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The biggest bang for the buck: Leveraging best practices in defence procurement for Europe's rearmament

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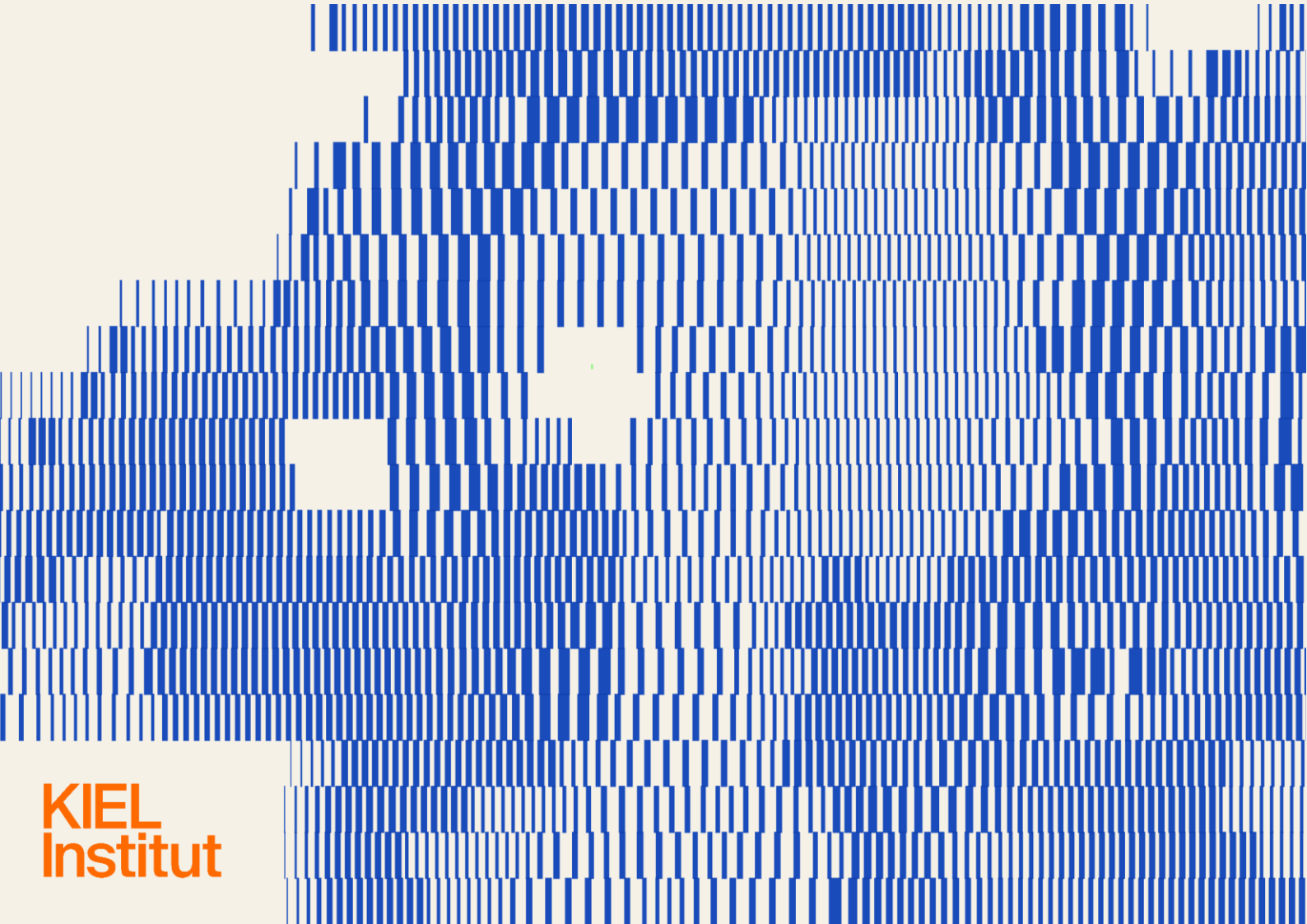

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Overview

Europe is embarking on a historic increase in defence and security spending. If done well, it will fundamentally reshape European defence capabilities amd remake the European defence industrial base. If done badly, Europe risks wasting billions for outdated and expensive equipment with little difference in military capability.

The application of key economic insights from mechanism design and best practice in procurement is essential. This report synthesizes the key insights from economic research on how to maximize European military capabilities, economic resilience, and innovation per Euro spent.

(i) The procurement of innovation should be placed at the centre of Europe's defence strategy. Evidence from U.S. programmes shows that autonomous, flexible agencies with highly skilled programme managers, bottom-up project selection, and active project management outperform rigid, top-down systems. A combination of funding pushes for R&D and pull incentives through purchase commitments is most effective.

(ii) Europe must prepare for demand surges during a conflict and secure actual production capacity through contracts across the supply chain. Future scalability of production, unit-cost reduction, and ensuring secure supply chains and critical inputs must be central to the strategy.

(iii) Effective procurement processes require well-trained and competent buyers with sufficient discretion, combined with strong ex post accountability. Flexibility and discretion are typically preferable to rigid ex ante rules and overspecification in slow bureaucratic processes. For standardized goods such as ammunition, competitive auctions and fixed-price contracts perform well.

(iv) On a European level, the case for centralising defence procurement is strong. A single European defence procurement market would yield large cost savings, strengthen the industrial base, enhance interoperability, and improve coordination of R&D and surge-capacity investments.

Keywords defence procurement, defence spending, governance, contract design, innovation, competition, military industrial base, R&D incentives, European defence integration

JEL classification H41, H56, H57, D44, L14, L52, O31, O38

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The biggest bang for the buck: Leveraging best practices in defence procurement for Europe's rearmament

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1 Introduction: Goals, challenges, and caveats

In June 2025, countries forming the North Atlantic Treaty Organisation (NATO) agreed to spend 5% of their GDP annually on defence and security by 2035. This target includes at least 3.5% of GDP dedicated to "core defence requirements", with the remaining 1.5% allocated to broader security-related needs such as critical infrastructure protection, network defence, civil preparedness, innovation, and strengthening the defence industrial base. The scale of this build-up will be substantial, particularly for the alliance's European members. For example, since 2000, average annual defence spending has been 1.3% of GDP in Germany, 2% in France, 1.5% in Italy, 1.4% in Spain, and 2.3% in the United Kingdom (Stockholm International Peace Research Institute, 2025). Meeting these requirements implies that, by 2035, European NATO members would collectively spend an *additional* 831 billion euro per year in national security-related expenditures (Tian, Scarazzato, and Guiberteau Ricard, 2025),[1] implying a radical reshaping of defence procurement markets and the European defence industrial base. Yet this historic rearmament effort comes at a time of increasingly tight public finances and high debt levels across Europe, making it paramount to spend these resources efficiently.

