

USING TAXATION TO FUND MILITARY SPENDING

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I. Introduction

As a reflection of the recent structural deterioration in the global security environment, many countries are increasing their military expenditure to upgrade and modernize their military capabilities. For example, Japan plans to almost double its military expenditure by 2027 in response to its growing threat perception of China, while Sweden's military spending is expected to surge by 45 per cent between 2020 and 2025 amid growing tensions with Russia. While the intent to boost military spending is clear, for many countries the choice of where to source the funds required to pay for the increases—and the impact of that choice—is often less clear. The money could be raised through government borrowing, through revenue from the sale of natural resources or through increases in rates of taxation. Each financing option has consequences.

The main source of state revenue is taxation.¹ In the above examples, both Japan and Sweden have chosen to finance their increases in military expenditure by increasing taxation.² Such a choice could have substantial impacts on economic growth or redistributive effects on income equality.³ Despite these potentially far-reaching consequences, most studies that look at how governments pay for increases in military expenditure focus on the use of debt or revenue from natural resources—no scholarly attention has yet been paid to the issue of using taxation to fund military spending.⁴

¹ Organisation for Economic Co-operation and Development (OECD), *Government at a Glance 2019* (OECD Publishing: Paris, 2019), pp. 66–67.

² Kelly, T., 'Japan govt panel recommends broad tax burden for defence budget hike', Reuters, 22 Nov. 2022; Swedish Ministry of Defence, 'Summary of government bill "Totalförsvaret 2021–2025" (Total defence 2021–2025)', 17 Dec. 2020; and Michell-Mall, S., Micu, P. and Kulneff, E., 'Nya budgeten: skatt på öl och tobak höjs' [The new budget: Taxes on beer and tobacco are increased], *Expressen*, 21 Sep. 2020.

³ Iosifidi, M. and Mylonidis, N., 'Relative effective taxation and income inequality: Evidence from OECD countries', *Journal of European Social Policy*, vol. 27, no. 1 (Feb. 2017); and Verbist, G. and Figari, F., 'The redistributive effect and progressivity of taxes revisited: An international comparison across the European Union', *FinanzArchiv/Public Finance Analysis*, vol. 70, no. 3 (Sep. 2014).

⁴ Caruso, R. and Domizio, M. D., 'Military spending and budget deficits: The impact of US military spending on public debt in Europe (1988–2013)', *Defence and Peace Economics*, vol. 28, no. 5 (2016); DiGuiseppe, M., 'Guns, butter, and debt: Sovereign creditworthiness and military expenditure', *Journal of Peace Research*, vol. 52, no. 5 (2015); Hunter Christies, E., 'The demand for military expenditure in Europe: The role of fiscal space in the context of a resurgent Russia', *Defense and Peace Economics*, vol. 30, no. 1 (2019); Perlo-Freeman, S. and Brauner, J., 'Natural resources and military expenditure: The case of Algeria', *Economics of Peace and Security Journal*, vol. 7, no. 1 (2012); and Bäckström, P., 'How to finance military spending: tax or debt?', Swedish Defence Research Agency (FOI) Memo no. 6890, 15 Nov. 2019.

SUMMARY

● World military expenditure is on the rise. To fund their increases in military spending, options available to governments include tax, debt or revenue from natural resources. Each form of financing has its consequences, economic, political or social.

Tax is the prevalent source of finance for governments. The use of tax, and the choice among different types of tax, can have an impact on income inequality and economic growth, among other things. However, no scholarly attention has yet been paid to the use of taxation to fund military spending. Using statistical analysis combined with in-depth case studies sheds light on this use of taxation.

The findings—based on data for 100 countries between 1990 and 2020 and reinforced by detailed case studies on Burundi and Ukraine—show that countries in conflict tend to resort to indirect taxation to fund military expenditure. This is particularly true for low-income countries and for countries with an autocratic regime. This association can be consequential, considering the accumulated evidence on the impacts of indirect taxation on income inequality.



This paper addresses this gap by exploring the links between taxation and military spending. Drawing on the period 1990–2020 and covering the 100 countries for which tax and military spending data is available, it offers relevant evidence not only to understand how the announced increases in military spending may affect tax structures, but also how low-income, autocratic and conflict-affected countries in particular fund military spending. The study combines statistical analysis with in-depth case studies to shed light on how military spending and taxation can interact.

If a government decides to fund military spending through taxation, two types of tax are at its disposal: direct and indirect. A choice of indirect taxes (e.g. tax on sales of goods) can be consequential since it can disproportionately burden the poor and can have a regressive effect on income inequality. In contrast, choosing direct taxes (e.g. income tax) means adopting a progressive structure where the amount of tax collected is based on income levels. Direct taxes can thus reduce income inequality. In outlining the potential redistributive effects of military spending choices, the study offers food for thought to policymakers on the economic and social consequences of military spending.

The paper continues in section II with a further explanation of the main ways in which governments can fund military spending, with a focus on taxation. It also outlines the study's contribution at a policy and research level. Section III uses statistical methods to investigate the relationship between military spending and taxation. Section IV analyses in detail the cases of Burundi and Ukraine to supplement the quantitative results. Section V concludes with a discussion of the implications of the findings and by offering some policy recommendations and considering avenues for future research. Appendix A gives details of the definitions of terms and sources of data used in this study.

II. How is military spending funded?

Research on how military spending is funded is relatively scarce and mostly focuses on debt as a source of revenue. The findings seem to be context dependent and hard to generalize. For instance, a recent study finds that military spending is associated with more external debt only in countries with a weak debt-management system.⁵ Other studies do find a relationship between debt and military spending, but their evidence often relates to a specific country, region or period.⁶ This suggests that debt is not always used to fund military spending—its use depends on national or regional characteristics and political conditions that may change rapidly.

⁵ Khan, L., Arif, I. and Waqar, S., 'The impact of military expenditure on external debt: The case of 35 arms importing countries', *Defence and Peace Economics*, vol. 32, no. 5 (2021).

