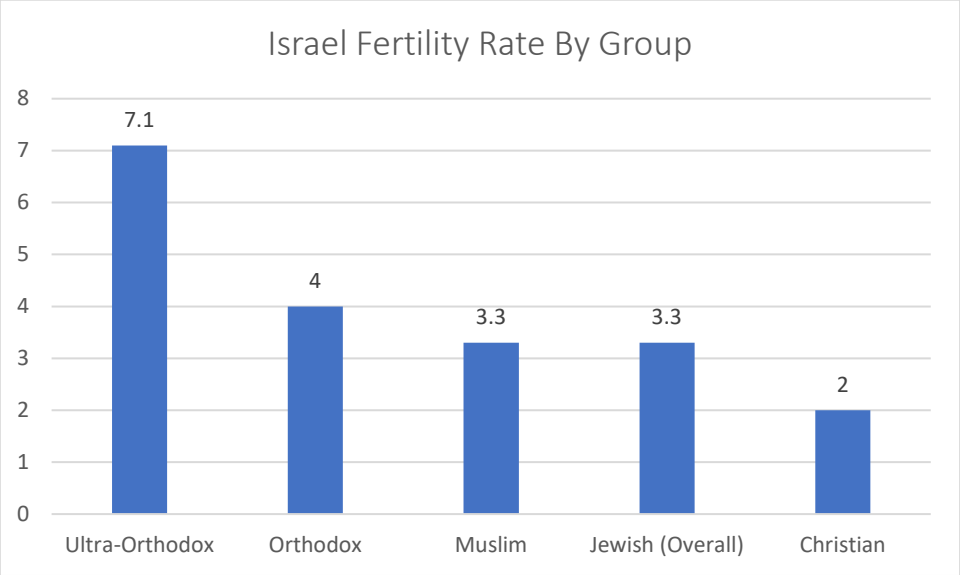

Figure 10. Source: Stiftung Wissenschaft und Politik.

Modelling the Trilemma: A Guide for Policymakers

The purpose of modelling the trilemma is to understand what the trade-offs look like. We have used the United Kingdom as a case study, where the authors of this paper are both resident and where the data is available to undertake the analysis. However, a similar approach could be taken for any of the many countries in the developed world which have below replacement fertility rates and are supplementing their flagging workforces with recruits from overseas.

We took existing UK data from the 2021 census and the Office of National Statistics ("ONS")[43] and asked the following questions for the country:

- Scenario A: United Kingdom retains "mass migration" model: How much immigration is required to hold the current old-age dependency ratio at reasonable levels for the next 60 years, assuming continuing fertility trends? What would this mean for the percentage of the United Kingdom population made up of first-generation immigrants? Here, a manageable dependency ratio is the independent variable with requisite immigration being the dependent variable. United Nations ("UN") "Total Fertility Rate" ("TFR") forecasts are used.

- Scenario B: United Kingdom adopts "economic stagnation" model: How high would the dependency ratio go if we closed the door to immigration, again assuming continuing fertility trends? What impact would this have on the percentage of the population that is made up of first-generation immigrants? Here, low immigration is the independent variable with resulting dependency ratios being the dependent variable and again UN TFR forecasts are used.

- Scenario C: United Kingdom adopts "more children" model: What would the impact on the old-age dependency ratio be if the United Kingdom adopted an aggressive and successful pro-natalist policy that resulted in an increase in the fertility rate to replacement levels in the short-term and converged with Israeli fertility rates in the long-term while sharply reducing immigration to more historically normal levels? What would such a model mean for the percentage of the population made up of first-generation immigrants? Here the independent variable is the fertility rate, which reaches towards Israeli levels (similar to what they were in the United Kingdom in the mid-1960s, around three children per woman) with immigration held relatively low and the dependency ratio being the dependent variable.

First, we must explain the rationale for choosing the old-age dependency ratio and the percentage of the population made up of first-generation immigrants as the relevant variables of study. Demographers and economists typically look at the dependency ratio rather than the old-age dependency ratio. The difference between the two is the inclusion of children in the dependency ratio and the exclusion of children in the old-age dependency ratio. The economic logic of using the dependency ratio is robust. After all, no one doubts that children are dependents—they are pure consumers of goods and do not contribute to the economy. But when considered from a broader point of view, children are the best available "asset" to stave off an ageing society. We believe, therefore, that policymakers concerned with demographic problems should largely ignore the dependency ratio and focus on the old-age dependency ratio.

We have chosen to look at the percentage of the population made up of first-generation immigrants—hereafter referred to as the "immigration ratio"—to try to quantify the potentially destabilising impact of immigration. We take a neutral view of second-generation immigrants. That is, we assume that they integrate into the host society and become interchangeable with the native population. Some may argue that this is a contentious stance to take, but we believe it fits with our overall conservative modelling framework. We have already shown how mass migration can undermine the cohesion of a society and produce one which is increasingly unequal and lacking in social solidarity.

Here, it is worth briefly discussing what a sustainable immigration ratio might look like. We will be liberal in our assumptions and presume that the United States, being famously a country built on immigration, has historically represented a country that has achieved maximum levels of immigration while also managing to integrate immigrants into the native population. For this reason, we assume that any immigration ratio that is substantially higher than the highest achieved by the United States is, at best, highly experimental and, at worst, potentially destabilising. The chart below shows the immigration ratio in the United States since 1790. As we can see, the maximum immigration ratio that the United States has achieved and subsequently absorbed was in the late 19th and early 20th centuries when the ratio was just above 14%. As we saw earlier, the immigration ratio in the United Kingdom was 14.4% in 2021—so around the same as the United States saw in its great migration wave.