This report synthesises key insights from the economics literature on defence procurement to inform the ongoing European defence build-up. I survey some of the most relevant work in this area,[2] highlighting how existing research can inform policymakers on some of the crucial challenges they are likely to face.
Specifically, I consider:

- which types of procurement mechanisms are best suited for different types of defence goods and services;
- how to design a procurement strategy that can scale up production rapidly in response to crises;
- how to effectively incentivise military innovation and the development of new technologies;
- what degree of centralisation is optimal for European defence procurement.

In many respects, the procurement of military goods and services does not differ conceptually from the acquisition of non-defence products. This is useful, since the larger literature on public procurement in general can be informative on some issues. Yet other features are distinctive and may require closer attention to defence-specific work, or careful extrapolation from literature developed in other contexts that share critical characteristics with defence procurement. This creates a challenge, since the economics literature on defence procurement is relatively scarce.

[1] For core defence only, the authors estimate an additional spending of 336 billion per year by 2035.

[2] Sandler and Hartley (2007) offer an excellent overview of the field of defence economics. Rogerson (1994) discusses the incentive problems that characterise defence procurement. Hartley (2017) presents a more recent and accessible treatment of the economics of defence industries.

Indeed, economists' interest in this sector has been very limited compared to other areas of public economics and industrial organisation, despite its significant size and importance. This is as true today as it was three decades ago, when Rogerson (1994) hypothesised that a *"barrier to entry created by the need to first learn about procurement practices,"* or a *"lingering distaste for military matters among academics"* could be reasons behind the sparse literature. And while there may be some merit to these explanations, I believe that at least two other factors also help explain why economics research on, say, health, education, or welfare programmes, dwarfs that on defence.

The first factor is data availability. Frontier research in applied microeconomics often relies on detailed administrative data from government agencies, which in the defence sector are typically not accessible to researchers due to the sensitive nature of the information involved. A thorough analysis of defence procurement would require access to granular data on contract awards and bidding processes, as well as follow-up cost and performance metrics on awarded contracts. Such data are often classified or restricted, or when publicly available they lack many key variables that would enable a richer analysis. For example, the U.S. Federal Procurement Data System (FPDS) provides more than 100 different variables on each contract awarded by the Department of defence (DOD), yet basic pieces of information are not provided, such as a breakdown between quantity and unit prices, an ex ante price or engineer's cost estimate to benchmark award prices, the identity of the losing bidders and the value of their bids, or detailed performance metrics on cost, schedule, and technical performance. The DOD does collect some of this information systematically, but it is deemed "source selection sensitive", thereby impeding its use by external researchers. Similar limitations arise with data from other countries. And while this has not precluded some researchers (including myself) from using the publicly available data to conduct empirical research on defence procurement, it does limit the scope of analyses that one can perform, and may be a reason why fewer researchers work on this topic.

A second related factor that may explain why defence procurement is relatively understudied is that it is an area of government activity where outcomes are conceptually hard to define and difficult to systematically measure. When studying the effectiveness of educational policies, researchers can measure their impact on student test scores and graduation rates. When assessing the impact of health interventions, they can quantify their effects on mortality rates or disease incidence. But how can we evaluate the effectiveness of investments in defence? How do we measure the value in terms of security, the prevention of future conflicts, or the deterrence of terrorist attacks that a new weapons system delivers?

As Hartley (2012) notes, one possible yet highly unsatisfactory approach is to measure inputs (i.e., the money spent on defence) as a proxy for output (i.e., the consequences of that spending). This used to be the standard practice by most governments, although more recently they have started adopting the notion of *defence capabilities* as the key output measure. Capabilities are the ability to achieve a certain specific goal, such as the ability to deploy a certain number of troops to a conflict zone within a specific timeframe, or the ability to protect a territory from a particular type of missile attack. This is a major improvement relative to old practice, making clear that different types and amounts of inputs may generate the same output. Still, major challenges remain. On the one hand, it may be hard to define and measure capabilities in precise *quantitative* terms. On the other hand, the measures tend to be relatively narrow, and will fail to capture the contribution to the prevention of conflicts and its consequent costs in terms of human lives and economic damages, arguably the ultimate outcome we should care about. To quote and paraphrase major British historical figures, "you can't always get what you want", and and it may well be that capabilities are the worst possible defence outcome measure, except for all the others that have been tried from time to time. In the absence of better alternatives, capabilities appear to be the most meaningful outcome measure, and governments should strive to define and quantify them as accurately as possible. More empirical work using these metrics as outcomes would be highly valuable, as most of the existing work focuses on measures of contract performance, such as cost overruns and schedule delays.

With these challenges and caveats in mind, the report synthesises lessons from the existing economics literature on defence procurement, organised around themes likely to be central in the current European policy discussion. Section 2 considers which procurement mechanisms are appropriate for different types of acquisition, highlighting trade-offs among mechanisms, the role of competition, and the balance between rules and discretion. Section 3 examines strategies for scaling up production in response to crises, drawing parallels with vaccine production during the COVID-19 pandemic. Section 4 discusses methods for procuring innovation, and Section 5 considers the optimal degree of centralisation in European defence procurement. Section 6 concludes with key takeaways and policy recommendations.

2 Procurement mechanisms

How should governments procure defence goods and services? Important dimensions of this question concern what specific mechanisms to use when selecting between potential suppliers, what type of payment schemes to use to reward vendors, and the extent to which procurement officers should exercise discretion in making these decisions, deviating from pre-established

rules.

Most research on these questions considers public procurement in general, although defence procurement is sometimes explicitly discussed or used as a motivating example. A smaller set of papers focuses squarely on defence procurement. Taken together, one overarching message emerges: one size does not fit all. Different types of acquisitions will require different types of mechanisms, competition is not always unambiguously beneficial, and the optimal degree of buyer discretion depends on context.

Awarding mechanism and competition

A first important challenge faced by an agency acquiring a military good or service is how to select a contractor from a pool of potential vendors. Should they rely on competitive auctions—and, if so, should awards be made to the lowest bidder Should they strive to maximise competition, or restrict tenders to a few pre-selected firms? Should they negotiate directly with suppliers?

Economists have typically been enthusiastic supporters of auctions as an awarding mechanism. This is backed by a large theoretical literature showing how auctions can be a powerful instrument to drive down procurement prices when goods are simple and homogeneous, and sellers may have private information about their costs (e.g., McAfee and J. McMillan, 1986; Laffont and Tirole, 1987; Bulow and Klemperer, 1996). If non-price attributes such as product or service quality are important, and if these dimensions are easy to measure and verify, then auctions that explicitly incorporate non-price dimensions into the allocation rule (i.e., scoring auctions) can be optimal (Che, 1993; Asker and Cantillon, 2008; Asker and Cantillon, 2010).