⁶ E.g. Dunne, J. P., Nikolaidou, E. and Chiminya, A., 'Military spending, conflict and external debt in sub-Saharan Africa', *Defence and Peace Economics*, vol. 30, no. 4 (2019); Abbas, S. and Wizarat, S., 'Military expenditure and external debt in South Asia: A panel data analysis', *Peace Economics, Peace Science and Public Policy*, vol. 24, no. 3 (2017); Kollias, C., Manolas, G. and Paleologou, S., 'Military expenditure and government debt in Greece: Some preliminary empirical findings', *Defence and Peace Economics*, vol. 15, no. 2 (2004); and Dunne, J. P., Perlo-Freeman, S. and Soydan, A., 'Military expenditure and debt in small industrialised economies: A panel analysis', *Defence and Peace Economics*, vol. 15, no. 2 (2004).



From a policymakers' perspective, using debt to fund military spending is appealing: because the need to repay debt is incurred in the future, borrowing can be politically beneficial to a government as the duty of repayment may fall on a future administration. Similarly, for a developed country with high credit rating, debt can be an affordable way to finance military spending that avoids the unpopular policies of increases in tax or cutting spending in other government sectors or the inflationary effects of printing money.⁷ Sometimes, the appeal of debt is irrelevant, as necessity imposes itself: for countries lacking adequate fiscal revenue, debt is one of the few other means to finance additional spending.⁸ However, even in cases where debt is preferred, excessive debt can cause severe economic problems such as distorting the economy, slowing down economic growth and creating fictitious wealth.⁹

Debt is undoubtedly a major financing stream for public expenditure, but it is not the principal one: taxation remains the main source of revenue for governments worldwide. The World Bank estimates that the global average of taxation as a share of gross domestic product (GDP)—known as tax effort—was 14 per cent in 2020.¹⁰ For the wealthier countries that are members of the Organisation for Economic Co-operation and Development (OECD), tax effort averaged 34 per cent.¹¹

Despite the importance of taxation as a source of funding for the state, no study has tackled its relationship with military spending. At most, taxation has only featured peripherally in the analysis.¹² Instead, studies tend to use GDP as an indicator of resource availability or a state's capacity to collect tax.¹³ This, however, is inadequate: while the economy and taxation are intertwined in several ways, they should not be conflated—a big economy (as measured by GDP) does not necessarily mean a large tax base. There are examples of states, such as China or India, with large economies that collect relatively low levels of tax.¹⁴ In these cases, using GDP to explain variations in military spending may not be the best option.

Tax revenues can be broken down into two components according to the transactional costs.¹⁵ Direct taxation encompasses tax on income, capital gains and corporate profits and tax on wealth. Indirect taxation covers tax on purchases of goods and services and tax on international trade.¹⁶ Direct taxes are the most difficult to levy because they require a complex

⁷ DiGiuseppe (note 4).

⁸ Azam, M. and Feng, Y., 'Does military expenditure increase external debt? Evidence from Asia' *Defence and Peace Economics*, vol. 28, no. 5 (2017).

⁹ Pettis, M., 'How does excessive debt hurt an economy?', China Financial Markets, Carnegie Endowment for International Peace, 8 Feb. 2022.

¹⁰ World Bank, 'World Development Indicators', 16 Sep. 2022.

¹¹ Organisation for Economic Co-operation and Development (OECD), *Revenue Statistics 2022: The Impact of COVID-19 on OECD Tax Revenues 1965–2021* (OECD Publishing: Paris, 2022), p. 15.

¹² Rota, M., 'Military spending, fiscal capacity and the democracy puzzle', *Explorations in Economic History*, vol. 60 (2016).

¹³ Perlo-Freeman and Brauner (note 4), pp. 17–18.

¹⁴ Organisation for Economic Co-operation and Development (OECD), 'Revenue statistics in Asia and the Pacific 2022—China', 2022; and *The Economist*, 'Why only 2% of Chinese pay any income tax', 1 Dec. 2018.

¹⁵ Kiser, E. and Karceski, S. M., 'Political economy of taxation', *Annual Review of Political Science*, vol. 20 (2017).

¹⁶ Kiser and Karceski (note 15); and Rodríguez-Franco, D., 'Internal wars, taxation, and state building', *American Sociological Review*, vol. 81, no. 1 (2015).

**Box 1.** The regression model for analysis of the financing of military spending through taxation

The general form of the regression model is

$$\ln M_{i,t} = \alpha_0 + \beta_1 \ln T_{i,t} + \theta X_{i,t} + \beta_2 X_{i,t} \ln T_{i,t} + \rho_i + \tau_t + \epsilon_{i,t}$$

where $M_{i,t}$ is the military spending (in constant 2020 US dollars) of country i at time t , $T_{i,t}$ is taxation as a share of gross domestic product (GDP), β_1 is the coefficient for taxation as a share of GDP, $\theta X_{i,t}$ represents the various covariates included in the regression (e.g. GDP per capita, debt, armed conflict) and their coefficients, $X_{i,t} \ln T_{i,t}$ picks up the effect of taxation during an armed conflict (i.e. interaction term), β_2 is the coefficient of this interaction effect, α_0 is the intercept, ρ_i is country-fixed effects, τ_t is time-fixed effects and $\epsilon_{i,t}$ is the error term. \ln represents the natural logarithm of selected variables in the regression.

The control variables are chosen on the basis of the expected effect on the relationship between military spending and taxation. For example, GDP per capita is included on the basis that increased income means countries can devote more resources to the military. Government expenditure is included on the basis that taxation can also fund higher government spending, and higher military spending is just part of increased government expenditure.