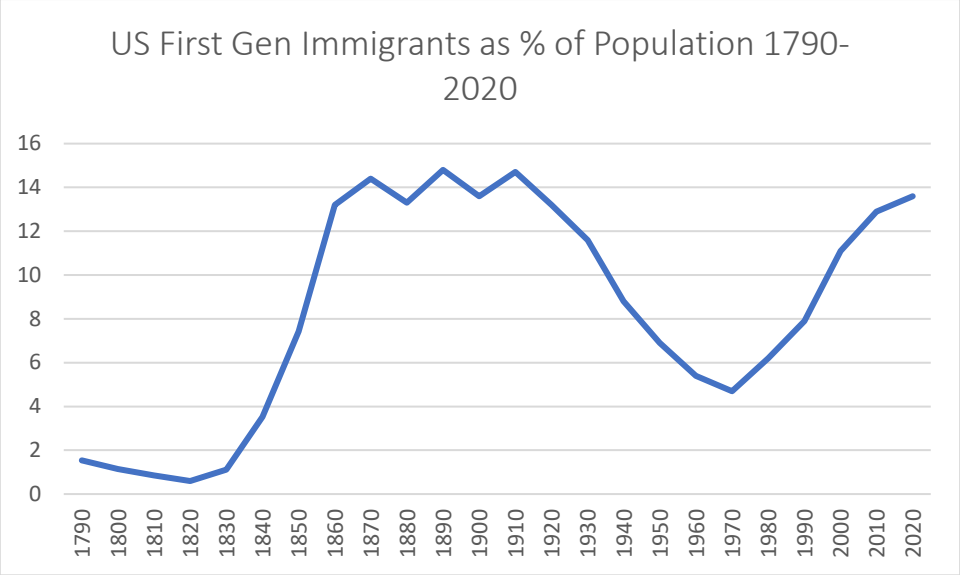

Figure 11. Sources: Migration Policy Institute, US Census.

The availability of cohort-specific census data has allowed us to generate a cohort-specific picture of immigration into the United Kingdom. For example, looking at the difference in the number of 6-year-olds and 16-year-olds between decennial censuses allows us to estimate how many of the 16-year-olds are immigrants, given the fact that mortality among 6 to 16-year-olds is (thankfully) statistically insignificant in the United Kingdom today.

Let us turn then to our first set of results.

"Mass Migration" Model:

This is our model of the United Kingdom if current trends continue. That is, the model assumes the country maintains its downward trend in its fertility rate and attempts to keep the old-age dependency ratio at relatively sustainable levels through mass migration. To model this, we have used ONS projections of both the United Kingdom's fertility rate and the old-age dependency ratio.[44] We should note that we do not agree with the UN's fertility projections and think that they are far too optimistic. In their widely used projections, the United Nations assumes that fertility rates in the United Kingdom are going to stay at the present levels for the rest of the century. But the current evidence does not support this conclusion. For example, the birth rate (the number of live births per 1,000 people) among the 20 to 24-year-old category in the United Kingdom in 2011 was 71.6. Yet the birth rate in the same category in 2021 was 42.3, a substantial decrease.[45] "Generation Z" (children born between 1996 and 2010) appears, by all accounts, to be an ultra-low fertility group. Despite our doubts, we have used the UN TFR projections regardless to make our modelling as conservative as possible. Policymakers, however, should keep in mind that we believe that our first UK model is far too optimistic; *actual outcomes are likely to be far more dramatic than projected.* This is because if the fertility rate is lower, the level of migration needed to maintain a low old-age dependency ratio must be higher.

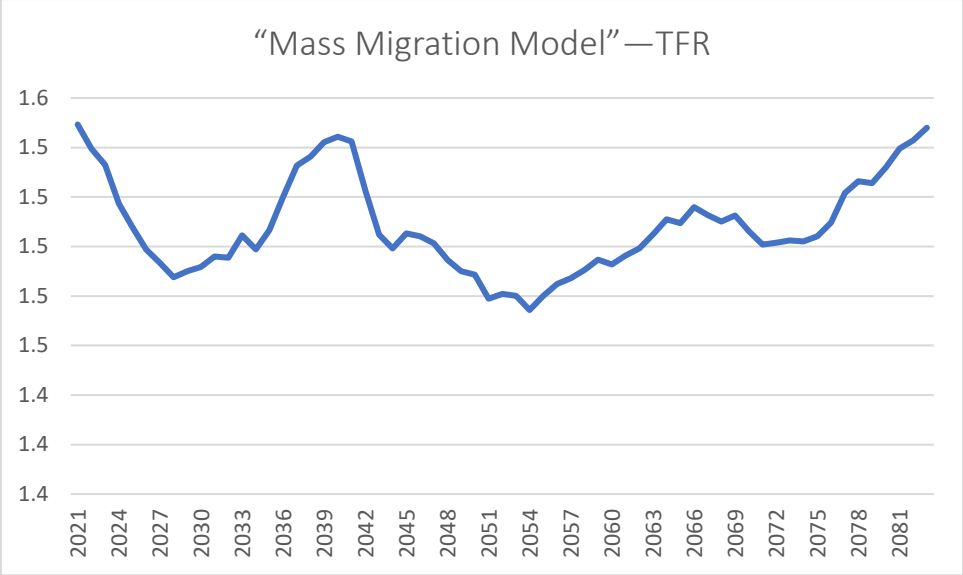

Figure 12. Sources: UN and ONS data.