However, when important aspects of quality are non-contractible, an auction that awards the contract to the lowest bidder may lead to inefficient outcomes, perhaps by selecting low-cost but low-quality contractors (i.e., adverse selection) or by inducing firms to opportunistically "cut corners" in the implementation of the contract (i.e., moral hazard). In this case, theoretical work shows that standard auctions are usually outperformed by mechanisms that resemble direct negotiation, restrict the set of competing firms, or introduce allocation rules that do not necessarily award to the lowest bidders (Spulber, 1990; Manelli and Vincent, 1995; Calzolari and Spagnolo, 2009; Burguet, Ganuza, and Hauk, 2012; Chillemi and Mezzetti, 2014; Decarolis, 2018; Lopomo, Persico, and Villa, 2023).

The issue of non-contractible quality is likely to be a concern in real-world procurement markets, particularly for more complex goods and services. Consequently, and in line with the theoretical insights, a growing body of empirical work documents the shortcomings of standard auctions.[3] Carril, Gonzalez-Lira, and Walker (2025) explore this in the context of defence procurement, studying U.S. defence contracts awarded competitively via first-price auctions. They observe that a rule in the federal procurement system mandates that contracts expected to exceed $25,000 be publicised on a government website, whereas contracts below this threshold receive bids only from firms directly informed by the buyer. This creates an exogenous source of variation in competition, as otherwise very similar contracts receive a significantly different number of bids depending on whether they cross the policy threshold. Using a combination of density analysis, a regression discontinuity design, and an empirical auction model, they find that contract awards advertised through the government platform see a 60% increase in the number of bids, and that this increased competition leads to award prices that are, on average, 6% lower. However, competition also increases the likelihood of cost overruns and delays, particularly for more complex contracts. For simple contracts such as the acquisition of off-the-shelf products, the award-price savings dominate, so that more competition reduces total costs. For more complex contracts, initial savings due to fiercer competition are more than compensated for by higher cost overruns, leading to higher total procurement costs. The model implies that the one-size-fits-all policy of mandating publicity for all types of contracts is suboptimal. Instead, important cost savings would be achieved by a policy that maximises competition for simple contracts, but that grants buyers of more complex goods and services a greater amount of discretion to restrict competition.

[3]For example, Bajari, R. McMillan, and Tadelis (2009) show that auctions perform worse than negotiation when goods are more complex and contractual design is incomplete, in the context of Northern California's construction sector. Decarolis (2014) shows that when Italian procurement bodies introduced first-price auctions they saw a significant increase in ex post cost overruns, thereby dissipating a large share of the savings induced by competition. Also in Italy, Coviello, Guglielmo, and Spagnolo (2018) document better procurement outcomes when auctions for public construction projects can be restricted to a set of firms invited by the buyer.

Multi-sourcing and split awards

One specific form of competition that has attracted attention in the defence procurement literature is the reliance on multiple suppliers for a single need. The main application is the procurement of large and complex systems—say, the new generation of fighter jets—which can be thought of as two-stage processes: an initial development phase where firms compete on designs and prototypes, followed by a production phase where the winning design is manufactured at scale. The production phase, at least initially, is typically awarded to the developer of the winning design. But once the technology is developed and production processes are established, should the buyer consider introducing competition to the incumbent manufacturer by potentially awarding all or part of the subsequent production to a second source?

A number of theoretical papers have studied this question with defence procurement as their main motivating example. The logic of (potentially) awarding a production contract to a second source is that the threat of losing the contract will create incentives for the incumbent to reduce costs and improve service. However, these benefits from competition may be weakened or even reversed when there is a learning curve that gives the incumbent a cost advantage over the second source, transferring the technology is costly, or if competition at the production stage affects firms' incentives at the development stage, leading them to bid less aggressively for development or to underinvest in research effort.

Anton and Yao (1987) emphasise the "experience curve" channel and its interaction with asymmetric information. While the existence of an incumbent's cost advantage reduces the benefits of competition, they show that the threat of second sourcing can efficiently discipline the incumbent's cost revelation. Riordan and Sappington (1989) emphasise instead the costly technology transfer and the linkages between development and production stages. They show that second sourcing can only be optimal for intermediate levels of technology transfer costs: if these costs are too high, then production by the second source is prohibitively expensive; if they are too low, then second sourcing eliminates research and development incentives during the initial phase. A numerical simulation implies that second sourcing is often undesirable.

Rather than allocating the entire production contract to a second source, an alternative is to split the production contract between the incumbent and a new entrant. Rob (1986) shows that splitting may be a way to leverage the benefits of competition while retaining incentives for R&D in the initial phase. However, Anton and Yao (1989) and Anton and Yao (1992) show that award splitting may induce coordination or even collusion among bidders.

In Section 4, I will come back to the issue of effectively incentivising innovation and the role of subsequent production procurement contracts. Finally, it is worth mentioning that these models typically focus on the price effects of multi-sourcing and split awards, whereas a buyer may have non-price motivations for these strategies, such as ensuring supply security or maintaining a competitive industrial base. I will return to these issues in Section 5.

Contract design

Beyond how to allocate the contract between prospective firms, a second question is how that contract should be structured, particularly regarding payment schemes. Should the contract reward the vendor unconditionally on a fixed-price basis, or should payments be indexed to costs? The former type creates strong incentives for cost reduction, but makes the vendor bear all the risk from cost uncertainty. The latter contract shares risk between buyer and seller, but may weaken incentives for cost containment.

In a classic paper, Laffont and Tirole (1986) study this problem by developing a model of how to optimally incentivise a seller who has private information about their costs and may invest in cost reductions. The optimal scheme is to offer a menu of incentive contracts that allow for screening, where each contract combines a fixed payment with a cost-plus reimbursement. This optimally balances incentives to reduce costs with risk-sharing.

Bajari and Tadelis (2001) observe that such menus are rarely used in practice. Instead, either "pure" fixed-price or cost-plus contracts are the norm. They propose a theory that emphasises ex post adaptation to unforeseen contingencies, rather than ex ante screening. This implies that both buyer and seller face substantial uncertainty that materialises *after* the contract award and may trigger design changes and renegotiations. The authors find that simple projects use fixed-price contracts with a high degree of design completeness, leaving little room for ex post adaptation, whereas more complex projects are procured with cost-plus contracts, leaving the design relatively incomplete and increasing the likelihood of adaptation.

