CHAPTER 2

DEFENSE SPENDING: MACROECONOMIC CONSEQUENCES AND TRADE-OFFS

Defense spending is increasing rapidly. Over the past five years, about half of the world's countries have increased their military budgets, and arms sales by the world's largest defense firms have doubled in real terms over two decades. As geopolitical tensions intensify, these trends are set to continue. Drawing on a dataset covering 164 countries since 1946, this chapter finds that large defense spending booms have become more frequent, especially in emerging market and developing economies. In a typical boom, which lasts more than two-and-a-half years, defense outlays increase by about 2.7 percentage points of GDP, with roughly two-thirds financed through higher deficits. While the resulting defense buildups can boost economic activity in the short term—lifting consumption and investment, particularly in defense-related sectors—they also temporarily increase inflation and create significant medium-term challenges. On average, fiscal deficits worsen by about 2.6 percentage points of GDP, and public debt increases by about 7 percentage points within three years of the start of a buildup, while external balances deteriorate as demand is geared toward imported equipment. Wartime booms are especially costly, with public debt jumping by about 14 percentage points of GDP and social spending falling in real terms. Defense spending multipliers are close to 1, on average, but vary widely depending on how spending is sustained, financed, and allocated and how much equipment is imported. While a defense buildup that is mostly deficit financed and allocates most of the spending to consumption maximizes short-term demand effects, it also risks overheating the economy and requires close coordination with monetary policy. A buildup that makes public investment a priority and fosters more integrated markets for military equipment production could support long-term productivity growth.

The authors of this chapter are Hippolyte Balima (co-lead), Jared Bebee, Colombe Ladreit, Andresa Lagerborg, Flavien Moreau, Andrea Presbitero (co-lead), and Evgenia Weaver, with contributions from Kareem Ismail, Pedro Juarros, Takuji Komatsuzaki, Krzysztof Krogulski, Moheb Malak, Ahn Dinh Minh Nguyen, Robert Sierhej, and Can Ugur. Maryam Abdou, Owen Desberg, Shrihari Ramachandra, and Isabela Rozario provided research assistance. The chapter benefited from comments by Ethan Ilzetzki and internal seminar participants and reviewers.

Introduction

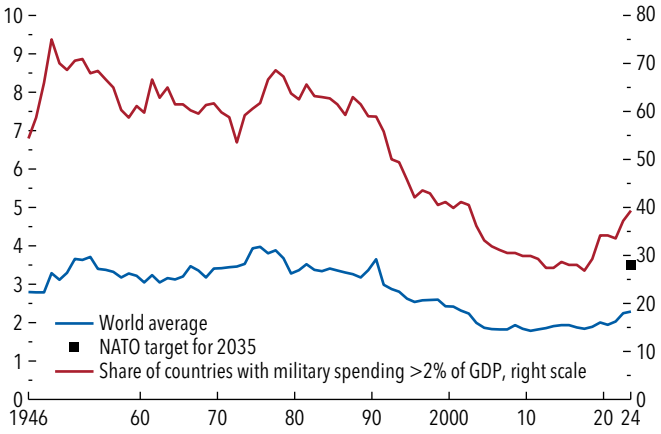
With the end of the Cold War, the number of conflicts[1] declined globally and governments worldwide reduced the share of public resources allocated to defense spending and military buildup. Geopolitical tensions started resurfacing in the mid-2010s (see Chapter 1), and the number of conflicts has increased substantially since then, as discussed in Chapter 3. This shift has prompted countries to recalibrate their defense spending priorities. As a result, over 2020–24, 50 percent of countries worldwide increased their defense spending budgets and, as of 2024, almost 40 percent allocated more than 2 percent of GDP to defense spending, compared with 27 percent in 2018 (Figure 2.1).[2] According to the Stockholm International Peace Research Institute (SIPRI) Arms Industry Database, arms sales by the world's largest 100 arms firms have doubled in real terms over the past two decades. These numbers are set to increase, as North Atlantic Treaty Organization (NATO) members committed in June 2025 to raise their annual defense and security-related spending to 5 percent of GDP by 2035, more than double the previous 2 percent guideline.[3] The actual and projected buildup of defense spending entails important macroeconomic trade-offs, especially in an environment of elevated and increasing public debt and growing spending pressures,

[1]For simplicity, the terms "war" and "conflict" are used interchangeably throughout the chapter.

[2]Defense spending comprises all government expenditures devoted to the maintenance, development, and deployment of military forces. Following the definition of the Stockholm International Peace Research Institute (SIPRI), defense spending includes personnel costs, operations and maintenance, procurement of arms and equipment, military research and development (R&D), and military infrastructure.

[3]The North Atlantic Treaty Organization (NATO) is a military alliance founded in the aftermath of World War II, currently including 32 member countries (30 in Europe as well as Canada and the United States). It serves as a system of collective security whereby member states agree to mutual defense in response to an attack by any nonmember country. In June 2025, NATO members committed to investing 3.5 percent of GDP annually on core defense requirements and up to 1.5 percent of GDP to security-related spending to protect critical infrastructure, defend networks, ensure civil preparedness and resilience, innovate, and strengthen the defense industrial base.

Figure 2.1. Defense Spending on the Rise
(Percent of GDP, left scale; percent, right scale)



Sources: Gethin 2024; Stockholm International Peace Research Institute Military Expenditure Database; World Human Capital Expenditure Database; and IMF staff calculations.

Note: NATO = North Atlantic Treaty Organization.

as governments worldwide are already facing increasing demand to invest in infrastructure, public services, and economic security, while also needing to scale up spending on the green transition as well as health care and pensions to meet the needs of aging societies (Acalin and others 2025; Eble and others 2025).

This chapter studies the macroeconomic consequences of ramping up defense spending, considering potential intertemporal trade-offs, in which a country's economy runs hot in the short term but faces increased risks to medium-term macroeconomic stability, as well as weakening economic resilience, reflected in higher government deficits, cuts to social spending, and worsening external balances. Increasing defense spending can also help countries reach other objectives, such as strengthening defense resilience and serving as a deterrent.[4] The chapter, however, does not aim to quantify countries' defense resilience, which is related to national security objectives and, hence, beyond the scope of the chapter's analysis.

A large literature examines the macroeconomic effects of defense spending, initially motivated by its usefulness as a source of plausibly exogenous variation in government expenditure, since major defense buildups are often driven by geopolitical events—such as wars, security threats, or strategic realignments—rather than by contemporaneous domestic economic conditions (Barro 1981; Ramey and Shapiro 1998). Early contributions, largely focused on the United States, exploited historical military buildups and narrative evidence to isolate government spending shocks from the business cycle, establishing benchmark estimates of output and employment responses (Hall 2009; Barro and Redlick 2011; Ramey 2011; Nakamura and Steinsson 2014; Ramey and Zubairy 2018). More recently, renewed geopolitical tensions have spurred work on European economies (Ben Zeev, Pappa, and Scola Gagliardi 2025; García-Serrador, Sarasa-Flores, and Ulloa 2025; Ilzetzki 2025; Alloza and others 2026; Furceri and others 2026) as well as on emerging market and developing economies (Miyamoto, Nguyen, and Sheremirov 2019; Sheremirov and Spirovska 2022), typically using data from the late 1980s onward. While this literature documents important differences across countries, most studies remain narrowly focused on short-term multipliers, which measure the response of real GDP to changes in defense spending, or immediate budgetary implications of military outlays (Marzian and Trebesch 2025),[5] leaving important gaps in understanding the broader macroeconomic consequences of defense spending buildups.

To fill these gaps, this chapter provides a bird's-eye view of defense spending in a large sample of countries since World War II. In particular, the chapter addresses the following questions:

- *What do defense spending booms (that is, episodes of large defense spending buildup) look like?* How frequent have such booms been? How do they differ in frequency, size, and duration during wartime and peacetime and between advanced economies and emerging market and developing economies? And how are they financed?
- *What are the key macroeconomic trade-offs of increasing defense spending?* How do defense spending booms affect macroeconomic dynamics? Do the buildups associated with these booms overheat the economy in the short term? And do they lead to a deterioration of fiscal balances through higher government deficit and debt, as well as a widening

[4]Defense resilience refers to the ability to withstand and recover from attacks, encompassing military capability as well as civil preparedness. Recent literature shows deterrence effects are modest. Increases in defense spending lead to a small and persistent decline in conflict over the long term, with no effect on short-term conflict risk (Benmelech and Monteiro 2025).

[5]A related literature, discussed in Chapter 3, studies the economic toll of war.

of the current account? Do defense spending booms imply a reorientation of government spending that crowds out other outlays, including social spending?
- *How large are defense spending multipliers?* Do they vary with country characteristics and the design of the stimulus—such as its duration, the import content of defense outlays and their allocation between current and capital spending—and to what extent are they affected by the response of monetary and fiscal policy? How large are spillovers to third countries? What are the potential general equilibrium effects of ramping up defense spending?

To answer these questions, the chapter compiles a comprehensive dataset on yearly defense spending and macroeconomic variables for 164 countries since 1946. It first discusses the channels through which higher defense spending percolates through the economy, how it differs from other forms of fiscal stimulus, and the trade-offs that it generates. Next, it defines defense spending booms as periods when the two-year moving average of defense spending increases by at least 1 percentage point of GDP, lasting for as long as defense spending does not decline as a share of GDP. It characterizes booms by their length, size, and financing and discusses a rich set of stylized facts to highlight key short-term macroeconomic trade-offs and medium-term vulnerabilities arising from ramping up defense spending. In the second part of the chapter, the focus shifts to the macroeconomic effects of defense spending. The chapter contributes to the debate surrounding defense spending multipliers through novel estimates based on a large sample of countries and through model simulations. Both approaches consider how defense multipliers may depend on country characteristics, the design of the associated buildups, and monetary and fiscal policy responses.

Based on this dataset and approaches, the chapter's main findings are as follows:
- *Defense spending booms have become more frequent, involve significant resources relative to an economy's overall capacity, and are mostly debt financed.* They have increased since the mid-2010s and are more common in emerging market and developing economies. Booms raise defense spending by about 2.7 percentage points of GDP and last for more than two-and-a-half years, on average. About two-thirds of the additional spending is financed through higher budget deficits, especially in the case of temporary booms, with a more modest contribution from revenue mobilization and spending reprioritization.
- *On the one hand, ramping up defense spending propagates through the economy as a sector-specific demand shock and can also raise medium-term growth through capital accumulation and productivity gains.* In the short term, defense spending boosts private consumption and investment, through positive *demand-side* effects, especially in defense-related sectors, leading to higher output and prices. Firm-level analysis supports the presence of a strong demand channel benefiting firms in the defense sector, but also shows that booms associated with rising public debt reduce private investment as firms' financing constraints become more binding. In addition, bottlenecks in sectoral reallocation can mitigate the boost in demand. On the *supply side*, booms are followed by a higher capital stock and an increase in total factor productivity over the long term.
- *On the other hand, scaling up defense spending can weaken fiscal and external sustainability and risk crowding out social spending.* The average defense spending boom is followed by an increase in the fiscal deficit of about 2.6 percentage points of GDP and an increase in the public-debt-to-GDP ratio of about 7 percentage points three years after the boom's onset. Such dynamics create trade-offs that manifest themselves through time and can put fiscal sustainability under strain, particularly in countries with limited fiscal space. While the average defense spending boom does not lead to a contraction in social spending, when higher defense outlays are financed primarily through spending reprioritization, the *guns versus butter* trade-off emerges, and spending on social protection, health, and education is substantially reduced. The fiscal costs are particularly salient in wartime, when public debt jumps by 14 percentage points of GDP and social spending is reduced in real terms, regardless of how the defense spending is financed. On the external side, stronger demand is partly directed at importing foreign goods, especially in countries importing military equipment, worsening the current account balance.
- *The multiplier of defense spending is close to 1, but it varies with the degree of import leakages, the financing mix, the allocation between current and capital spending, the persistence of the defense spending buildup, and the policy response.* Estimates of defense spending multipliers are characterized by substantial uncertainty, which reflects a wide variety of experiences

across countries and over time, with endogeneity concerns that tend to bias the estimates. When these concerns are attenuated, the average multiplier is close to 1 and aligns with model-based simulations. Defense spending multipliers are smaller in countries that rely heavily on arms imports, reflecting demand leakages abroad, and when the boom is temporary. By contrast, multipliers are larger when defense increases are deficit financed—as the immediate demand impulse is not offset by contemporaneous fiscal tightening elsewhere in the budget—and concentrated in current spending, such as that for personnel and operational outlays, which tend to have a larger short-term impact on activity. Similar results hold in model-based scenarios. Simulations further illustrate that monetary accommodation can raise the multiplier, though at the cost of higher inflation and a worsening current account deficit, while the immediate offsetting of fiscal measures can contain these pressures but dampen output effects. A coordinated plan for defense spending aimed at promoting joint procurement within regional blocs and at reducing the import content of defense outlays could lead to larger output effects and contain external imbalances.