All regressions in this paper are estimated using robust standard errors with panel-fixed effects. Full details of the model and results are available from the authors upon request.

monitoring system, followed by equally complex systems of enforcement and compliance. Indirect taxes are less demanding from an administrative perspective; they require little collection capacity beyond tracking economic exchanges or trade flows at the endpoint.¹⁷

Compared to direct taxation, indirect taxes are less visible to taxpayers, which allows states to increase tax with less resistance. Indirect taxes can also be collected much more quickly, and they do not undermine the political support of the government in elite circles or the broader population.¹⁸ In a scenario where a state requires immediate and substantial resources for higher military spending (e.g. in reaction to a perceived threat, during an armed conflict or to fund an expensive military procurement), using indirect taxes as a funding source is a particularly attractive option.

Non-tax revenue is another source of funding that can be politically attractive as it does not require taxing of the general population.¹⁹ In countries with natural resources such as fuel and non-fuel minerals, a large portion of non-tax revenue is typically made up of revenue from the sale of natural resources owned by the government.²⁰ In many such countries, off-budget mechanisms that generate non-tax revenue directly from natural resources are a well-established form of funding military spending. Examples include Chile, which uses income from exports of copper to fund military spending, and Venezuela, where oil revenue from the state-owned oil company helps to fund the military.²¹

¹⁷ Beramendi, P. and Rueda, D., 'Social democracy constrained: Indirect taxation in industrialized democracies', *British Journal of Political Science*, vol. 37, no. 4 (Oct. 2007).

¹⁸ Sausgruber, R. and Tyran, J.-R., 'Testing the Mill hypothesis of fiscal illusion', *Public Choice*, vol. 122, nos 1–2 (Jan. 2005); and Hays, J. C., 'Globalization and capital taxation in consensus and majoritarian democracies', *World Politics*, vol. 56, no. 1 (Oct. 2003).

¹⁹ Perlo-Freeman and Brauner (note 4).

²⁰ UN University World Institute for Development Economics Research (UNU-WIDER), Government Revenue Dataset, 'User guide & FAQs', Aug. 2022, p. 3.

²¹ Colgan, J., 'Venezuela and military expenditure data', *Journal of Peace Research*, vol. 48, no. 4 (2011); and Lopes da Silva, D. and Tian, N., 'Ending off-budget military funding: Lessons from Chile', SIPRI, 16 Dec. 2019.



III. A multivariate regression analysis of financing military spending through taxation

This section uses multivariate regression analysis to explore the quantitative association between military spending and taxation. The relationship between two variables of interest (in this case, military spending and taxation) is often biased by other factors (e.g. other sources of financing such as debt). By using multivariate regression analysis, it is possible to assess how taxation funds military spending by factoring in (i.e. controlling for) these other potential influencing variables (see box 1).²² These variables include total government spending, income level, regime type, the presence of an armed conflict, and other financing means such as debt and revenue from natural resources (see appendix A for definitions of the variables and sources of data).

The starting point of the regression analysis assesses whether a general association exists between military spending and taxation. This first regression, which includes all 100 countries and all years (1990–2020) for which data is available, reveals no relationship between tax and military spending. The lack of a relationship remains the same when overall tax effort is replaced with various subcategories of tax, such as direct tax, indirect tax, income tax or trade tax.

While the initial set of regressions shows no evidence for an association between tax effort and military spending for the 100 countries studied here, this does not mean that this relationship is not present in other groups of countries. The first set of regressions does not include relevant structural factors—such as the presence of armed conflict, country income level or country regime type—that may affect the tax and military spending association. These factors are considered in the following subsections.

Funding military spending through taxation during conflict

Tax effort and military expenditure have a strong and positive relationship for countries in an armed conflict. The result can be interpreted as follows: in the presence of armed conflict and controlling for other factors that may affect military spending (see box 1), on average a 1 per cent increase in taxation as a share of GDP is associated with a 0.23 per cent increase in military spending (see figure 1(a)). This relationship is also statistically significant at the 95 per cent level. In other words, there is a less than 5 per cent probability that the positive relationship between taxation as a share of GDP and military spending is random. As such, the typical statistical approach is to reject the ‘null hypothesis’ (i.e. no significant relation) between tax effort and military spending and accept the alternative hypothesis that a relationship exists. In times of urgency—in this case an armed conflict—countries tend to rely on taxation to finance military expenditure.

As described in section II, the choice of the type of tax levied by the government to fund military spending may depend on the institutional and political

²² Dunne, J.P. and Perlo-Freeman, S., ‘The demand for military spending in developing countries’, *International Review of Applied Economics*, vol. 17, no. 1 (2003); and Albalade, D., Bel, G. and Elias, F., ‘Institutional determinants of military spending’, *Journal of Comparative Economics*, vol. 40, no. 2 (May 2012).



Figure 1. Selected multivariate regression results on the relationship between taxation and military spending

Notes: All tax variables are measured as a share of gross domestic product (GDP). Note that ‘A 1% increase in tax’ means, for example, an increase in tax effort from 10 per cent of GDP to 10.1% (and not an increase of 1 percentage point, e.g. from 10 per cent of GDP to 11 per cent).

The figure shows the results of the regression analysis for which a statistically significant relationship was found. Significance level (or *p*-value) is indicated by shading. The *p*-value refers to the likelihood that the relationship between two variables (in this case taxation and military spending) could occur under the hypothesis that no relationship exists (i.e. null hypothesis). A *p*-value of less than 0.01 (i.e. 99 per cent level of significance) means that, in statistical terms, there is less than a 1 per cent probability that the relationship between two variables is by chance or random. A common threshold in statistics is that this randomness should occur less than 5 per cent of the time. If this threshold is not reached, then the result is typically said to be statistically insignificant. In other words, the hypothesis that a relationship exists between military spending and taxation can be rejected. In the cases not shown in the figure (e.g. democracies, countries not in armed conflict, middle- and high-income countries), the *p*-value was greater than 0.1 (i.e. too low a level of significance).

costs associated with each type of tax. Direct taxes are the most difficult to levy, while indirect taxes are less administratively demanding and quicker to collect. Disaggregating overall tax as a share of GDP into direct and indirect taxes reveals a stark contrast in the relationship between taxation and military expenditure during armed conflict: there is no association between direct taxes and military spending, whereas indirect tax revenue is positively and significantly related to military expenditure (see figure 1(a)). An increase of 1 per cent in indirect taxation as a share of GDP leads to a 0.23 per cent increase in military spending, with statistical significance at



the 99 per cent level. By statistical standards, there is a less than 1 per cent chance that this association is random.

