How Does Fertility Decline Shape State Strategic Behavior and Policy Responses in National Defense and Power projection?

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How does fertility decline shape state strategic behavior and policy responses in the realms of national defense and power projection? Fertility rates across economically developed regions have declined sharply over the past two decades, leading to profound changes in government response and action. Demographic studies have extensively focused on the economic and social impacts of low fertility, but currently, less consensus has been reached regarding its strategic and geopolitical implications. This literature review investigates this question by drawing on works from demographic studies, security analyses, and policy reviews. Focusing primarily on Russia's demographic crisis, its recent foreign policies, the war in Ukraine, and the growing strategic importance of Taiwanese semiconductors, this study examines how declining fertility could be a key contributor to government actions in response to projected manpower scarcity and the loss of power projection. This study does not argue that demographic decline directly causes conflicts and tensions, but rather examines how declining fertility functions as a structural constraint that shapes the range of strategic options available to states. The finding of this review is that existing research on this subject remains fragmented. Demographic research often emphasizes fiscal impacts without security considerations, while security studies analyze military subjects and geopolitical strategy without accounting much for demographic issues. By synthesizing these studies' findings, this literature review clarifies the extent to which demographic decline and its effects may influence geopolitical events and government actions.

Introduction

Around the world, fertility rates in major nations have declined sharply. Countries like the US, Russia, China, and Japan have all reported birth rates below the replacement rate of 2.1 births per woman[1]. This sub-replacement fertility is closely linked to population aging and the decline in the working-age population[2]. From a civilian perspective, the effects of this fertility decline are already apparent for some. Factories use robots to assemble in place of human workers. Retailers cut down on cashiers with self-checkout systems. Chatbots and virtual assistants can handle customer service without human assistance[3]. These systemic changes underscore the rapid introduction of automation into society. Under the pretext of a declining demographic, new technologies and advancements are being deployed to supplement labor shortages in the upcoming future.

However, a substantial and noticeable change is unfolding in the realms of national defense in response to the fertility decline. For the past few decades, military power has been synonymous with population and manpower, as large armies provided the bases for large-scale operations. But in the context of a declining demographic, states can no longer rely on the mass mobilization of human capital. Currently, unmanned systems and artificial intelligence are drastically reshaping military strategies and warfare dynamics. Analysts have noticed and stated that governments alter their policies, change their strategies, and try to adapt as they respond to the underlying demographic issues and fertility decline[4].

Methodology

This study employs a literature review approach, synthesizing peer-reviewed scholarship across three fields: demographic studies, security and defense analysis, and government policy review. Sources were identified through systematic searches of academic databases including JSTOR, Google Scholar, and PubMed using keyword combinations such as "fertility decline and geopolitics," "demographic scarcity and military," "Russia and demographic crisis," "passportization," "unmanned systems and Ukraine," and "semiconductor and national security." Beyond peer-reviewed journal articles, only UN reports and government publications are cited. Sources were excluded if they lacked peer review, were opinion editorials, or were not relevant to the topic. Data from selected studies were organized thematically around four areas: Russia's demographic crisis, population-augmenting foreign policies, wartime technological adaptation, and semiconduc-

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tor geopolitics.

Discussion: Russia's Demographic Crisis

Russia entered the 21st century with one of the most severe demographic crises in the world. After the collapse of the Soviet Union, fertility decline, emigration, and high mortality rates all combined to produce an acute demographic crisis[5]. Since the collapse of the USSR, emigration has remained a persistent feature of Russia's demographic landscape, and the post-2022 period has produced additional outflows. The total fertility rate (TFR) dropped to just 1.2 children per woman during the mid-1990s following the Soviet collapse[6]. Though modest recovery did occur in the late 2000s, supported by state incentives such as the "Maternity Capital" program, Russia's fertility rates have never fully recovered. Even worse, recent estimates indicate a renewed decline in Russia's fertility in the late 2010s and the early 2020s[7].

Russian demographer Anatoly Vishnevsky has warned that these trends will result in a major reduction in the workforce, precisely when Russian industries need them most[6]. The United Nations' *World Population Prospects* further concluded that even under optimistic scenarios, Russia's population will shrink by millions by the mid-century[8]. These predictions also foreshadow mass labor shortfalls and can increase pressure on Moscow to adapt economic and security policy under tighter manpower constraints. The examination of Russia's demographic crisis is important as it connects to analysts' views of the responses governments employ for demographic decline[4].