Based on these findings, and subject to the caveat that the macroeconomic effects of past defense spending booms should be interpreted with caution—as today's defense buildups differ in conflict modalities, technology intensity, concentration of production hubs, and regional spending synchronization—the chapter offers these policy recommendations for navigating trade-offs when ramping up defense spending:

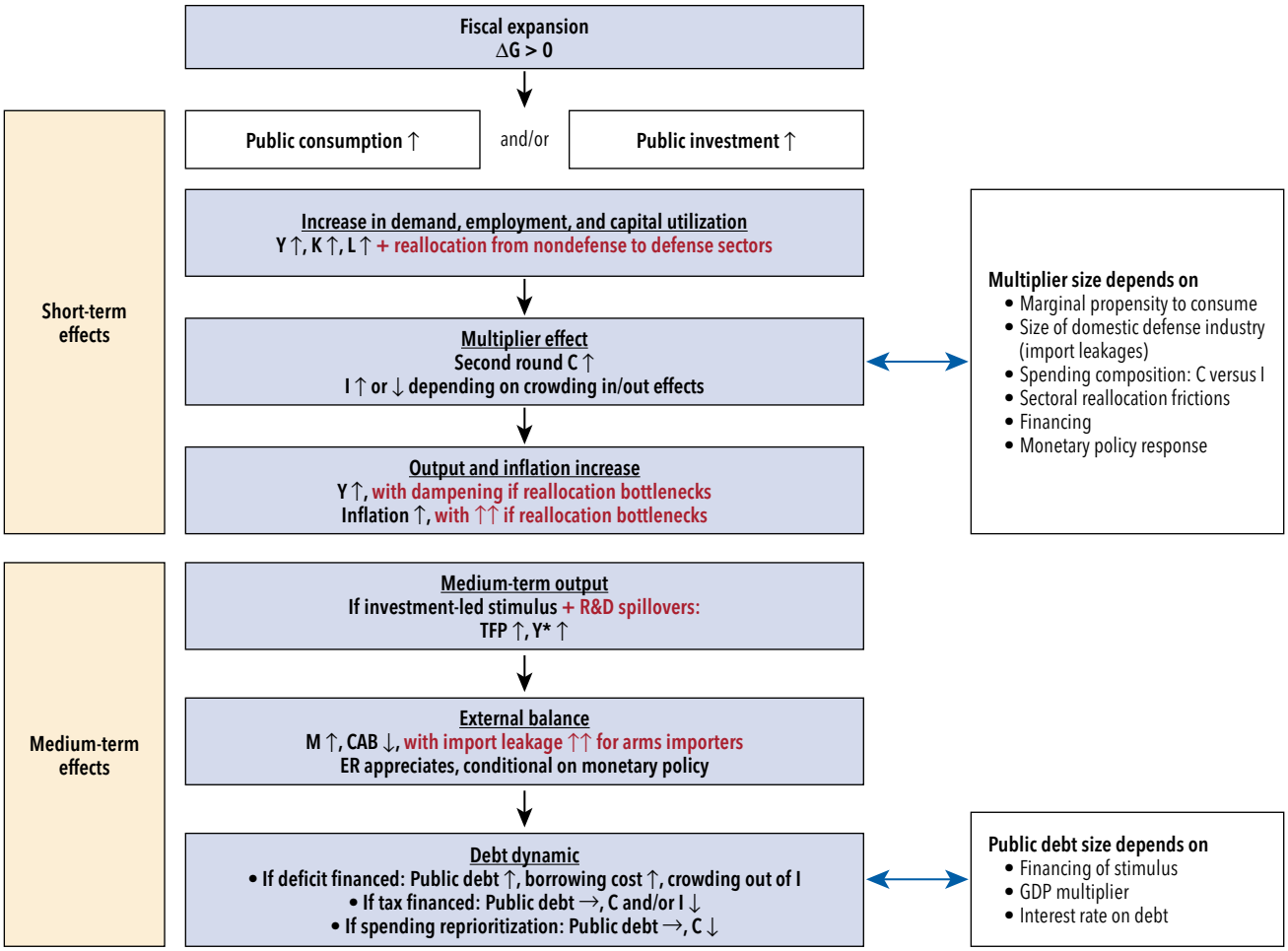
- *Countries should consider that aggregate output effects of defense spending are likely to be modest and depend on structural characteristics and policy choices.* Countries seeking to strengthen defense capabilities may face trade-offs in the short term. While a deficit-financed stimulus maximizes the demand effect, a larger allocation to current spending, possibly directed at military personnel, could further boost employment and domestic demand effects, but at the cost of overheating the economy. In this case, close coordination with monetary policy is critical to temper inflationary pressures. By contrast, a large share spent on equipment—especially if imported—will reduce inflationary pressures, but also demand effects, while worsening the current account balance, unless stronger domestic productive capacity lowers import leakages. In the long run, however, defense capital spending, especially if directed at outlays for research and development (R&D) without crowding out other nondefense productive investment, can promote innovation and growth.
- *As scaling up defense spending is likely to place pressure on both fiscal and external balances, policies should be directed at preserving fiscal and external sustainability.* Over time, higher deficits and debt can narrow fiscal space and undermine fiscal sustainability, especially in wartime, while larger import bills may weaken external positions, limiting policymakers' room to respond to future shocks. In this context, choices about how defense spending is financed and allocated become critical. Absent complementary measures, sustained defense buildups, particularly during wartime, risk crowding out other public priorities—most notably social spending—either through explicit budgetary reallocation or through gradual erosion in real terms. These considerations highlight the importance of embedding decisions about defense spending within a medium-term fiscal and macroeconomic framework that preserves fiscal sustainability, mitigates external vulnerabilities, and safeguards social and growth-enhancing expenditures.

The Macroeconomics of Defense Spending: A Primer

The expansion of defense spending acts as a sector-specific positive demand shock to the economy, but can create positive or negative supply-side effects through sectoral reallocation and changes in relative prices (Figure 2.2). Recent empirical evidence suggests that, at least in the short term, military spending stimulates output through positive demand effects (Ilzetzki 2025) and can put upward pressure on prices (Ben Zeev and Pappa 2017). As is the case for other forms of fiscal stimulus, its macroeconomic consequences—especially the reaction of private consumption and investment—depend on the current status of the economy, the monetary policy reaction, the allocation of defense spending between government consumption and investment, and its financing mix. But unlike other forms of fiscal stimulus, a defense buildup has distinctive features that shape its transmission to the economy (Figure 2.2, red text):

- First, it entails a large *reallocation of resources from nondefense- to defense-oriented sectors* as defense

Figure 2.2. Defense Spending: Transmission Channels



Source: IMF staff compilation.

Note: Red text highlights relevant channels for defense spending. ΔG indicates change in government spending. ↑↑ implies a substantial increase. C = consumption; CAB = current account balance; ER = exchange rate; G = government spending; I = investment; K = capital; L = labor; M = imports; R&D = research and development; TFP = total factor productivity; Y = output; Y* = potential output.

outlays are highly concentrated in a narrow set of industries—such as aerospace and transport equipment, electronics and instruments, machinery, and specialty materials (Nekarda and Ramey 2011)—and often take the form of procurement contracts rather than broad public sector payrolls or transfers. As a result, a defense buildup functions as a sector-specific demand shock that often triggers costly reallocations of capital and labor across sectors, rather than a uniform expansion in aggregate demand (Ramey and Shapiro 1998).

- Second, *a larger share of defense spending is typically allocated to government consumption* (military personnel, services, and supplies) *than to investment* (military equipment and infrastructure). In fact, for 35 NATO and European Union member countries for which data are available, current spending accounts for about 80 percent of total government defense spending (Becker and others 2025). However, the capital share—including procurement and R&D—has been comparatively larger in countries such as the United States, reflecting programs administered by the Defense Advanced Research Projects Agency. Moreover, during periods of defense buildup, public investment can account for a substantial portion of the increase in defense outlays (Box 2.1). This compositional bias carries important macroeconomic implications. Relative

to public investment, defense-related government consumption tends to generate weaker and less-persistent effects for potential output, as it does not directly expand productive capacity.[6] Instead, it operates primarily through demand and income channels, increasing wages and employment in defense-related activities.

- Finally, defense spending entails *a significant risk of demand leakages through imports*, reflecting the high degree of concentration in global arms production and the fact that many countries are net importers of military equipment. Indeed, nearly half of total arms revenue among the world's top 100 arms-producing firms is generated in the United States, while Europe accounts for about 14 percent and China 12 percent.[7] As a result, most countries import a large share of their military equipment, with this ratio as high as 80 percent for European Union member countries (Draghi 2024). This pattern has important macroeconomic implications: When defense spending is directed toward imported equipment, as it is, for example, in Denmark (Danmarks Nationalbank 2025) or Poland (Box 2.1), a substantial share of the associated demand stimulus accrues to foreign producers rather than to domestic value added, dampening the response of domestic output and employment to the spending while contributing to a deterioration in the external balance.

As highlighted in Figure 2.2, defense spending operates in the short term as a targeted government demand shock, increasing both activity and utilization rates of capital and labor in defense-intensive sectors. In parallel, the output boost generated by ramping up spending could be accompanied by an increase in inflation, with stronger potential inflationary effects if the economy is close to potential, labor markets are tight, capital reallocation frictions arise, or key inputs become scarce as resources are shifted to defense-oriented sectors (Antonova, Luetticke, and Mueller 2025; Heerma van Voss and others 2026). The output effect can also be amplified in the case of a permanent defense spending shock, with potentially larger labor supply and investment responses (Baxter and King 1993; Barro and Redlick 2011). Crucially, sectoral adjustment costs associated with reallocating factors toward defense production can dampen the output response and short-term multiplier and crowd out private consumption and interest-sensitive investment, as seen during the Korean and Vietnam war buildups in the United States (Ramey and Shapiro 1998, 2001; Phelan and Trejos 2000).

The net effect of defense spending on output will also depend on its composition:

- A larger share of government spending directed at consumption, especially compensation for military personnel and when targeted to sectors in which households are less wealthy and have a higher marginal propensity to consume, can crowd in private consumption through higher labor demand and wages (Fisher and Peters 2010). As a result, government consumption multipliers could be larger than those coming from investment spending (Boehm 2020), especially in the short term, as capital spending is often subject to import leakages and implementation lags, and yields returns over a longer horizon (Alloza and others 2026).
- At the same time, evidence suggests that investment-driven buildups can have positive and persistent effects on output by boosting innovation, entrepreneurship, and private investment through public spending on R&D (Gross and Sampat 2023; Antolin-Diaz and Surico 2025; Moretti, Steinwender, and Van Reenen 2025). However, supply effects can also be negative through crowding-out effects, reallocating spending away from productive physical and human capital to defense, and through distortions leading to an inefficient allocation of resources that can lower productivity (Deger and Smith 1983; Knight, Loayza, and Villanueva 1996).

The choice of how to finance a defense spending buildup—whether through taxes, spending reprioritization, or borrowing—has important macroeconomic implications and entails distinct trade-offs (Ohanian 1997). Tax-financed defense spending tends to crowd out private consumption, dampening the expansionary effects on output and inflation, although inflationary pressures may still arise from relative scarcity and sectoral bottlenecks. When booms are financed through spending reprioritization, private consumption may also be affected, as lower transfers and reduced provision of public services weigh on household disposable income.