This first finding implies that, in times of conflict where a state requires an immediate funding source for military activities, the type of tax matters. Indirect tax revenue can be a more practical financing option for governments than revenue from direct taxation.²³

Military spending, indirect taxation, armed conflict and income

In addition to conflict, other factors such as structural differences in country income level may affect taxation as a funding source for military spending. The next set of regressions groups the 100 countries according to income—low, lower-middle, upper-middle and high—in order to adjust for heterogeneity across countries. The regression results show a substantial difference between low-income countries and the three other income groups.

Of the four income groups, indirect taxation as a share of GDP during an armed conflict has a positive and significant link to the level of military spending only for low-income countries. In other words, only low-income countries rely consistently on indirect taxes to fund their military spending during conflict: an increase of 1 per cent in indirect taxation as a share of GDP is associated with a 0.31 per cent increase in military spending (see figure 1(b)). This is the strongest and most statistically significant association of all the estimated regressions. Indirect taxation during conflict is statistically significant at the 99 per cent level. In other words, the chance that the positive relationship between indirect taxation and military spending during armed conflict is random is less than 1 per cent.

To check the consistency of the above relationship, indirect taxation can be replaced in the multivariate regression first by tax on goods and services and then by tax on trade. The results in each case are consistent with the findings for indirect taxes in general. For low-income countries in conflict, tax on goods and services and tax on trade are both positively associated with higher military spending: a 1 per cent increase in goods and services tax as a share of GDP is linked with a 0.15 per cent increase in military spending, while a 1 per cent increase in trade tax as a share of GDP is associated with a 0.18 per cent increase in military spending (see figure 1(b)). These associations were specifically only evident in the low-income country group.

The same regressions were estimated for direct taxes for each income group. Across all four groups, not a single case of association was found between military spending and direct taxation, including all subcategories of direct tax (e.g. income tax). This reinforces the above findings that the type of tax matters. Moreover, country income level matters: the association between indirect taxes and military spending is driven by low-income countries.

²³ Beramendi and Rueda (note 17); Martin, I. W. and Gabay, N., 'Fiscal protest in thirteen welfare states', *Socio-Economic Review*, vol. 11, no. 1 (Jan. 2012); and Kiser and Karceski (note 15).



Military spending, indirect taxation, armed conflict and political regime

Differences in political regime type may also complicate the relationship between military expenditure and indirect taxation. Autocratic countries generally need the support of the political and economic elite, while democratic states rely on the support of the overall population. Autocratic countries may thus find it easier and less politically costly to tax the poorer majority, and so may be more likely to choose indirect taxes to fund military spending.

To account for differences in political regime as a factor, multivariate regressions of the overall sample can be divided into two groups based on regime type: autocracies (combining closed autocracies and electoral autocracies) and democracies (combining electoral democracies and liberal democracies).

Among countries in conflict, funding military spending through taxation is only evident in autocratic countries, not democracies. Of the types of tax, it is just indirect taxation that matters: there is no statistical relation between direct taxation and military spending. For autocracies in conflict, every 1 per cent increase in indirect taxation as a share of GDP is associated with a 0.22 per cent increase in military spending (see figure 1(c)). This finding is statistically significant such that there is a less than 5 per cent chance that the positive relationship between indirect taxation and military spending during armed conflict is random.

As above, indirect taxation can be replaced in the multivariate regression by its subcategory taxes on goods and services and on trade. The results are consistent with those for all indirect taxes: in times of conflict, tax on goods and services and tax on trade are positively associated with higher military spending in autocracies. For goods and services tax as a share of GDP, a 1 per cent increase is linked with a 0.16 per cent increase in military spending. In the case of trade tax as a share of GDP, a 1 per cent increase is associated with a 0.20 per cent increase in military spending. Both these results are statistically significant such that there is less than 5 per cent chance that the relationship is random (see figure 1(c)).

Summary of the results of the multivariate regression analysis

In exploring taxation as a funding method for military spending, a clear set of factors are found to influence the taxation and military spending relationship. Of the different types of tax, only indirect taxation and its subsets (i.e. goods and services tax and trade tax) are linked with higher military expenditure. Moreover, the association between the level of military spending and indirect taxation as a share of GDP is only observed for countries in armed conflict.

Furthermore, for those in conflict, the association between military spending and indirect taxation is only valid for low-income countries or autocratic states. Although there is some overlap between low-income and autocratic states, fewer than half of autocratic states are low-income countries. This suggests similarities in the two country groups that complement the overall association between indirect taxation and military spending.



From all the multivariate regression results, the strongest association (i.e. the association with the largest magnitude) between military spending and indirect taxation is for conflict-affected low-income countries (see figure 1(b)). For this group, an increase of 1 per cent in indirect taxation as a share of GDP is associated with a 0.31 per cent increase in military spending. The magnitude of this association is around 35 per cent larger than the second-strongest association (i.e. 0.23) found for the group of conflict-afflicted countries of all incomes (see figure 1(a)). As a result, it can be concluded that low-income countries drive the overall regression estimates for countries of all incomes.