Demographic Scarcity and Russian Response: Foreign Policies and Ukraine

How a country defines and counts its population often depends on one's own interpretation. In Russia's case, it conceptualized the act of "passportization," or the mass issuance of Russian passports, which has been used on regions such as Abkhazia and South Ossetia in Georgia as a method to artificially inflate population figures. Nagashima argues that these policies can be reflected as the result of Russia's attempt at repopulation and demographic augmentation: incorporating people into Russia's legal and political categories without necessarily producing demographic growth through natural births[9]. This technique is administratively quick compared to natalist policies; it is also scalable in contested spaces, where Russia can leverage documentation and legal status as tools to incorporate more people into its territory.

Nagashima notes that this technique is particularly common in unrecognized republics and states bordering Russia, stating that simplified naturalization is a flexible foreign policy that allows Russia to expand the state's legal population[9]. International reporting on Russian control practices in occupied territory shows that "passportization" can operate together with administrative integration - linking rights such as jobs, housing, and services to citizenship. This increases the state's ability to treat residents as part of its governed population[10]. Wherever these policies are implemented, Russia also extends its standard federal institutions to the occupied regions, including courts, pensions, and, critically, also conscription. Conscription would allow the Russian government to recruit manpower and labor from these regions whenever it needs.

This brings the narrative to Ukraine, where in 2014, Russian separatists and military forces annexed Crimea and parts of the Donbass region in Ukraine. In a study on the Russian annexation of Crimea, Charron characterizes the peninsula's occupation as an act of "recolonization" by Putin[11]. Having formerly been part of Russian territory, Crimea underwent many policies that allowed it to re-integrate into Russia. Administrative absorption into its federal system, in-migration from Russia itself, and the out-migration of those who are unwilling to live under Moscow's control would condition Crimea to integrate under Russia's authority, given enough time. Every step reconfigured the population of Crimea to condition itself under Russia's authority. As per UN reporting documents, both the displacement of Crimean residents into mainland Ukraine and the relocation of Russian citizens into Crimea occurred in the years after 2014, contributing to measurable demographic change within the region; this inclusion added as much as 2.5 million people into the Russian population[10]. This sequence may have helped establish a template for population-augmentation policies that Russia later replicated in later phases of the war[11].

However, it is important to note that the annexation of Crimea by Russian forces was not without cost. It was met with overwhelming international backlash, especially from the US and countries in the European Union, who called the annexation unlawful and illegal[12]. In response to the annexation, these countries collectively imposed a series of economic and diplomatic sanctions on Russia. The UN General Assembly also refused to acknowledge the newly established government of Crimea under any circumstances[12]. By late 2014, trade restrictions plunged Russia's economy into stagnation, followed by a year-long recession in 2015 that severely weakened its economic position[13].

"Replenishment" of Russian Population: Annexation and Net-population Calculus Analysis

Because passportization and annexation legally enroll the citizens and residents of annexed territories as "Russian" under Russian law, a common claim within pro-Russian sources is that the war has actually "replenished" Russia's population, at least on paper. In a study on Russia's demographic devel-

opment, "replenishment" is stated in four distinct senses: (1) juridical incorporation, often by citizenship or legal status, (2) statistical inclusion in state population counts, (3) de facto resident population on the ground, and (4) the size and availability of conscription-eligible cohorts[5]. Indeed, Russia's net total population has increased compared with its pre-war census, as official headcounts can show an immediate "increase" when newly claimed territories are added to administrative statistics, as occurred after the 2014 annexation of Crimea[11].

However, this assertion by the Russian government hinges on a statistical change rather than on an unambiguous demographic gain. Contemporary international law notes that forcible annexation does not transfer the sovereign title or the legal character of the population under law. In other words, counting occupied populations as residents of one's own is against international law, making Russia's conversion of occupied residents into Russians illegal[14]. Specifically, this claim follows from the post-1945 prohibition on territorial acquisition by force and the associated duty of non-recognition, which Russia directly breaches and thus renders its claims over Crimea and other parts of Ukraine invalid under international law[14]. And even if annexation and forced passportization processes did restore populations on paper, the residential population of occupied zones is highly fluid. Large-scale displacements outward from occupied zones, as well as the movement of fighting-age males, complicate any record of a stable population in annexed regions.