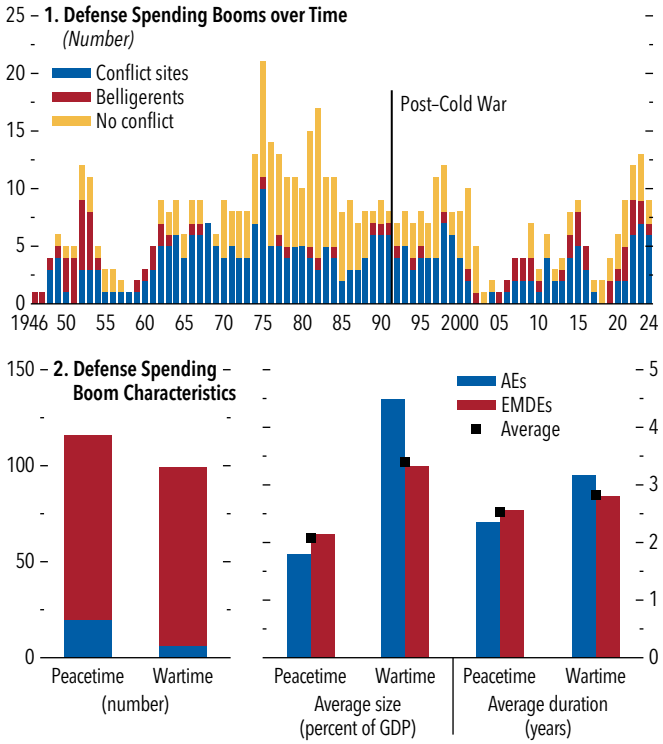
[6]Not only consumption, but also public investment in the defense sector (such as the purchase of military equipment), can yield lower productivity relative to other types of public investment (such as infrastructure).

[7]Europe's share increases to 22 percent when the United Kingdom in included. Data are from the SIPRI Arms Industry Database.

Deficit-financed buildups, by contrast, generally produce larger short-term demand effects, as immediate crowding out is weaker. However, forward-looking households may reduce current consumption in anticipation of future tax increases, particularly if higher defense spending is expected to persist, thereby lowering the effective fiscal multiplier. In addition, sustained reliance on debt financing raises intergenerational trade-offs and can increase vulnerabilities over the medium term. Higher borrowing costs, especially in countries with limited fiscal space, could dampen private investment and partially offset the expansionary effects of higher public spending. These considerations suggest that permanent defense buildups require durable financing arrangements, such as higher revenues or lasting changes in spending composition, to limit medium-term vulnerabilities. Taken together, these considerations underscore that the macroeconomic impact of defense spending depends not only on its scale and the financing mix, but also on expectations regarding its duration and permanence.[8]

Defense spending buildups can also generate important cross-border spillovers. As demand for military goods and advanced technologies rises, countries typically increase imports from major arms exporters or technologically advanced economies. These leakages generate positive spillovers to foreign producers that absorb the additional external demand. Such effects tend to be larger in countries without a substantial domestic defense industrial base.

Figure 2.3. Defense Spending Booms



Source: IMF staff calculations.

Note: The figure shows episodes of defense spending booms, defined as periods during which the two-year moving average of defense spending increases by at least 1 percentage point of GDP, lasting for as long as defense spending does not decline as a share of GDP. Wartime (peacetime) booms are defined based on whether (or not) an on-site conflict emerges one year before or within three years following the defense spending boom onset. AEs = advanced economies; EMDEs = emerging market and developing economies.

Defense Spending Booms

Definition and Characteristics

Episodes of defense spending expansion have been frequent and, after slowing in the early 2000s, have picked up again (Figure 2.3, panel 1). The chapter defines a defense spending boom as a period when the two-year moving average of a country's defense spending increases by at least 1 percentage point of GDP, with the boom lasting for as long as defense spending does not decline as a share of GDP.[9] According to this definition, there have been 215 defense spending booms since 1946 across 164 countries, mostly concentrated in the late 1970s and in the 1980s. Defense spending booms that immediately follow a conflict or culminate in an on-site conflict (taking place within a country's borders) within three years are classified as "wartime" booms, which account for about half of the booms. All others—denoted "peacetime" booms—are further classified as "belligerent" (if they are associated

[8]The financing mix and its effects likely differ across countries. Advanced economies generally have more room to smooth temporary defense spending increases through borrowing, whereas more limited fiscal space and higher risk premiums in emerging markets increase the likelihood of crowding out and sharper trade-offs between defense objectives and macroeconomic stability.

[9]This definition is close in spirit to how the literature identifies large fiscal expansions and contractions based on sustained changes in spending and taxes (Alesina and Perotti 1995). Lacking a widely used definition of defense spending booms, the chapter tests the robustness of its main findings using two alternative definitions, based on (1) a less-restrictive threshold set at 0.5 percentage point of GDP and (2) the measure proposed by Marzian and Trebesch (2025). See Online Annex 2.2 for details. All online annexes are available at www.imf.org/en/Publications/WEO.

with belligerent conflicts, occurring abroad) or "no conflict" (if no conflict is experienced on-site nor elsewhere). Booms are also evenly split between those that lead to a temporary or a permanent increase in defense spending, depending on whether the ratio of defense spending to GDP returns to its initial level 10 years after the boom's onset.

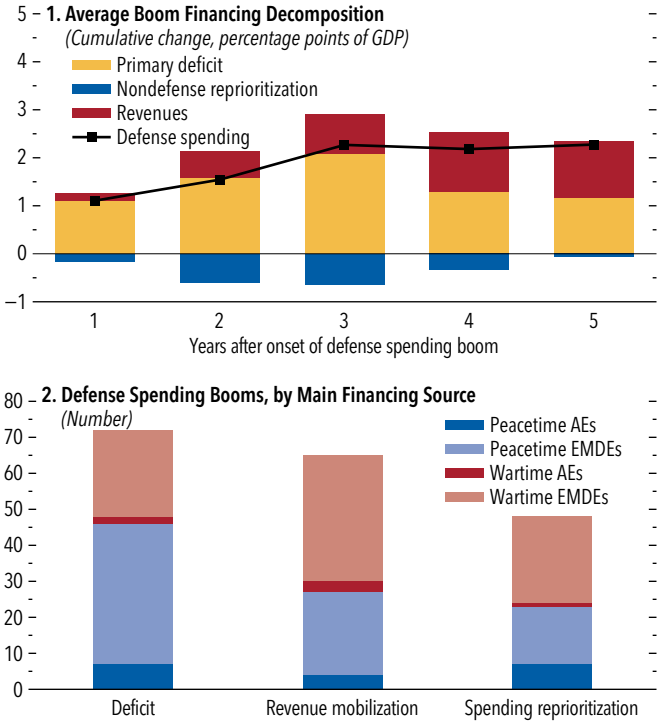
Defense spending booms are predominantly concentrated in emerging market and developing economies (88 percent) and are especially common in the Middle East and in Africa, regions historically more susceptible to conflicts (see Chapter 3). Chapter 2 of the April 2019 *Regional Economic Outlook: Sub-Saharan Africa* also shows that conflicts in the region tend to lead to substantial increases in military expenditures. Similar results have been uncovered with regard to terrorist attacks in African countries, with spillover effects to neighboring countries' defense spending (Boly and Kéré 2026).

Episodes of defense scaling up in advanced economies are less frequent (about 11 percent of booms have happened in European countries), but they tend to be larger and last longer than in other countries. This is especially the case during wartime, consistent with the spikes in US defense spending during the Korean War and World War II (Ramey 2011) and the decline in defense spending following the end of the Cold War (Sandler and George 2016). While the average boom lasts more than two-and-a-half years and accounts for an increase in defense spending of about 2.7 percentage points of GDP, booms in advanced economies during conflicts last, on average, three-and-a-half years and amount to about 4.5 percentage points of GDP (Figure 2.3, panel 2). In the post–Cold War period, defense spending booms have become slightly shorter and smaller in size. Also, size is broadly similar across booms linked to a temporary or permanent increase in defense spending, with the latter 0.7 percentage point of GDP greater than temporary booms.

Financing Defense Spending

Defense spending booms are front-loaded and financed primarily through higher deficits, with revenue mobilization playing a secondary role and spending reprioritization occurring only gradually. On average, most defense outlays take place in the first year of a boom, and nearly all additional spending is completed within three years of the boom's onset (Figure 2.4, panel 1). The initial buildup is financed largely through widening budget deficits, which increase by about 1.1 percentage points of GDP in the first year and reach roughly 2 percentage points cumulatively by year 3, implying sizable fiscal costs. Revenue mobilization contributes more modestly, accounting for about 0.2 percentage point of GDP in the first year and 1.2 percentage points overall. By contrast, spending reprioritization plays a limited role early on and becomes prominent only in later years, suggesting that governments initially rely on borrowing but increasingly turn to reallocating expenditures as borrowing costs rise or fiscal constraints tighten. After year 3, deficits begin to narrow, marking a reversal of the initial financing pattern. These findings are consistent with recent evidence over a longer horizon for a sample of 20 advanced economies (Marzian and Trebesch 2025). Consistent with theory, the average

Figure 2.4. Financing Defense Spending Booms



Source: IMF staff calculations.

Note: In panel 1, the black line denotes the cumulative increase in defense spending in percentage points of GDP. The horizontal axis measures the duration of the defense spending booms, in years. For each year, this increase is decomposed into its financing sources. "Nondefense reprioritization" is computed as the residual in this equation: *Change in Deficit = Change in Defense Spending + Change in Nondefense Spending − Change in Revenues.* In panel 2, wartime (peacetime) booms are defined based on whether (or not) an on-site conflict emerges one year before or within three years following the corresponding defense spending boom onset. AEs = advanced economies; EMDEs = emerging market and developing economies.

temporary boom is entirely deficit financed in the first three years, while higher revenues account for about half of the three-year increase in military spending during permanent booms.

While this average pattern masks substantial heterogeneity across episodes, the deficit remains the dominant source of financing overall, accounting for 39 percent of booms, especially during peacetime, when it is the dominant financing source for almost half of the booms. At the same time, revenue mobilization emerges as the primary financing channel in 35 percent of cases, while spending reprioritization is the primary conduit in 26 percent of cases, highlighting meaningful variation in how countries fund defense expansions (Figure 2.4, panel 2).

Strengthening Defense Capabilities

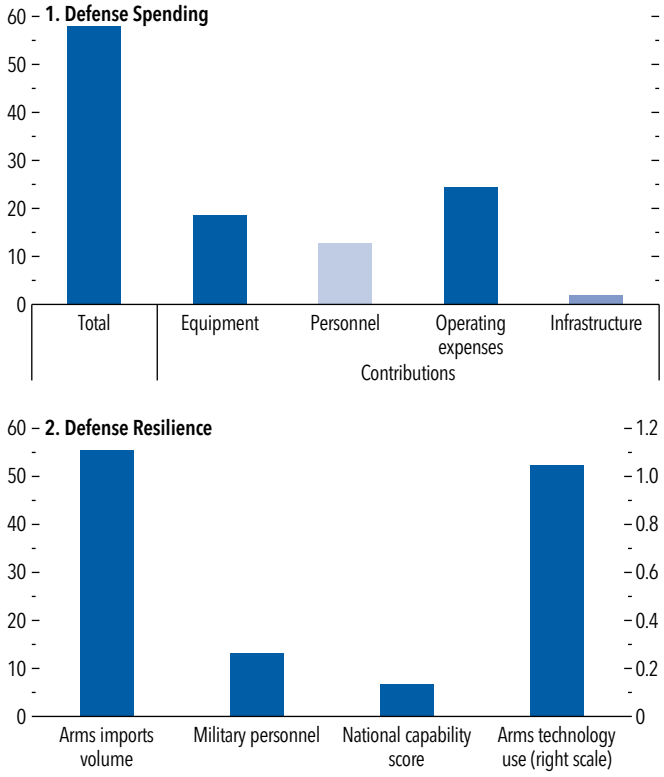
Defense spending booms translate into large and persistent expansions in military investment, personnel, and capabilities. On average, real defense outlays increase by about 60 percent within three years of the onset of a boom—an amount equivalent to almost 2 percent of GDP—reflecting a sizable buildup of resources devoted to military equipment, alongside higher spending on personnel and operating expenses (Figure 2.5, panel 1).

These outlays are associated with a strengthening of defense capabilities, as reflected in a 7 percent rise in the Composite Index of National Capability, a broad measure of national power that incorporates defense spending, personnel, energy use, industrial capacity, and population (Kadera and Sorokin 2004). The buildup is accompanied by a sharp increase in arms imports—reaching 55 percent over three years—which can weigh on external balances, and by a roughly 13 percent increase in personnel, potentially generating second-round demand effects (Figure 2.5, panel 2). At the same time, countries expand their adoption of advanced military technologies, including artillery, armored vehicles, aircraft, and helicopters, as reflected in a higher share of available arms technologies in use.

Macroeconomic Consequences of Defense Spending: Empirical Evidence

Credible identification of the macroeconomic effects of defense spending requires isolating changes that are both unanticipated and plausibly unrelated to contemporaneous business cycle conditions.

