

# High Unemployment and the Armed Forces: The Costs and Benefits of Recruiting Military Personnel in Norway

## Authors:

Petter Y. Lindgren, economist, Norwegian Defence Research Establishment (FFI),  
petter.lindgren@ffi.no

Ane Ofstad Presterud, economist, Norwegian Defence Research Establishment (FFI), ane-  
ofstad.presterud@ffi.no

## Abstract:

The SARS-CoV-2 pandemic, the subsequent non-pharmaceutical interventions by governments to reduce the transmission of the coronavirus, and adjusted consumer behaviors have resulted in high unemployment rates worldwide. In this paper, we explore whether the Norwegian Armed Forces can exploit this period of high unemployment to strengthen security and defense in Norway while increasing the job opportunities for young individuals in a difficult labor market. Before the pandemic, the Norwegian government had planned to gradually increase the number of personnel in the armed forces. Hence, an expedited recruitment strategy may improve welfare. We calculate the costs and benefits to Norwegian society of a strategy that exploits the hike in unemployment rates to recruit new personnel to the armed forces at a faster rate. We find that the expedited recruitment strategy will likely provide net benefits to society if the unemployed have a fair chance of being employed. However, we stress that there must be a real need for higher defense spending, it is difficult to estimate the economic value of defense production, and there may be a trade-off between the goals of labor market policies and those of defense policies.

## Introduction

The SARS-CoV-2 pandemic, the subsequent non-pharmaceutical interventions by governments to reduce the transmission of the coronavirus, and adjusted consumer behaviors have dramatically lowered demand, production, and employment worldwide. In turn, economies have entered recessions. Policymakers now search for efficient mitigation policies to reduce unemployment and the economic and social costs of displacement.

One way to fight unemployment is for the public sector to hire more employees. Although few economists recommend countering short-term negative business cycles with the permanent expansion of the public sector, such an expansion is reasonable under certain circumstances. If a society already plans more human resources to a specific public sector, regardless of business cycle, a more rapid expansion of the personnel base can make economic sense during a bust.

In April 2020, a few weeks after the March interventions to hinder the spread of the coronavirus, the Norwegian Ministry of Defense (MOD) proposed a long-term plan for the armed forces that included a gradual increase in the number of military personnel and conscripts from 2021 to 2024. With a soaring unemployment rate that peaked at four times the normal unemployment rate in April 2020, there was clearly leeway in the economy to expand the armed forces faster than the original plan allowed for. In December 2020, after political negotiations and further planning, a majority in Parliament agreed on a long-term plan with the expedited recruitment of new personnel.

In this study, we investigate the costs and benefits of an expedited recruitment strategy based on the already-planned personnel expansion of the Norwegian Armed Forces. Although the plan involves both professional military personnel and conscripts, we only focus on the former group. In effect, we assess whether armed forces in advanced economies can exploit the current period of high unemployment to strengthen national security and defense while also increasing the opportunities for young individuals in a difficult labor market. Crucially, the benefits of expedited recruitment rely on a planned gradual increase of personnel in the armed forces.

Economists agree that unemployment is expensive for individuals and societies due to production loss. Furthermore, numerous studies in labor economics have shown that recessions and mass displacements have negative effects on workers, impacting their future wages and careers (Wachter and Bender 2006; Couch and Placzek 2010; Kahn 2010; Altonji, Kahn, and Speer 2016).

From an economic point of view, the assessment of the costs and benefits of a project to speed up the recruitment of military personnel in the armed forces is associated with several challenges. First, the societal need for more military personnel must be high to reasonably prioritize the armed forces over other public sectors or the provision of tax cuts or cash transfers to Norwegian citizens. Hence, we examine the arguments given by security and defense planners for expanding the armed forces.

Second, increasing the labor input to the armed forces does not necessarily improve the outcomes that citizens care about, namely peace, security, and sovereignty. Thus, we review the literature on defense economics to provide insights into the obstacles that policymakers and voters face in obtaining their desired defense and security outcomes.

Third, the labor market must improve for the expedited recruitment strategy to be of significant interest during the bad business cycle caused by the pandemic. Therefore, we discuss the potential tensions between labor market policies and defense policies and how the recruitment strategy may affect the labor market opportunities for unemployed and employed workers.

After addressing these three issues, this study presents a cost-benefit analysis (CBA) model and its main assumptions. We provide our results for Norwegian society using a CBA model and examine various changes to its underlying assumptions. Notably, the results highlight some assumptions that may impact the estimated net benefits of the expedited recruitment strategy if they are altered. Finally, we calculate the fiscal effects of the proposed strategy on the MOD and Ministry of Finance (MOF).

## **The need for an expansion of the Norwegian Armed Forces**

NATO and, in particular, the United States have played a fundamental role in the orientation of Norwegian security policies throughout the Cold War and beyond. Norway's main security threat during the Cold War was the Soviet Union. NATO policymakers were particularly interested in Northern Norway due to the Soviet Union's easy access to the Atlantic Ocean and the expansion of its Northern Fleet, which contained over 90% of its ballistic missile submarines, at the Kola Peninsula (Børresen, Gjeseth, and Tamnes 2004; Johnson, Hove, and Lillekvelland 2017).

In the 1990s, the threat from the east decreased as Russia withdrew its forces from Central and Eastern Europe and the economic downturn reduced its military capabilities (Børresen,

Gjeseth, and Tamnes 2004). Norway collected the ‘peace dividend’ by reducing its spending on the armed forces from around 3% of GDP in 1990 to less than 1.5% in the early 2010s (Johnson, Hove, and Lillekvelland 2017).

Norway’s perception of national security changed following Russia’s military modernization program and, more specifically, the annexation of Crimea and intervention in Eastern Ukraine. In response to this provocation, NATO members called for rearmament. In the 2014 Wales Summit, NATO members pledged to aim for increasing defense spending to a minimum of 2% of their gross domestic product (GDP) over the following decade.<sup>1</sup> In addition, the United States’ increasing preoccupation with a rising China has increased the fear of abandonment in Oslo. Hence, Norway is clearly willing to demonstrate its commitment to the alliance. The American hegemony has been challenged by other great powers such as China and Russia, which has implications for how Norway perceives its main ally’s willingness and ability to provide security in Scandinavia.

Although free- or easy-riding is expected in alliances that provide a public good (Olson and Zeckhauser 1966; Sandler and Hartley 2001), the Norwegian government has increased its defense budget from 1.37% in 2013 to an estimated 1.89% in 2021.<sup>2</sup> Moreover, the MOD plans to substantially increase spending and increase the personnel in the armed forces over the next four to eight years (Forsvarsdepartementet 2020a).

Given the increasingly complex and uncertain security situation with a belligerent Russia, the relative decline of the United States’ power potential, and the rise of China, the Norwegian government intends to spend 2% of the GDP on defense in 2028. The aim is to secure Norway’s territory, sovereignty, and democratic regime and fulfill its obligations as a member of NATO.

According to the security and defense establishment in Norway, increased spending on the armed forces will improve territorial integrity and secure national sovereignty. The Norwegian Chief of Defence (CoD) (2019) has argued that because the security situation in Norway has deteriorated, Norway must both take ‘a greater responsibility for its own security’ and contribute more to the ‘deterrence and defence capabilities of NATO.’ The CoD has proposed four different plans to build up the armed forces until 2028. However, only the most expensive one would be ‘appropriate for the security situation’.<sup>3</sup>

In addition, the Norwegian Defence Research Establishment (FFI) has highlighted the need for more manpower to improve the armed forces in an increasingly complex and uncertain security situation (Skjelland et al. 2019). The FFI exploits scenario planning to understand threats and possible futures as well as war games and simulation models to understand the performance and efficiency of adjustments to the military structure. A long-term perspective allows for tasks, structures, and finances to be balanced, taking into account concerns such as defense-specific cost inflation (Hove and Lillekvelland 2016), planned personnel and wage increases,

---

<sup>1</sup> [https://www.nato.int/cps/en/natohq/official\\_texts\\_112964.htm](https://www.nato.int/cps/en/natohq/official_texts_112964.htm)

<sup>2</sup> Source: Defense budgets from the MOD (Forsvarsdepartementet 2012; 2020b), gross national product (GDP) numbers from Statistics Norway, including estimates for the GDP in 2021 (SSB 2021).

<sup>3</sup> For interested readers, the advice from the Chief of Defence contains information on the number of units of weapon systems, number of personnel, and strengths and weaknesses with each build-up approach. An abridged English version is available here: [https://www.forsvaret.no/aktuelt-og-presse/publikasjoner/fagmilitaert-rad/FMR%202019%20english.pdf/\\_attachment/inline/f85fc95d-3364-406a-9d02-6373fb325414:a477b4d241c42381174de9924caae62d9c02c248/FMR%202019%20english.pdf](https://www.forsvaret.no/aktuelt-og-presse/publikasjoner/fagmilitaert-rad/FMR%202019%20english.pdf/_attachment/inline/f85fc95d-3364-406a-9d02-6373fb325414:a477b4d241c42381174de9924caae62d9c02c248/FMR%202019%20english.pdf)

uncertainty in international deployments (Fetterly and Solomon 2015), and the affordability of manpower, weapon systems, equipment, and infrastructure (Melese 2015).

The defense and security establishment attempts to understand threats to Norwegian security, sovereignty, and territorial integrity and then provide optimal solutions to advance the armed forces, given the budget constraints of the MOD. The establishment has, among other things, suggested an increase in the number of military professionals. However, to conduct a CBA, we must determine the value that an increase in the personnel structure of the armed forces brings to Norwegian citizens and society. In the next section, we explore the defense economics literature to shed light on the complexity of this determination.

### **The value of increased defense production**

To conduct a CBA on the armed forces, the analyst needs a reasonable understanding of the value of defense and security production. Unfortunately, the social value of the provision of defense and security goods and services in a given political community is difficult to calculate for numerous economic reasons. To shed light on this issue, we apply several concepts from production theory.

#### *Inputs, outputs, and outcomes*

Personnel (labor and human capital) as well as weapons systems, infrastructure, and equipment (capital) are the *inputs* in the production of defense goods and services, whereas the *outputs* are military units such as battalions, squadrons, fleets, and wings. The ultimate objective of defense production is not such outputs, though. Rather, citizens value social *outcomes* such as peace, security, and sovereignty. While the defense organization has some degree of control over the production of defense outputs, the outcomes rely on both defense outputs and a host of non-discretionary variables. These variables include allies' willingness and capability to support the maintenance of peace and sovereignty of the country at hand, threatening state<sup>4</sup> and non-state actors' behaviors, defense-specific cost increases, and the business cycle and conditions in the domestic labor market.

The differences between outputs and outcomes are usually summarized as efficiency, the ability to do things right, and effectiveness, doing the right things (Førsund 2017; Hanson 2019a). They can also be referred to as technical and allocative efficiency, respectively (Hartley and Solomon 2015). The optimal defense production strategy is to make sure that i) the most effective mixture of defense capabilities is produced, given the present costs and environment; ii) these capabilities are produced with the most cost-effective outputs; and iii) each output is produced in the most efficient manner (Hanson 2019a; see also 2016; 2019b). Nevertheless, this is easier said than done. Defense economics literature has highlighted many of the challenges involved. Although defense organizations share some of these challenges with other public sectors, others are unique to defense production.

#### *Defense is a public good*

Defense outcomes – peace, sovereignty, and security – and defense production itself are public goods in that one citizen consuming them does not reduce the consumption of other citizens (non-rivalry) and no citizen can be excluded from consumption once peace or defense has been

---

<sup>4</sup> For the literature on threats, see e.g. Brummer (2020), Oren and Brummer (2020) and Lindgren (2019).

provided (non-exclusion) (Hartley 2012). The value of public goods is the sum of every citizen's valuation of them. Since public goods are non-excludable, however, people are incentivized to underplay their preferences for defense production and defense outcomes (i.e. an easy or free ride). Although this issue can be dealt with theoretically, it is notoriously difficult to study empirically (Cornes and Sandler 1996). Moreover, while people probably have a firm understanding of their valuation of a beer or a bicycle, it may not be reasonable to assume that everyone understands their willingness to pay for outcomes such as peace, security, and national sovereignty. Perhaps this is why citizens only grasp the real values of these outcomes once they are lost.

The impact of non-discretionary environmental variables on social outcomes further complicates how citizens should value defense production. This is particularly important for a small state like Norway, which has experienced for centuries how European great powers have influenced and, indeed, determined its fate. Is peace today dependent on the size and quality of the Norwegian defense or just contingent on the involvement of the United States in Northern Europe? Is Russia a potential threat to Norwegian sovereignty? Or do the Russians only care about the territory of the former Soviet Union? Evidently, it is difficult to reasonably estimate how national defense outputs contribute to achieving favorable social outcomes like peace, sovereignty, and security. Likewise, it is difficult to assume that all citizens can have full knowledge of the utility of defense production per se. Even experts in areas such as international relations, security studies, and military and defense production have trouble agreeing on the impacts of defense production on social outcomes.