IV. Case studies

Based on the results from the regression, this section conducts qualitative analysis of Burundi and Ukraine—two cases that mostly conform to the general quantitative results that military expenditure is funded through indirect taxation. Both Burundi and Ukraine have been heavily affected by armed conflict. While Burundi was always an autocratic state, Ukraine, a historically autocratic state, has been transitioning to democracy. By 2020, Ukraine was classified as a newly formed democracy (after two earlier short periods of electoral democracy in the 1990s and 2000s).²⁴ Throughout the period of analysis, Burundi was a low-income country and Ukraine mostly a lower-middle-income country (except in the period 1999–2001, when it was classified as low income). Together, the cases shed light on how indirect taxation and military expenditure are associated with each other and the role that country-specific factors can play in influencing taxation as a source of financing for military spending.

In Burundi, rising military spending before and during the 1991–2005 conflict coincided with growing revenue as a share of GDP from indirect taxes (i.e. taxes on goods and services). Although military spending fell towards the end of the civil war, tax remained high and rose higher due to unsustainable debt and decreasing government revenue from other sources.

In Ukraine, rising military spending from the start of armed conflict in 2014 coincided with a shift towards reliance on indirect taxes, but this combination did not significantly increase tax effort. This was due to practical difficulties in collecting direct taxes in conflict-ridden areas and to the introduction of a flat (i.e. non-progressive) rate of income tax, which led to a fall in direct taxation as a share of GDP. Instead, the Ukrainian government relied primarily on debt and reserves, which became unsustainable as the conflict dragged on.

Comparing the trajectories of the two cases provides important insights. For instance, external debt rose substantially in Ukraine and continued to increase in Burundi once conflict broke out, signalling that debt may be a way to fund rising military expenditure in the short term. However, as conflict persists, governments opt for alternative funding sources depending on country-specific factors. The case studies once again highlight the need to consider the complexities of the relationship between military spending and taxation during conflict.

²⁴ The classification is according to the Varieties of Democracy (V-Dem) Project, V-Dem Dataset version 12, Mar. 2022. See also Lührmann, A., Tannenberg, M. and Lindberg, S. I., 'Regimes of the world (RoW): Opening new avenues for the comparative study of political regimes', *Politics and Governance*, vol. 6, no. 1 (2018); and appendix A below.

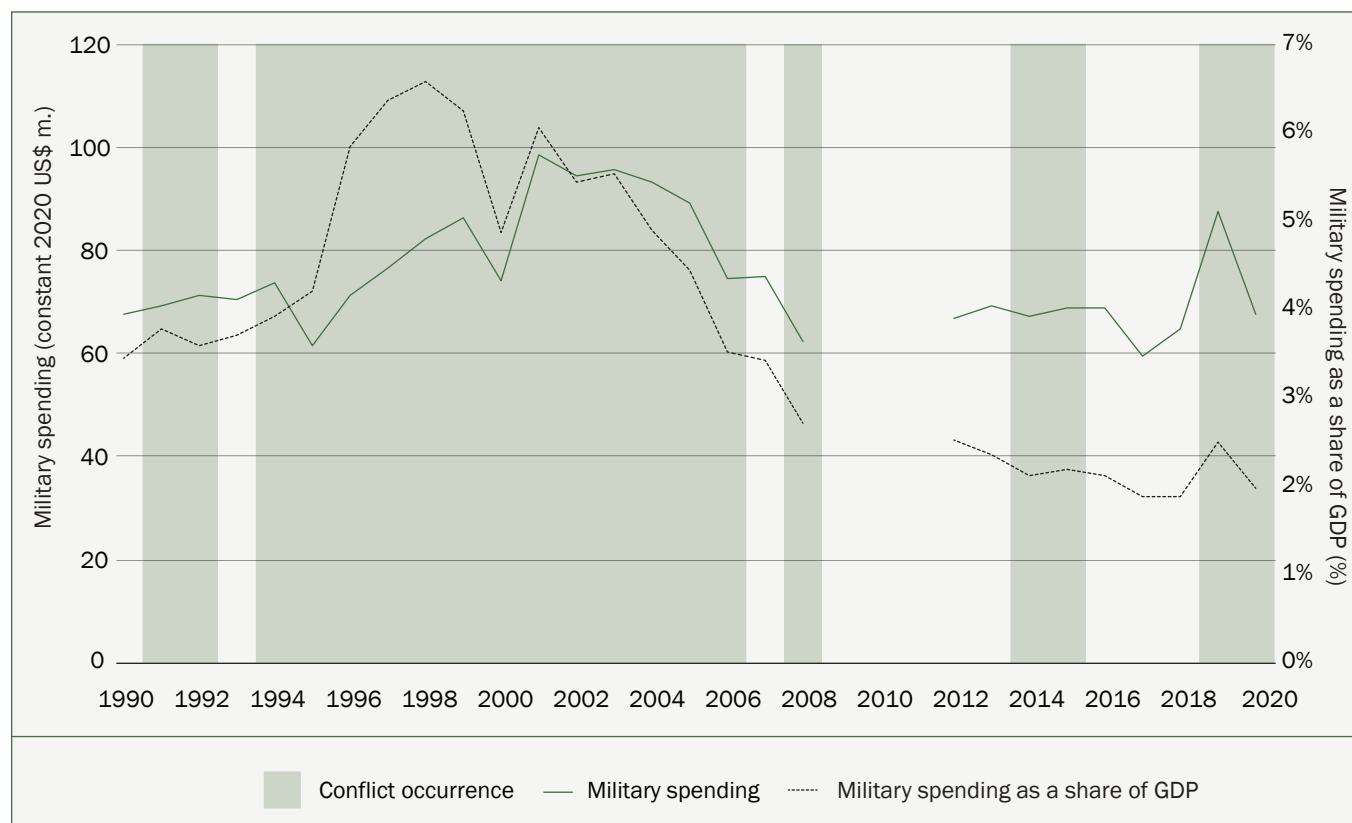


Figure 2. Burundi's military spending and military spending as a share of gross domestic product, 1990–2020

Note: Military expenditure data for Burundi is unavailable for 2009–11.

Source: SIPRI Military Expenditure Database, Apr. 2022, <<http://milex.sipri.org>>.