Additionally, peer-reviewed research also puts the annexation and integration of the Ukrainian population within a broader project for Russia, one of "imperial supremacy," that envisions that a common civilizational space should be "gathered."[15] The paper analyzes how Russia's justificatory repertoire puts the incorporation of people and land as reunification rather than expansion. This is viewed by many as "imperial expansion" by the Russian government — a term used to describe Russia's attempt to revert to its old ways of expansion and militarism. The research describes the perspectives scholars had about Russia's foreign policies before 2022, and their predictions for Russia to act as a "modern country" under international norms[15]. This means that no outright military force will be used. However, it is contradictory to their belief, and their predictions were proven false by Russia's decision to invade and commit to a full-scale war in 2022. The 2022 Russo-Ukraine War puzzled many scholars as to why Russia would commit to such a risky and costly decision just because of its claims of national security. Before the annexation of Crimea, Russia's GDP reached an all-time high of $2.29 trillion, only to fall to an all-time low of $1.28 trillion in 2016, primarily due to economic sanctions imposed by the West following the annexation of Crimea[13]. Thus, many expected Russia to adapt and divert from its aggressive foreign policies, not double down on them. At the same time, however, this paper does not treat demographic scarcity as the sole reason for annexation. It emphasizes a mixed set of drivers, mainly security aims, coercive leverage over neighbors, and ideological projects. Therefore, demographic constraints are set within the background of other geopolitical causes when considering government action and response, preventing the assumption that demographic decline is solely responsible for state behavior and policy implementations[15].

Causation between low fertility rates and Russia's decision to invade Ukraine is not specifically claimed. Instead, the main argument made by these studies is that population-augmenting methods of annexation became more available to Russia as it progressed, making it easier to explore artificially boosting its population figures under other political influences.

Overall, the annexation and forced passportization are designed to convert populations of occupied territories under Russian law, statistical figures, and potentially, even manpower reserves. So far, they have successfully achieved the statistical expansion of their population under Russian law, despite major international backlash. However, a counter-argument could be made that even where passportization increases legal legibility for the occupied population, its primary function may be political control and projection rather than demographic engineering. A definitive answer to explain Russia's actions is impossible[15]. Russia's supposed "imperial restoration" justifies the political and economic payoff that is involved in juridical population-gathering. It remains true that the process of this annexation naturalization instrument could be used and deployed faster than any demographic-improving policies naturally, even if it means the long-run issue still remains.

Wartime Changes: Drones, Automation, and Global Implications

The war in Ukraine eventually escalated to the full-scale war in 2022, when Russian forces attacked and crossed into Ukraine proper. Since the beginning of the war, military casualties have soared while neither side gained significant progress. The conflict marked the largest European war since WWII, and it fundamentally changed battlefield tactics and military strategies as new technologies constantly changed the way they fought[13].

Initially, Russia invaded Ukraine with its traditional tactics adopted from Soviet doctrine: "Deep Battle" tactics that insisted on a wave of attacks on an enemy line until a weak point was found to be exploited; vertical envelopment attempts by using paratroopers behind enemy lines; combined arms in the synchronized use of infantry, armor, artillery, and air support[16]. Within the first 48 hours, these tactics proved decisively ineffective. The armored columns were deployed without proper infantry support and supplies; the paratroop-

ers (VDV) dropped in Hostomel Airport couldn't hold on to their capture as reinforcement failed to reach them in time; the Russian air force also couldn't achieve air superiority and the complete domination over an airspace. Ukrainian air defenses proved more resilient and potent than the Russians initially predicted[16]. The Russian military couldn't outmaneuver the enemy, it couldn't reach Kyiv, nor could it sufficiently track and destroy Ukrainian forces fighting with guerrilla-style tacticsa[17].

On the other hand, Ukraine adopted a new style of warfare. It effectively utilized new technologies alongside maneuver defense to neutralize Russian army concentrations. Ukraine effectively utilized a "hit and run" tactic with small teams of 2–4 soldiers to stall Russian movement. They also adopted a decentralized, more adaptive command chain in order to allow units to operate more independently and rapidly[18].