While the theory provides clear insights into the features of simple contracts and when a given form is preferred, there is virtually no systematic empirical evidence on the performance of different contractual forms in defence procurement. Crocker and Reynolds (1993) study the determinants of contract type for a small sample of U.S. Air Force engine contracts, showing that cost-plus contracts are more likely when technological uncertainty is higher, whereas fixed-price contracts are more

prevalent when the supplier has a history of past opportunistic behaviour or there is more potential for hold-up by a single source. Carril and Duggan (2020) use the universe of defence contracts in the U.S. in 1986–2001, a period of significant consolidation among defence contractors, to study how industry concentration affected the procurement process, including the choice of contract type. Using exogenous variation from the heterogeneous impact of mergers across product markets, they find that increased concentration led to greater use of cost-plus contracts.

Both empirical studies offer insights into factors that influence contract-type choice. However, the question of how changes in contract type causally influence procurement outcomes remains largely unexplored. The answer likely depends on contract characteristics, with fixed-price contracts performing better for simpler procurements and cost-plus contracts being more appropriate for complex procurements that require ex post adaptation. However, a quantitative assessment of these trade-offs would be valuable for procurement design and remains an open area for future research.

Buyer discretion

The previous sections discussed how different dimensions of procurement design may influence contract outcomes. In practice, these choices will be made by procurement officers whose scope of action is constrained by a set of rules and regulations. How tight or loose should these rules be? To what extent should we limit buyer discretion, and to what extent should we allow procurement officers to use their judgement, expertise, and on-the-ground information to make decisions?

In policy circles, this is often referred to as one of the most contentious issues in procurement design (Gutman, 2014). The stakes are naturally very high. The OECD refers to public procurement as "the government activity most vulnerable to waste, mismanagement and corruption",[4] and several high-profile procurement scandals across countries have reinforced the perception that discretion may lead to abuse. Yet limiting discretion may lead to rigid rules that impede adaptation to changing circumstances and prevent procurement officers from using their expertise to make better decisions. The risk is that buyers spend most of their time focusing on costly compliance rather than on getting the best value for money (Kelman, 1990).

This question has attracted significant attention in economics research, with mixed empirical evidence on the trade-off. Some studies emphasise that greater discretion leads to favouritism and worse procurement outcomes (Palguta and Pertold, 2017; Baltrunaite, 2019; Szucs, 2024), whereas others find that it can improve outcomes (Coviello, Guglielmo, and Spagnolo, 2018; Bandiera, Best, et al., 2021; Carril, 2022; Decarolis, Fisman, et al., 2025).

Bosio et al. (2022) propose a way to rationalise these mixed findings. They build a model in which procurement outcomes are jointly determined by regulatory rules and public-sector capacity. The main result is that regulation is desirable in countries with low public-sector capacity, but not in countries with high capacity, since it hinders the exercise of optimal discretion. Cross-country evidence supports these predictions: tighter procurement regulation correlates with improved outcomes, but only in low-state-capacity countries. Carril (2022) provides a similar rationalisation in a within-country framework. Whether rules or discretion lead to better outcomes depends on the degree to which procurement officers are aligned with the public interest, a key parameter in the model. Using U.S. federal procurement data, he shows that alignment in this context is relatively high, indicating that expanding buyer discretion would be beneficial. Yet the model makes clear that a context with a lower degree of alignment could lead to the opposite conclusion.

Takeaways for European defence procurement

Contracting should not be bound by one-size-fits-all rules. Instead, a flexible procurement system that allows buyers to choose from a menu of mechanisms and contract types is likely to yield better outcomes. Competitive bidding and high-powered fixed-price contracts should be the default for off-the-shelf transactions and encouraged for relatively simple acquisitions with easy-to-verify quality, such as ammunition or low-tech drones. For more complex purchases with uncertainty regarding the need for ex post adaptation, restricting the set of competing firms, negotiating directly, and/or relying on cost-reimbursement contracts may be more appropriate.

[4] https://www.oecd.org/en/topics/sub-issues/integrity-in-public-procurement.html. Accessed October 2025.

Granting procurement authorities broad discretion requires careful selection and training of procurement officers. Discretion need not imply a lack of accountability; procurement managers should be able to justify their choices, and ex post audits can be used to detect and sanction waste and abuse. The key is to avoid an excessively bureaucratic system that seeks to control waste by limiting buyers ex ante and subjecting them to costly regulatory compliance.

3 Scaling up production in times of crisis

One respect in which defence procurement may be distinct from many other sectors is the possibility of sudden increases in demand following geopolitical crises. A surge in demand requires a rapid scaling up of production, which, in the absence of specific planning, may be extremely difficult—or even infeasible—to achieve. Without a specific institutional design, the industrial base is unlikely to have incentives to invest in capacity to accommodate these surges, and input shortages and other supply chain bottlenecks are likely to emerge.

How should the defence procurement system anticipate and prepare for these demand surges? This key question has received little attention in the economics literature on defence procurement. However, economists have put some thought into this issue in the context of the recent COVID-19 pandemic, with the need to rapidly scale up vaccine production offering useful parallels and insights. Furthermore, some institutional mechanisms used to respond to the pandemic have their origin in defence preparedness, with the U.S. defence Production Act serving as an important legal lever to expedite vaccine production.

In the early days of the vaccine rollout in the U.S., Castillo et al. (2021) estimated that rapidly expanding capacity to accelerate immunization would yield enormous social benefits, on the order of US$600–1,000 per course. Early vaccine deals with manufacturers, by contrast, paid producers US$6–40 per course, revealing that producers lacked incentives to invest in the socially optimal level of capacity. In this and follow-on work (Ahuja et al., 2021; Athey et al., 2022), the authors propose a few market design principles to close this gap, which I then extrapolate to the defence context.

A core principle is that governments should contract on capacity rather than quantity. Paying for delivered units creates weak incentives to invest in capacity that can be rapidly deployed during surges and is likely to result in delays that can be extremely costly. Instead, governments should pay manufacturers to invest in capacity, securing a priority right to units produced when needed. To ensure that firms have some skin in the game, these upfront payments need not cover the full cost of capacity, and some incentives can be retained for delivered units, perhaps with bonuses for early delivery.

Capacity investments will serve little purpose if critical inputs are not available at the speed and scale required. Rather than solving the problem, it would simply shift the bottleneck upstream in the supply chain. Governments have several tools to relax these supply chain constraints. For inputs that do not depreciate quickly, stockpiling may be a reasonable solution. In other cases, the same type of capacity contracts discussed above may be appropriate for certain critical inputs and intermediate goods. Finally, governments may need to resort to legally compelled prioritisation mechanisms to ensure that scarce critical inputs are directed to defence production in times of crisis.

Bown (2022) discusses how the U.S. relied on the defence Production Act to assign a priority rating to its vaccine contracts. Priority-rated contracts not only give the government priority over other potential buyers but also require manufacturers to pass that priority rating along the supply chain, ensuring prioritised access to critical inputs. The author documents how this mechanism was widely successful in enabling hundreds of millions of doses of vaccines to be produced for U.S. consumption within weeks of the first successful vaccine trials. However, the relative slowdown in U.S. production in later months, coupled with input shortages, suggests that this mechanism is likely insufficient on its own and should be complemented by input capacity–expanding contracts of the type discussed above.