Figure 2.5. Strengthening Defense Capabilities
(Percent change, three years ahead)



Source: IMF staff calculations.

Note: The figure plots three-year-ahead local projection estimates of cumulative responses to defense spending booms. Darker-colored bars denote coefficients that are statistically significant at the 10 percent level. In panel 1, the real defense spending decomposition focuses on a sample of 31 member countries of the North Atlantic Treaty Organization (NATO); data are not available for Iceland. Panel 2 uses a sample of 78 countries for "Arms imports volume," 146 for "Military personnel," 157 for "National capability score," and 158 for "Arms technology use."

In practice, this is challenging to do, particularly in cross-country settings, as defense outlays may respond endogenously to domestic economic conditions, fiscal space, or security developments—for example, following revenue windfalls, during economic downturns, or in response to rising domestic and geopolitical risks. As a result, observed changes in defense spending can also be driven by output or fiscal dynamics, complicating causal interpretation.

Defense spending correlates positively with lagged GDP growth and government revenues. To the extent that higher revenues and stronger growth relax fiscal constraints and enable greater military outlays, this procyclicality may bias upward the estimated macroeconomic effects of defense spending. By contrast, defense spending is also positively associated with

conflicts. Because wars generate large economic costs, as documented in Chapter 3, failing to account for this simultaneity would bias the estimated effects downward. Similarly, if defense spending increases are triggered by adverse geopolitical developments—such as an increase in geopolitical risk—and these developments independently depress economic activity (Caldara and Iacoviello 2022), the estimated macroeconomic consequences of defense spending would again be biased downward.[10]

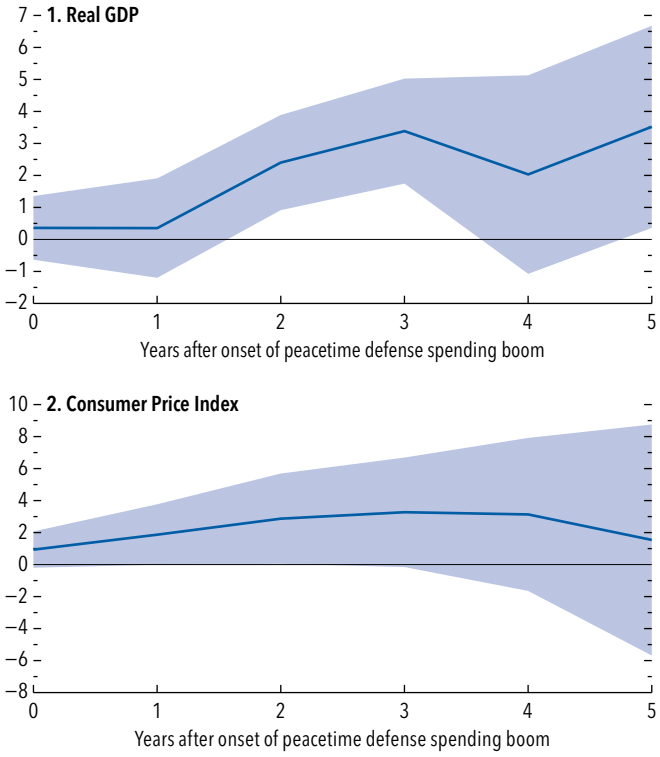
Some endogeneity concerns can be attenuated by considering defense spending booms in peacetime that—unlike regular changes in defense spending—are not predictable based on real GDP growth, government revenue dynamics, or recession indicators, and by excluding fragile and conflict-affected states and commodity exporters, to avoid confounding effects arising from long-term conflict scarring (see Chapter 3) and commodity price cycles. This section of the chapter first examines the macroeconomic implications of defense spending booms, with a focus on peacetime episodes, before turning to the estimation of defense spending multipliers.

Macroeconomic Dynamics after Defense Spending Booms

To understand how the economy reacts to a sharp increase in defense spending, this section uses panel local projections (Jordà 2005) to study macroeconomic dynamics following defense spending booms. It starts by analyzing the evolution of output, its components, and prices. Next, to shed light on the underlying channels through which defense spending can shape aggregate output, the macroeconomic evidence is complemented with firm-level analysis to test the relative importance for corporate investment of a positive demand shock stemming from additional defense spending versus the crowding-out effect from higher public debt. Last, the section considers all booms to illustrate their fiscal implications, potential crowding out of nondefense spending (the *guns versus butter* trade-off), and their effects on external imbalances. While results must be interpreted with caution because of the endogeneity of spending booms, especially those during wars, exploiting the richness of the data and the large variation in the intensity and length of booms across periods of war and peace can provide a more informative discussion of the trade-offs generated by the buildup of defense spending (Marzian and Trebesch 2025).

Defense spending booms in peacetime are followed by a sizable increase in real GDP and by a short-lived rise in inflation. Following a boom, a country's real output is more than 3 percent higher than in periods when the country is not experiencing a boom, with the increase materializing about two years after the boom's onset and persisting over the medium term (Figure 2.6, panel 1). Given the average size and length of booms in peacetime, this pattern is consistent with a multiplier of defense spending above 1. The average increase in GDP is driven by booms that are linked to a permanent increase in defense spending. In these episodes, real GDP increases by more than 5 percent over five years (see Online Annex 2.3). Consumer prices also increase by almost 3.6 percent on average relative to nonboom periods, but this inflationary effect is temporary and fades over the medium term (Figure 2.6, panel 2).

Figure 2.6. Output and Prices after Peacetime Booms
(Percent change)

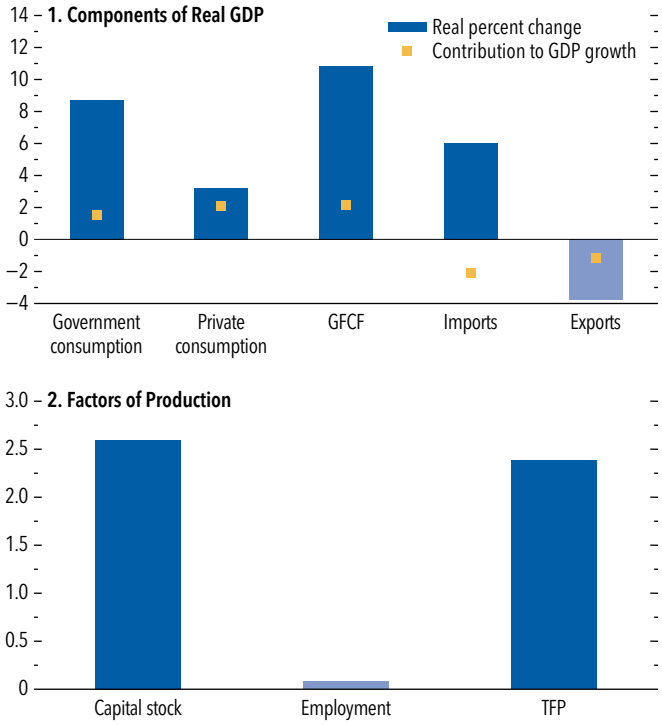


Source: IMF staff calculations.

Note: The panels plot local projection estimates of cumulative responses to peacetime defense spending booms. Fragile and conflict-affected states, as well as commodity-exporting emerging market and developing economies, are excluded from the sample. The sample period spans 1946–2024. Solid lines denote point estimates, and shaded areas denote 90 percent confidence intervals.

[10]See Online Annex 2.2 for a more extensive discussion, additional results, and robustness tests.

Figure 2.7. Transmission Channels of Defense Spending Booms
(Percent, three years ahead)



Source: IMF staff calculations.

Note: The panels plot the three-year-ahead coefficients from local projection estimates of cumulative responses to peacetime defense spending booms. Fragile and conflict-affected states, as well as commodity-exporting emerging market and developing economies, are excluded from the sample. The sample period spans 1946–2024. Darker-colored bars denote coefficients that are statistically significant at the 10 percent level. GFCF = gross fixed capital formation; TFP = total factor productivity.

The output response is driven by higher domestic absorption, reflecting increases in government consumption alongside crowding in of private consumption and investment, with broadly similar contributions to GDP growth across components. Consistent with a large share of the stimulus being allocated to personnel and operating expenses, government consumption rises by about 9 percent within three years (Figure 2.7, panel 1). Private consumption also increases—by roughly 3 percent—likely supported by wider fiscal deficits and direct demand effects through higher labor demand in defense-related sectors. Total investment shows a comparable positive response, reflecting both higher public investment in defense equipment and infrastructure and increased private investment, particularly in defense-related industries. Turning to the external sector, stimulus-driven demand leads to wider external imbalances, as both the current account and trade balance deteriorate. Imports accelerate—reflecting leakages from defense spending and stronger demand for foreign goods—while exports remain broadly unchanged. Moving to the key factors of production (Figure 2.7, panel 2), defense spending booms are associated with a subsequent increase in the stock of capital, in line with the documented boost to investment, and an increase in total factor productivity, which may be explained by changes in capacity utilization (Basu 1996) and learning by necessity, as firms adapt to surging demand by improving productivity when facing capacity constraints (Ilzetzki 2024).[11]

Firm-Level Evidence on Defense Spending and Private Investment

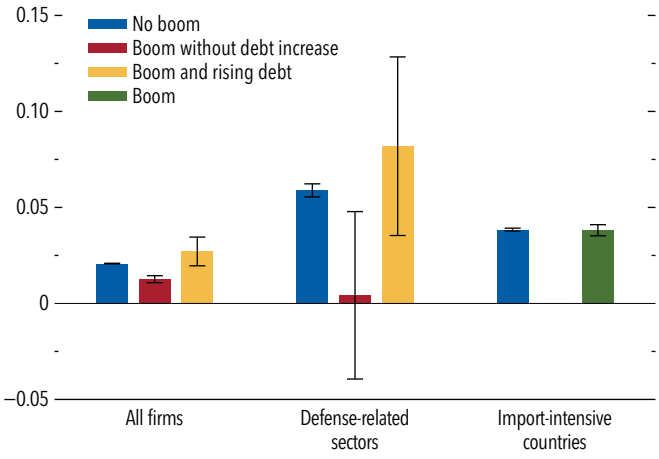
While aggregate investment increases in response to higher defense spending, at the firm level the response can differ, reflecting the balance between a demand channel—supporting investment, particularly in defense-intensive sectors—and a potential crowding-out effect, as increasing public debt can tighten firms' financing constraints (Huang, Pagano, and Panizza 2020). To disentangle these channels, the chapter estimates the sensitivity of investment to cash flows—a standard indicator of the presence of credit constraints (Fazzari, Hubbard, and Petersen 1988)—around defense spending booms, distinguishing between episodes associated with increasing public debt and those that are budget neutral. The analysis draws on data for more than 4.6 million private nonfinancial firms across 41 countries between 1995 and 2023.[12]

Firm investment becomes less sensitive to internal funds during defense spending booms, consistent with a positive effect on demand that relaxes financing constraints and supports aggregate investment. By contrast, when booms coincide with higher public debt, financing conditions tighten and crowd out firm investment, as shown by a higher sensitivity

[11]This interpretation is consistent with the effect on total factor productivity losing its statistical significance once capacity utilization is controlled for. However, defense spending booms are followed by greater total factor productivity over longer horizons, consistent with evidence showing that the R&D component of defense spending can boost innovation and crowd in private R&D spending (Antolin Díaz and Surico 2025; Moretti, Steinwender, and Van Reenen 2025). See Online Annex 2.3.

[12]This approach also mitigates concerns about the endogeneity of defense spending booms, as it controls for unobserved shocks at the sector and country level, such as changes in demand, that drive firm investment decisions. See Online Annex 2.4 for a detailed discussion of the data (sourced from Orbis), the methodology, and the full set of results.

Figure 2.8. Firm Investment after Booms
(Regression coefficients)



Source: IMF staff calculations.

Note: The figure reports coefficients measuring the sensitivity of investment to cash flows, estimated from a regression controlling for past investment and sales (all expressed as percent of assets). The blue bars correspond to the sensitivity for firms in countries without defense spending booms. The red bars measure the sensitivity for firms in countries during periods of boom not associated with debt increases, and the yellow bars measure that sensitivity during periods of boom associated with debt increases. Import-intensive countries are defined as those for which arms imports are above the cross-country average. The sample includes 41 countries between 1995 and 2023. Bars denote point estimates, and whiskers denote 90 percent confidence intervals. See Online Annex 2.4 for further details.

of investment to cash flow.[13] As expected, demand effects are strongest in defense-related sectors, in which the sensitivity of investment to cash flow falls to zero during budget-neutral booms, suggesting that government demand fully offsets financing frictions. Conversely, in countries with high import content of defense goods, where spending largely leaks abroad, the demand channel is muted, and investment sensitivities during booms remain unchanged relative to those in normal periods (Figure 2.8).