#### *Valuation challenges with the public provision of services*

When dealing with public sector production (e.g. defense, education, and health care), analysts cannot use the output price as a guide to determine the social value of the production. For private goods sold in markets, the price represents the marginal value for the consumers, and the total profits in the market constitute the producer surplus. Even in private markets, however, we lack information on the consumer surplus, which is an important part – perhaps the most important part – of social value. Hence, the price does not 'revea[l] society's valuation of output' (Hartley and Solomon 2015: 38). Rather, it only reflects the valuation of the marginal output.

Nevertheless, the price mechanism serves other instrumental functions for private goods provided by the market, as these goods are characterized by 'both excludability and rivalry; large numbers of private consumers and buyers; rivalry between firms; motivation and rewards through profits; and a capital market that imposes penalties on poor economic performance through take-overs and the ultimate sanction, bankruptcy' (Hartley and Solomon 2015: 38). The price signals to firms whether to scale up or down production. Together, competition with other firms and the desire to increase profits drive a continuous process of innovation and cost reduction within a given firm. Public providers of goods and services experience no or, at least, much less competition than private providers. In addition, their revenues are not a function of consumer demand. Public providers rely on, among other things, the size of the public budget and their ability to persuade the general public, politicians and other stakeholders of the need to maintain or increase their budgets.

It is possible to measure some aspects of the goods and services that public producers provide, such as the number of treated patients, years of education per pupil, and troops trained for

combat. Nevertheless, it is much harder to measure the actual outcome, namely the quality of a health treatment, an education, or a battalion. Moreover, social outcomes are influenced by other non-discretionary environmental variables, such as psychical activity and nutrition among the general populace, a culture that supports learning and education among families, and the military capabilities and intentions of potential adversaries. Clearly, the quality and the actual causal effects of the services themselves on outcomes are challenging to estimate in the public sector.

Market forces also provide other mechanisms to enforce a continuous hunt for more efficient production. Military, education, and health-care leaders are rarely rewarded for spending their time implementing cost-efficient cuts to production (Hartley 2012; Hartley and Solomon 2015). The ratchet effect – the incentive to spend every penny in the budget to avoid future budget cuts – is as prevalent in the armed forces as it is in other public sectors (Litwack 1993; Diehl and Goertz 1985). Plus, sanctions are not the same in the public sector and the market; public leaders rarely lose their jobs when they do not enforce cost-efficient production (Hartley 2012; Hartley and Solomon 2015). Finally, while capital markets punish unprofitable firms with acquisitions and bankruptcies, the public sector relies on political support instead of profitability (Hartley and Solomon 2015).

Because of the factors that armed forces share with other public sectors, their input expenditures cannot be equal to their outcome values. There are, however, even further complications when it comes to the valuation of defense production.

#### *Unique characteristics of defense production*

Defense production has some unique characteristics that make it hard to estimate the value of the goods and services provided. Not only is the government a monopolist as the sole provider of the armed forces, but it is also a monopsonist as a purchaser of military inputs in the domestic economy, including the hiring of personnel with war and combat experience. Moreover, the international market for weapon systems and equipment is distorted by factors such as secrecy, the few buyers, the small number of producers, the protection of industries and technology, government regulations on exports and profits, and technology that may be sensitive for national security (Hartley 2007). This hinders performance optimization in the military industry and armed forces. Furthermore, military products can be considered tournament goods (Hove and Lillekvelland 2016; Nordlund 2016).<sup>5</sup> These are goods without intrinsic value, but where ranking matters. There is a huge difference in value between having the best and the second best armed forces when a war breaks out (Lazear and Rosen 1981). For many military capabilities, only relative performance produces value, which makes optimization even more difficult.

Defense organizations consist of several branches, such as the navy, army, and air forces. While there may be competition between them, they often have monopolies over each domain: the ocean, land, and air, respectively. The lack of market pressure is prevalent at every level of the defense organization. Few, if any, leaders or squadrons gain prestige or rewards by focusing on saving money or openly supporting cuts in their own branch to optimize the capabilities

---

<sup>5</sup> Thanks to the anonymous referee for making this point.

provided by the collective armed forces. This affects the willingness of these branches to change and adapt to new organizational structures (Hartley 2012; Hartley and Solomon 2015).

Unlike other public services, the armed forces do not have consumers in the same sense that the health care sector has patients and the education sector has students. Thus, the public lacks a clear overview of defense production, and society provides little feedback on this production. Critically, the defense sector is capital heavy with large investments in increasingly expensive weapon systems and equipment. As the technological frontier rapidly develops, the probability of the misallocation of capital is much higher in the defense sector than in other service-oriented public sectors.

In the market, a firm with large investment errors goes bankrupt, and the owners lose their money. In general, people are more careful with their own money than with other people's money. An investor can only make a certain number of bad investments before there is no more capital to be invested. However, there is no similar mechanism to ensure that the armed forces and their leaders avoid bad investments and learn from their mistakes.

### *Principal-agent theory*

The economics literature questions the assumption that the defense and security establishment identifies the need for increased security and defense production solely for the purpose of the common good. Since we as authors also partake in this establishment, we relax this assumption of altruism and instead portray the actors in the security and defense establishment as participants in a principal-agent framework with their own preferences, interests, and objectives.

In many cost-benefit analyses (CBAs), the concept of the social planner from welfare economics looms in the background. In particular, it is often taken for granted that the economic benefits and costs of a project can be estimated. However, in the real world, stakeholders have their own interests and will act to see them realized. In defense production, there is a chain of principal-agent relationships from voters (those who benefit from peace) to soldiers (those who produce peace). In a rudimentary overview, voters are principals over politicians, politicians are principals over bureaucrats, bureaucrats are principals over military leaders, and military leaders are principals over soldiers. These agents have their own preferences and interests that may differ from those of the principals. Owing to the use of asymmetrical information and the principals' need to transfer decision authority to the agents, it is extremely challenging to ensure that the public expenditure on inputs is outweighed by the benefits to society. For instance, defense planners and leaders of the armed forces may be more interested in acquiring new technological weapon systems, hiring more personnel, or expanding the budgets of their branches than in achieving an optimal and cost-efficient force structure.

### *Value equals production expenditure as a starting point*

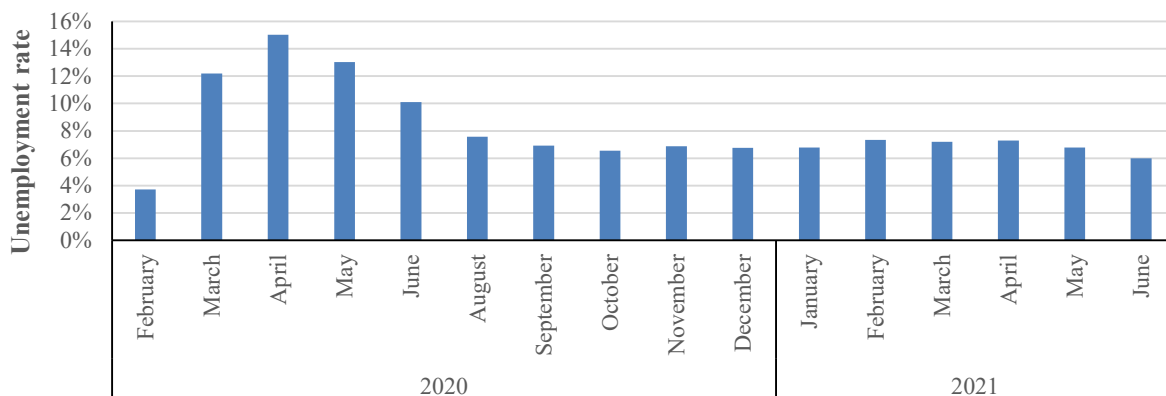
The value of defense production is complex to measure, perhaps impossible, due to the factors discussed above. While we appreciate the arguments put forward by the military economics literature, we must put a value on defense production to conduct a CBA. Therefore, we begin by asserting that there is truth to the proposals from the security and defense establishment in Norway (i.e. the CoD, FFI and MOD) and the armed forces can transform increased manpower into the outcomes that citizens care about, namely peace, security, and sovereignty. Indeed,

many studies on the value of public service production have acknowledged the complex valuation of these services but still used equality signs between production cost and value due to a lack of good data (Smeeding et al. 1993; Aaberge, Langørgen, and Lindgren 2017). The guidelines for CBA in Norway also recommend this approach for goods and services not provided in a market, including public health care and defense production (Finansdepartementet 2014). We also follow this approach when creating the basic model. To test the sensitivity of the results, we then adjust the value of defense production.

### The future of the labor market

The corona pandemic has led to a serious spike in the unemployment rate in Norway (see Figure 1). While it is difficult to predict the future of unemployment rates, it seems reasonable to assume that the economy will return to normal as the vaccination program is rolled out and the infection rates fade. Regardless, it will take more time for the labor market than the economic growth numbers to return to its pre-corona status.

**Figure 1:** The unemployed as a share of the labor force, including the fully unemployed, partly unemployed, and jobseekers on employment measures by the Norwegian Labour and Welfare Administration.

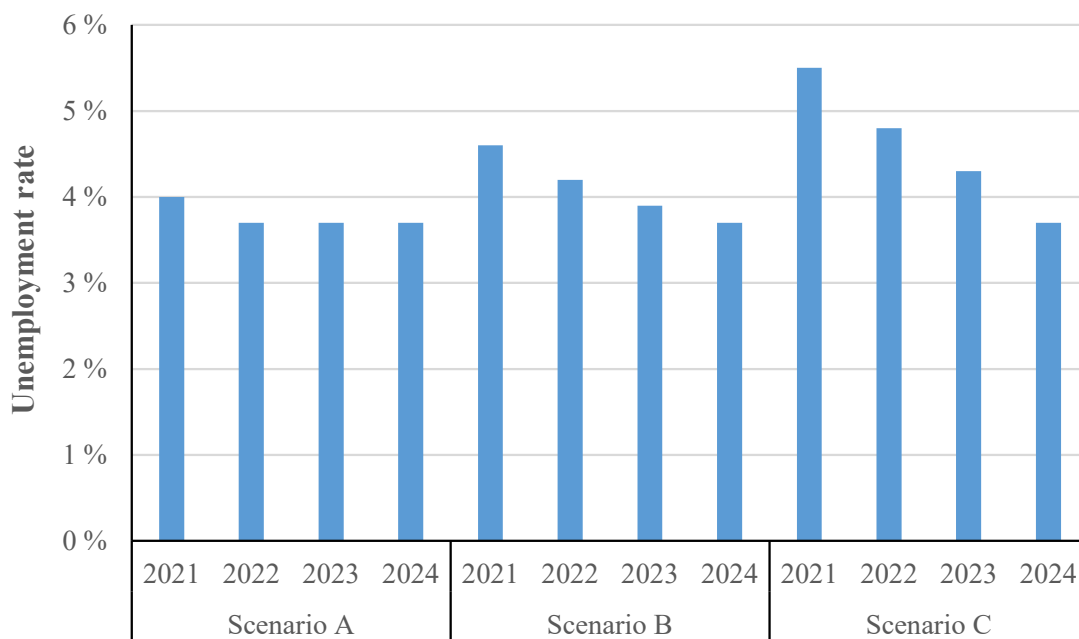


Source: Unemployment numbers from the Norwegian Labour and Welfare Administration (nav.no), and labor force numbers from Statistics Norway (ssb.no). Data retrieved Jul 31, 2021. Note that the data do not contain numbers for July.

Statistics Norway forecasts that the unemployment rate is back to normal, with a ten-year average of 3.7% in 2024, 4.6% in 2021, 4.2% in 2022, and 3.9% in 2023 (SSB 2021). As the future may differ from the forecast, we tested the CBA calculations with a faster improvement of the Norwegian unemployment rate and a slower improvement (see Figure 2). In Scenario A, we modeled a fast recovery, with an unemployment rate of 4% in 2021 and a normal rate in 2022. In Scenario B, we applied the forecast. In Scenario C, we modeled a slow recovery with an unemployment rate of 5.5% in 2021, 4.8% in 2022, 4.3% in 2023, and 4.0% in 2024.

**Figure 2:** Unemployment rate forecasts for 2021–2024: Scenario A (fast improvement), Scenario B (Statistics Norway’s forecast), and Scenario C (slow improvement).