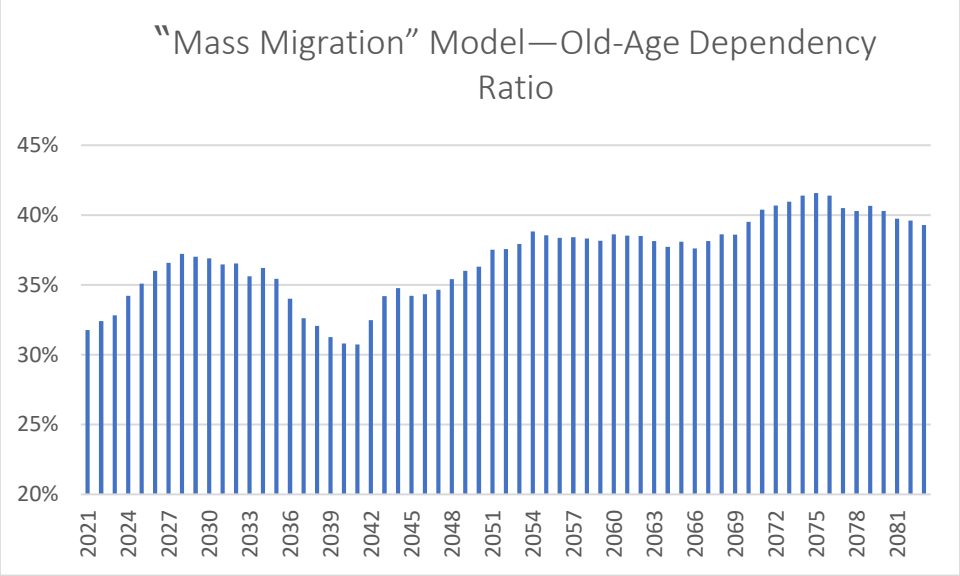

Figure 13. Sources: UN and ONS data.

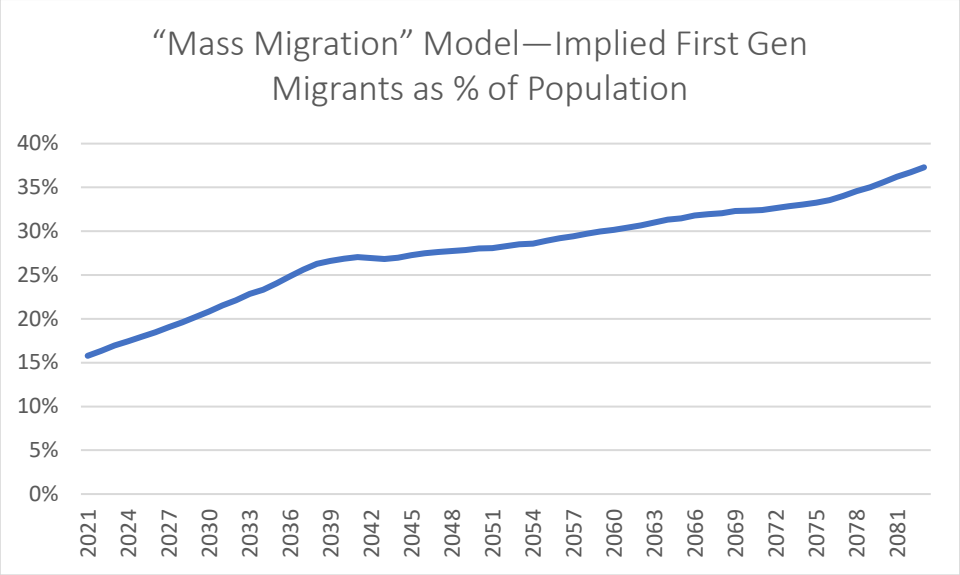

Figure 14. Sources: UN and ONS data.

If we assume that the upcoming low fertility of Generation Z drives the United Kingdom's fertility rates down to South Korean levels (0.8) by 2083, we find that by that year, instead of 37%, the immigration ratio rises to 54%. As mentioned previously, this increase is due to higher immigration levels being needed to maintain a sustainable old-age dependency ratio.

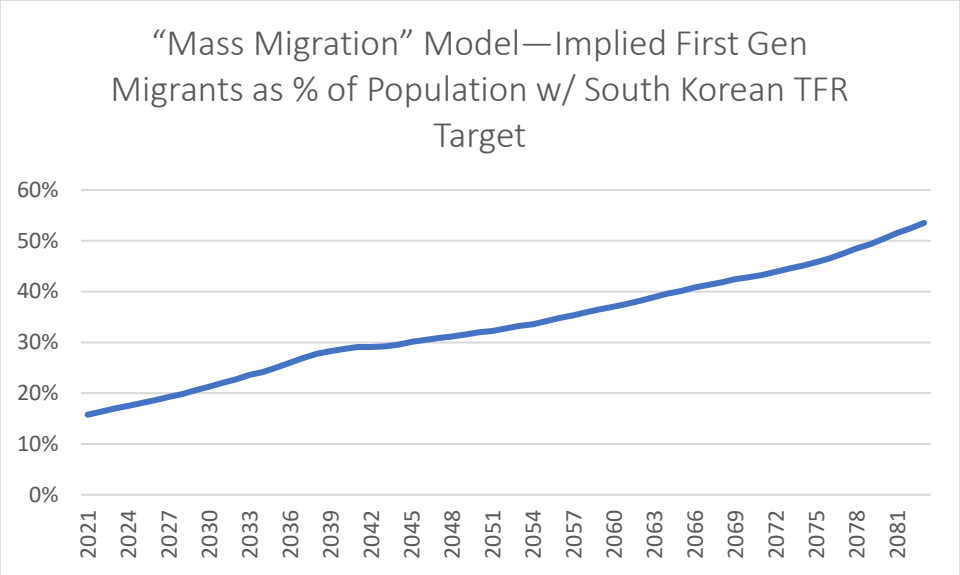

Figure 15. Sources: UN and ONS data.