Fiscal Costs of Defense Spending Booms

Defense spending booms generally lead to a deterioration in countries' fiscal positions. Consistent with the evidence discussed earlier about booms being financed predominantly by government borrowing and with recent findings by Marzian and Trebesch (2025), within three years after a boom's onset, the government deficit widens by about 2.6 percentage points of GDP and the public-debt-to-GDP ratio increases by almost 7 percentage points more than that of countries not ramping up defense spending (Figure 2.9, panel 1).

Fiscal costs are not limited to rising debt and risks to fiscal sustainability; booms can also crowd out nondefense primary spending. Whereas in the full sample of defense spending booms there is no clear evidence of crowding out, in line with the findings of Marzian and Trebesch (2025) on a smaller sample of advanced economies, there is a clear policy trade-off between higher defense outlays and other public spending priorities when booms are financed predominantly through spending reprioritization. Spending reprioritization implies cuts in the budget, with nondefense primary spending declining by more than 20 percent in real terms (about 2 percent of GDP) in the three years following a boom. The decrease in social spending amounts to about 1 percentage point of GDP and spans multiple categories of spending, including social protection, health, and education (Figure 2.9, panel 2).[14] Taken together, these findings underscore the importance for policymakers of carefully considering financing choices when scaling up defense spending, as reliance on spending reprioritization, while potentially appropriate when a surge is permanent, can entail meaningful distributional and social consequences over the medium term.

The fiscal implications of ramping up defense spending differ markedly depending on whether booms are associated with on-site conflicts. Wartime booms are followed by a sharp increase in public debt and a contraction in real social spending. In contrast, peacetime booms benefit from positive output effects (Figure 2.6, panel 1) and are not followed by an increase in debt-to-GDP ratios or by crowding out of social spending, on average (Figure 2.9, panel 3).

Estimating Defense Spending Multipliers

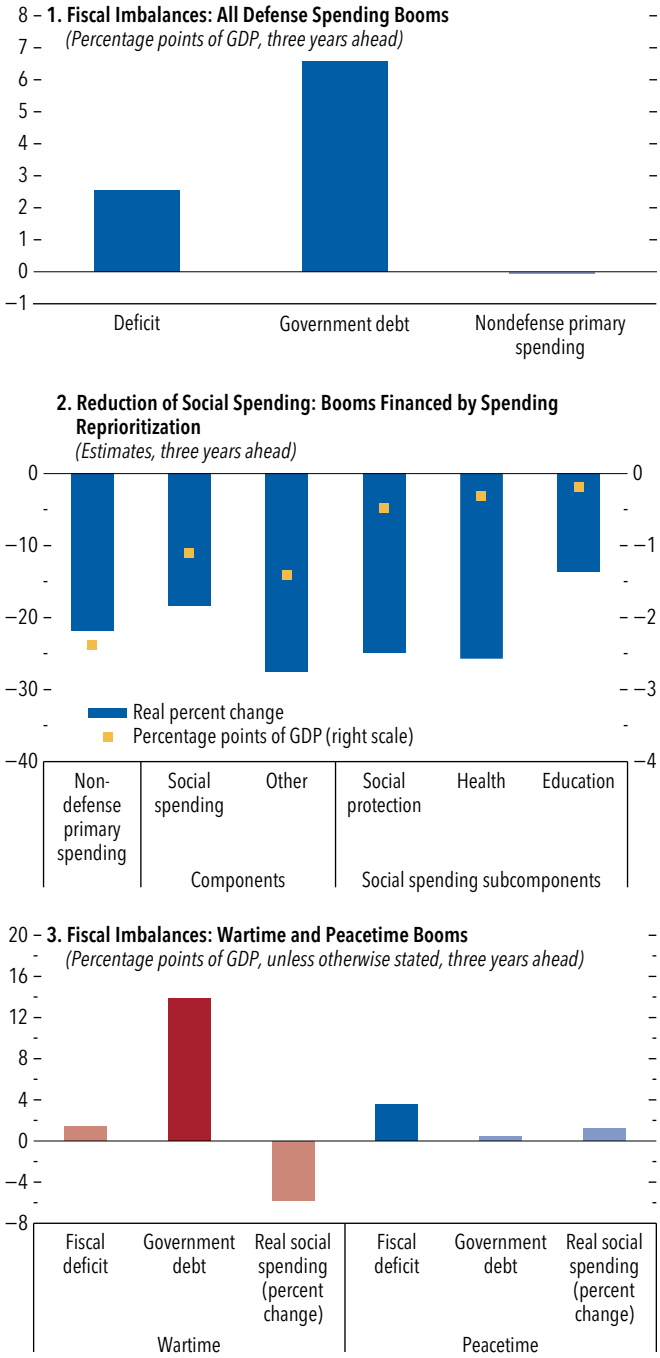
To provide a comprehensive view of the output response to defense spending outside boom episodes, this subsection estimates defense spending multipliers for a large sample of countries, excluding fragile and conflict-affected states.

Two exercises directed at attenuating the potential endogeneity of defense spending yield multipliers

[13]The crowding out in response to higher debt may be consistent with a larger output response to deficit-financed defense spending booms, because of general equilibrium effects.

[14]The decline in social spending is smaller, at about 7 percent in real terms, for advanced economies. See Online Annex 2.2.

Figure 2.9. Fiscal Consequences of Defense Spending Booms



Source: IMF staff calculations.

Note: The panels plot the three-year-ahead coefficients from local projection estimates of cumulative responses to defense spending booms. Wartime (peacetime) booms are defined based on whether (or not) an on-site conflict emerges one year before or within three years following a defense spending boom onset. The sample period spans 1946–2024. Darker-colored bars denote coefficients that are statistically significant at the 10 percent level.

generally closer to 1.[15] First, narrative methods are used to identify a subset of defense spending booms that are driven by external geopolitical events or by alliance-related decisions that are largely unrelated to local macro-fiscal conditions and domestic security concerns.[16] Using *narrative* defense spending booms as an instrument for defense spending leads to multipliers that are estimated at about 1 (Figure 2.10, panels 1 and 2), consistent with earlier estimates ranging between 0.6 and 1.2 for defense spending and centered on 1 for government spending.[17] Second, restricting the sample to members of defense alliances (NATO and the Islamic Military Counter Terrorism Coalition) has the advantage that their defense spending is not anticipated by macroeconomic conditions, such as GDP growth and government revenue (see Online Annex 2.2), as their defense decisions are often shaped by forces outside their domestic political and economic systems (Sheremirov and Spirovska 2022). In this case, the resulting estimates are not always statistically significant but still close to 1 (Figure 2.10, panels 3 and 4).[18]

While the positive association between defense spending and prior GDP growth or revenue windfalls may lead to upward-biased point estimates, estimating defense spending multipliers on a large cross-country sample provides more granular evidence on the factors shaping the output response to defense spending.

In line with the existing literature, defense spending multipliers are larger when the defense buildup is permanent (as sustained demand encourages capital formation), for arms exporters (likely because of lower leakage of defense spending through imports), and when defense spending is financed mostly by deficits

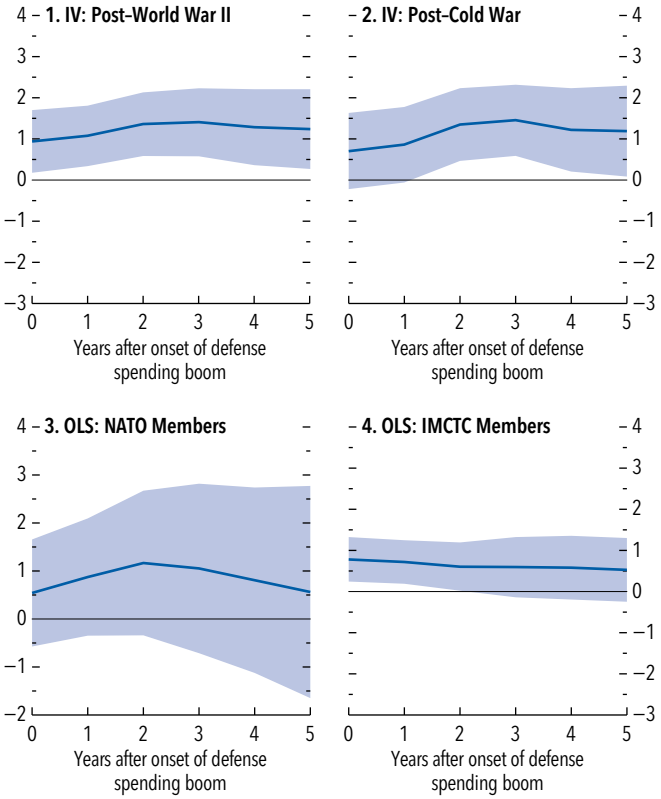
[15]While these exercises rely on changes in defense spending that are not predicted by lagged economic conditions, they can still be endogenous to current and expected conditions, as well as to other macroeconomic shocks, such as geopolitical risks.

[16]These *narrative* episodes are uncorrelated with lagged economic conditions such as GDP growth, government revenues, commodity cycles, and recessions. See Online Annex 2.2 for details.

[17]Reported multipliers vary widely in the literature—ranging from less than 1 (Barro and Redlick 2011) to about 2 or more (Fisher and Peters 2010; Antolin Díaz and Surico 2025; Furceri and others 2026), reflecting differences in samples, time periods, country characteristics, and empirical approaches. See Online Annex Table 2.5.5 for a literature review of defense spending multipliers.

[18]NATO comprises 24 advanced economies and 8 emerging market and developing economies, whereas the Islamic Military Counter Terrorism Coalition (IMCTC) comprises 41 emerging market and developing economies. Restricting the sample to members of these alliances comes at the cost of limiting the possibility of generalizing results to other contexts.

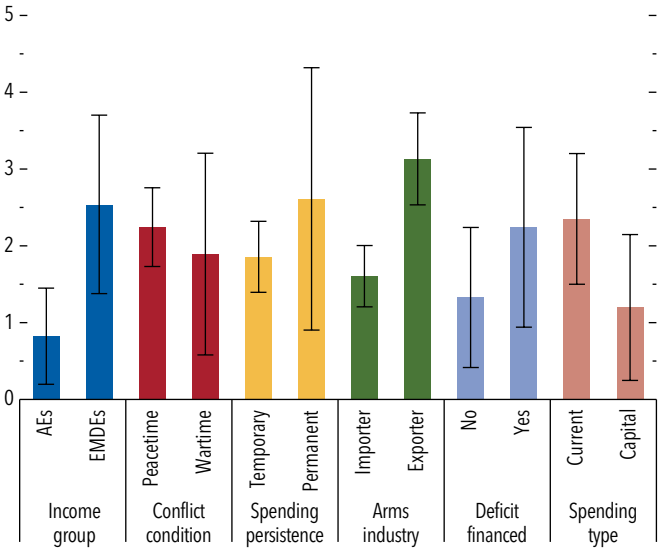
Figure 2.10. Defense Spending Multipliers
(Cumulative multipliers)



Source: IMF staff calculations.

Note: The panels plot local projection estimates of cumulative responses of output to defense spending. Fragile and conflict-affected states are excluded from the sample. The sample period spans 1946–2024 in panel 1 and 1991–2024 in panels 2, 3, and 4. In panels 1–2, multipliers are estimated using narrative defense spending booms as an instrument for defense spending. Solid lines denote point estimates, and shaded areas denote 90 percent confidence intervals. See Online Annex 2.5 for details. IMCTC = Islamic Military Counter Terrorism Coalition; IV = instrumental variable; NATO = North Atlantic Treaty Organization; OLS = ordinary least squares.

Figure 2.11. Differences in Defense Spending Multipliers
(Cumulative multipliers, three years ahead)



Source: IMF staff calculations.