Takeaways for European defence procurement

Europe may find itself in a situation where weapons production needs to be rapidly scaled up, above and beyond the current expected pace of rearmament. Preparations for this scenario should start now. Europe should consider contracting on production capacity, paying firms to invest today at levels that can accommodate possible surge demand in the future. Ex-

panding capacity in this way can act as a deterrent, and is also key to achieving economies of scale in production. Candidates for these investments include ammunition, drones, and existing weapon systems that can be produced at scale with current technology–such as artillery, cruise missiles, air-defence systems, manned aircraft, and airlift capacity (Quinet et al., 2025). This capacity need not be wasted if demand surges do not materialise, and coordination to ensure that firms can repurpose capacity for other products in peacetime would be desirable.

Supply chains are fundamental to ensuring that this capacity can be effectively used when needed. Authorities should identify critical inputs that may become bottlenecks and apply similar capacity contracts upstream. Stockpiling some critical inputs may also be appropriate. Legal mechanisms to prioritise critical inputs for defence production in times of crisis may be a necessary last resort.

4 Procuring innovation

Another distinctive feature of defence procurement is the importance of innovation. Both improving existing technologies and developing new ones are crucial to adapting to the constantly changing nature of warfare. How should governments effectively incentivise defence innovation? Note that the benefits of a well-designed innovation strategy in defence are likely to far exceed the immediate impacts on national security, given the potential for spillovers to the broader economy (Moretti, Steinwender, and Van Reenen, 2025).

Although not commensurate with its relevance, there is a growing empirical literature in economics that sheds light on the procurement of military innovation.[5] A first finding is that individual buyers play a key role in the success of innovation procurement. Decarolis, Rassenfosse, et al. (2021) provide evidence of this, analysing R&D contracts awarded by the U.S. Department of defence and leveraging exogenous replacements of contract managers due to their deaths. The authors find that sudden changes in the employee in charge of managing an R&D contract significantly reduce the number and quality of innovation outputs, as measured by the number of follow-on patents and their citations. The results suggest that buyers' expertise and specialised human capital are important and hard-to-replace determinants of innovation procurement success.

Other studies have focused more directly on the design of particular innovation procurement programmes. Perhaps the most famous programme is the Defence Advanced Research Projects Agency (DARPA), often credited for major developments in military applications such as missile defence and stealth technology, as well as major inventions that spilled over to commercial applications, like the internet or global positioning systems (GPS). Azoulay et al. (2019) provide a comprehensive overview of DARPA and discuss the complementary design features that may explain its success. A first key aspect is organisational flexibility, manifested in a flat organisation with limited bureaucracy; independence from other branches of the Department of defence; the ability to hire programme managers outside the rigid civil service system–typically from academia and industry in fixed-term appointments–and discretion to use more flexible contracting mechanisms. A second element is a bottom-up approach, where programme managers use the aforementioned autonomy and flexibility to (re-)direct resources in real time to technological areas based on changing priorities and innovation promise. A third feature is programme managers' discretion to select projects, as opposed to blindly following a strict cutoff rule based on peer review scores. The fourth main characteristic is that DARPA project managers are not merely counterparts of the research team, but take an active role in managing the projects, including making decisions on capital, tasks, milestones, and technical goals over the projects' life cycle. Finally, the authors argue that the DARPA model is best suited for projects where three elements are present: (i) a specific challenge exists, (ii) the technology exists but is relatively unexplored and has great potential for improvement (a "nascent S-curve" technology), and (iii) important inefficiencies exist in the broader innovation system.

Another programme that has gathered economists' attention is the U.S. Department of defence's Small Business Innovation Research (SBIR), which provides funding to small firms to develop research projects. Bhattacharya (2021) studies the traditional version of this programme, with projects that respond to specific technological requirements and are awarded through a multi-stage R&D contest. Optimally designing this contest involves complex trade-offs that render the desirability of different design choices ambiguous ex ante. For example, competition may increase the expected value of the innovations developed, but it also leads to costly duplication of research efforts. Similarly, stronger incentives in the form of larger pro-

[5] Chiappinelli, Giuffrida, and Spagnolo (2025) provide a recent survey of the general economics literature on public procurement of innovation. Here, I focus specifically on defence.

curement contracts for successful firms induce more effort, but this may or may not be socially efficient depending on the strength of holdup problems and business-stealing effects. Developing and estimating a model tailored to this setting, the author finds that providing stronger incentives and increasing the number of competing firms would significantly increase the social surplus generated by the programme, even though they reduce the sponsor agency's own welfare.

A more general design choice is the degree to which innovation procurement should be "top-down" versus "bottom-up." A top-down approach involves the government specifying detailed requirements and soliciting proposals to meet them, as in the traditional SBIR. A bottom-up approach may open up calls for proposals to *any* technology that firms think the sponsor might need. Howell et al. (2025) provide a direct evaluation of these two competing approaches, leveraging the fact that the U.S. Air Force ran both types of calls in parallel within its SBIR. Comparing marginally selected and marginally rejected proposals in both traditional (top-down) and open (bottom-up) solicitations, they find that only open awards increase technology adoption by the military and commercial innovation, measured as follow-on patenting and VC investment. The null effects of conventional awards on innovation outcomes are coupled with an increase in programme lock-in–that is, an increased likelihood of future research awards to the same firm. One of the positive effects of open awards is attracting proposals from new types of firms that would not normally participate in traditional calls–younger, smaller, startup-like firms–although openness matters above and beyond this compositional effect.

The literature often distinguishes between "push" and "pull" mechanisms to incentivise innovation. Push mechanisms provide funding upfront to support research effort, whereas pull mechanisms reward successful candidate innovations. Both programmes discussed above–DARPA and SBIR–have a large push component by funding the initial phases of research and development. Additionally, the (often implicit) promise of follow-on procurement contracts for successful candidates provides a complementary pull incentive.

In Section 3, I discussed mechanisms proposed by economists in the context of the COVID-19 pandemic. These mechanisms also offer insights into innovation procurement, and, in particular, how to combine push and pull mechanisms effectively. Funding for capacity investments–emphasised in Section 3 as a way to rapidly scale up production of an existing product–was proposed to be funded *at risk*, that is, even before a successful vaccine candidate had been identified (Athey et al., 2022). Contracting on capacity with several candidates would then not only ensure timely availability of production once a successful vaccine was developed, but also create strong incentives for firms to invest in research effort in the first place, thereby increasing the likelihood and speed of vaccine development. The downside of the policy is that, precisely due to the investment at risk, some resources will inevitably be wasted as not all candidates will succeed. However, the enormous benefits from speeding up vaccine availability dwarfed these costs (Castillo et al., 2021). In the spirit of advanced market commitments (Kremer and Glennerster, 2004; Kremer, Levin, and Snyder, 2020; Kremer, Levin, and Snyder, 2022), the authors also propose complementing these push incentives with pull funding in the form of purchase guarantees at a lucrative price, to further increase incentives for research effort at the development stage.