### Unemployment rates and the tension between defense policy and labor market policy

CBA's rely on insights into welfare economics and the use of society's resources. Resource spending comes with opportunity costs, namely the costs of *not* exploiting these resources in other projects. In CBA's of investments or policy changes under ordinary economic circumstances, the employment of labor represents the use of a scarce resource and thus has opportunity costs. When the economy undergoes a negative business cycle with excessive unemployment, the opportunity costs of unused labor decrease. The CBA literature discusses how to analytically and empirically deal with the potential exploitation of the labor of the formerly unemployed. Two separate issues are of primary interest here.

#### *Unemployment rates and employment in public projects*

First, we must determine the 'response rate' of the unemployed, meaning how the unemployment rate responds to a one-unit increase in labor demand. Thus, we are interested in the probability of an unemployed individual finding employment due to the project under analysis. A random selection of workers to a project from the whole labor force will give us a response rate equal to the unemployment rate. Unemployed individuals could, however, be expected to have a higher chance of being hired than employed workers because they have more time to spend searching for jobs and stronger incentives to search for and apply to vacant jobs.

Both theoretical and empirical studies have suggested that the response rate is higher than the unemployment rate. In their seminal piece, Haveman and Krutilla (1967) identified a 'frictional minimum' of unemployment at which a project will not reduce the number of unemployed. Any unemployment above this minimum is excessive and thus employable by public projects. The authors also operated with a maximum unemployment rate of 25%, for which there is a one-by-one conversion of labor demand to unemployment reduction. This is four times the likelihood used in a random selection model. Between the minimum and maximum unemployment rates, Haveman and Krutilla (1967) tested both linear and semi-logarithmic labor response rates.

Other studies have argued that the response rate also exists for lower unemployment rates than the minimum provided in Haveman and Krutilla (1967). For instance, Zuidema (1987) estimated response rates of 7%, 22%, 50%, 85%, and 95% for unemployment rates of 0.5%, 1%, 2%, 5%, and 10%, respectively. These are substantially higher than Haveman and Krutilla's (1967) rates. In addition, Vitaliano (2012) estimated the response rate as a function of job vacancies over the labor force rate. Exploiting a dataset for the United States from 2001–2011, he determined that when the vacancies were at a minimum during the Great Recession of 2008 and 2009, the probability was 55%. This is higher than Haveman and Krutilla's (1967) estimate of 46%. When the vacancies were at their highest, the probability was 23%, while the mean was 32%. Moreover, Haveman and Krutilla (1967) acknowledged that a public project has direct *and* second-order effects because a public project may also require more workers in the industries that supply the project with materials, equipment, and capital goods. The authors exploited input-output tables to calculate the general equilibrium effects.

Another mechanism involved in increasing the response rate of the unemployed is vacancy. Namely, a vacant job may be taken by an already employed person, but they will then leave behind a vacant position at their former employer, which may be filled by an unemployed person (Persky, Felsenstein, and Carlson 2004). Such job chains multiply the likelihood that the unemployed will be employed when a public project hires personnel (Bartik 2012).

#### *Matching tensions between defense policy and labor policy*

Second, we must acknowledge that the unemployed may differ from the employed in terms of their skills, education, and talents. Although the CBA literature covers overall estimates of the employment effects of public projects, there is little guidance available for hiring projects in the armed forces. There may be a tension between defense policy and labor market policy in that the armed forces need specific types of recruits (e.g. those with high cognitive and physical skills and talents). If the distribution of such skills and talents among the unemployed is worse than in the general populace, the probability of the unemployed being employed in the armed forces is relatively lower. Among the normal rate of unemployment, a component is structural in the sense that the unemployed lack the skills and talents necessary for finding work. Another component is frictional. Some people are employable, but they experience friction due to asymmetric information on behalf of employers and employees, making the search for jobs time consuming. If the frictional component is relatively large, an expedited recruitment strategy will reduce unemployment. Yet, this will be to a lesser degree if the structural component dominates.

Even during the pandemic, the unemployment rate is low in Norway compared to many other modern economies. It is important, however, to acknowledge the role of various public cash benefit programs in the identification of the unemployed. The Norwegian government offers a relatively generous disabled benefits program, addressing around 11% of the total number of individuals in the 20–66 age group. Moreover, if the work ability of an individual is reduced due to injuries or sickness, she may be eligible for Work Assessment Allowance (AAP) for up to three years. An additional 4% of the population in the 20–66 age group receive AAP. Studies have found that mass displacement in Norway leads to a substantial increase in the use of disability benefits (Rege, Telle, and Votruba 2009). Bratsberg, Fevang, and Røed (2013) even argued that unemployment and disability are close substitutes in Norway. This means that

within the group termed ‘unemployed’ in Norway, we find less ‘structural’ and ‘health-related’ unemployment in the unemployed pool than in many other modern economies.

The armed forces predominantly hire young people without higher education. The organization has several education institutions and prefers to educate, teach, and train its personnel internally. As a group, young people are hit hard by busts in general and the pandemic-induced business cycle in particular. The armed forces also need a wide range of skills and talents to fill various occupations. All these factors point to a high response rate. At the same time, the armed forces seek recruits with high cognitive and physical skills and talents. Indeed, they have this in common with many other private and public employers. If high cognitive and physical skills are scarce among the unemployed, the response rate will be low.

Ultimately, it seems likely that the armed forces can mitigate the high unemployment rate with an expedited recruitment strategy. To take into consideration the uncertainty of this important parameter, we conduct our analysis with four alternative response multipliers, Alternatives I–IV. We multiply these alternatives with the forecasted unemployment rates in Scenarios A–C per year to derive response rates. Table 1 shows the response rates per alternative, scenario, and year. The higher the response multiplier, the higher the response rate. In Alternative I, the response multiplier is 1, meaning that the likelihood of an unemployed individual becoming employed either directly or indirectly due to the expedited recruitment strategy is equal to a random selection of an employee from the whole pool of unemployed and employed individuals. The higher likelihood of an unemployed individual finding employment due to a unit increase in labor demand is further incorporated in Alternatives II–IV, where the response multipliers are 2, 8, and 15, respectively.

**Table 1:** The response rate by year (2021–2023), alternative multiplier (I–IV), response multiplier (1, 2, 8 15), and scenario (A–C) for the unemployed and employed.

Recruitment pool	2021				2022				2023			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Scenario/alternative	1	2	8	15	1	2	8	15	1	2	8	15
<b>Unemployed</b>												
A	4.0	8.0	32.0	60.0	3.7	7.4	29.6	55.5	3.7	7.4	29.6	55.5
B	4.6	9.2	36.8	69.0	4.2	8.4	33.6	63.0	3.9	7.8	31.2	58.5
C	5.5	11.0	44.0	82.5	4.8	9.6	38.4	72.0	4.3	8.6	34.4	64.5
<b>Employed</b>												
A	96.0	92.0	68.0	40.0	96.3	92.6	70.4	44.5	96.3	92.6	70.4	44.5
B	95.4	90.8	63.2	31.0	95.8	91.6	66.4	37.0	96.1	92.2	68.8	41.5
C	94.5	89.0	56.0	17.5	95.2	90.4	61.6	28.0	95.7	91.4	65.6	35.5

## Materials and Methods

Here, we present the CBA model and the data input. We start by discussing the recruitment strategies and continue by describing the various costs and benefits included in the CBA.

### Recruits and their careers

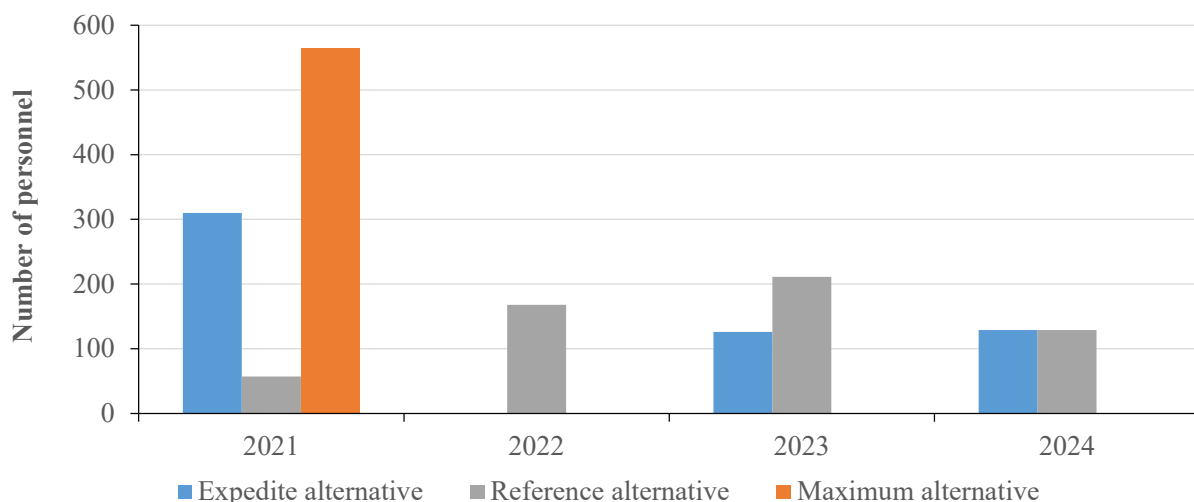
We apply two main recruitment strategies in this analysis: the expedited alternative and the reference alternative. They involve recruiting 565 individuals as military personnel from 2021–2024 at different speeds. The reference alternative is the recruitment strategy proposed by the

government in December 2021, while the expedited alternative is the recruitment strategy that Parliament agreed upon after discussing the government’s proposal.<sup>6</sup> We also added an alternative that we termed the maximum alternative, which involves hiring all 565 persons in 2021. Figure 3 displays the hiring of personnel per year.

The exact positions included in these hiring strategies are not publicly available. We model the hiring within two types of contracts and two types of military grade systems based on the current status of and future plans for the military personnel structure. Predominantly, the armed forces hire personnel with two types of contracts: T35 contracts are for ‘Other Ranks’ (OR) military personnel with a forced retirement at 35 years of age, whereas T60 contracts are for both OR and ‘Officers’ (OF) with a retirement age of 60 years. We model the armed forces to hire 50% of the personnel with T35 contracts and 50% with T60. Because the special retirement age of 60 years old is currently under scrutiny by the government, we increased the special retirement age to 67 years old, which is in alignment with the general retirement age and reforms of special retirement ages in other sectors (Hanson and Lindgren 2020; 2019). Furthermore, we assume that the recruits with T35 contracts were 20–24 years old (equal shares) and the recruits for T60 contracts were 20–39 years old (equal shares).

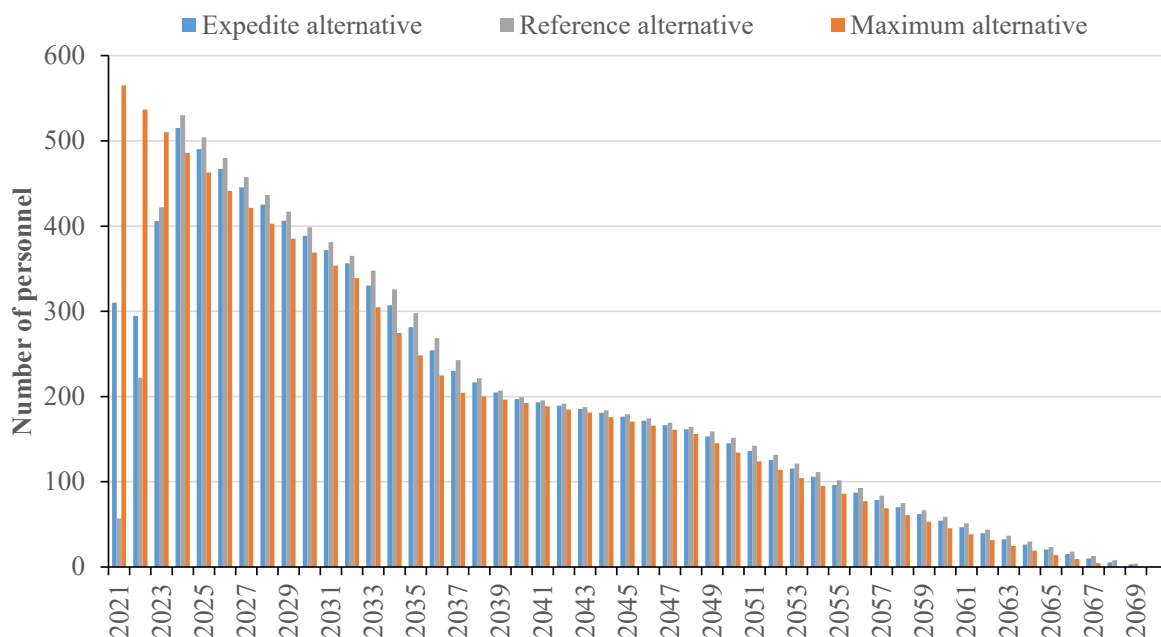
The quit rates are estimated to be 8% per year for T35 contracts and 2% per year for T60 contracts (Lillekvelland and Strand 2015). Figure 4 shows the overall force structure per year after recruiting 565 persons following the expedited, reference, and maximum alternatives. Compared to the reference alternative, the expedited and maximum alternatives have much more personnel in 2021 and 2022 but slightly fewer in every other year until 2069 because more people have left the armed forces due to an earlier start.