Note: The figure shows nonlinearities in the size of three-year-ahead cumulative multipliers by income group, conflict status, boom persistence, size of defense industry, sources of financing, and spending composition. "Wartime" ("Peacetime") is defined based on whether (or not) an on-site conflict has occurred in the past year or occurs within three years ahead. "Importer" ("exporter") refers to economies in which the average share of arms exports in their arms trade is below (above) the median for the sample. "Deficit financed" is defined based on whether the annual change in a country's defense spending is driven mostly by a change in its deficit (rather than by changes in its revenues or nondefense spending). "Current" spending comprises personnel and operating expenses, whereas "Capital" spending comprises spending on equipment and infrastructure. A change in defense spending in year *t* is defined as "Permanent" if the direction of the change in the ratio of defense spending to GDP in that year is sustained over the subsequent 10 years and as "Temporary" otherwise. Bars denote point estimates, and whiskers denote 90 percent confidence intervals. AEs = advanced economies; EMDEs = emerging market and developing economies.

rather than through revenue mobilization or spending reprioritization (Figure 2.11). In addition, spending composition matters, with larger multipliers estimated for current spending items (personnel and operating expenses) than for capital spending (equipment and infrastructure), possibly from a high marginal propensity to consume for current spending and high average import content for capital spending.[19] Defense spending multipliers are also larger in countries with fixed exchange regimes, where monetary policy accommodates the fiscal expansion (Ilzetzki, Mendoza, and Végh 2013), and with higher public investment efficiency, consistent with the findings discussed in the October 2025 *Fiscal Monitor* (see Online Annex 2.3). Ramping up defense spending can also generate spillovers to trade partners. Consistent with increasing trade integration and advanced economies being the main exporters of arms and military equipment, an increase in defense spending, starting in the 1990s, is associated with higher output in advanced economies, while there are no significant spillovers to emerging markets nor before the end of the Cold War (Box 2.2).

[19]The difference between capital and current spending multipliers, however, is not statistically significant, given the large confidence bands for capital spending multipliers.

Macroeconomic Consequences of Defense Spending: Model Simulations

Modeling Assumptions

To quantify the general equilibrium implications of a buildup of defense spending under different scenarios, the chapter uses the IMF's Flexible System of Global Models, an annual multiregion dynamic stochastic

general equilibrium model that combines both microfounded and reduced-form formulations of various economic sectors (Andrle and others 2015).[20] Compared with the empirical analysis, the model simulations impose structural discipline on macroeconomic relationships, incorporate policy reactions, and enable counterfactual simulations to illustrate both short-term and long-term effects from increasing defense spending under different scenarios. The baseline scenario is calibrated considering the planned increase in defense spending across a representative group of European Union member countries, as of October 2025, measured as a deviation from spending levels before Russia's invasion of Ukraine. On average, the ramping up of defense spending in Europe is sizable and is projected to reach 1 percent of GDP in 2026 and increase to 1.3 percent by 2030 (Figure 2.12, panel 1). The level of spending is assumed to remain constant as a share of GDP until 2035 and then to decline linearly to 75 percent of the 2030 level by 2050.[21] Defense spending is assumed to be allocated 80 percent to consumption and 20 percent to investment, in line with data on military spending subcomponents for European Union member countries (European Commission 2025). Part of government spending is allocated to foreign goods, and the baseline scenario assumes that the import content amounts to 20 percent for government spending, with the investment component having a much higher import content, including toward the United States, in line with its dominance in the arms industry. The buildup of defense spending is assumed to be fully debt financed through 2028. After that, offsetting measures are gradually introduced and fully implemented by 2033, when all spending is budget neutral.

Modeling Scenarios

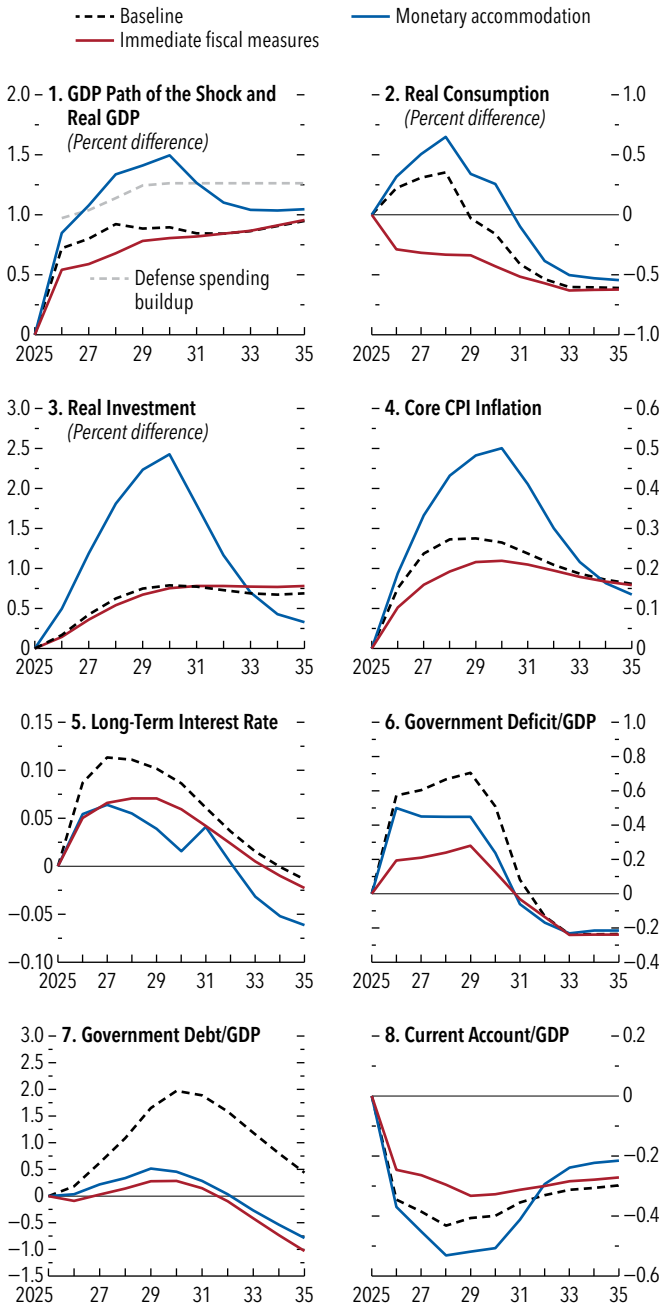
Under the baseline scenario, real GDP for European countries is projected to increase by 0.7 percentage point in 2026 and by 0.9 percentage point by 2028, after which it broadly stabilizes (Figure 2.12, panel 1). The persistent effect on output comes partly from the

[20]The analysis uses the model's euro area module, which includes a bloc for each of the 11 major euro area countries plus 13 other blocs, covering major world economies as stand-alone blocs (China, India, Japan, Sweden, Switzerland, United Kingdom, United States) and six other regions. While the defense spending buildup is calibrated to the European experience, the scenario results can be generalized to other contexts. See Online Annex 2.6 for details.

[21]Starting the simulation in 2026 implies that the defense spending buildup is treated as an unanticipated shock at that date, leading to a potential upward bias of short-term growth effects.

Figure 2.12. Defense Spending: Baseline and Alternative Scenarios

(Percentage point difference, unless noted otherwise)



Source: IMF staff calculations.

Note: The figure presents model simulations calibrated to a defense spending shock in the European Union, as plotted in panel 1. The monetary accommodation scenario (blue lines) assumes that the central bank does not react following a standard interest rate rule. The immediate fiscal measures scenario (red lines) assumes that offsetting measures are implemented immediately rather than gradually to make the defense spending shock budget neutral. CPI = consumer price index.

public investment component of the stimulus, which raises productivity in the long term and crowds in private investment. Given the size of the fiscal shock, this implies a medium-term fiscal multiplier slightly below unity (at about 0.8), within the range of recent estimates produced by the European Central Bank using different dynamic stochastic general equilibrium models (Bokan and others 2025). Inflation peaks at about 28 basis points in 2029 and then starts a gradual decline, although it remains permanently 0.16 percentage point higher than it would have been without the stimulus (Figure 2.12, panel 4). The policy rate increases as monetary policy reacts to higher inflation. Long-term interest rates also rise, and the exchange rate appreciates. The loss of external competitiveness, together with the assumption that part of the defense stimulus is directed at importing military equipment from abroad, leads to a worsening of the current account deficit that peaks at 0.4 percent of GDP in 2028 and then stabilizes at 0.3 percent of GDP. As the baseline assumes that initially the defense spending is fully debt financed, the deficit increases through 2029, when the offsetting measures start to kick in, bringing the deficit back down rapidly (Figure 2.12, panel 6). However, the change in the financing mix that reduces government transfers crowds out private consumption and contributes to reducing the fiscal multiplier. Over the long term, thanks to the improvement in GDP, the budget balance improves by about 0.2 percent of GDP. Public debt follows a similar hump-shaped path, increasing by almost 2 percentage points of GDP by 2030 and then declining toward its baseline (Figure 2.12, panel 7).

Four alternative scenarios capture the key macroeconomic trade-offs and the policy options for countries that are building up defense spending. In the first scenario, the model is used to show the effect of the same spending shock under different monetary policy reactions (Figure 2.12, blue lines). When monetary policy accommodates the shock, rather than raising rates in response to higher growth and inflationary pressures, the demand effect is larger, as shown by higher private consumption, stronger investment, and a higher path for real GDP compared with those in the baseline. As a result, the model yields a larger multiplier, which is now above 1 over the medium term. But core inflation spikes by half a percentage point and the current account deteriorates by 0.5 percentage points of GDP—notwithstanding a depreciation of the exchange rate—because of strong income effects.

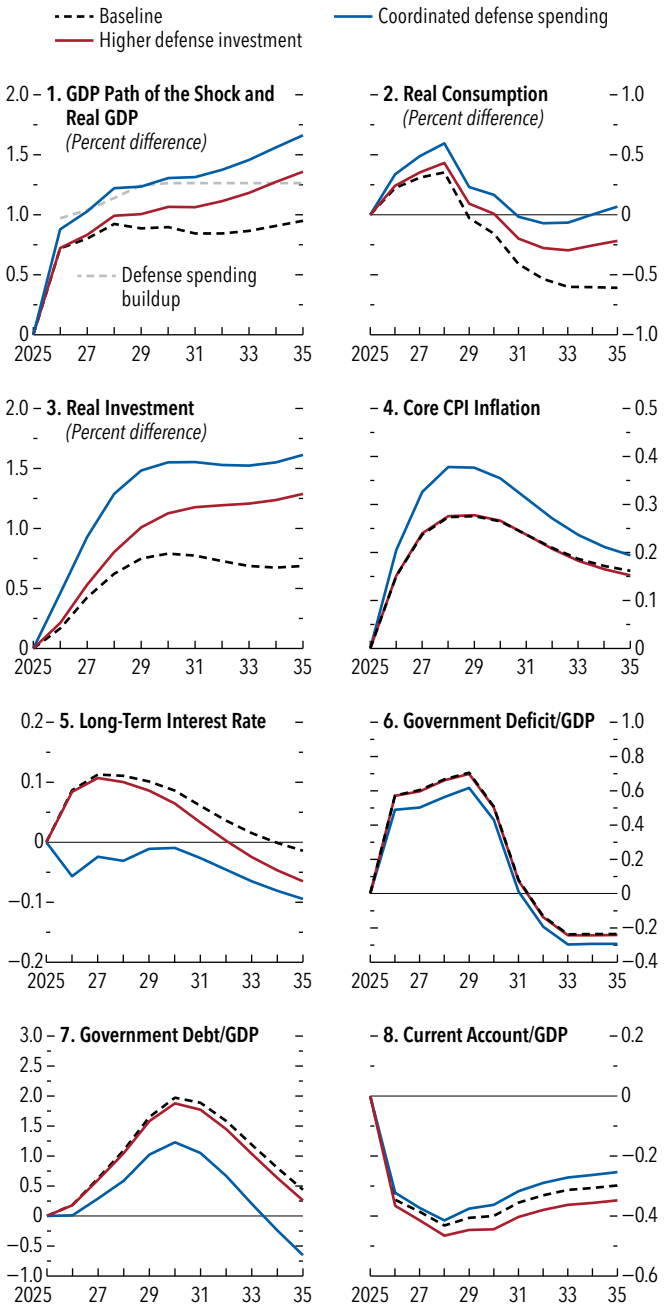
In the second scenario, fiscal policy is assumed to react faster and the offsetting measures are implemented immediately, to minimize the public debt buildup (Figure 2.12, red lines). In this case, the deficit is contained and the dynamics are more favorable, but the effectiveness of the stimulus is weaker, and the multiplier falls to about 0.7.[22]

The third scenario aligns with the recent experience of countries such as Poland (Box 2.1) and considers the long-term implications of allocating a larger share (40 percent) of government defense spending to investment (Figure 2.13, red lines). By raising the public capital stock and boosting productivity in the long term, public investment crowds in private investment and stimulates labor demand, leading to larger long-term output effects, consistent with evidence that defense R&D can generate long-term innovation and productivity gains through knowledge spillovers (Moretti, Steinwender, and Van Reenen 2025).