By late 2022, both sides had normalized the use of FPV (first-person-view) kamikaze drones for precision strikes against armor, artillery, logistics, and other assets of military value. FPV rigs and commercial quadcopters are all extremely cheap to produce compared to traditional precision systems, and the targets they damage and destroy are far more numerous and costly[18].

This transition is described as the rise of "air-littoral," a dense layer of airspace just above ground level, where small unmanned systems conduct ISR (intelligence, surveillance, and reconnaissance), fire adjustment, and precision attacks[18]. A sustained peer-reviewed synthesis of battlefield learning in Ukraine documents how thousands of commercial quadcopters, FPV rigs, and loitering munitions routinely shaped tactical campaigns and operations for both sides during key battles[18].

Another study highlights why drones have become so widespread amid severe casualties. They reallocate labor, shorten the kill chain, and raise the effectiveness per person on the front[19]. So when recruiting and training processes are strained, manpower constraints could be partially alleviated with the help of digital targeting. This allows small teams to sustain coverage over a wide area that would otherwise require larger cohorts[19].

However, the downside of this strategy is that it effectively turns the war into a grueling conflict of attrition. Sustained performance now heavily leans towards resilient communications, reliable logistics, and a major upscale in the production of drones and other unmanned systems. The lethality of war in this new context is also drastic. For comparison, drone-enabled warfare in Ukraine has been as deadly, if not more deadly, than legacy tactics and technologies employed in wars before 2022[18]. For Russia, sustained casualties among military-age males continue to persist, tightening the already dire demographic issue for Russia's future. It is estimated that over 5% of the total population between the ages of 20 and 40 are serving in the Russian military[7].

Meanwhile, the study found that the birthrate of Russia has dropped to levels comparable to those after the dissolution of the Soviet Union[7]. In Ukraine, the situation is even worse. High casualties continue to shrink the dwindling pool of military-age personnel, while the emigration of millions strips Ukraine of its demographic structure. Uncertainty has further collapsed the Ukrainian fertility rate, with its fertility rate standing at only 0.98 births per woman at the end of 2023, far below the replacement rate[20]. This context helps explain the increased institutionalization of unmanned systems, and technologies are increasingly being used to supplement the manpower shortages as the war continues.

It is worth noting, however, that not all states facing demographic decline have responded with military aggression. Countries like Japan, South Korea, and Germany all face comparable or even more severe fertility crises, but have pursued the problem entirely differently. These nations have invested heavily in pronatalist fiscal policies, including cash birth incentives, expanded parental leave, and childcare subsidies as mechanisms to stabilize their fertility rates[21]. However, countries experiencing this decline often turn to automation and technology as well[3]. For example, Japan, South Korea, and Germany have adopted industrial automation and robotics at significantly higher rates than the global average, channeling demographic pressure into technological investment[3]. This counter-case suggest that demographic decline does not inherently produce aggressive state behavior; rather, the nature of a government's response heavily depends on the context of other factors.

Yet regardless of whether states pursue pronatalist policies or military solutions, all paths increasingly converge on a shared dependency on advanced semiconductor technology. The automation technologies reshaping both civilian economies and modern warfare require advanced semiconductors to function - especially those produced in Taiwan[22]. This dependency connects the demographic pressures faced by aging societies worldwide to a single strategic chokepoint.

The Demand for Semiconductors: Taiwan

As explored previously, unmanned systems have become critical to both Russia and Ukraine as they face a shortage of manpower and labor[18]. These systems and technologies require an enormous and continuous supply of semiconductors in order for mass implementation. Since the outbreak of the Russia-Ukraine war, many studies have determined how the strategic utility of semiconductors has grown, with the likes of drones and other autonomous weapons in high demand after their proven effectiveness in combat[23].

In recent years, semiconductors have become a direct source of geopolitical tension, especially in East Asia, where

Taiwan continues to dominate the semiconductor and chip industry. Corrado documents in his analysis of the Indo-Pacific chip network and argues that global semiconductors rely on only a couple of advanced fabrication sites, particularly those in Taiwan operated by TSMC. He calls what Taiwan has produced a "dual imperative": a world that depends on semiconductors for economic purposes[24]. This tension has only intensified post-2022. Every major country has kept a keen eye on the Russo-Ukraine War, and with it, the importance of semiconductors has come to the fore; chips and automation are now more relevant. In Corrado's study, congress explicitly pointed out: "If a potential adversary bests the United States in semiconductors over the long term or suddenly cuts off U.S. access to cutting-edge chips entirely, it could gain the upper hand in every domain of warfare." And in the case of the "potential adversary," the most likely candidate that the statement is referring to is China[24].