**Figure 3:** Recruitment strategies in the armed forces and number of individuals hired per year (2021–2024) following three strategies: expedited, reference, and maximum alternatives.



**Figure 4:** Number of additional individuals in the armed forces provided by the expedited, reference, and maximum alternatives.

<sup>6</sup> The plan also involves a substantial increase in the number of conscripts, but the economic value of this increase is not included in the scope of the analysis presented here. Compulsory military service is a related yet very different economic topic.



### The CBA model

The CBA model includes effects on the value added, the marginal cost of public funds, leisure, and scarring. The model calculates the benefits and costs of both the expedited and reference alternatives and, finally, determines the difference between them. The difference represents the net gain or loss for Norwegian society from hiring personnel using the expedited recruitment strategy versus the reference recruitment strategy. The main model relies on a set of assumptions, including the value of defense production, salaries in the armed forces, and discount rate. The results from the main model are the *main results*. In addition, we conduct sensitivity analyses of these assumptions to understand more about how our conclusions regarding the net gain or loss of the expedited recruitment strategy were affected by the assumptions in the main model. We include the maximum recruitment strategy in the sensitivity analyses because it is an alternative to the expedited recruitment strategy.

The value added refers to the value created for society from the production of defense services. In this study, the value added stems from two sources: a time effect from producing defense services earlier in the expedited alternative than in the reference alternative and, by far the largest source, the allocation of unemployed persons into productive service in the armed forces. The size of the value depends on the value of each person’s contribution to the armed forces instead of either producing valuable goods and services in the private sector, in a different public sector, or while being unemployed. As previously discussed, this value is notoriously difficult to estimate. We start by simply equating the value of the defense production to the gross salaries plus taxes. Next, we test this assumption with sensitivity analyses. To calculate the value added by the expedited and reference alternatives, the model multiplies the value added per employee with the number of employees per year and discounts the future stream of value added.

We had access to the average salaries per age cohort for military personnel in the armed forces in 2020. As the employees hired in the 2021–2024 period age, their salaries increase. Consequently, the value added also increases. Personnel with more experience, skills, and training have higher productivity. In the main model, we assume that the personnel make the

same average wage per age cohort whether they are employed in the private sector or a different public sector. We test these assumptions in the following sensitivity analyses.

The expedited recruitment strategy is more expensive than the reference strategy in 2021 and 2022 because of expenditures on wages and pensions for military personnel. Simultaneously, the government will pay less in unemployment benefits (UB) and receive more taxes, given that a share of the employed military personnel is drawn from the unemployed pool. The net fiscal effect on the government budgets depends on how much the labor demand reduces unemployment. If the reduction is notable, the fiscal effect on the government turns positive.

CBAs employ a welfare economics perspective. Thus, we are concerned not with transfers of money. Rather, we want to determine the efficiency distortions produced by the tax system while studying the economic effects of a project. Public spending requires taxation, which introduces a wedge into optimal production, work, and consumption decisions compared to a non-taxation situation. This wedge results in a social loss even when individuals behave rationally. The marginal cost of public funds (MCF) refers to distortions of the optimal allocation of resources associated with taxation. In Norway, the MOF advises the use of an MCF of 20% of the public funds spent. Christiansen (2015) suggested that this is too high. Bos, van der Pol, and Romijn (2019) argued that the MCF should be 0.<sup>7</sup> Here, we apply the MOF's recommendations but test the main results by setting the MCF to 10% and 0 in the sensitivity analyses.

The fiscal effects of the wages of the employees in the armed forces, pension payments, tax revenue, and UB are calculated by multiplying the number of individuals in each group (i.e. armed forces employees, civilian sector employees, and the unemployed) with the corresponding values for their wages, pensions, UB, and taxes and discounting future streams of revenue and expenses (multiplied with the MCF).

Employing the unemployed may come with a social cost, namely the value forgone by these individuals that is not available for non-market work such as household production and leisure anymore. This value can be challenging to determine. Many labor economics and CBA studies on the use of unemployed workers have advocated for the use of the reservation wage as an estimate of the opportunity cost of labor supply. The reservation wage is the minimum wage a worker requires to provide labor in the formal labor market. Other studies have instead argued that the value of leisure matters in CBAs.<sup>8</sup> In fact, some have suggested that the value of leisure can be negative for the unemployed. Mishan and Quah (2007: 69) wrote that due to the cost of the unemployment stigma, unemployed workers may be 'prepared to pay to be employed even where no wage at all is offered to him.' In the seminal treatment of unemployment in CBAs, Haveman and Krutilla (1967: 389) suggested that 'involuntary leisure has a zero benefit.' Finally, Haveman and Farrow (2011: 3) proposed that involuntarily imposed leisure may 'convey disutility.' These claims of a potential non-positive valuation of time substantially differ from the estimates of the reservation wage in macroeconomics and labor studies. One reason for this may be that the reservation wage contains more than the time forgone when accepting a job. In the main model, we set the value of the leisure of the unemployed to 0, but we also tested the sensitivity of this assumption.

---

<sup>7</sup> See Lindgren and Presterud (2021a; 2021b) or Hanson and Lindgren (2020) for further discussion.

<sup>8</sup> Bartik (2012) refers to these as part of a different tradition than the reservation wage scholars.

The labor economics literature has shown that recessions and mass displacements have negative effects on workers (e.g. on their future wages and careers) (Wachter and Bender 2006; Couch and Placzek 2010; Kahn 2010; Altonji, Kahn, and Speer 2016). Spells of unemployment scar workers by making it harder for them to find new work and increasing the likelihood of experiencing such spells again later in their careers (Eliason and Storrie 2006; Gregg and Tominey 2005; Gregory and Jukes 2001; Knabe and Rätzel 2011; Schmillen and Umkehrer 2017; Brandt and Hank 2014). It is challenging to precisely estimate how much the recruitment strategy of the armed forces can mitigate the scarring effect of unemployed people who are either directly or indirectly employed because of this strategy. Unemployment caused by the pandemic may have different effects than previous busts. Consequently, the external validity of former studies may be limited for this particular case. It is also questionable how much employment in the armed forces can reduce this scarring effect. We did not mitigate for scarring in the main model and tested the sensitivity of the main results by introducing such an effect.

Table 2 shows the parameter values in the main model and the sensitivity analyses. The salaries for T35 and T60 personnel increase each year with a 2% real growth rate, and the average salary level is adjusted due to the changing age composition of the recruited workforce. We add 25% to these salaries to account for the employer's taxes and social benefits under the guidelines of the CBA in Norway (DFØ 2014). We set the tax rate to 45% for salaries, but we also lowered it for the unemployed and those with pensions due to lower average income tax and the lack of employer's taxes. We model pensions as deferred income made during the working career.

This study used several parameters that are either difficult to estimate or necessary to conduct sensitivity analyses of the value of defense production, the value of leisure, scarring, MCF, the discount rate, education, the share of non-employable persons in the workforce, matching issues, and the value of other public sectors.

**Table 2:** Parameter values in the main model and sensitivity analyses.

Category	Main model	Sensitivity analysis			
		1	2	3	4
<b>Salary</b>					
T35 - 2021	73,814				
T35 - 2022	83,193				
T35 - 2023	85,973				
T60 - 2021	97,609				
T60 - 2022	102,483				
T60 - 2023	105,231				
Salary real growth rate	2%				
<b>UB</b>					
Unemployment benefits (UB) - 2021	31,475				
Real growth rate	2%				
<b>Taxes</b>					
Taxes and added social contributions	25%				
Tax rate for workers	45%				
Tax rate for unemployed	20%				
Tax rate on pension	22%				
<b>Public pension</b>					
Military personnel	23.8%				

Civil sector	18.1%				
<b>Other parameters</b>					
Value added (% of salaries)	100%	80%	90%	110%	120%
Leisure value (% of net UB)	0%	50%	100%	150%	
Scarring (% of salary)	0%	1%	2%		
MCF	20%	10%	0%		
Discount rate	4%	6%	8%	10%	
Education	0		0.5y (OR)/3y (OF)		
Non-employable in the workforce	0%	2%	3.7%		
Matching issue (% decrease of value added)	0%	-2%	-5%		
Value added, other sector (% of armed forces)	100%	102%	105%	110%	115%

## Results

### Main results

In this section, we present the main results of the CBA and sensitivity analyses. Table 3 reports the main results. The alternatives vary regarding the multiplication factor for the probability of recruiting personnel from the unemployed pool (response rate), while the scenarios vary regarding the unemployment rate in the Norwegian economy from 2021–2023. The main results show that the project has net benefits for Norwegian society in most alternatives and scenarios. It is only in Alternative I (low response multiplier) that the expedited recruitment strategy has a negative effect. Therefore, the difference between net loss and net gain in the main results assumes that the likelihood of the unemployed finding employment due to armed forces recruitment increases from a random selection to two times this likelihood. The total defense budget in 2021 was 7.3 billion USD. The net gain of the recruitment strategies to society as a share of the annual budget ranges between 0.01% (Scenario A/Alternative II) and 0.37% (Scenario C/Alternative IV).

The main results follow a simple model built on some assumptions about its parameter values. This section contains the results of ten sensitivity analyses that we performed to check the robustness of the main results.

**Table 3:** Main results of using the expedited recruitment strategy instead of the reference recruitment strategy, discounted million USD (2021) per alternative and scenario.

Category/alternative Scenario	I			II			III			IV		
	A	B	C	A	B	C	A	B	C	A	B	C
Value added	1.1	1.2	1.5	2.4	2.8	3.3	10.1	11.5	13.5	18.9	21.6	25.4
NAF salaries (MCF)	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
Pension (MCF)	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	-0.3	-0.3	-0.4	-0.5	-0.5
Taxes (MCF)	0.1	0.1	0.1	0.2	0.2	0.3	0.8	0.9	1.1	1.5	1.8	2.1
UB (MCF)	0.1	0.1	0.1	0.2	0.2	0.2	0.7	0.8	0.9	1.2	1.4	1.7
Total	-0.7	-0.5	-0.2	0.8	1.2	1.8	9.4	11.0	13.3	19.4	22.4	26.7

### *Value of leisure*

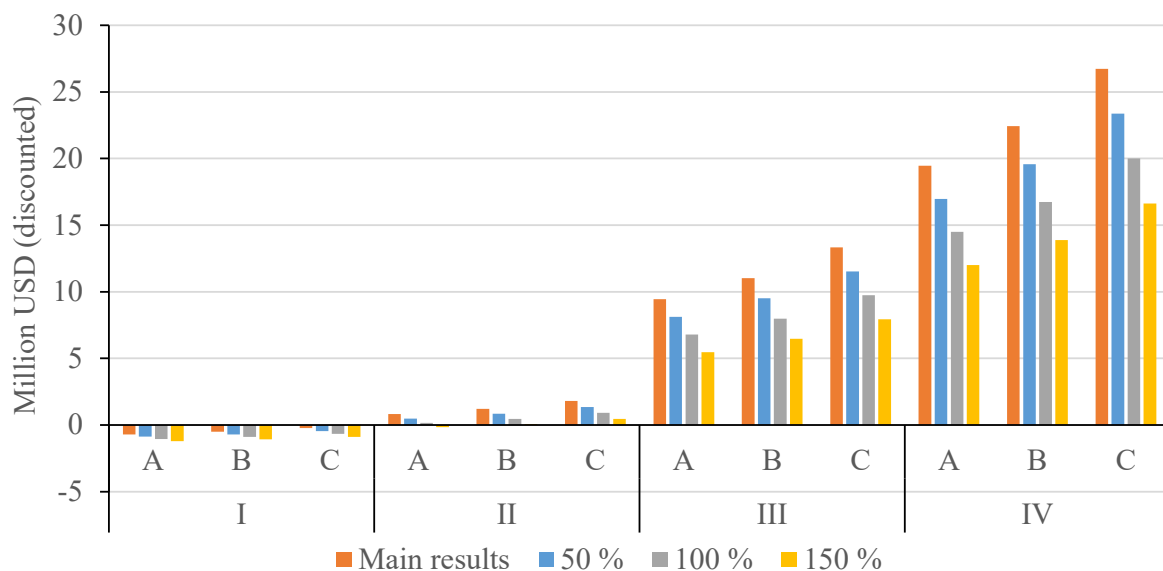


In the main results, we set the value of leisure as 0 for the involuntarily unemployed. We also test how the results change if leisure has value for the unemployed. Hence, we use several values of leisure as percentages of the net UB received on average by the unemployed. We conduct tests with 50%, 100%, and 150% of this value, resulting in leisure values of approximately 20,000, 40,000, and 60,000 USD in 2021.