The final scenario is explicitly targeted at modeling the benefits of a coordinated program for defense spending and financing (Figure 2.13, blue lines). The scenario *jointly* lowers the assumption on the import content of the spending shock; reduces exogenous risk premiums by 20 basis points for as long as the spending is fully debt financed; and raises the productivity of public investment by 20 percent compared with that in the baseline, to reflect productivity gains coming from economies of scale, greater specialization, and faster diffusion of learning and innovation across a larger integrated market (Hartley 2008; Letta 2024). This scenario is in line with current proposals such as that of Hildebrand, Rey, and Schularick (2026) and the Security Action for Europe, a €150 billion loan facility for common procurement aiming to boost the European defense industry, reduce its fragmentation, and prioritize European suppliers. Under this scenario, real investment and, to a smaller extent, real consumption increase in the short term compared with their levels in the baseline, leading to a larger output boost, implying a short-term multiplier close to 1. Productivity gains resulting from reduced fragmentation support long-term growth. The coordinated defense spending

[22]Additional analysis shows the longer-term benefits of a larger allocation of the stimulus to capital spending (up to 40 percent, close to the share in the United States), as real investment keeps increasing over the projection horizon, sustaining output growth (see Online Annex 2.6). This is relevant also in the European context, in which there is a large variation in the investment share, from very low levels to up to 50 percent (European Commission 2025).

Figure 2.13. Higher Investment Spending and Coordinated Defense Spending
(Percentage point difference, unless noted otherwise)



Source: IMF staff calculations.

Note: The figure presents the model simulations calibrated to a defense spending shock in the European Union, as plotted in panel 1. The higher defense investment scenario (red lines) assumes a larger share (40 percent rather than 20 percent) of government defense spending allocated to investment. The coordinated defense spending scenario (blue lines) assumes a lower import content of the spending shock, a 20 basis point reduction in the risk premiums, and a 20 percent increase in the productivity of public investment. CPI = consumer price index.

buildup leads to a smaller increase in public debt, but also to higher inflation.[23] Because of reduced import leakages, in the medium term the current account improves regardless of the offsetting effect caused by stronger demand.

Conclusions and Policy Recommendations

After decades of declining global defense spending, rising geopolitical risks and more frequent military conflicts are pushing countries toward an inflection point, with several ramping up defense spending. As this reversal is happening at a time of already elevated spending pressures, policymakers face salient trade-offs when spending more on defense.

The macroeconomic impact of the current defense buildup could differ from that of past episodes, as defense outlays are increasingly capital and R&D intensive and are occurring in economies that are more integrated and more indebted. However, empirical and model-based results can help explain how defense buildups propagate through the economy.

A unique analysis of a sample of 164 countries since the end of World War II shows that governments have frequently engaged in sizable spending booms, mostly financed through borrowing. Operating as a sector-specific demand shock, defense buildups during peacetime raise output and prices in the short term, especially when the increase in defense spending is permanent, and they can also raise medium-term growth through higher capital stock and possibly productivity gains. Firm-level evidence shows that spending booms can have larger demand effects on defense-related sectors, boosting investment, but they can also crowd out private investment when associated with debt buildups.

Defense spending booms often weaken fiscal and external balances. Booms occurring in wartime are followed by sharp increases in public debt and large reductions in social spending, the standard *guns versus*

[23]An opposite scenario considers a one-off increase in risk premiums by 50 basis points to model the possible implications of rising spreads in response to higher spending, especially in countries with limited fiscal space, lacking any coordination. The scenario shows a more muted output and price response and a larger increase in public debt. A sustained increase in sovereign yields, particularly where defense expansions are perceived as fiscally unsustainable, could create macrofinancial vulnerabilities by weakening domestic financial institutions and amplifying stress in sovereign bond markets (see Chapter 2 of the April 2022 *Global Financial Stability Report* and Chapter 3 of the October 2025 *Global Financial Stability Report*).

butter trade-off. In contrast, peacetime booms tend to raise output without worsening debt or crowding out social spending. On the external side, stronger imports, the result of increased demand and in part of the purchase of foreign military equipment, worsen the current account.

Model-based simulations help quantify the general equilibrium effects of defense spending buildup. In the baseline scenario, the model predicts moderate output gains, consistent with the average multiplier estimated at about 1. Inflation goes up modestly and temporarily, monetary policy tightens in response, and the current account deteriorates as imports (including those of military equipment) increase. Public debt increases in the first years of the buildup but gradually stabilizes as offsetting fiscal measures are implemented. The policy reaction matters. When monetary policy accommodates the shock, the demand effect is stronger and the multiplier is larger. But this comes at the cost of higher inflation and a widening of the current account. When fiscal policy tightens to limit the accumulation of public debt, the effect of the stimulus is weaker and the multiplier is smaller.

The chapter's findings underscore the importance of policy design and structural features in shaping defense spending's macroeconomic outcomes. Policymakers should consider the following options:

- *Integrating defense buildup within credible medium-term fiscal frameworks.* As defense booms are typically front-loaded and tend to be debt financed, countries should embed spending plans in medium-term fiscal frameworks to safeguard fiscal sustainability. Since wartime booms are associated with larger debt increases and social spending cuts, as shown in Chapter 3, governments should prepare contingency plans for conflict-related buildups, including mechanisms for protecting the vulnerable and preserving essential services. These considerations are more salient for fragile and conflict-affected states that lack domestic defense industries and have limited potential to raise revenue and weak fiscal frameworks (IMF 2022).
- *Carefully managing macroeconomic conditions to prevent overheating and friction costs.* Defense buildups raise prices and utilization rates, especially when the economy is near capacity. Coordination with monetary authorities is essential to avoid inflationary pressures while maintaining space for productive private investment. When feasible, smoothing the pace of buildup can help mitigate bottlenecks, especially if large reallocations across sectors are expected.
- *Considering that defense spending composition matters for short-term stimulus and long-term productivity gains.* Current spending produces larger short-term multipliers, whereas capital spending, if it is directed at R&D outlays and does not crowd out nondefense productive investment, can support productivity over the longer term. While the mix is dictated mostly by security needs, countries should internalize macroeconomic constraints and recognize that scaling up defense investment typically requires a large up-front commitment and sustained spending, making it fiscally more demanding than increases in current outlays.

Box 2.1. Scaling Up Defense Spending: The Case of Poland

Poland has the highest spending on defense, as a share of GDP, among member countries of the North Atlantic Treaty Organization (NATO). After donating significant portions of its standing arsenal to Ukraine in 2022, Poland moved quickly to rebuild and modernize its military. Between 2021 and 2025, defense spending increased from 2.2 percent to an estimated 4.5 percent of GDP, in cash terms (Figure 2.1.1, panel 1). At $46.7 billion, Poland now has the fifth-largest defense outlay in Europe. This box highlights the key features of the scaling up of defense spending in Poland and discusses its macroeconomic implications.

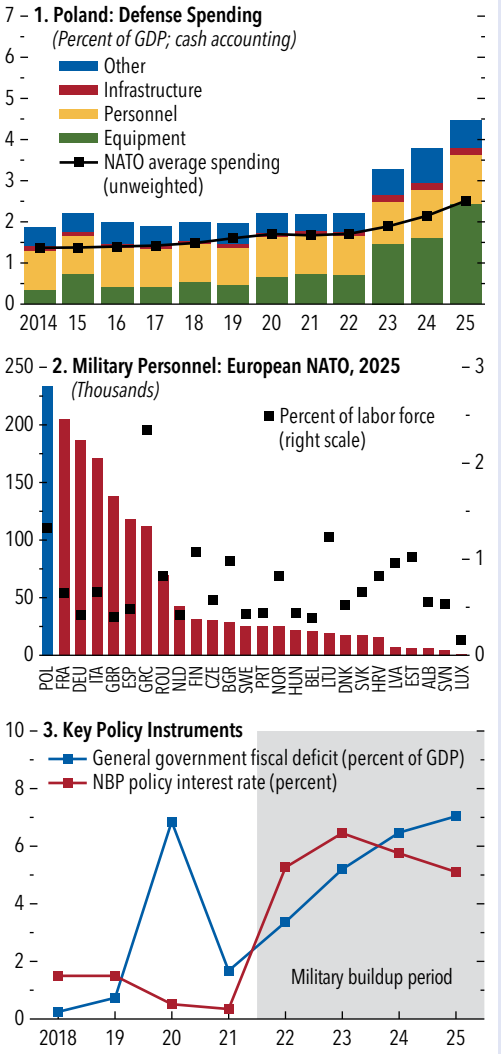
The increase in defense spending was driven by investment in equipment. Equipment spending rose from 0.7 percent to 2.4 percent of GDP and now accounts for more than half of total defense outlays, the highest share in NATO. Given the lack of domestic capacity, this surge was met largely through imports (accounting for 80 percent of total capital spending, according to private estimates), particularly from Korea and the United States. However, several government initiatives aimed to increase domestic production to support resilience and growth.

Poland also scaled up military personnel from 116,200 in 2020 to 233,800 in 2025, without conscription, relying instead on expanding recruitment and raising salaries, with personnel outlays rising from 0.9 percent to 1.2 percent of GDP between 2021 and 2025. As a result, Poland now has the first-largest standing military in the European Union (Figure 2.1.1, panel 2).

Thus far, the macroeconomic impact of Poland's military buildup has been muted. Between 2021 and 2025, Poland increased total public spending in accrual terms by 6.5 percent of GDP, of which defense accounted for about 2 percentage points. Given initially low public debt (at 48 percent of GDP in 2022) and ready access to financing, the spending increase was financed almost entirely by increases in the deficit. While the broader fiscal expansion did contribute to economic growth, the impact of the defense spending increase alone was likely modest, because the spending was highly import intensive. At the same time, to the degree that looser fiscal policy did contribute to higher domestic demand, it likely resulted in a tighter monetary policy path than would have been seen without such spending increases (Figure 2.1.1, panel 3).

The authors of this box are Kareem Ismail, Krzysztof Krogulski, Moheb Malak, Robert Sierhej, and Can Ugur.

Figure 2.1.1. Scaling Up Defense Spending: The Case of Poland



Sources: Haver Analytics; IMF, *World Economic Outlook*; National Bank of Poland (NBP); North Atlantic Treaty Organization (NATO); Statistics Poland; and IMF staff calculations.

Note: In panel 1, 2024 and 2025 data are estimates. "Other" includes operations and maintenance expenditure, other research and development expenditure, and unallocated expenditure. Personnel figures are not fully comparable across countries because of differences in definitions and coverage of active personnel, reserves, and auxiliary forces. In panel 2, data for France and the United Kingdom refer to 2024. Data labels in the figure use International Organization for Standardization (ISO) country codes.

Box 2.2. Spillovers from Defense Spending

Defense outlays are often large, persistent, and characterized by complex cross-border supply chains. As a result, their macroeconomic effects can spill over to other countries, either through direct imports of defense-related goods and services or indirect imports arising from increased aggregate demand. To understand the size and nature of these spillovers, this box constructs country-specific foreign defense expenditure measures based on a trade-weighted aggregation of partner countries' defense expenditure. These measures provide the basis for quantifying the international transmission of defense spending shocks (Auerbach and Gorodnichenko 2013; Furceri and others 2026). By capturing the extent to which higher defense spending abroad translates into increased import demand, higher values of these measures would imply higher output in exporting countries.