Burundi

Since achieving independence in 1962, Burundi has been marred by instability and ethnic conflicts, including a genocide in 1972, a civil war from 1991 to 2005, and several coups or attempted coups. The escalation of violence leading up to the civil war coincided with a period of substantial growth in Burundi's military expenditure, which increased by 47 per cent in real terms between 1987 and 1991, from 2.6 per cent of GDP to 3.8 per cent.

President Pierre Buyoya came to power in a 1987 coup, the fifth since independence, and continued decades of military rule. After adopting a new constitution, in 1993 Buyoya lost the first multiparty elections to Melchior Ndadaye. Ndadaye was the first president from the Hutu ethnic group following decades of political domination by the minority Tutsis. The short-lived democratic transition ended abruptly in October 1993, when President Ndadaye was assassinated by Tutsi extremists in another coup attempt. Although the coup failed, Burundi was plunged into a prolonged civil war: Ndadaye's death sparked fierce violence and chaos across the country as local militia groups, divided along ethnic lines, began to engage in attacks and killings in retribution.²⁵

After Buyoya regained power in yet another coup in 1996, he tried to resolve the conflict and finally reached a peace agreement with most warring parties

²⁵ Reyntjens, F., 'Briefing: Burundi: A peaceful transition after a decade of War?', *African Affairs*, vol. 105, no. 418 (Jan. 2006).

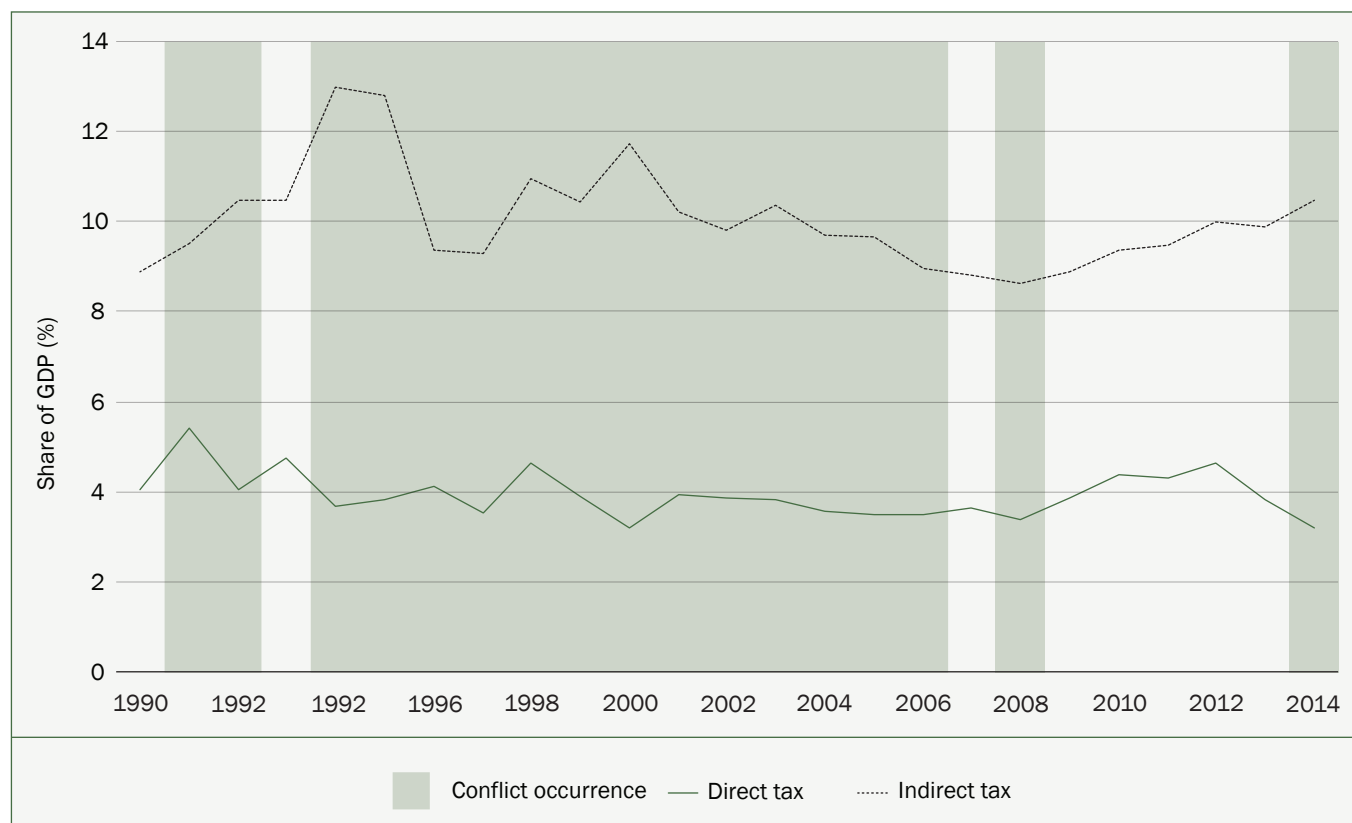


Figure 3. Burundi's revenue from direct and indirect taxation as shares of gross domestic product, 1990–2014

Note: Tax data for Burundi is unavailable for 2015–20.

Source: UN University World Institute for Development Economics Research (UNU-WIDER), Government Revenue Dataset, Oct. 2022.

in August 2000.²⁶ However, fighting went on as major Hutu rebel groups initially refused to sign the agreement, and it was not until 2006 that the war officially ended after claiming over 300 000 lives.²⁷

From the outbreak of the war, Burundi's military expenditure rose drastically, increasing by 40 per cent in real terms between 1993 and its peak in 2001, rising from 3.7 per cent of GDP to 6.1 per cent (see figure 2). It then remained at about 5.2 per cent of GDP during the final years of the civil war.