Takeaways for European defence procurement

Europe has exhibited weak innovation performance relative to other advanced economies, in part due to less private R&D spending, less effective public R&D spending, a fragmented innovation ecosystem, a shortage of academic talent at the very top, underdevelopment of innovation clusters, and financial, legal, regulatory, and bureaucratic barriers to the creation and scale-up of innovative firms (Draghi, 2024). This makes the challenge of procuring high-tech innovation for defence even more complex. At the same time, it may offer an opportunity to design a new innovation procurement system centred on defence that delivers security outcomes while also yielding positive spillovers to civilian innovation and the broader economy. Quinet et al. (2025) advocate for such an innovation-driven defence strategy with a special focus on key sectors expected to have high spillover potential. These include autonomous systems and robotics, artificial intelligence and advanced software, space capabilities, rocket and missile technologies, and satellite constellations.

Experience from U.S. programmes offers some lessons for how this strategy might be carried out. Since organisational flexibility is crucial, it is difficult to see how current EU institutions could fulfil this role, at least within the current institutional and regulatory framework. A new agency with a high degree of autonomy may be needed. The ability to hire programme managers at the highest level of technological expertise from academia and industry, to give them broad discretion to select and actively manage projects, and to have them report directly to high-level political authorities would be key features.

Multi-stage R&D contests may be a powerful mechanism to attract private capital, accelerate innovation, and support market entry and competition. Following the example of the U.S. SBIR programme, Europe may consider restricting a significant share of these types of contests to small firms. While large firms will likely continue to play a central role in defence innovation given the scale and complexity of many projects, investing in small firms and startups may yield large innovation dividends, and diversify the industrial base by fostering the entry of new players.

Contest design should be evaluated carefully and continuously. In the current European context, however, a combination

of strong incentives and significant competition is likely to be appropriate, especially for strategic technological areas with high degrees of uncertainty.

Bottom-up innovation should be encouraged. A dedicated share of funding should go to open calls for proposals, allowing firms to propose any technology they believe may be relevant for defence applications or have high dual-use potential. Even within the strategic sectors identified above, funding agencies can maintain openness by specifying the critical challenges and capabilities they seek to achieve, while leaving firms free to propose any technology that could meet those goals. Purchase commitments for successful innovations should complement upfront R&D funding.

5 Procurement centralisation

To what degree should defence procurement be centralised? This question is particularly relevant in the European context. One possibility is that each country continues to procure defence goods and services independently, as has been the norm historically. An alternative is to centralise procurement at the EU or NATO level, with a single procurement agency in charge of military acquisitions. Of course, a middle-of-the-road approach is possible in which some procurement is centralised, while other acquisitions are left to national governments.

Dimitri, Dini, and Piga (2006) present a detailed discussion of the trade-offs involved in procurement centralisation. The main argument in favour of centralisation is that it can generate cost savings through a combination of economies of scale, reduced duplication of effort, specialisation, knowledge and resource sharing, and the ability to pool demand to exercise greater bargaining power. Indeed, empirical evidence consistently shows that centralisation yields significant savings.[6] The main drawback of centralisation is the lack of flexibility, as a centralised agency may be less able to cater to specific local needs and preferences in a timely manner, or to effectively use valuable local information about changing local environments. Centralisation may also be preferred when product standardisation is desirable, local favouritism and corruption are salient concerns, the sector is strategic to national goals, or network effects are important. Applied to defence procurement, most of these conceptual considerations point toward the desirability of centralisation, particularly for major military acquisitions. For example, the interoperability of national defence systems is a strategically important objective that centralisation would facilitate.

Furthermore, there are additional industrial-organisation reasons that make the case for centralisation even stronger. As discussed by Hartley (2017), defence industries are decreasing-cost industries. Large fixed costs, economies of scale in production, and learning-by-doing effects imply that reaching large production scales is critical to achieving cost efficiency. These features also shape market structure, leading to oligopolistic markets with a few large players. Fragmenting demand across different national buyers exacerbates these issues, leading to smaller production scales, higher costs, and a more fragile industrial base. By contrast, creating a single European defence market would enable these efficiencies, increase competition between national incumbent firms, and facilitate the entry of new players.

Centralisation may also be combined with explicit preferences for European suppliers, although the case for such a measure is less clear-cut. Given the industry characteristics discussed above (namely, economies of scale and learning-by-doing), one could justify these preferences based on standard industrial-policy considerations. However, recent empirical evidence is not particularly encouraging in this regard.[7] Additionally, there may be an argument for favouring European producers over and above efficiency considerations, given that maintaining a robust industrial base that does not depend on foreign suppliers

[6] In the context of Italian public procurement, Bandiera, Prat, and Valletti (2009) estimate that procurement centralisation generated direct savings on the order of 28%, whereas Lotti et al. (2024) show that there were also important *indirect* savings for agencies who did not purchase centrally. Substantial price savings have also been found for different countries in the context of public procurement of healthcare products and pharmaceuticals (e.g., Dubois, Lefouili, and Straub, 2021; Cao, Yi, and Yu, 2024; Ferraresi, Gucciardi, and Rizzo, 2021; Clark, Coviello, and De Leverano, 2024).

[7] Bartelme et al. (2025) show that even the optimal design of industrial policy in the US manufacturing sector is unlikely to yield large welfare gains. More specifically, Bombardini et al. (2024) show that "Buy American" preferences in the context of US federal procurement have led to modest employment gains at high and increasing costs.

may be a strategic security objective in itself. While the case for explicit European preferences and the extent of their possible implementation remain unclear, particularly in light of their potentially high costs (Bombardini et al., 2024), centralisation would facilitate the implementation of such a policy.

Finally, centralisation complements the considerations discussed in previous sections. Centralisation may lead to the concentration of awards to fewer firms, but explicit mechanisms of multiple sourcing and split awards (Section 2) may be used to maintain competition and a robust industrial base. Centralisation would facilitate mechanisms that encourage surge-capacity investments (Section 3), and enable the coordination of R&D efforts across countries (Section 4). The latter would permit a more ambitious focus on the main technological challenges that Europe faces, pooling together national budgets and reducing duplication of research effort.

Takeaways for European defence procurement

The case for a single European defence procurement market is very strong. While acquisitions that are more local in nature may still be best procured nationally, centralising major acquisitions at the European level would yield substantial cost savings, create a more robust industrial base, encourage entry and competition, ensure interoperability of defence systems, and coordinate surge-capacity investments and R&D. This echoes other recent policy proposals (Draghi, 2024; Quinet et al., 2025; Nicoli and Beetsma, 2024).