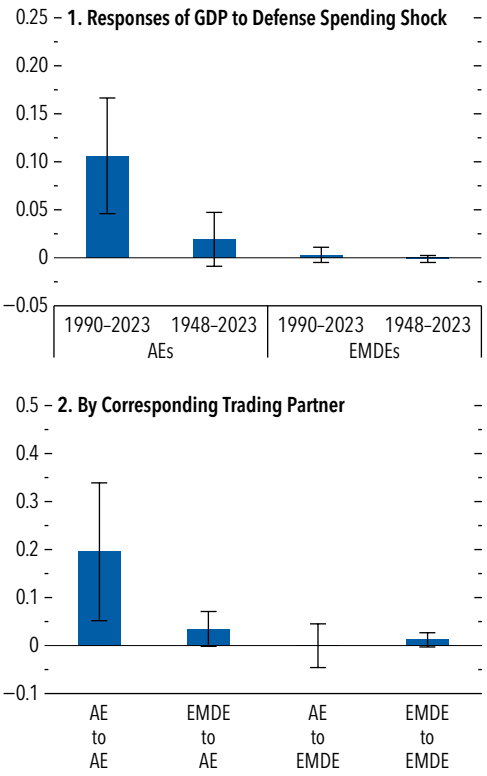
Estimates from local projections on the sample used to estimate the defense spending multipliers in the chapter show that spillovers to advanced economies are statistically significant in the post-1990 period (Figure 2.2.1, panel 1), while they are smaller and not statistically significant in the full sample (1948–2023). By contrast, there is no evidence of spillovers to emerging market and developing economies. These results are consistent with the larger share of advanced economies in global exports and international arms trade. They also reflect the deeper trade integration, more interconnected supply chains, and greater cross-border participation in defense-related production in the post–Cold War period, all factors that amplify international spillovers.

Reflecting the dense and highly integrated trade networks among advanced economies, most spillovers originate from trade linkages among these economies, and boost GDP by about 0.2 percent in response to a defense spending shock by 1 percent of trading partners' GDP. Spillovers are even larger for common trade areas, such as the European Union (Furceri and others 2026). Spillovers from emerging market and developing economies' defense spending are, in contrast, close to zero (Figure 2.2.1, panel 2).

The authors of this box are Pedro Juarros and Anh Dinh Minh Nguyen.

Figure 2.2.1. Spillovers from Defense Spending

(Percent)



Source: IMF staff calculations.

Note: Panel 1 shows responses of trading partners to a positive defense spending shock of 1 percent. Panel 2 shows responses to a positive defense spending shock of 1 percent of GDP in trading partners over the 1990–2023 sample. The responses are rescaled by the average export share of countries in the group over the associated sample. The panel shows the greatest response in the five-year horizon since the occurrence of the shock. Bars denote point estimates, and whiskers indicate 90 percent confidence intervals. "AE to AE" refers to spillovers from defense spending in AE trading partners to AEs; "EMDE to AE" refers to spillovers from defense spending in EMDE trading partners to AEs; "AE to EMDE" refers to spillovers from defense spending in AE trading partners to EMDEs; "EMDE to EMDE" refers to spillovers from defense spending in EMDE trading partners to EMDEs. AE = advanced economy; EMDE = emerging market and developing economy.

References

Acalin, J., V. Alonso, C. Arroyo, R. Lam, L. Martinez, A. D. M. Nguyen, F. Roch, and others. 2025. "Fiscal Guardrails against High Debt and Looming Spending Pressures." IMF Staff Discussion Note 25/004, International Monetary Fund, Washington, DC.

Alesina, A., and R. Perotti. 1995. "Fiscal Expansions and Adjustments in OECD Countries." *Economic Policy* 10 (21): 205–48.

Alloza, M., R. Domínguez-Díaz, P. Durá, and I. Varotto. 2026. "The Macroeconomic Effects of Defense Expenditure: Evidence from Spain." Working Paper, Bank of Spain, Madrid.

Andrle, M., P. Blagrave, P. Espaillat, K. Honjo, B. Hunt, M. Kortelainen, R. Lalonde, and others. 2015. "The Flexible System of Global Models—FSGM." IMF Working Paper 15/64, International Monetary Fund, Washington, DC.

Antolin-Diaz, J., and P. Surico. 2025. "The Long-Run Effects of Government Spending." *American Economic Review* 115 (7): 2376–413.

Antonova, A., R. Luetticke, and G. J. Mueller. 2025. "The Military Multiplier." CEPR Discussion Paper 20220, Centre for Economic Policy Research, London.

Auerbach, A. J., and Y. Gorodnichenko. 2013. "Output Spillovers from Fiscal Policy." *American Economic Review* 103 (3): 141–46.

Barro, R. J. 1981. "Output Effects of Government Purchases." *Journal of Political Economy* 89: 1086–121.

Barro, R. J., and C. J. Redlick. 2011. "Macroeconomic Effects from Government Purchases and Taxes." *Quarterly Journal of Economics* 126 (1): 51–102.

Basu, S. 1996. "Procyclical Productivity: Increasing Returns or Cyclical Utilization?" *Quarterly Journal of Economics* 111 (3): 719–51.

Baxter, M., and R. G. King. 1993. "Fiscal Policy in General Equilibrium." *American Economic Review* 83 (3): 315–34.

Becker, J., S. Benson, J. P. Dunne, and E. Malesky. 2025. "Disaggregated Defense Spending: Introduction to Data." *Journal of Peace Research* 62 (3): 772–88.

Ben Zeev, N., and E. Pappa. 2017. "Chronicle of a War Foretold: The Macroeconomic Effects of Anticipated Defence Spending Shocks." *Economic Journal* 127 (603): 1568–97.

Ben Zeev, N., E. Pappa, and E. Scola Gagliardi. 2025. "The Offensive Power of Defense News in Europe." CEPR Discussion Paper 20637, Centre for Economic Policy Research, London.

Benmelech, E., and J. Monteiro. 2025. "Military Spending and War." NBER Working Paper 34123, National Bureau of Economic Research, Cambridge, MA.

Boehm, C. E. 2020. "Government Consumption and Investment: Does the Composition of Purchases Affect the Multiplier?" *Journal of Monetary Economics* 115: 80–93.

Bokan, N., P. Jacquinot, M. Lalik, G. Muller, R. Priftis, and R. Rigato. 2025. "Macroeconomic Impacts of Higher Defence Spending: A Model-Based Assessment." Economic Bulletin 6, European Central Bank, Frankfurt.

Boly, A., and E. Kéré. 2026. "Terrorism and Military Expenditure in Africa: An Analysis of Spillover Effects." *Journal of African Economies* 35 (1): ejaf007.

Caldara, D., and M. Iacoviello. 2022. "Measuring Geopolitical Risk." *American Economic Review* 112 (4): 1194–225.

Danmarks Nationalbank. 2025. "Higher Defence Spending May Increase Capacity Pressures Moderately." Danmarks Nationalbank Analysis 19, Danmarks Nationalbank, Copenhagen.

Deger, S., and R. Smith. 1983. "Military Expenditure and Growth in Less Developed Countries." *Journal of Conflict Resolution* 27 (2): 335–53.

Draghi, M. 2024. "The Future of European Competitiveness: Part A—A Competitiveness Strategy for Europe." European Commission, Brussels.

Eble, S., A. Pitt, I. Bunda, O. E. Adilbish, N. Budina, G. H. Hong, M. T. Malak, and others. 2025. "Long-Term Spending Pressures in Europe." IMF Departmental Paper 2025/002, International Monetary Fund, Washington, DC.

European Commission. 2025. "The Economic Impact of Higher Defence Spending." Institutional Paper 318, European Commission, Brussels.

Fazzari, S. M., G. Hubbard, and B. C. Petersen. 1988. "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity* 1988 (1): 141–206.

Fisher, J. D. M., and R. Peters. 2010. "Using Stock Returns to Identify Government Spending Shocks." *Economic Journal* 120 (544): 414–36.

Furceri, D., P. Juarros, S. Mishra, A. D. M. Nguyen, A. S. Pessoa, and A. Sollaci. 2026. "Macroeconomic Impacts of EU Defense Spending." IMF Working Paper 26/53, International Monetary Fund, Washington, DC.

García-Serrador, A., D. Sarasa-Flores, and C. Ulloa. 2025. "Buy Guns or Buy Roses? EU Defence Spending Fiscal Multipliers." BBVA Research 25-06, Banco Bilbao Vizcaya Argentaria, Madrid.

Gethin, A. 2024. "Revisiting Global Poverty Reduction: Public Services and the World Distribution of Income, 1980–2022." Unpublished. https://amory-gethin.fr/research.html.

Gross, D. P., and B. N. Sampat. 2023. "America, Jump-Started: World War II R&D and the Takeoff of the US Innovation System." *American Economic Review* 113 (12): 3323–56.

Hall, R. 2009. "By How Much Does GDP Rise If the Government Buys More Output?" *Brookings Papers on Economic Activity* 40 (Fall): 183–249.

Hartley, K. 2008. "Collaboration and European Defence Industrial Policy." *Defence and Peace Economics* 19 (4): 303–15.

Heerma van Voss, B., D. de Leeuw, F. Marotta, C. Mehlbaum, A. Smadu, I. Stanga, and S. Wöhrmüller. 2026 "The Economic Consequences of Defence Spending." De Nederlandsche Bank, Amsterdam.

Hildebrand, P., H. Rey, and M. Schularick. 2026. "A Proposal on European Defence Governance and Financing." Kiel Policy Brief 199, Kiel Institute for the World Economy, Kiel, Germany.

Huang, Y., M. Pagano, and U. Panizza. 2020. "Local Crowding-Out in China." *Journal of Finance* 75: 2855–98.

Ilzetzki, E. 2024. "Learning by Necessity: Government Demand, Capacity Constraints, and Productivity Growth." *American Economic Review* 114 (8): 2436–71.

Ilzetzki, E. 2025. "Guns and Growth: The Economic Consequences of Defense Buildups." Kiel Report 2, Kiel Institute for the World Economy, Kiel, Germany.

Ilzetzki, E., E. G. Mendoza, and C. A. Végh. 2013. "How Big (Small?) Are Fiscal Multipliers?" *Journal of Monetary Economics* 60: 239–54.

International Monetary Fund (IMF). 2022. "IMF Strategy for Fragile and Conflict-Affected States (FCS)." International Monetary Fund, Washington DC.

Jordà, Ò. 2005. "Estimation and Inference of Impulse Responses by Local Projections." *American Economic Review* 95 (1): 161–82.

Kadera, K., and G. Sorokin. 2004. "Measuring National Power." *International Interactions* 30 (3): 211–30.

Knight, M., N. Loayza, and D. Villanueva. 1996. "The Peace Dividend: Military Spending Cuts and Economic Growth." *IMF Staff Papers* 43 (1): 1–37.

Letta, E. 2024. "Much More Than a Market." Jaques Delors Institute, Paris.

Marzian, J., and C. Trebesch. 2025. "Guns and Butter: The Fiscal Consequences of Rearmament and War." Kiel Working Paper 2310, Kiel Institute for the World Economy, Kiel, Germany.

Miyamoto, W., T. L. Nguyen, and V. Sheremirov. 2019. "The Effects of Government Spending on Real Exchange Rates: Evidence from Military Spending Panel Data." *Journal of International Economics* 116: 144–57.

Moretti, E., C. Steinwender, and J. Van Reenen. 2025. "The Intellectual Spoils of War? Defense R&D, Productivity, and International Spillovers." *Review of Economics and Statistics* 107 (1): 14–27.

Nakamura, E., and J. Steinsson. 2014. "Fiscal Stimulus in a Monetary Union: Evidence from US Regions." *American Economic Review* 104 (3): 753–92.

Nekarda, C. J., and V. A. Ramey. 2011. "Industry Evidence on the Effects of Government Spending." *American Economic Journal: Macroeconomics* 3 (1): 36–59.

Ohanian, L. E. 1997. "The Macroeconomic Effects of War Finance in the United States: World War II and the Korean War." *American Economic Review* 87 (1): 23–40.

Phelan, C., and A. Trejos. 2000. "The Aggregate Effects of Sectoral Reallocations." *Journal of Monetary Economics* 45 (2): 249–68.

Ramey, V. A. 2011. "Identifying Government Spending Shocks: It's All in the Timing." *Quarterly Journal of Economics* 126 (1): 1–50.

Ramey, V. A., and M. D. Shapiro. 1998. "Costly Capital Reallocation and the Effects of Government Spending." *Carnegie-Rochester Conference Series on Public Policy* 48: 145–94.

Ramey, V. A., and M. D. Shapiro. 2001. "Displaced Capital: A Study of Aerospace Plant Closings." *Journal of Political Economy* 109 (5): 958–92.

Ramey, V. A., and S. Zubairy. 2018. "Government Spending Multipliers in Good Times and in Bad: Evidence from US Historical Data." *Journal of Political Economy* 126 (2): 850–901.

Sandler, T., and J. George. 2016. "Military Expenditure Trends for 1960–2014 and What They Reveal." *Global Policy* 7 (2): 174–84.

Sheremirov, V., and S. Spirovska. 2022. "Fiscal Multipliers in Advanced and Developing Countries: Evidence from Military Spending." *Journal of Public Economics* 208: 104631.