At 16 per cent in 1990, military spending as a share of Burundi's government expenditure was already one of the highest rates in the world before the onset of conflict. It then soared to 29 per cent in 1996 and remained at over 20 per cent until 2001. Faced with sky-high war spending, the Burundian government relied primarily on taxation, especially indirect taxes, as the main source of revenue (see figure 3). Over 70 per cent of tax revenue came from indirect taxes.²⁸ At the start of the war, indirect taxes as a share of GDP initially fell due to the disruption of economic activities and a trade embargo imposed by neighbouring countries on Buyoya's regime following the 1996

²⁶ Reuters, 'Burundi peace talks close with little progress', CNN, 30 Nov. 2000.

²⁷ United Nations, 'As UN winds up Burundi peacekeeping operation, Council urges continued support', UN News, 21 Dec. 2006.

²⁸ UN University World Institute for Development Economics Research (UNU-WIDER), Government Revenue Dataset, Oct. 2022.



Figure 4. Burundi’s revenue from types of indirect taxation as shares of gross domestic product, 1990–2014

Note: Tax data for Burundi is unavailable for 2015–20.

Source: UN University World Institute for Development Economics Research (UNU-WIDER), Government Revenue Dataset, Oct. 2022.

coup.²⁹ However, the trend soon reversed as the government ramped up tax on goods and services, a subcategory of indirect taxation, to support military efforts and compensate for the loss of revenue from trade tax. The government also gradually restored stability in urban areas, where most of the tax base was located.³⁰ As a result, revenue from tax on goods and services increased to an average of 6.9 per cent of GDP between 1993 and 2002, up from 5.4 per cent during the previous decade. It climbed further in the post-conflict decade to peak at 9.2 per cent in 2014 after a major tax reform in 2009 to strengthen revenue capacities (see figure 4).

The trend and forms of Burundi’s taxation correspond to the multivariate results described in section III. The prolonged civil war in Burundi rendered indirect taxes preferable as the collapse of state authority, dwindling elite support, and weakened administrative capacity and fiscal infrastructure made it increasingly difficult to collect direct taxes (such as income tax).³¹ This could explain the rising revenue from goods and services tax as a share of GDP despite the relatively stable level of income tax during the conflict. Tax on goods and services as a share of GDP continued to grow even after the conflict ended.

²⁹ Nduricimpa, A., ‘Tax reforms, civil conflicts and tax revenue performance in Burundi’, *Scientific African*, vol. 13 (2021).

³⁰ Eriksson, M., Wallensteen, P. and Sollenberg, M., ‘Armed conflict, 1989–2002’, *Journal of Peace Research*, vol. 40, no. 5 (2003).

³¹ Mawejje, J. and Odhiambo, N. M., ‘The dynamics of fiscal deficits in Burundi: An exploratory review’, *Acta Universitatis Danubius. Oeconomica*, vol. 15, no. 5 (2019).

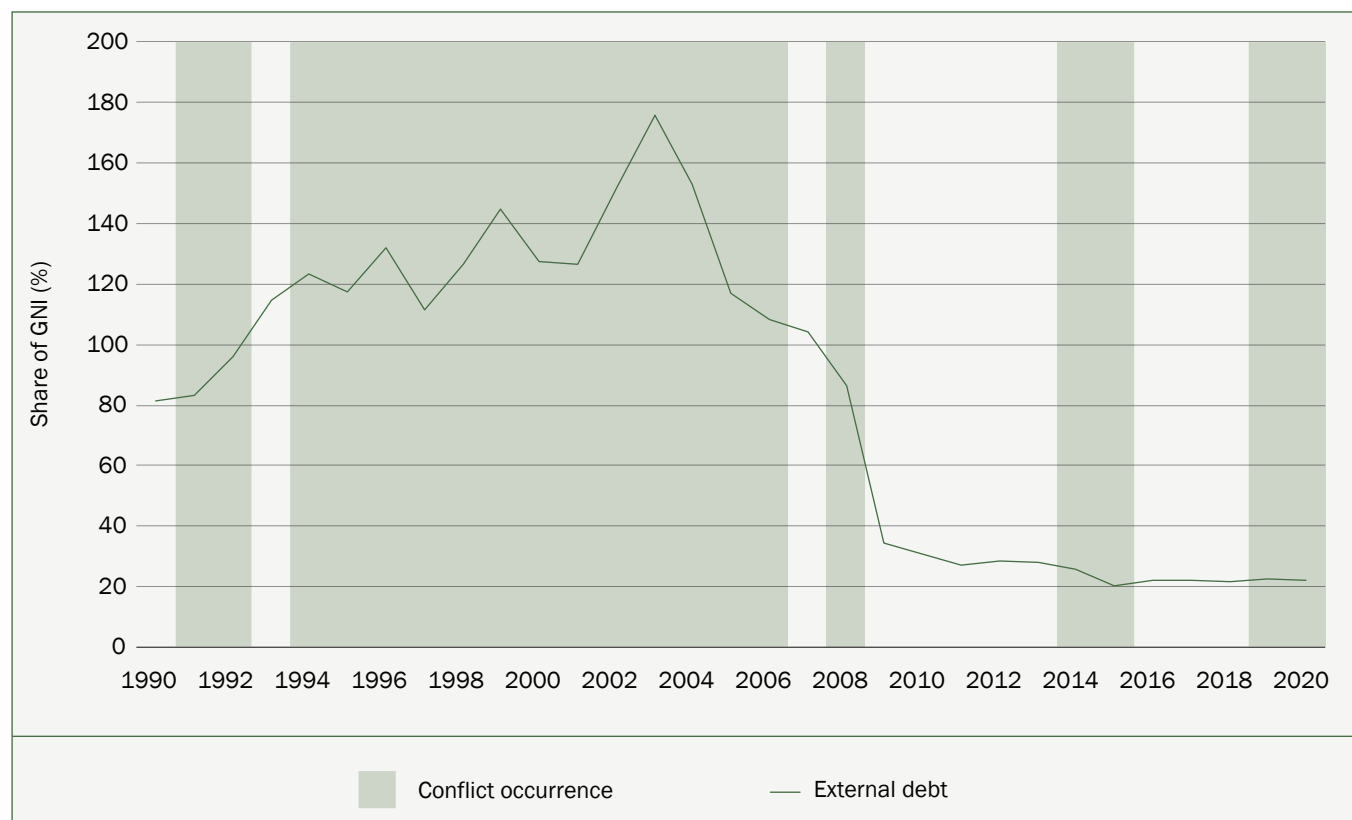


Figure 5. Burundi's external debt as a share of gross national income, 1990–2020

Source: World Bank, 'World Development Indicators', 16 Sep. 2022.