"Economic Stagnation" Model:

Our next model will assume that the United Kingdom severely restricts immigration but maintains its low fertility rate. This is what we are terming the "economic stagnation" model whereby low fertility is combined with low immigration, resulting in economic pain, typified by Japan today. We should emphasise, however, that the extent to which our "economic stagnation" model embodies Japan is somewhat mythologised. Among economists and demographers, Japan is thought to be a low fertility society with severe restrictions on immigration. It is no doubt true that Japan has an extremely low

fertility rate—the country has had a fertility rate of below 1.5 since the early 1990s. But it is not clear that the Japanese are extreme in their immigration policy. In 2023, the net migration rate—that is, the number of net migrants let into the country per 1,000 people—is around 33% of the United Kingdom's.[46] While this is substantially lower than today's British rate of net migration, it would have been considered normal in the United Kingdom in the 1980s or early 1990s. Japan is only restrictionist in its immigration policy relative to the extreme non-restrictionism of Western countries in the past two decades.

For this reason, we have used a stylised or mythologised Japan for our example. We have taken the erroneous stereotype of Japanese immigration policy as it exists among economists and demographers as if it were true. In doing so, we have assumed that the United Kingdom immediately restricts its net migration by 95%. This implies that the net migration rate in the United Kingdom falls to around one-eighth of Japan's *actual* net migration rate. At the same time, we have assumed that the United Kingdom's fertility rate falls to just above 1.0 by mid-century and then declines again to just below 1.0 by 2083. Note that such a fertility rate would replicate what we see today in countries like South Korea. Given the evidence of emerging ultra-low fertility rates among Generation Z, we believe that this is a realistic prospect for the United Kingdom in the coming years.

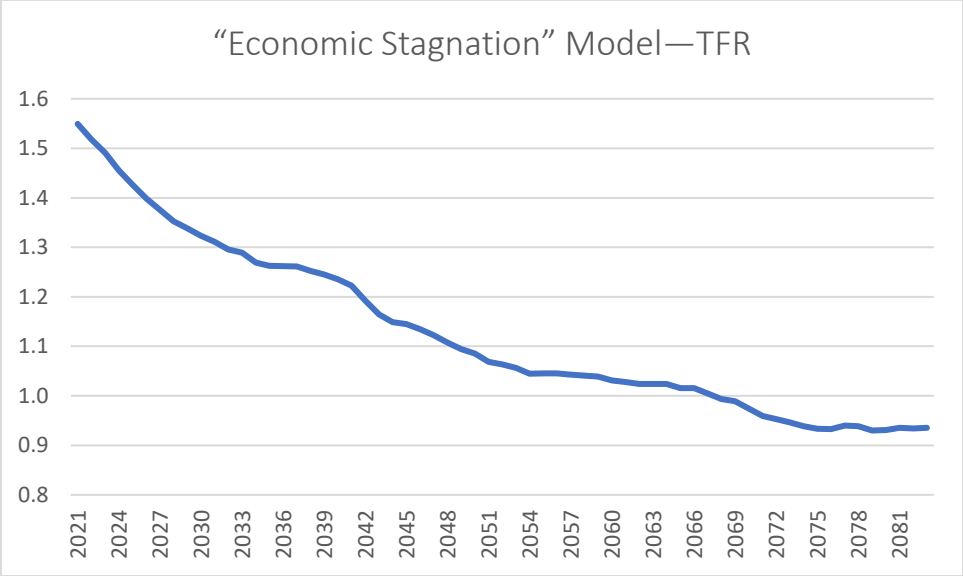

Figure 16. Source: UN data.

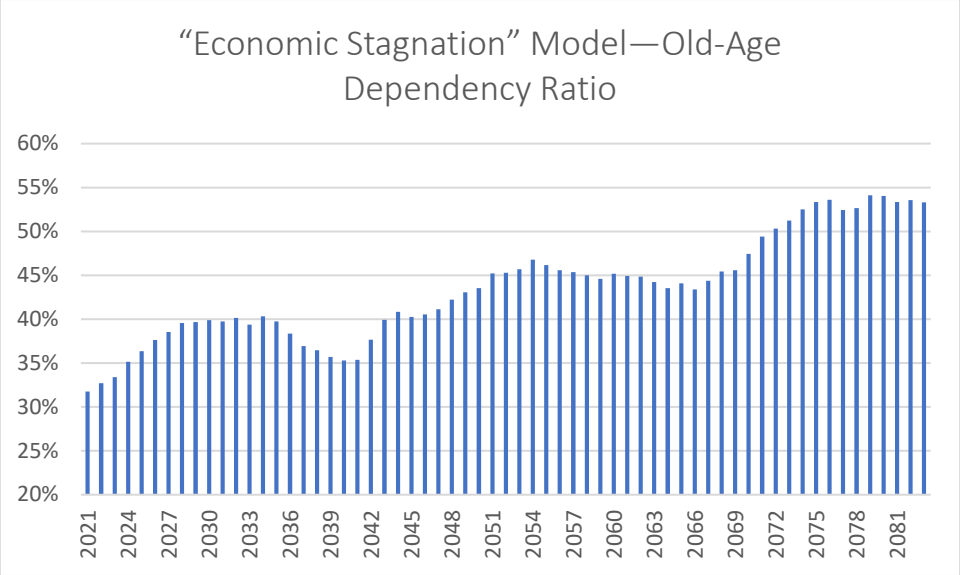

Figure 17. Source: UN data.