6 Conclusion

The European defence landscape will change dramatically in the coming years. Economics research offers useful insights into how to design an effective defence procurement system, although many open questions remain. During this period of transformation, experimenting and rigorously collecting data to learn what works best will be fundamental. Specifying clear targets for investment in terms of well-defined capabilities and precise performance metrics is essential for continuously evaluating progress and adapting strategies as needed.

A summary of the main takeaways is as follows:

- Different types of acquisitions require different procurement mechanisms and contract types: one size does not fit all. Competitive bidding and fixed-price contracts work best for simple purchases with relatively standardised goods. More complex procurements, where quality is hard to verify or there is significant uncertainty around future adaptation needs, are better served by mechanisms that may restrict competition, rely on negotiation, and/or use cost-reimbursement contracts.
- Buyers should have flexibility to choose the best tool for each procurement based on their expertise and judgement. Buyer competence is key, so careful selection and training of procurement officers is essential. Waste and abuse should be targeted ex post rather than through rigid ex ante rules that limit buyer discretion.
- A robust procurement system should deliver a vigorous industrial base capable of scaling up critical production in times of conflict. Europe should consider capacity-investment contracts today that can be rapidly deployed in times of crisis. Special attention should be paid to critical inputs; for these, stockpiling, capacity contracts, and legal prioritisation mechanisms may be needed.
- Innovation should be at the core of the defence strategy. A new autonomous agency with highly skilled programme managers, given broad discretion to select and actively manage projects, may be needed. Open calls for proposals for any technology that may be relevant for defence applications should be encouraged. Even within strategic sectors, openness about the specific solutions should be maintained. A combination of push and pull mechanisms should be used to incentivise innovation effectively.
- A centralised European defence procurement market would be beneficial in terms of cost savings, industrial-base robustness, competition, interoperability of systems, surge-capacity investments, and R&D coordination.

References

Ahuja, Amrita et al. (2021). "Preparing for a Pandemic: Accelerating Vaccine Availability". In: *AEA Papers and Proceedings* 111, pp. 331–35.

Anton, James J and Dennis A Yao (1987). "Second sourcing and the experience curve: price competition in defense procurement". In: *The RAND Journal of Economics*, pp. 57–76.

– (1989). "Split awards, procurement, and innovation". In: *The RAND Journal of Economics*, pp. 538–552.

– (1992). "Coordination in split award auctions". In: *The Quarterly Journal of Economics* 107.2, pp. 681–707.

Asker, John and Estelle Cantillon (2008). "Properties of scoring auctions". In: *The RAND Journal of Economics* 39.1, pp. 69–85.

– (2010). "Procurement when price and quality matter". In: *The RAND Journal of Economics* 41.1, pp. 1–34.

Athey, Susan et al. (2022). "Expanding capacity for vaccines against Covid-19 and future pandemics: a review of economic issues". In: *Oxford Review of Economic Policy* 38.4, pp. 742–770.

Azoulay, Pierre et al. (2019). "Funding breakthrough research: promises and challenges of the "ARPA Model"". In: *Innovation Policy and the Economy* 19.1, pp. 69–96.

Bajari, Patrick, Robert McMillan, and Steven Tadelis (2009). "Auctions versus negotiations in procurement: An empirical analysis". In: *Journal of Law, Economics, and Organization* 25.2, pp. 372–399.

Bajari, Patrick and Steven Tadelis (2001). "Incentives versus Transaction Costs: A Theory of Procurement Contracts". In: *The RAND Journal of Economics* 32.3, pp. 387–407.

Baltrunaite, Audinga (2019). "Political Contributions and Public Procurement: Evidence from Lithuania". In: *Journal of the European Economic Association* 18.2, pp. 541–582.

Bandiera, Oriana, Michael Carlos Best, et al. (2021). "The allocation of authority in organizations: A field experiment with bureaucrats". In: *The Quarterly Journal of Economics* 136.4, pp. 2195–2242.

Bandiera, Oriana, Andrea Prat, and Tommaso Valletti (2009). "Active and passive waste in government spending". In: *American Economic Review* 99.2009 Sept, pp. 1278–1308.

Bartelme, Dominick et al. (2025). "The textbook case for industrial policy: Theory meets data". In: *Journal of Political Economy* 133.5, pp. 1527–1573.

Bhattacharya, Vivek (2021). "An empirical model of R&D procurement contests: An analysis of the DOD SBIR program". In: *Econometrica* 89.5, pp. 2189–2224.

Bombardini, Matilde et al. (2024). *The Increasing Cost of Buying American*. Tech. rep. National Bureau of Economic Research.

Bosio, Erica et al. (2022). "Public procurement in law and practice". In: *American Economic Review* 112.4, pp. 1091–1117.

Bown, Chad P (2022). "Covid-19 vaccine supply chains and the Defense Production Act". In: *Oxford Review of Economic Policy* 38.4, pp. 771–796.

Bulow, Jeremy and Paul Klemperer (1996). "Auctions versus Negotiations". In: *American Economic Review* 86.1, pp. 180–194.

Burguet, Roberto, Juan José Ganuza, and Esther Hauk (2012). "Limited liability and mechanism design in procurement". In: *Games and Economic Behavior* 76.1, pp. 15–25.

Calzolari, Giacomo and Giancarlo Spagnolo (2009). "Relational Contracts and Competitive Screening". In: *Mimeo*.

Cao, Shengmao, Lisa Xuejie Yi, and Chuan Yu (2024). "Competitive bidding in drug procurement: Evidence from china". In: *American Economic Journal: Economic Policy* 16.3, pp. 481–513.

Carril, Rodrigo (2022). "Rules Versus Discretion in Public Procurement". In: *Mimeo*.

Carril, Rodrigo and Mark Duggan (2020). "The impact of industry consolidation on government procurement: Evidence from Department of Defense contracting". In: *Journal of Public Economics* 184, p. 104141.

Carril, Rodrigo, Andres Gonzalez-Lira, and Michael S Walker (2025). "Competition under Incomplete Contracts and the Design of Procurement Policies". In: *American Economic Review* Forthcoming.

Castillo, Juan Camilo et al. (2021). "Market design to accelerate COVID-19 vaccine supply". In: *Science* 371.6534, pp. 1107–1109.