Figure 5 shows the results of introducing these leisure values *vis-à-vis* the main results. Overall, the leisure value decreases the net benefits of the project in all scenarios and alternatives because there are more unemployed hired in the expedited alternative than in the reference alternative. A high response rate reduces the net benefit the most, given that more unemployed who value their lost leisure are hired.

With a substantial value on leisure of 40,000 USD per year, the project is not profitable in Alternative I regardless of scenario and only negligibly positive in Alternative II. In Alternatives III and IV, the project is positive regardless of scenario, but it results in a large decrease in the net benefits compared to the main results. Therefore, assumptions about leisure value strongly impact the project's profitability.

**Figure 5:** Net benefits to Norwegian society according to a sensitivity analysis of the main results that added 50%, 100%, and 150% of the unemployment benefit as the leisure value.



#### *Drawing from a smaller unemployed pool*

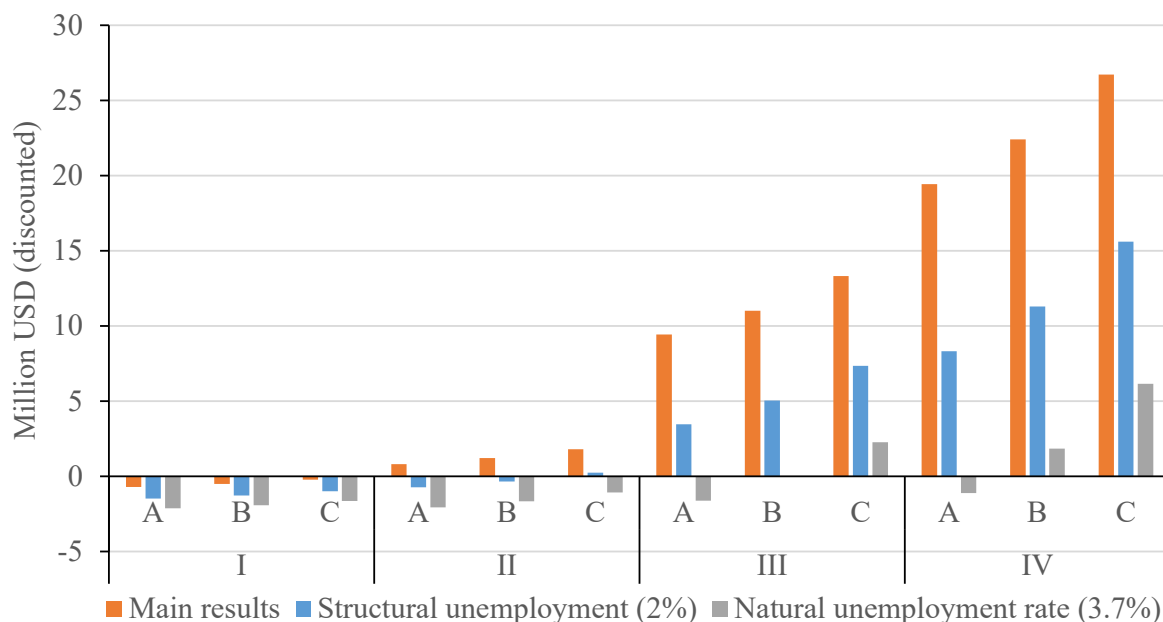
In the main model, we assumed that the share of eligible candidates among the unemployed is equal to the share among the employed workforce. Consequently, we apply no lower frictional minimum (Haveman and Krutilla 1967). We could assume that a constant share of the unemployed are unable to be hired by the armed forces for 'structural' reasons (i.e. they lack the skills and talents, whether physical or cognitive, to be employed in the armed forces). Thus, we deduct the unemployment rate by 2% age points and let the rest be employable by the armed forces to approximate the structural unemployment rate in Norway.

A stricter assumption is that the natural unemployment rate defines the pool of the unemployed who cannot be employed in the armed forces. In response, we restrict the potential candidates

to only working individuals or the additional individuals who became unemployed due to the pandemic. Following this assumption, we determine that only during periods with unemployment rates above 3.7% (i.e., the pre-corona ten-year average unemployment rate), unemployed people have a chance to be employable in the armed forces.

In Figure 6, the main results are shown *vis-à-vis* the results that test the assumption about how large a share of the workforce is employable by the armed forces. If the probability of being suitable for the armed forces among the unemployed is restricted by the structural unemployment rate or natural unemployment rate, then the net benefits for society are much lower and negative in more alternatives and scenarios than in the main results. The project is strongly affected by assumptions regarding the share of the unemployed pool who are employable in military positions in Norway.

**Figure 6:** Net benefits to Norwegian society according to a sensitivity analysis of the share of the workforce that is unemployable: main results (0%) versus structural unemployment (2%) and natural unemployment rate (3.7%).

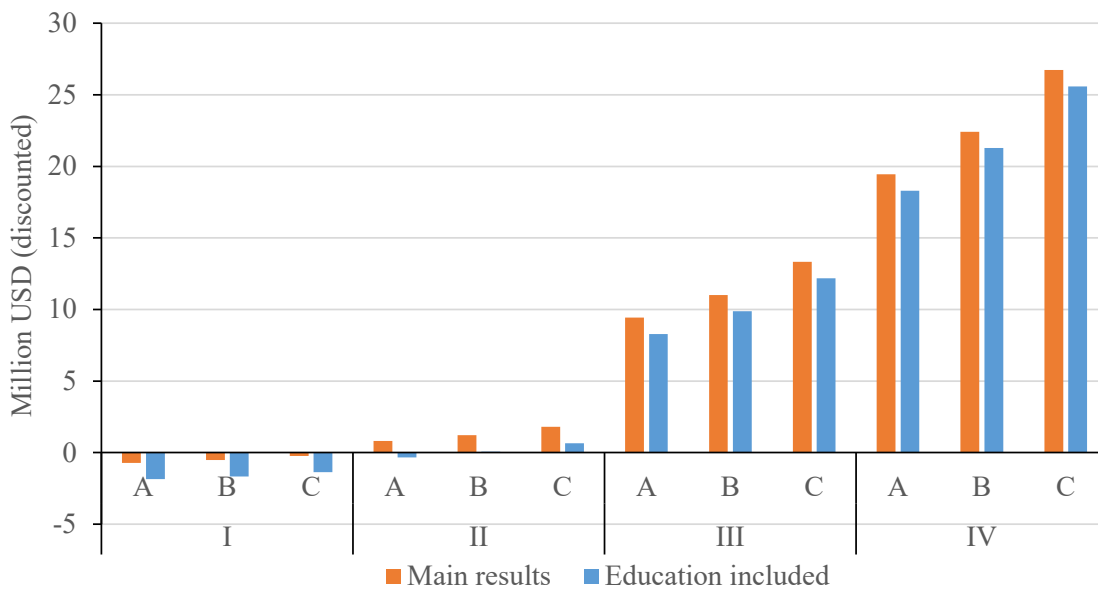


### Education and training

In the main model, we assumed that the recruits spent no time on education and training, at least not to the extent that time was taken away from the production of defense services. We investigated what happens to the main results if recruits are given time for non-work education, specifically six months of training for OR and three years of education for OF. Since education is provided for the same number of personnel in the expedited and reference alternatives, we expected to find only a time-discount effect on the net benefits for Norwegian society.

Figure 7 shows that the assumption about education and training has a small impact on the main results. The reason for this small decrease is that the total amount of time spent on education is closer to the present in the expedited alternative than in the reference alternative. Since the net gains in Alternative II are small, the project turns negative in Scenario A and more negligible in Scenarios B and C. In Alternatives III and IV, the small decrease does not impact the overall assessment of the project.

**Figure 7:** Net benefits to Norwegian society according to a sensitivity analysis of education and training: main results versus adding six months to three years of education for military personnel.



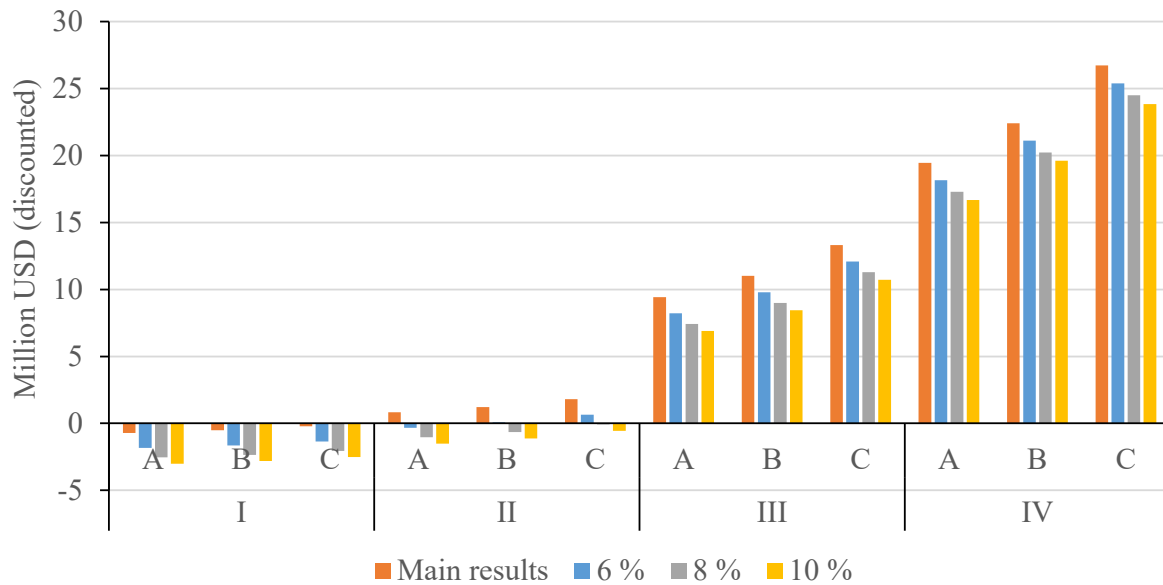
### Discount rate

In the main model, we applied a discount rate of 4% in accordance with the recommendation of the MOF (Finansdepartementet 2014). We wanted to determine how a change in this assumption affects the results. In response, we test the project’s net benefits by applying discount rates of 6%, 8%, and 10%.

A high discount rate moderately decreases the value of the project. This happens if a project’s costs and benefits are similarly distributed over its lifetime. The gain from employing unemployed is, however, only located in 2021 and 2022. The value of these front-loaded benefits is only moderately affected by the magnitude of the discount rate. While the discount rate matters less in Alternatives III and IV, the discount rate has larger implications for Alternatives I and II because the net benefits to society is already low in the main results. All scenarios turn net negative when the discount rate is at 8% in Alternative II.

We conclude that the discount rate has a moderate effect on the project’s net benefits. For decision-makers in Norway, this moderate effect is perhaps less important since the MOF wants a discount rate of 4% on all projects with similar systematic risks.

**Figure 8:** Net benefits to Norwegian society according to a sensitivity analysis of the discount rate: main results (4%) versus 6%, 8%, and 10% discount rates.

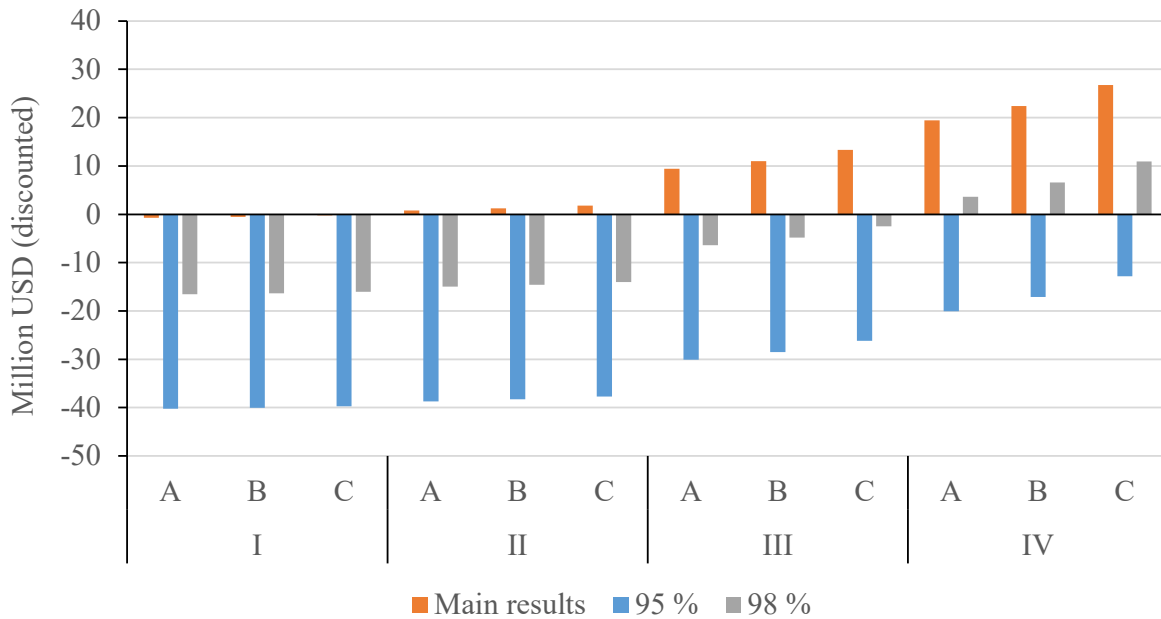


### Matching

In the main model, all military employees in the expedited alternative perform as well as the military employees in the reference alternative. But what if the personnel from the unemployed pool do not match well with the armed forces? Or what if the expedited hiring of personnel creates problems with selecting the right personnel? To answer these questions, we test the net benefits of the project if the value added by the military employees in the expedited recruitment strategy is lower on average than that value added by the reference alternative. We let the value added be 95% and 98% of the assumptions in the main model.