According to the U.S. International Trade Commission in 2023, Taiwan alone is responsible for over 85% of the world's advanced chip output[25]. China already engages in mass-production schemes that dwarf the US in industrial capacity. This means that, given the technologies available in Taiwan, China would gain the upper hand and be able to outproduce and outmatch its opponents over time[26]. Thus, this makes the Taiwan Strait a major hotspot of political tension, as the two superpowers compete with each other over the strategically critical supply.

These figures reveal that in the context of the Russo-Ukraine War, governments are starting to recognize the importance of semiconductors, which are essential to a modern military. This becomes relevant for countries facing a declining demographic, such as Japan, the UK, and South Korea. They have already committed major efforts and resources to keeping the semiconductor chain running, as it becomes increasingly crucial for them to replace their dwindling labor pool with technology. The demographic and fertility declines within these countries have made semiconductors an immensely vital resource[22]. Furthermore, in response to the vulnerability of Taiwan's supply concentration, the US and its allies have implemented export controls and domestic incentives, such as the CHIPS Act, in an effort to boost domestic production and reduce their dependence on Taiwan[26]. Scholars have also highlighted the US' attempt at cutting its geopolitical rivals off from this crucial technology - mainly China and Russia. This literature review makes the assessment that every major power now treats chip access as a national security matter[22].

Conclusion

Across the cases reviewed in this literature review, a pattern of low fertility rates and demographic decline prompts governments to respond and change their behavior. Clearly analyzed in this review is Russia, from its passportization schemes and illegal annexations, to the fertility decline and its unsuccessful war in Ukraine. This, in turn, prompts a rapid shift towards autonomous systems and, subsequently, a struggle over semiconductors, as presented in studies such as Corrado's and Wang's research. From this perspective, demographic decline appears to affect, directly or indirectly, the very choices that states make to preserve or project power. However, it is important to consider that the paper's core finding is not that "fertility decline causes conflict." Still, demographic decline can operate as a structural constraint that impacts how governments react, often leading to adaptations and other options to overcome this constraint.

The research reviewed does not suggest or point towards a single definitive conclusion. Instead, the studies included in this review vary in how directly they connect declining fertility rates and demographics to geopolitical responses. Some focused on how manpower shortages erode a nation's labor force and defense capabilities; others noted the growing importance of automation as a response to these trends. While none of these explicitly argues that demographics cause conflict, one can observe governments' actions and see them as relevant to their consideration. The pressure of declining fertility is real, and it varies depending on the kind of response different governments pursue. This addresses an alternative-explanation concern. In Russia's case, ideology, regime incentives, wartime adaptation, and sanction-related economic pressures are all plausible motives for its actions. Still, demographic constraints should be treated as a significant interactor with these drivers, not as a full substitute for them.

Territorial annexation, population absorption, the industrial upscaling of unmanned systems, and AI all reflect the effects of a declining demographic. These trends could be documented in the economically developed regions around the globe, and these adaptations are not isolated. They occur wherever demographic and fertility declines happen, and often in the prospect that there will be fewer young people to mobilize and fewer people to work, at least statistically. This effect, highlighted in the literature review, has caused a greater dependency on technological substitutes according to multiple peer-reviewed sources.

Another effect analyzed in this review is the rise of warfare technologies, such as drones and unmanned systems, and, consequently, the increased demand for semiconductors critical to warfare. While it is definitely driven by other incentives, multiple studies have pointed out that the importance of advanced semiconductors and chips cannot be ignored in warfare. Thus, the international attention around Taiwan has become even more volatile than before, with semiconductors now playing a decisive role in a country's military capability. Access to advanced chips has been assessed by many studies for their necessity in maintaining national defense and secu-

rity.

The full implications of these trends described in this literature review are yet to be fully examined. As the world continues to experience fertility decline, tensions and conflicts are certain to arise, but it is uncertain whether they are directly due to declining demographics.

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