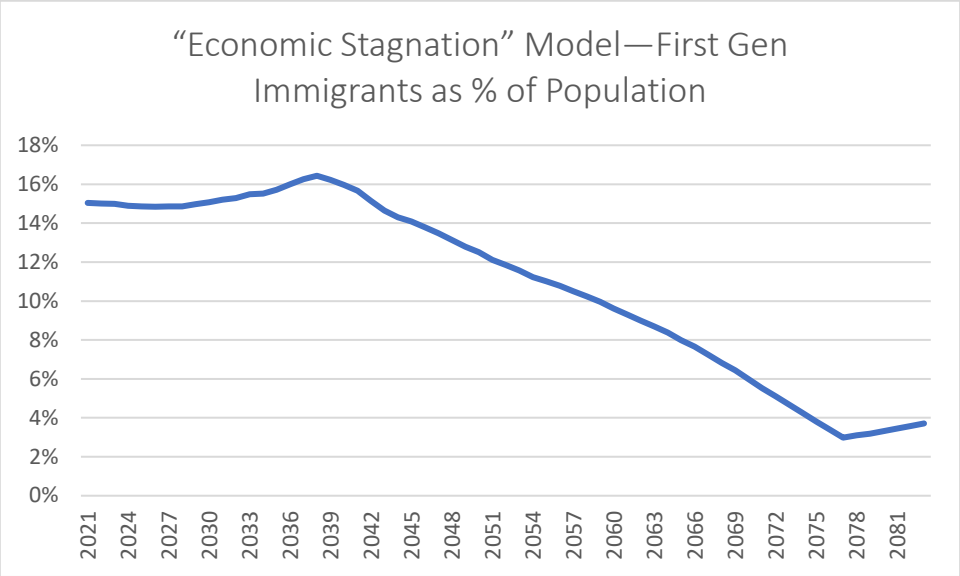

Figure 18. Source: UN data.

"More Children" Model:

For a very different outcome, we turn to our model based on Israel which we have termed the "more children" model. As with the "economic stagnation" model, we have created a somewhat stylised "more children" model. In 2023, Israel's net migration rate is around half that of the United Kingdom's.[47] Israel is therefore a relatively high migration country. Yet Israel's migration policy is atypical as it explicitly aims to foster cultural homogeneity by encouraging Jewish people to migrate to the country. This approach reflects the Israeli nation's status as being a nation predominantly comprised of Jews who are immigrants or whose ancestors immigrated in the last 100 years or so. To account for this, in our Israel model we have assumed that the United Kingdom returns, not to actual Israeli rates of net migration, but rather to more modest British levels. For this reason, we have assumed that net migration in our Israel model immediately falls by 75% in the United Kingdom as if the country engaged in immigration restriction.

Likewise, our assumptions about the United Kingdom's fertility rate in our "more children" model are stylised. Israel currently has a fertility rate of 2.9. Our Israel model is trying to understand what would happen to the United Kingdom if it implemented a successful pro-natalist policy and this policy led to (i) an immediate increase in the fertility rate to replacement levels (reflected in the graph below) and (ii) a continued steady increase in the fertility rate towards Israeli levels by 2083. We believe that this would be roughly what a successfully implemented pro-natalist policy might look like in practice. That such a policy would cause an immediate jump from 1.56 to Israel's 2.9 seems unreasonable. For these reasons, we have chosen to make our Israel model, like our Japan model, stylised for the purpose of useful exposition to policymakers.

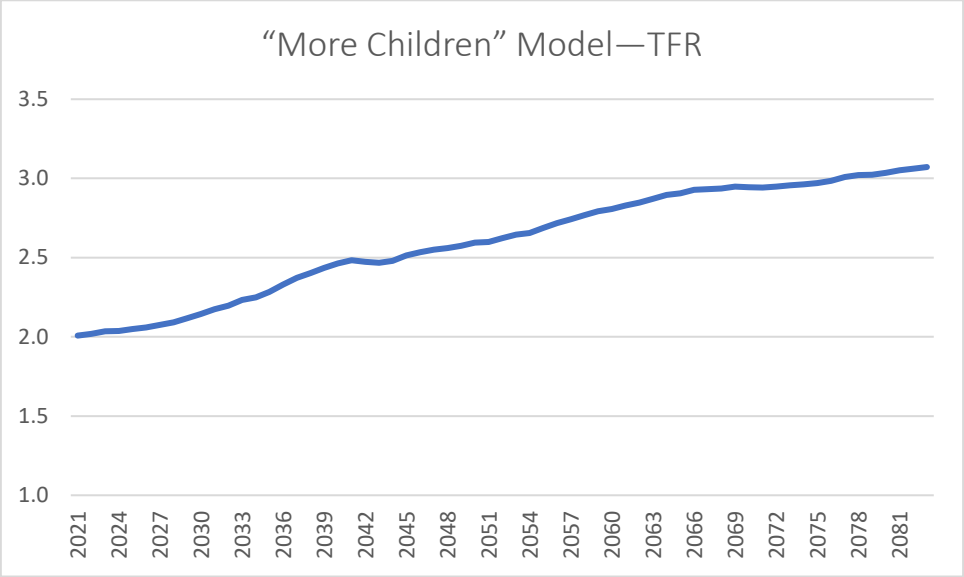

Figure 19. Source: UN data.

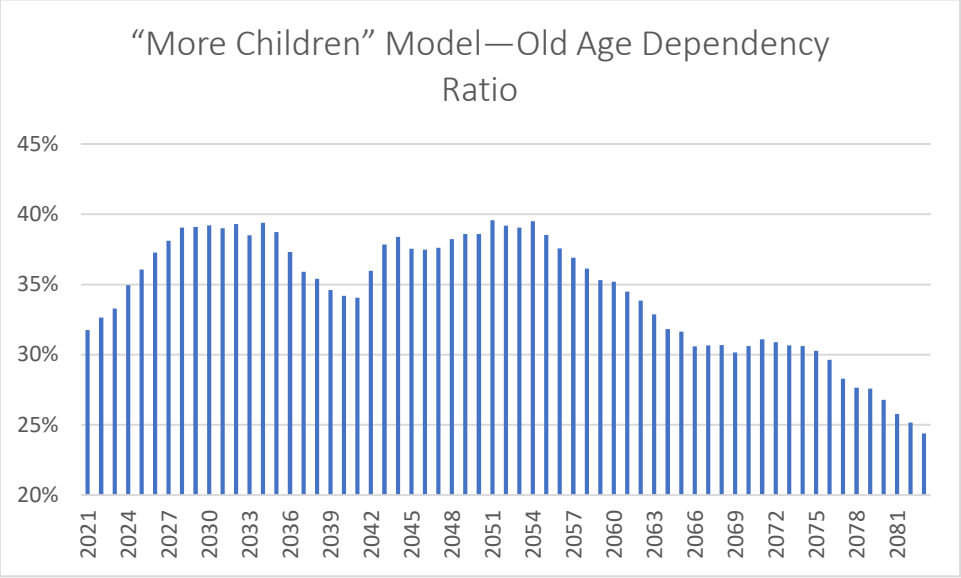

Figure 20. Source: UN data.