As shown in Figure 9, a decrease in the value added by the military personnel in the expedited alternative strongly impacts the net benefits. If the recruitment of personnel in a more rapid manner leads to worse quality or matching between employer and employee, then the project is not profitable (95%) in any scenario or alternative and only profitable in Alternative IV (98%). Evidently, the expedited recruitment strategy should ensure that the armed forces recruit the right candidates, regardless of their employment status.

**Figure 9:** Net benefits to Norwegian society according to a sensitivity analysis of the value added by military personnel in the expedited alternative: 95% and 98% of the value added by military personnel in the reference alternative.

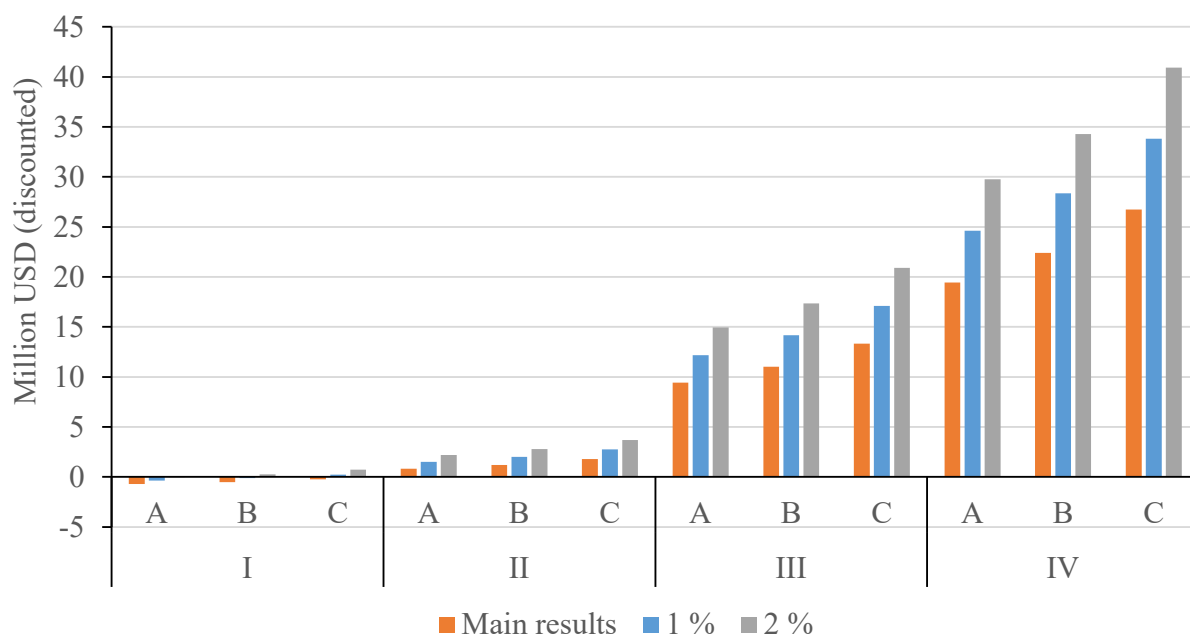


### Scarring

Hiring personnel to the armed forces in the midst of high unemployment may reduce the number of unemployed individuals and thus mitigate the long-term economic problems of scarring. Therefore, we test the net benefits of the expedited recruitment strategy by assuming that unemployed individuals who are either directly or indirectly recruited to the armed forces will avoid scarring (i.e., a decrease in wages and value added) for the rest of their careers. We assume that the unemployed who are not recruited to the armed forces experience 1% and 2% reductions in their future wages.

Figure 10 shows that the effect of scarring mitigation is closely related to the number of unemployed hired directly or indirectly due to the expedited recruitment strategy. The scarring effect magnifies the large social net benefits in Alternatives III and IV, but it leads to small benefits in Alternatives I and II.

**Figure 10:** Net benefits to Norwegian society according to a sensitivity analysis of the scarring of unemployed persons in the form of lifetime earnings reduction: 1% and 2% reduction in wages after being unemployed.

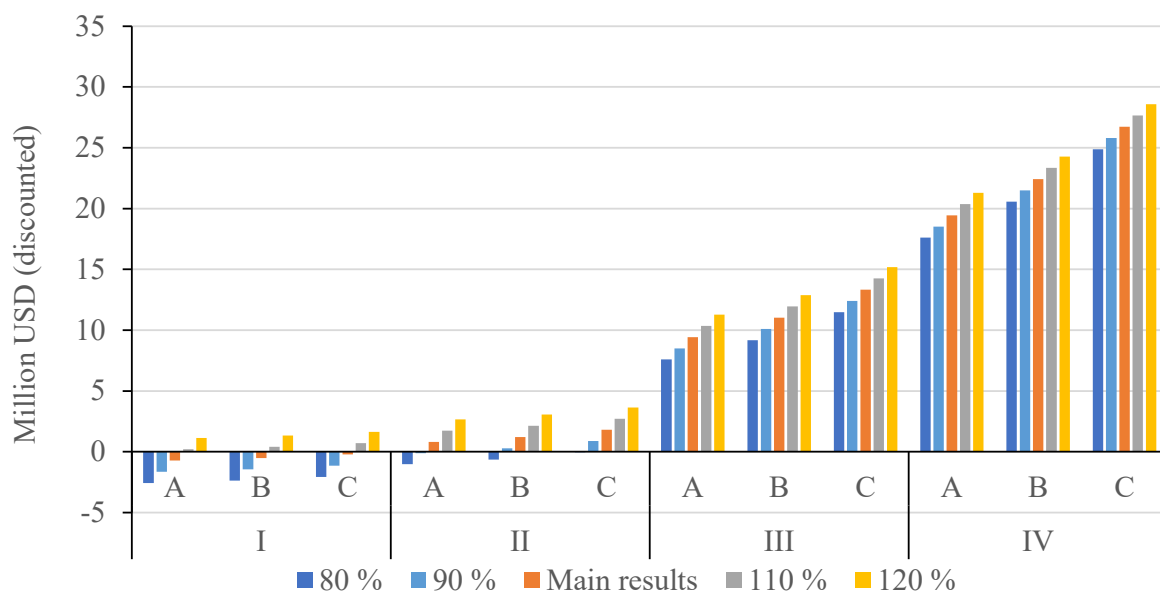


### *Value of defense*

In the main results, we assumed that the value of defense production is equal to the expenditure. This is a common assumption for public service production (e.g. Aaberge, Langørgen, and Lindgren 2018), and it is in accordance with the guidelines for CBA in Norway for non-market goods and services (Finansdepartementet 2014). However, the defense economics literature on the value of defense production clarifies that this assumption is strict and often unrealistic.

We studied the project's sensitivity to different values of the defense production of hiring new personnel to the armed forces. In Figure 11, we test the project when the value added by the personnel was 80%, 90%, 110%, and 120% of the value added in the main results. The results show that the sensitivity of our defense production assumption is moderate. Except for Alternative II and Scenario A (80% and 90%) and Scenario B (80%), all alternatives and scenarios are profitable. If the value of defense production is higher than the estimate in the main results, Alternative I has a net positive profitability. The reason for the moderate effect is that we compared each higher or lower value in the expedited recruitment strategy with a similar value in the reference recruitment strategy.

**Figure 11:** Net benefits to Norwegian society according to a sensitivity analysis of the value of defense production: 80–120% of the main results' assumptions.

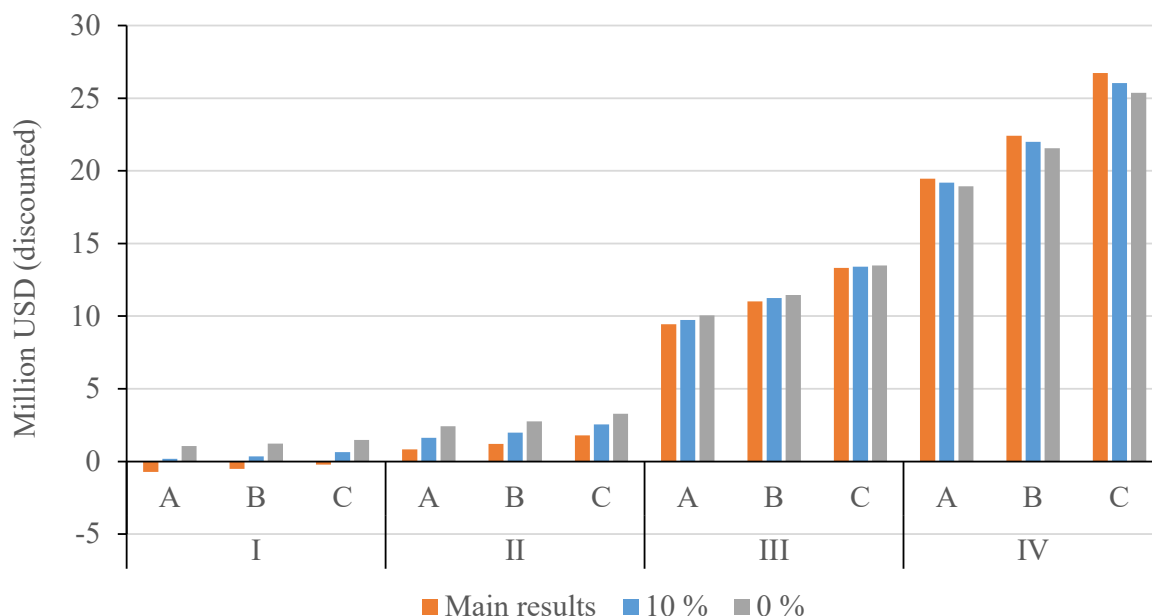


### *Marginal cost of public funds*

In the main results, we assumed that the MCF was 20% of the fiscal spending in accordance with the CBA guidelines in Norway (Finansdepartementet 2014). The MCF literature features discussions on how large this parameter should be. Here, we test the project's sensitivity to the MCF assumption by reducing it to 10% and 0%.

Figure 12 shows an interesting pattern. When the unemployment-reducing effect of hiring personnel to the armed forces is low to medium, the low MCF thus increases the net benefits. Yet, when the effect is high, the even lower MCF decreases the net benefits. This result hinges on the fact that the government's budgets are negatively affected by a low reduction in unemployment and vice versa. We conclude that a change in the MCF assumption has a moderate effect on the results. All scenarios in Alternative I turn net positive with an MCF of 10% or 0%.

**Figure 12:** Net benefits to Norwegian society according to a sensitivity analysis of the MCF: 20% (main results), 10%, and 0%.