Che, Yeon-Koo (1993). "Design competition through multidimensional auctions". In: *The RAND Journal of Economics*, pp. 668–680.
Chiappinelli, Olga, Leonardo M Giuffrida, and Giancarlo Spagnolo (2025). "Public procurement as an innovation policy: Where do we stand?" In: *International Journal of Industrial Organization*, p. 103157.
Chillemi, Ottorino and Claudio Mezzetti (2014). "Optimal procurement mechanisms: bidding on price and damages for breach". In: *Economic Theory* 55.2, pp. 335–355.
Clark, Robert, Decio Coviello, and Adriano De Leverano (2024). "The impact of centralization on procurement outcomes and market structure: Evidence from Italy". In: *Mimeo*.
Coviello, Decio, Andrea Guglielmo, and Giancarlo Spagnolo (2018). "The Effect of Discretion on Procurement Performance". In: *Management Science* 64.
Crocker, Keith J and Kenneth J Reynolds (1993). "The efficiency of incomplete contracts: an empirical analysis of air force engine procurement". In: *The RAND Journal of Economics*, pp. 126–146.
Decarolis, Francesco (2014). "Awarding Price, Contract Performance, and Bids Screening: Evidence from Procurement Auctions". In: *American Economic Journal: Applied Economics* 6.1 A, pp. 108–132.
– (2018). "Comparing Procurement Auctions". In: *International Economic Review* 59.2, pp. 391–419.
Decarolis, Francesco, Raymond Fisman, et al. (2025). "Rules, discretion, and corruption in procurement: Evidence from italian government contracting". In: *Journal of Political Economy Microeconomics* 3.2, pp. 213–254.
Decarolis, Francesco, Gaétan de Rassenfosse, et al. (2021). "Buyers' role in innovation procurement: Evidence from US military R&D contracts". In: *Journal of Economics & Management Strategy* 30.4, pp. 697–720.
Dimitri, N, F Dini, and G Piga (2006). "When Should Procurement be Centralized". In: *Handbook of Procurement*. Cambridge University Press, pp. 47–81.
Draghi, Mario (2024). *The future of European competitiveness: Part B, In-depth analysis and recommendations*. Tech. rep. Mario Draghi Report. European Commission. URL: https://commission.europa.eu/document/download/10017eb1-4722-4333-add2-e0ed18105a34_en.
Dubois, Pierre, Yassine Lefouili, and Stéphane Straub (2021). "Pooled procurement of drugs in low and middle income countries". In: *European Economic Review* 132, p. 103655.
Ferraresi, Massimiliano, Gianluca Gucciardi, and Leonzio Rizzo (2021). "Savings from public procurement centralization in the healthcare system". In: *European Journal of Political Economy* 66, p. 101963.
Gutman, Jeffrey (2014). "Is there room for discretion? reforming public procurement in a compliance-oriented world". In: *Global Economy & Development Working Paper* 74.
Hartley, Keith (2012). "Conflict and defence output: an economic perspective". In: *Revue d'économie politique* 122.2, pp. 171–195.
– (2017). *The Economics of Arms*. Agenda Publishing. ISBN: 9781911116233. URL: http://www.jstor.org/stable/j.ctv5cg7q6.
Howell, Sabrina T et al. (2025). "Opening up military innovation: causal effects of reforms to US defense research". In: *Journal of Political Economy* 133.11, pp. 000–000.
Kelman, Steven (1990). *Procurement and Public Management: The Fear of Discretion and the Quality of Government Performance*. AEI Press.
Kremer, Michael and Rachel Glennerster (2004). *Strong medicine: creating incentives for pharmaceutical research on neglected diseases*. Princeton University Press.
Kremer, Michael, Jonathan Levin, and Christopher M Snyder (2020). "Advance market commitments: insights from theory and experience". In: *AEA Papers and Proceedings*. Vol. 110. American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203, pp. 269–273.
– (2022). "Designing advance market commitments for new vaccines". In: *Management Science* 68.7, pp. 4786–4814.
Laffont, Jean-Jacques and Jean Tirole (1986). "Using Cost Observation to Regulate Firms". In: *Journal of Political Economy* 94.3, pp. 614–641.
– (1987). "Auctioning incentive contracts". In: *Journal of Political Economy* 95.5, pp. 921–937.
Lopomo, Giuseppe, Nicola Persico, and Alessandro T. Villa (2023). "Optimal Procurement with Quality Concerns". In: *American Economic Review* 113.6, pp. 1505–29.
Lotti, Clarissa et al. (2024). "Indirect savings from public procurement centralization". In: *American Economic Journal: Economic Policy* 16.3, pp. 347–366.

Manelli, Alejandro M. and Daniel R. Vincent (1995). "Optimal Procurement Mechanisms". In: *Econometrica* 63.3, pp. 591–620.

McAfee, R Preston and John McMillan (1986). "Bidding for contracts: a principal-agent analysis". In: *The RAND Journal of Economics*, pp. 326–338.

Moretti, Enrico, Claudia Steinwender, and John Van Reenen (2025). "The intellectual spoils of war? Defense R&D, productivity, and international spillovers". In: *Review of Economics and Statistics* 107.1, pp. 14–27.

Nicoli, Francesco and Roel Beetsma (2024). *Joint Public Procurement as a Tool for European Union Industrial Policy*. Bruegel Policy Brief 18/2024. Accessed 2025-12-01. URL: https://www.bruegel.org/policy-brief/joint-public-procurement-tool-european-union-industrial-policy.

Palguta, Ján and Filip Pertold (2017). "Manipulation of procurement contracts: Evidence from the introduction of discretionary thresholds". In: *American Economic Journal: Economic Policy* 9.2, pp. 293–315.

Quinet, Alain et al. (2025). *Economic principles for European rearmament*. Tech. rep. Kiel Policy Brief.

Riordan, Michael H and David EM Sappington (1989). "Second sourcing". In: *The RAND Journal of Economics*, pp. 41–58.

Rob, Rafael (1986). "The design of procurement contracts". In: *The American Economic Review* 76.3, pp. 378–389.

Rogerson, William P (1994). "Incentive Compatibility and the Bargaining Problem". In: *The RAND Journal of Economics* 25.3, pp. 441–450.

Sandler, Todd and Keith Hartley (2007). *Handbook of Defense Economics: Defense in a globalized world*. Elsevier.

Spulber, Daniel F (1990). "Auctions and Contract Enforcement". In: *Journal of Law, Economics, and Organization* 6.2.

Stockholm International Peace Research Institute (2025). *SIPRI Military Expenditure Database*. https://doi.org/10.55163/CQGC9685. Last visited: October 2025.

Szucs, Ferenc (2024). "Discretion and favoritism in public procurement". In: *Journal of the European Economic Association* 22.1, pp. 117–160.

Tian, Nan, Lorenzo Scarazzato, and Jade Guiberteau Ricard (2025). *NATO's New Spending Target: Challenges and Risks Associated with a Political Signal*. Tech. rep. URL: https://www.sipri.org/commentary/essay/2025/natos-new-spending-target-challenges-and-risks-associated-political-signal.

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