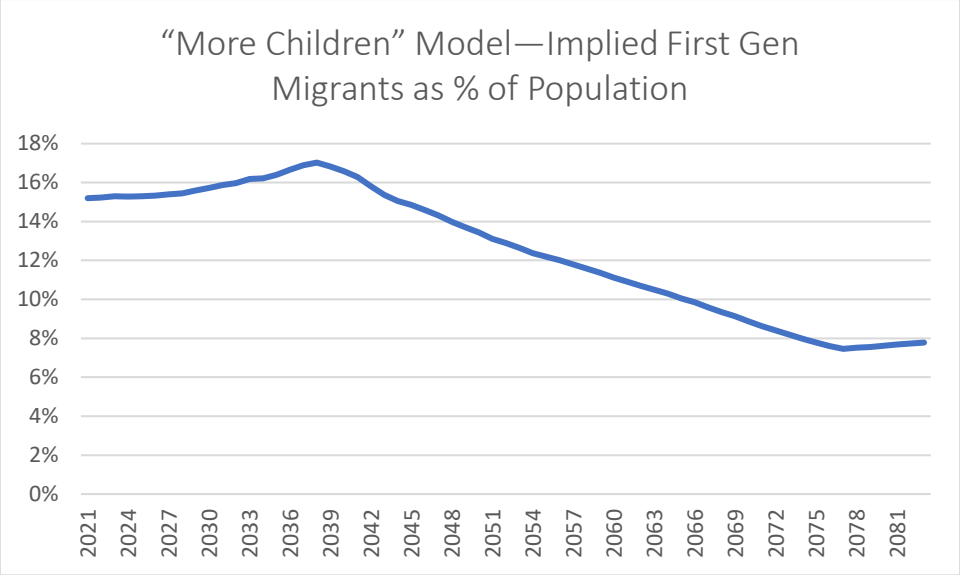

Figure 21. Source: UN data.

We include the table below to summarise the three models across a variety of different variables. While we have focused mainly on the fertility rate, the immigration ratio, and the old-age dependency ratio, our model tracks a variety of metrics. We include these below for the interested reader.

Immigrants as % of Population	2023	2033	2043	2053	2063	2073	2083
Mass Migration Model	16.9%	22.8%	26.8%	28.5%	31.0%	32.8%	37.3%
Economic Stagnation Model	15.0%	15.5%	14.6%	11.6%	8.7%	4.7%	3.7%
More Children Model	15.3%	16.2%	15.4%	12.6%	10.5%	8.2%	7.8%
Working Age Population Growth Rate							
Mass Migration Model	1.1%	0.6%	0.9%	0.5%	0.4%	0.4%	0.5%
Economic Stagnation Model	0.1%	-0.4%	-0.3%	-1.0%	-1.1%	-1.3%	-1.5%
More Children Model	0.3%	-0.2%	0.8%	0.7%	1.1%	1.4%	1.6%
(Births - Deaths)/Net Migration							
Mass Migration Model	0.11	-0.07	0.08	-0.11	-0.11	-0.16	-0.07
Economic Stagnation Model	1.04	-7.03	-7.04	-11.67	-10.25	-11.43	-10.39
More Children Model	2.13	2.24	3.86	4.47	6.25	7.64	9.61
Crude Birth Rate							
Mass Migration Model	10.09	9.90	9.90	9.74	9.90	9.88	10.18
Economic Stagnation Model	9.81	8.48	7.66	6.95	6.74	6.23	6.16
More Children Model	13.39	14.70	16.23	17.40	18.90	19.46	20.21
Total Fertility Rate							
Mass Migration Model	1.53	1.50	1.50	1.48	1.50	1.50	1.55
Economic Stagnation Model	1.49	1.29	1.16	1.06	1.02	0.95	0.94
More Children Model	2.03	2.23	2.47	2.64	2.87	2.96	3.07
Dependency Ratio							
Mass Migration Model	59.3%	59.0%	57.4%	61.0%	61.6%	64.6%	63.6%
Economic Stagnation Model	59.8%	61.3%	59.4%	63.5%	61.4%	67.3%	69.3%
More Children Model	61.3%	70.9%	75.5%	80.4%	77.7%	76.8%	71.5%
Old Age Dependency Ratio							
Mass Migration Model	32.8%	35.6%	34.2%	37.9%	38.1%	41.0%	39.3%
Economic Stagnation Model	33.4%	39.4%	39.9%	45.7%	44.2%	51.2%	53.3%
More Children Model	33.3%	38.5%	37.8%	39.0%	32.9%	30.7%	24.4%
Median Age							
Mass Migration Model	39	41	41	43	43	43	42
Economic Stagnation Model	40	43	45	47	47	50	50
More Children Model	39	40	38	35	31	30	29

Table 1. Sources: UN and ONS data.