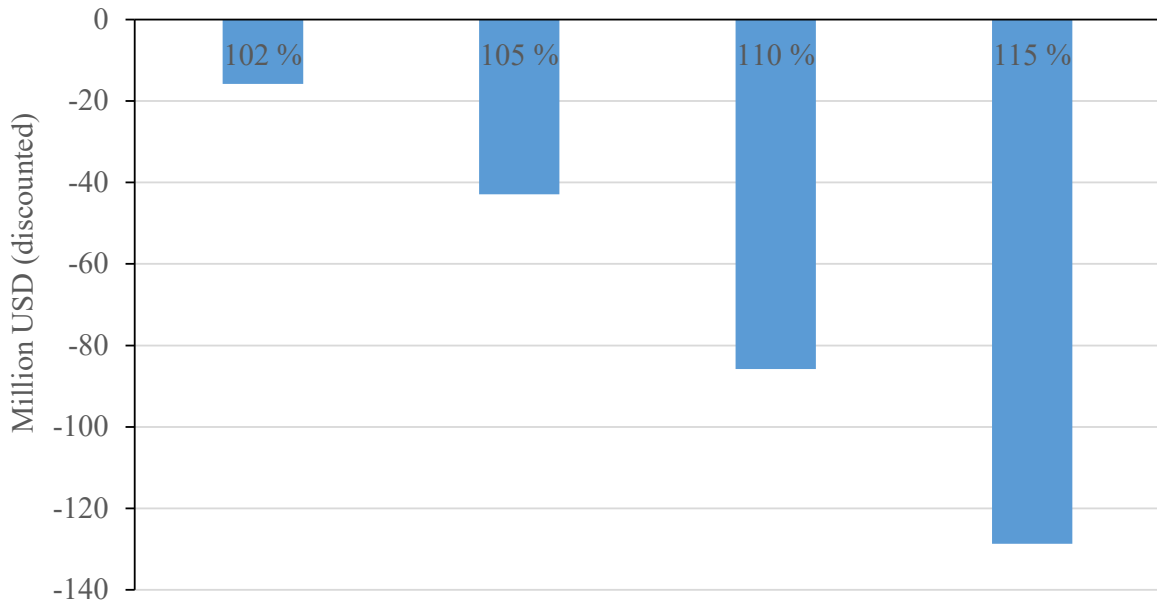
### Comparison to build up in other public sector

Policymakers must compare the gains in defense production made by hiring personnel to the armed forces against the net gains of hiring personnel to a different public sector. In response, we compare the difference in the net benefits of expedited recruitment to the armed forces (minus the net benefits of the reference alternative) against the same hiring profile in a different public sector (minus the net benefits of the reference alternative). If the value added to public production is the same, the net benefits are equal. This sensitivity only makes sense if we assume that a public sector with more value-added potential exists because of, for instance, the underproduction of public services.

Figure 13 shows the results for four values of the value added to the other public sector. The results show that the project is 16, 43, 86, and 129 million USD less beneficial for Norway than hiring personnel to a different public sector insofar as the values added by this public sector are 2%, 5%, 10%, and 15% higher than the values added by the armed forces, respectively. We conclude that the project's net benefits for Norwegian society are highly sensitive to the existence of a public sector with more value-added potential than the armed forces.

**Figure 13:** Net benefits to Norwegian society according to a sensitivity analysis of hiring personnel to a different public sector with a higher value-added potential: 102–115% of the value added to the armed forces.

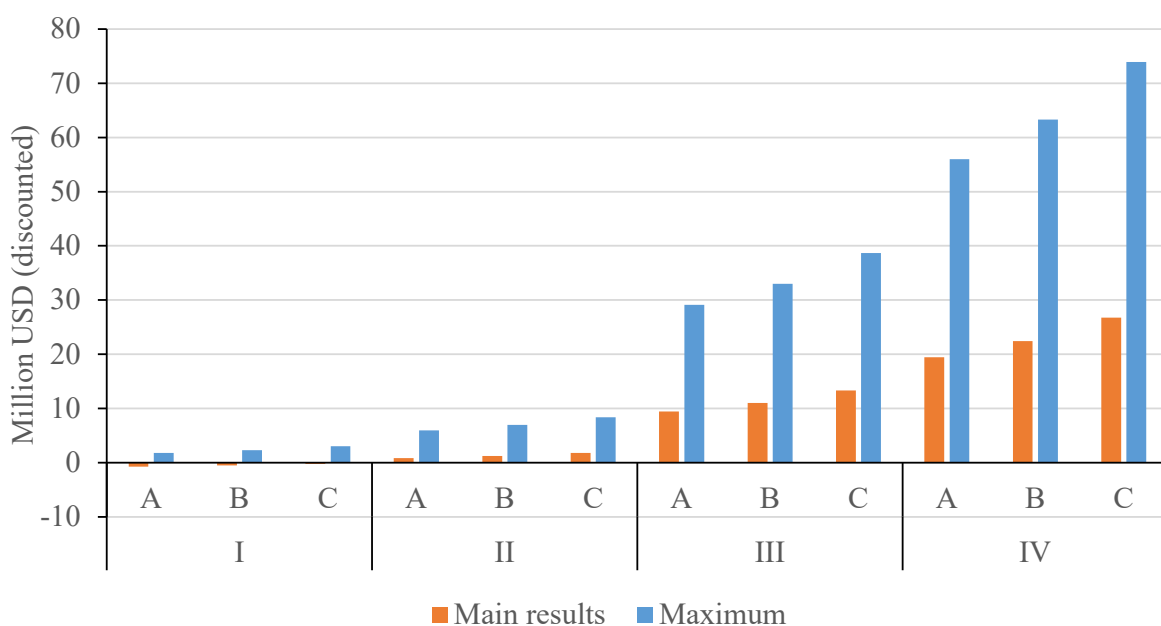




### Maximum recruitment

Policymakers agreed to an expedited recruitment strategy that was faster than the first proposal by the MOD. Consequently, we examine what would happen to the net benefits if the armed forces hired all 565 military professionals in 2021. Figure 14 shows that the net benefits to society are much higher in the maximum recruitment alternative than in the expedited recruitment alternative, regardless of alternative and scenario. The project also turns net positive in Alternative I because more unemployed are employed either directly in the armed forces or indirectly through the chains of employment initiated by the recruitment activities of the armed forces.

**Figure 14:** Net benefits to Norwegian society according to a sensitivity analysis of a maximum recruitment alternative.



### Fiscal analysis

The CBA weighs the economic benefits and costs of the expedited recruitment strategy against the reference recruitment strategy. Policymakers, voters, and other stakeholders should also be concerned with the fiscal effects, namely the changes to public revenue and expenditures, because they measure how taxpayers are affected by the policy under scrutiny.

Table 4 summarizes the fiscal effects on the MOD and MOF. The difference in the expenditures on salaries to the armed forces personnel is 9.2 million USD. This timing effect is unaffected by alternatives and scenarios. The pension expenditures of the MOF increase in the expedited recruitment strategy. The higher the reduction in unemployment, the larger the increase in pension payments. In Norway, the government covers pensions for both public and private sector employees. Higher unemployment reduction increases the taxes received by the MOF. Most importantly, the UB paid by the MOF to the unemployed are reduced in scenarios with high unemployment and alternatives with high unemployment reduction by hiring individuals to the armed forces.

In alternatives with small or medium reductions in unemployment (Alternative I–III), the net government spending increases by 0.8–8.8 million USD, equal to 0.01–0.12% of the total defense budget. If the project has a large effect on the unemployment rate (Alternative IV), the fiscal effect is positive and ranges from 2.6–6.8 million USD depending on the scenario for the labor market, thus equaling 0.04–0.09% of the defense budget in 2021.

**Table 4:** Fiscal effects of the expedited recruitment strategy instead of reference recruitment strategy on the MOD and MOF, discounted million USD (2021) per alternative and scenario.

Category/alternative Scenario	I			II			III			IV		
	A	B	C	A	B	C	A	B	C	A	B	C
<b>The MOD</b>												
NAF salaries	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2
<b>The MOF</b>												
Pension	-0.5	-0.5	-0.5	-0.6	-0.7	-0.7	-1.3	-1.4	-1.6	-2.0	-2.3	-2.6
Taxes	0.5	0.6	0.7	1.1	1.2	1.4	4.1	4.7	5.5	7.7	8.8	10.3
UB	0.4	0.5	0.6	0.8	0.9	1.1	3.3	3.8	4.5	6.2	7.1	8.4
<b>Total</b>	<b>-8.8</b>	<b>-8.7</b>	<b>-8.5</b>	<b>-8.0</b>	<b>-7.8</b>	<b>-7.4</b>	<b>-3.1</b>	<b>-2.2</b>	<b>-0.8</b>	<b>2.6</b>	<b>4.3</b>	<b>6.8</b>

## Discussion

In this study, we investigated whether it makes sense to expand the armed forces with new professional recruits in light of the current economic recession. Specifically, we studied the effects of using an expedited recruitment strategy for the Norwegian Armed Forces on Norwegian society, thus exploiting the hike in unemployment caused by the pandemic.

In April 2020, the MOD proposed a gradual increase in the military workforce of the armed forces and suggested hiring 565 individuals over the next four years. However, in December 2020, Parliament agreed to an expedited recruitment strategy. Thus, we executed a CBA of the expedited alternative versus the reference alternative.

The study singles out three great concerns for a CBA dealing with increasing the military workforce in the armed forces. First, policymakers and other stakeholders must be reasonably

sure that there is a need to increase defense budgets. Therefore, we present the analyses provided by the defense and security establishment in Norway that underscore the need for a stronger emphasis on defense production, highlighting the more aggressive behavior of Russia, the rise of China, and the demands of the United States and NATO.

Second, it is unclear how the armed forces can translate increased budgets into better societal outcomes. To shed light on the complexity of this concern, we present insights from the literature on defense economics. Unfortunately, there is no easy recipe for how to reasonably estimate the value of defense production. As a starting point, we followed other studies and equated the costs of the inputs and outcomes.

Third, there is a tension between labor policies for dealing with unemployment and defense policies. Optimal labor policies fighting unemployment may involve hiring the unemployed or educating and training them to upgrade their skills. However, optimal defense policies for recruitment mean finding the best candidates for the most suitable positions. If the unemployed are worse candidates than what the armed forces can hire from the civilian labor market, the maximization of defense production does not logically entail hiring the unemployed. Still, the armed forces must balance the need for additional recruits, their quality, and the cost of recruiting different types of individuals.<sup>9</sup> Notably, the unemployed may benefit from the hiring project if they fit the positions left vacant by new recruits to the armed forces.

In the CBA, we calculated the differences between the value added and public finances of the expedited recruitment strategy and those of the reference alternative. The conclusions drawn from the main results depend on the response rate, which reflects the recruitment of the unemployed to the armed forces. Following our estimations, Norwegian society incurs a net loss if everyone in the labor force has the same chance of employment under the project. If the response rate is higher, the project is net positive in all labor market scenarios. A high response rate translates into a high social value for the expedited project versus the reference project.

The main results hinge on numerous assumptions that are difficult to clarify. Therefore, we conducted nine sensitivity analyses. The CBA is particularly sensitive to the value of leisure, the share of the pool of unemployed who are eligible for recruitment either directly in the armed forces or indirectly through the chains of vacant positions left behind by armed forces recruits, matching issues, and the value added by alternative public sectors. We also tested the societal net benefits of a maximum recruitment strategy that recruited all military personnel in 2021. This maximum alternative has high values in all scenarios and alternatives due to its relatively large unemployment reduction. This finding hinges on the ability of the armed forces to select candidates of equal quality as in the reference alternative.

The fiscal effects on the government and thus the taxpayers are negative when the project's effect on the unemployed pool is low to medium and positive when this effect is high (i.e., a response multiplier greater than 9). From a fiscal point of view, it is interesting that the government can save money by using an expedited recruitment strategy. This is because the number of recruits in the armed forces is the same in the expedited and the reference alternatives. Thus, defense spending is the same in non-discounted terms. Crucially, the savings

---

<sup>9</sup> Thanks to the anonymous referee for making this point.

from reduced unemployment benefit payments and increase in tax revenues become relatively high when the project has a strong effect on unemployment.

The project may be positive under reasonable assumptions, but it is worth dwelling on three potential downsides. First, if only the unemployed in excess of structural unemployment or the normal unemployment rate can gain employment from the project, the project's net benefits are considerably smaller and even turn negative in several scenario-alternative combinations. Since the armed forces predominantly hire young personnel with little work experience and a lack of higher education, *a priori* a large share of young individuals should be eligible for work there. Notably, the unemployed in Norway are less likely to suffer from health-related issues than those in other modern economies due to generous social programs, including disability benefits. The armed forces, however, search for personnel with high cognitive and physical abilities, and the unemployed may have fewer of these qualities than the employed.

Second, an expedited recruitment strategy may cause the organization to hire personnel too quickly. Hence, the organization cannot always hire the optimal candidates. The matching of the chosen candidates and their abilities to defense production is of unequivocal importance. Evidently, the results are very sensitive to a decrease in the value added by the military personnel in the expedited alternative.

Third, the positive net benefit of the expedited recruitment strategy relies on the non-existence of a public sector with more potential for value added per employee. If, for instance, the health care or education sector can provide Norwegian society with more value added than the armed forces, we recommend policymakers prioritize these sectors instead.

On the opposite end, the project has some potential upsides. For instance, expedited recruitment may reduce scarring among workers, a labor market problem with serious long-term economic costs. Moreover, if the project sufficiently reduces unemployment, the government experiences a positive change in the budget by swapping from the reference recruitment strategy to a speedier one. Most importantly, policymakers and society must be confident that recruiting more personnel to the armed forces is likely to improve the outcomes that we all care about: peace, security, and sovereignty.