How would we summarise our findings? First, we would point out that we have not seen the type of modelling we have undertaken pursued elsewhere. Often model results are published on fertility rates and demographic trends, but these typically avoid the question of what level of migration—much less what level of immigration ratio—would be required to achieve them. We think that this is a serious oversight and has contributed to enormous misperceptions on the part of policymakers about the underlying assumptions of many projections. We hope that our modelling has, if not provided much-needed answers to these questions, at least raised them in the minds of interested people. In the future, when policymakers are confronted with a demographics model, we would encourage them to ask the modeller what assumptions this model makes about the immigration ratio.

Our "business as usual" UK/ "mass migration" model is clearly unsustainable. To achieve a reasonable old-age dependency ratio and therefore keep the economy at levels of sustainable growth, the rates of migration required are nonsensical. The model projects an immigration ratio of over 37% by 2083. This implies that more than one-third of the population would be foreign born. This is an immigration ratio that is almost triple that which the United States experimented with in the early 20th century. The immigration ratio rises to 54% if we assume that low fertility trends among Generation Z hold and the United Kingdom has South Korean-level fertility rates by 2083, implying that most of the population would be first-generation immigrants in 60 years. We cannot stress this point enough: *even using optimistic assumptions about fertility rates the "business as usual" model for the United Kingdom assumes that immigrants make up almost three times the share of the population as has ever been successfully undertaken by any country in recent history*. Beyond that, having well over one-third of the population as foreign born—often from completely random parts of the world—sounds like a recipe for disaster. Such levels of immigration would make integration very difficult and would likely lead to the breakdown of a unifying culture and social cohesion. There is a danger that the result would be a society that is tribal and divided, leaving the remaining native population feeling embittered by the rapid change of their country. If the country tends towards South Korean levels of fertility this would result in a country inhabited predominantly by first-generation immigrants. The United Kingdom will be competing, with an ever-growing demand, for a contracting pool of potential immigrants from the shrinking parts of the world with high fertility rates.

Our "economic stagnation" model involves a sharp reduction in immigration, while the fertility rate continues to decline. In this scenario, it is unlikely that British economic growth would continue. The old-age dependency ratio would climb above 0.45 by mid-century and by 2082 it would be well above 0.5. This means that in 60 years there would be less than one worker for every retiree. The economic and social problems that such a scenario would present would be profound. In this scenario, the British economy would be effectively turned into an elderly care home economy with very little potential for growth. There is the possibility of intergenerational conflict in this model, as the young become resentful of falling living standards caused by their income being redistributed for the benefit of the ageing population.

Which brings us to our "more children" model. Where our previous two models spell doom, this model spells potential rebirth. If the United Kingdom could pursue a viable pro-natalist policy the future would look rosy for the country. The old-age dependency ratio would increase slightly in the short-term, but this is unavoidable due to years of neglect of the British fertility rate (a result of the "demographic drag" explained earlier). In the long-term, however, it would fall. We believe that the British economy would be able to weather the short-term impacts and would greatly improve as new babies boosted the workforce relative to the old-age dependents, starting in around 2055. The "more children" model would allow a reasonable level of immigration, avoiding a situation in which the United Kingdom was undertaking a potentially reckless experiment in integration. In fact, under our assumptions, the immigration ratio stabilises until around 2040 and then declines. We have tested this model for both higher and lower net migration rates and it can absorb them both. Higher rates of net migration do not

vastly interfere with the immigration ratio and lower rates do not make much of a dent in the old-age dependency ratio. The lesson we draw from this is that pro-natalist policies are vastly more powerful than lax immigration policies in positively affecting the old-age dependency ratio.

A Vision for a Better Future

The point of making the trilemma more generally known is to help people understand the choices societies face. Informed decision-making is itself a good thing. It is likely to result in a better-run society than one where decisions are taken on false premises. This understanding is also preferable to individuals or governments failing to appreciate the different choices and therefore taking decisions by default rather than through conscious choice. Moreover, by understanding the logic of the choices we face, we are less likely to be misled by demagogues and charlatans. For example, it is salutary to know the effects of immigration on the demographic structure of the country and particularly on its workforce. This insight reveals that the pressures for immigration emanate not from some nefarious plot but rather from the country's demographic reality, itself the result of the aggregate of our individual fertility choices.

Here is an overview of the different scenarios the United Kingdom could face:

- The "mass migration" model turns the country into "Immigration Airstrip One", just a place for immigrants to arrive and work to maintain an ageing core, which they will then enter as they age. Nowhere like this has ever been seen. Quite apart from the lack of any kind of unifying theme to hold the country together, this will only work as long as the United Kingdom has enough of an economic advantage and wage differential to attract such people in ever-growing numbers. As economic progress is made elsewhere, as the wage advantage diminishes, and as other countries from India, to Poland, to Mexico experience sinking fertility rates, this is not only a dystopia but ultimately one which collapses in on itself.

- The "economic stagnation" model turns the country into a "disappearing old-age home". Old-age dependency ratios like these have never been experienced. It is difficult to see how anything like this can continue to function from the perspective of the financial markets and the labour markets alone. If we are relying on technology to make this happen, we are staking a great deal on Artificial Intelligence. So far, the evidence of its ability to substitute labour wholesale is lacking. This would be a risky bet.

- The "more children" model turns the country to the kind of normality we still see in much of the world, and which prevailed in the United Kingdom in the 1950s and 1960s. Our challenge is to make it happen in contemporary conditions.

For those running the country, the choices are stark. The scenarios set out are clearly archetypes. But they illustrate that that if our country and a widening swathe of others cannot one way or another get their fertility rates up, they are heading for troubled waters.

The discussion then naturally turns to specific policy recommendations. If the "more children" model is to be preferred, it is only going to be achieved through a shift in the priorities of the generation of potential child-bearers. But it is difficult to see how this can be achieved without the intervention of political and cultural leaders. The pros, cons, affordability, acceptability, and above all the effectiveness of all of approaches—material and cultural—need to be given an airing. The discussion cannot begin

productively, however, until we first as a community and a country accept that demography needs to be a national priority and that, without a recovery in fertility rates, we are heading for decline.