## References

- Aaberge, Rolf, Audun Langørgen, and Petter Y. Lindgren. 2017. "The Distributional Impact of Public Services in European Countries." In *Monitoring Social Inclusion*, edited by Anthony B. Atkinson, A.-C. Guio, and Eric Marlier. Luxembourg: Publication Office of the European Union.
- . 2018. "Accounting for Public In-Kind Transfers in Comparisons of Income Inequality between the Nordic Countries." *Nordic Economic Policy Review* 10: 175–209.
- Altonji, Joseph G., Lisa B. Kahn, and Jamin D. Speer. 2016. "Cashier or Consultant? Entry Labor Market Conditions, Field of Study, and Career Success." *Journal of Labor Economics* 34 (1): S361–401.
- Bartik, Timothy J. 2012. "Including Jobs in Benefit-Cost Analysis." *Annual Review of Resource Economics* 4: 55–73.
- Børresen, Jacob, Gullow Gjeseth, and Rolf Tamnes. 2004. *Norsk Forsvarshistorie 1970–2000 [Norwegian Defence History 1970–2000]*. Vol. 5. Eide Forlag: Allianseforsvar i endring.
- Bos, Frits, Thomas van der Pol, and Gerbert Romijn. 2019. "Should Benefit-Cost Analysis Include a Correction for the Marginal Excess Burden of Taxation?" *Journal of Benefit-Cost Analysis* 10 (3): 379–403. <https://doi.org/10.1017/bca.2019.11>.

- Brandt, Martina, and Karsten Hank. 2014. "Scars That Will Not Disappear: Long-Term Associations between Early and Later Life Unemployment under Different Welfare Regimes." *Journal of Social Policy* 43 (4): 727–43. <https://doi.org/10.1017/S0047279414000397>.
- Bratsberg, Bernt, Elisabeth Fevang, and Knut Røed. 2013. "Job Loss and Disability Insurance." *Labour Economics* 24 (October): 137–50. <https://doi.org/10.1016/j.labeco.2013.08.004>.
- Brummer, Matthew. 2020. "Innovation and Threats." *Defence and Peace Economics*, 1–22.
- Chief of Defence. 2019. "A Stronger Defence: The Military Advice of the Chief of Defence 2019." Norwegian Armed Forces.
- Christiansen, Vidar. 2015. "Kostnader Ved Skattefinansiering." *Samfunnsøkonomen* 129 (1): 46–56.
- Cornes, Richard, and Todd Sandler. 1996. *The Theory of Externalities, Public Goods and Club Goods*. 2nd edition. Cambridge: Cambridge University Press.
- Couch, Kenneth A., and Dana W. Placzek. 2010. "Earnings Losses of Displaced Workers Revisited." *American Economic Review* 100 (1): 572–89. <https://doi.org/10.1257/aer.100.1.572>.
- DFØ. 2014. *Veileder i Samfunnsøkonomiske Analyser*. Oslo: Fagbokforlaget.
- Diehl, Paul F., and Gary Goertz. 1985. "Trends in Military Allocations Since 1816: What Goes Up Does Not Always Come Down." *Armed Forces & Society* 12 (1): 134–44. <https://doi.org/10.1177/0095327X8501200107>.
- Eliason, Marcus, and Donald Storrie. 2006. "Lasting or Latent Scars? Swedish Evidence on the Long-Term Effects of Job Displacement." *Journal of Labor Economics* 24 (4): 831–56. <https://doi.org/10.1086/506487>.
- Fetterly, Ross, and Binyam Solomon. 2015. "Facing Future Funding Realities: Forecasting Budgets beyond the Future Year Defense Plan." In *Military Cost-Benefit Analysis: Theory and Practice*, edited by Francois Melese, Anke Richter, and Binyam Solomon, 161–93. New York, NY: Routledge.
- Finansdepartementet. 2014. "Rundskriv R: Prinsipper Og Krav Ved Utarbeidelse Av Samfunnsøkonomiske Analyser Mv." Finansdepartementet.
- Førsund, Finn R. 2017. "Measuring Effectiveness of Production in the Public Sector." *Omega* 73 (December): 93–103.
- Forsvarsdepartementet. 2012. "Prop. 1 S (2012-2013)." Proposisjon til Stortinget. Ministry of Defence.
- . 2020a. "Evne Til Forsvar – Vilje Til Beredskap Langtidsplan for Forsvarssektoren." Stortingsproposisjon Prop. 14 S (2020-2021).
- . 2020b. "Prop. 1 S (2020-2021)." Proposisjon til Stortinget. Ministry of Defence.
- Gregg, Paul, and Emma Tominey. 2005. "The Wage Scar from Male Youth Unemployment." *Labour Economics* 12 (4): 487–509. <https://doi.org/10.1016/j.labeco.2005.05.004>.
- Gregory, Mary, and Robert Jukes. 2001. "Unemployment and Subsequent Earnings: Estimating Scarring among British Men 1984–94." *The Economic Journal* 111 (475): 607–25.
- Hanson, Torbjørn. 2016. "Efficiency and Productivity in the Operational Units of the Armed Forces: A Norwegian Example." *International Journal of Production Economics* 179: 12–23.
- . 2019a. "Estimating Output Mix Effectiveness: An Applied Scenario Approach for the Armed Forces." *Omega* 83 (March): 39–49.
- . 2019b. "Four Essays on Military Economics: Efficiency, Trust and Risk Preferences in the Armed Forces." PhD thesis. Oslo: University of Oslo.
- Hanson, Torbjørn, and Petter Y. Lindgren. 2019. "Nytte-Kostnadsanalyse Av Heving Av Særaldersgrensen i Forsvaret." *Samfunnsøkonomen* 133 (4): 29–44.
- . 2020. "No Country for Old Men? Increasing the Retirement Age in the Norwegian Armed Forces." *Defence and Peace Economics*.
- Hartley, Keith. 2007. "Chapter 33 The Arms Industry, Procurement and Industrial Policies." In *Handbook of Defense Economics*, 2:1139–76. Amsterdam: North-Holland.
- . 2012. "Conflict and Defence Output: An Economic Perspective." *Revue d'économie Politique* 122 (2): 171. <https://doi.org/10.3917/redp.218.0171>.
- Hartley, Keith, and Binyam Solomon. 2015. "Measuring Defense Output: An Economics Perspective." In *Military Cost-Benefit Analysis: Theory and Practice*, edited by Francois Melese, Anke Richter, and Binyam Solomon, 36–75. New York, NY: Routledge.

- Haveman, Robert H., and Scott Farrow. 2011. "Labor Expenditures and Benefit-Cost Accounting in Times of Unemployment." *Journal of Benefit-Cost Analysis* 2 (2): 1–9. <https://doi.org/10.2202/2152-2812.1081>.
- Haveman, Robert H., and John Krutilla. 1967. "Unemployment, Excess Capacity, and Benefit-Cost Investment Criteria." *The Review of Economics and Statistics* 49 (3): 382–92. <https://doi.org/10.2307/1926648>.
- Hove, Kjetil, and Tobias Lillekvelland. 2016. "Investment Cost Escalation—an Overview of the Literature and Revised Estimates." *Defence and Peace Economics* 27 (2): 208–30.
- Johnson, Alexander Urnes, Kjetil Hove, and Tobias Lillekvelland. 2017. "Country Survey: Military Expenditure and Defence Policy in Norway 1970–2013." *Defence and Peace Economics* 28 (6): 669–85. <https://doi.org/10.1080/10242694.2015.1101896>.
- Kahn, Lisa B. 2010. "The Long-Term Labor Market Consequences of Graduating from College in a Bad Economy." *Labour Economics* 17 (2): 303–16. <https://doi.org/10.1016/j.labeco.2009.09.002>.
- Knabe, Andreas, and Steffen Rätzel. 2011. "Scarring or Scaring? The Psychological Impact of Past Unemployment and Future Unemployment Risk: Scarring or Scaring?" *Economica* 78 (310): 283–93. <https://doi.org/10.1111/j.1468-0335.2009.00816.x>.
- Lazear, Edward P., and Sherwin Rosen. 1981. "Rank-Order Tournaments as Optimum Labor Contracts." *Journal of Political Economy* 89 (5): 841–64.
- Lillekvelland, Tobias, and Kari Røren Strand. 2015. "En Analyse Av Sluttrater Og Stillingsrotasjon i Forsvaret." FFI-rapport 2014/00343. Kjeller: FFI.
- Lindgren, Petter Y. 2019. "Advancing the Role of Social Mechanisms, Mediators, and Moderators in Securitization Theory: Explaining Security Policy Change in Japan." *Asian Security* 15 (3): 343–64. <https://doi.org/10.1080/14799855.2018.1445895>.
- Lindgren, Petter Y., and Ane Ofstad Presterud. 2021a. "Expanding the Norwegian Armed Forces in the Time of Corona: Benefit-Cost Analysis in the Context of High Unemployment Rate." MPRA Paper. Munich Personal RePEc Archive.
- . 2021b. "Øke Bemanningen i Forsvaret i Dramatisk Nedgangskonjunktur? En Samfunnsøkonomisk Vurdering." *Samfunnsøkonomen* 135 (1): 45–59.
- Litwack, John M. 1993. "Coordination, Incentives and the Ratchet Effect." *The RAND Journal of Economics* 24 (2): 271–85.
- Melese, Francois. 2015. "The Economic Evaluation of Alternatives." In *Military Cost-Benefit Analysis: Theory and Practice*, edited by Francois Melese, Anke Richter, and Binyam Solomon, 74–109. New York, NY: Routledge.
- Mishan, E.J., and Euston Quah. 2007. *Cost-Benefit Analysis*. 5th ed. New York, NY: Routledge.
- Nordlund, Peter. 2016. "Defence-Specific Inflation – the Swedish Perspective." *Defence and Peace Economics* 27 (2): 258–79. <https://doi.org/10.1080/10242694.2015.1096571>.
- Olson, Mancur, and Richard Zeckhauser. 1966. "An Economic Theory of Alliances." *The Review of Economics and Statistics* 48 (3): 266. <https://doi.org/10.2307/1927082>.
- Oren, Eitan, and Matthew Brummer. 2020. "Threat Perception, Government Centralization, and Political Instrumentality in Abe Shinzo's Japan." *Australian Journal of International Affairs* 74 (6): 721–45.
- Persky, Joseph, Daniel Felsenstein, and Virginia Carlson. 2004. "Does 'Trickle Down' Work?: Economic Development Strategies and Job Chains in Local Labor Markets." Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
- Rege, Mari, Kjetil Telle, and Mark Votruba. 2009. "The Effect of Plant Downsizing on Disability Pension Utilization." *Journal of the European Economic Association* 7 (4): 754–85. <https://doi.org/10.1162/JEEA.2009.7.4.754>.
- Sandler, Todd, and Keith Hartley. 2001. "Economics of Alliances: The Lessons for Collective Action." *Journal of Economic Literature* 39 (3): 869–96. <https://doi.org/10.1257/jel.39.3.869>.
- Schmillen, Achim, and Matthias Umkehrer. 2017. "The Scars of Youth: Effects of Early-Career Unemployment on Future Unemployment Experience." *International Labour Review* 156 (3–4): 465–94. <https://doi.org/10.1111/ilr.12079>.

- Skjelland, Espen, Sigurd Glærum, Alexander Beadle, Monica Endregard, Mona Sagsveen Guttelvik, Alf C. Hennem, Sverre Kvalvik, et al. 2019. "Hvordan Styrke Forsvaret Av Norge?" FFI-rapport 19/00328. Kjeller: Norwegian Defence Research Establishment.
- Smeeding, Timothy M., Peter Saunders, John Coder, Stephen Jenkins, Johan Fritzell, Aldi J. M. Hagenaars, Richard Hauser, and Michael Wolfson. 1993. "Poverty, Inequality, and Family Living Standards Impacts across Seven Nations: The Effect of Noncash Subsidies for Health, Education and Housing." *Review of Income and Wealth* 39 (3): 229–56.
- SSB. 2021. "Konjunkturtendensene Med Nasjonalregnskapet for 1. Kvartal 2021." Tall som forteller. Oslo: Statistics Norway.
- Vitaliano, Donald F. 2012. "An Empirical Estimate of the Labor Response Function for Benefit-Cost Analysis." *Journal of Benefit-Cost Analysis* 3 (3): 1–12. <https://doi.org/10.1515/2152-2812.1119>.
- Wachter, Till von, and Stefan Bender. 2006. "In the Right Place at the Wrong Time: The Role of Firms and Luck in Young Workers' Careers." *American Economic Review* 96 (5): 1679–1705. <https://doi.org/10.1257/aer.96.5.1679>.
- Zuidema, Thijs. 1987. "Cost-Benefit Analysis in a Situation of Unemployment: Calculating the Decline in Unemployment as a Result of the Realization of a Government Project." *Public Finance Quarterly* 15 (1): 105–15. <https://doi.org/10.1177/109114218701500107>.