There is within all of this a message of hope and of responsibility. While the prospects are grave if fertility rates are not fixed, the fertility rate required to fix the problem is not high by historic standards. The choice of couples to have two or three children on average—ideally at the higher end of the range—should not be beyond the imaginable possibilities of modern societies if they are prepared to prioritise procreation and put front and centre of their lives the greatest joy there is: to bring new life into the world, to cherish and rear it with a sense of wonder and awe. While there are actions governments can take, ultimately societies will only thrive when individual citizens of childbearing age take on the very responsibilities which their parents and grandparents assumed, and without which they themselves would not have come into existence.

Lifestyles and attitudes can adapt and change, meaning fertility rates can too. The government can also help to create a culture where family formation and increased fertility rates are encouraged. For example, between 2001 and 2008, Australia experienced an increase in fertility rates, which coincided with the introduction of measures encouraging couples to have more children. But collectively, individuals at all levels of society have a role to play in choosing the best path out of this demographic trilemma.

[1] The total fertility rate is calculated by taking the number of children born over a period, normally a year, and calculating how many children the average woman would have if that year were typical for the fertility of the currently fertile cohort of women. See Paul Morland, *The Human Tide: How Population Shaped the Modern World* (London: John Murray, 2019), 287.
[2] David Goodhart, "Too Diverse?", *Prospect*, February 20, 2004, https://www.prospectmagazine.co.uk/essays/59131/too-diverse.
[3] "World Population Prospects 2019," United Nations Department of Economic and Social Affairs, accessed August 16, 2023, https://population.un.org/wpp2019/Download/Standard/Population/.
[4] "Labour Productivity," Office for National Statistics, accessed August 16, 2023, https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity.
[5] Phil Rees and Faisal Butt, "Ethnic Change and Diversity in England 1981-2001," *Census and Society* 36, no. 2 (2004): 174; "Ethnic Group, England and Wales: Census 2021," Office for National Statistics, accessed August 16, 2023, https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/bulletins/ethnicgroupenglandandwales/census2021.
[6] Initially at least, Norman conquerors represented at most 0.5% of the population of England.
"The Norman Conquest: Women, Marriage, Migration," Our Migration Story, accessed March 30, 2023, https://www.ourmigrationstory.org.uk/oms/the-norman-conquest-of-england-women-invasion-and-migration. Some believe that the Anglo-Saxon replacement of the indigenous population never happened and that Anglo-Saxons did not amount to more than a quarter or an eighth—or maybe even less—of England's population. "Invasion, What Invasion?", The Roman Miliary Research Society, accessed August 16 2023, http://www.romanarmy.net/invasion.shtml.
However, the latest genetic analysis suggests Anglo-Saxons represented 30% or 40% of the population.
Andrew Curry, "Migration, not conquest, drove Anglo-Saxon takeover of Britain," *Science*, 21 September, 2022, https://www.science.org/content/article/migration-not-conquest-drove-anglo-saxon-takeover-england.
The Huguenot migrants to England numbered no more than 200,000 when the population exceeded five million and a similar number of Jews came in the late 19th and early 20th centuries when the population was around 40 million.
Paul Morland, *The Human Tide: How Population Shaped the Modern World* (London: John Murray, 2019), 17.
[7] "Japan Demographics," Country Reports, accessed March 30, 2023, https://www.countryreports.org/country/Japan/population.htm.
[8] "World Population Prospects 2019," United Nations Department of Economic and Social Affairs, accessed August 16, 2023, https://population.un.org/wpp2019/Download/Standard/Population/.
[9] "Japan 2023," Marcotrends, accessed March 30, 2023 https://www.macrotrends.net/countries/JPN/japan/gdp-growth-rate.
[10] "Fertility Statistics," Eurostat, accessed March 30, 2023, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Fertility_statistic; "Fertility Rate, Total," World Bank, accessed March 30, 2023, https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=US.
[11] "Vital Statistics: Jewish Population of the World 1882-Present," Jewish Virtual Library, accessed August 17, 2023, https://www.jewishvirtuallibrary.org/jewish-population-of-the-world; https://www.jewishvirtuallibrary.org/jewish-and-non-jewish-population-of-israel-palestine-1517-present; "Jewish Population Rises to 15.3 Million Worldwide, With Over Seven Million Living in Israel," Jewish Agency for Israel, accessed August 16, 2023, https://www.jewishagency.org/jewish-population-rises-to-15-3-million-worldwide-with-over-7-million-residing-in-israel/.
[12] "Israel Natalism and Nationalism," Mercator, accessed March 30, 2023, https://mercatornet.com/israel-natalism-and-nationalism/80954/. In terms of nomenclature, note that a 2020 poll found that around three quarters of Arabs in Israel defined themselves as "Israeli" or as "Israeli Arab".
"Poll: 75% Among Arab Sector Define Themselves as Israeli," Israel Hayom, accessed April 5, 2023, https://www.israelhayom.com/2020/04/23/poll-75-among-arab-sector-define-themselves-as-israeli/.
[13] Many immigrants from the Former Soviet Union to Israel meet the requirement of having at least one Jewish grandparent but are not Jewish under Jewish law. This leads to the separate question of who exactly is a Jew.
[14] Frank W. Notestein, "On Population Growth and Economic Development", Population and Development Review 9, no. 2 (1983): 345
[15] Ron Lesthaeghe, "The Second Demographic Transition in Western Countries: An Interpretation," Population and Development Review 36, no. 2 (1991): 211.
[16] "Life Expectancy at Birth: Total (years)", World Bank, accessed August 16, 2023, https://data.worldbank.org/indicator/SP.DYN.LE00.IN.
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