During the pre-conflict decade, Burundi's external debt as a share of gross national income (GNI) more than quadrupled, from 23 per cent in 1982 to 96 per cent in 1992. It then surged further after the onset of the conflict, reaching an all-time high of 176 per cent of GDP in 2003 (see figure 5). This suggests that another funding source for Burundi's higher military spending was external borrowing.³² However, the use of external debt was a short-term measure that became untenable, obliging the government to generate finance from other sources in the protracted war. Burundi's external debt levels declined substantially after 2003 largely due to debt relief granted by international lenders.³³

High military spending and high indirect taxes during the conflict occurred alongside deteriorating inequality and other socioeconomic woes.³⁴ Poverty and inequality soared while the economy shrank by 33 per cent during the conflict period.³⁵ Violence and instability, including insurgencies, civil

³² Dunne et al. (note 6).

³³ International Monetary Fund (IMF), 'IMF and World Bank support Burundi's completion point under the enhanced HIPC initiative and approve debt relief under the multilateral debt relief initiative', Press Release no. 09/18, Jan. 2009; and African Development Bank Group, 'Burundi obtains US\$150.2 million AfDB debt relief', Apr. 2009.

³⁴ Ndikumana, L., 'Fiscal policy, conflict, and reconstruction in Burundi and Rwanda', UN University World Institute for Development Economics Research (UNU-WIDER) Discussion Paper no. 2001/62, Aug. 2001.

³⁵ UN University World Institute for Development Economics Research (UNU-WIDER), World Income Inequality Database (WIID) Companion data set, 30 June 2022; and World Bank, 'Poverty headcount ratio at \$2.15 a day (2017 PPP) (% of population)—Burundi', Open Data, accessed 16 Oct. 2022.



unrest and an attempted coup as recently as 2015, continued to trouble the country after 2005.

In Burundi—a conflict-affected, low-income and autocratic country—higher military expenditure in times of conflict was sustained through indirect taxation. This is directly in line with the regression findings in section III. The qualitative findings in the context of a country with sustained economic and humanitarian crises exemplifies the importance of considering the potential negative consequences of financing the increase in military spending. In Burundi’s case, the unsustainable nature of using external debt resulted in Burundi receiving debt relief support from international creditors such as the International Monetary Fund (IMF), the World Bank and the African Development Bank.³⁶ By relying on indirect taxation, the government burdened the poorer sections of society disproportionately, which could have exacerbated income divides in an already highly unequal country.

Ukraine

Russia’s illegal annexation of Crimea in 2014 set in motion a conflict that, by early 2023, still has no end in sight. The annexation took place in the wake of the Maidan Revolution and the ousting of Ukrainian President Viktor Yanukovich, a longstanding ally of Russian President Vladimir Putin. Social unrest began in November 2013 after Yanukovich rejected an association agreement with the European Union (EU) that would have deepened Ukraine’s economic ties with the EU. Yanukovich responded to the protests with violent repression, but without success. As demonstrations against his government took over the streets, Yanukovich fled the country in late February 2014, clearing the way for a new, Western-backed government under the prime minister, Arseniy Yatsenyuk.³⁷ For Putin, the backing of Yatsenyuk was an affront to Russian strategic interests.

The instability that followed created an opportunity for Russia to annex the Crimea region of Ukraine—Putin regarded the transfer in 1954 of Crimea from Russia to Ukraine when both were part of the Soviet Union to have been a historical mistake.³⁸ Russia actively backed Crimean secessionist forces from early 2014. For instance, it provided support for pro-Russian armed individuals who seized control of government buildings in Crimea in February. After a staged referendum, the separatist forces declared Crimea’s independence from Ukraine on 17 March 2014, and the Russian Federation annexed the territory the next day.³⁹

Following the annexation, Russia also backed secessionists in eastern Ukraine. Pro-Russian separatists in Luhansk and Donetsk oblasts—both in Ukraine’s Donbas region—took up arms around the time of the annexation of Crimea. In May 2014 they also held referendums—widely viewed as illegal—on secession from Ukraine. The Ukrainian government launched

³⁶ International Monetary Fund (IMF), ‘Burundi: Enhanced initiative for heavily indebted poor countries—Decision point document’, IMF Country Report no. 05/329, Sep. 2005, pp. 15–24.

³⁷ Anthony, I., ‘The Ukraine crisis: From popular protest to major conflict’, *SIPRI Yearbook 2015: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2015).

³⁸ Cassidy, J., ‘Putin’s Crimean history lesson’, *New Yorker*, 18 Mar. 2014.

³⁹ de Carbonnel, A., ‘How the separatists delivered Crimea to Moscow’, *Reuters*, 12 Mar. 2014.



a counteroffensive that became increasingly difficult to sustain as Russian forces began to get involved in the conflict.⁴⁰ Efforts to resolve the conflict were not successful, and in 2022 Russia escalated the conflict to a fully fledged invasion of Ukraine.

Ukraine's war effort has been costly and increasingly difficult to sustain. Ukrainian military spending began to increase after the annexation of Crimea in 2014 (see figure 6). In 2020 Ukraine spent \$5.9 billion on its military, 88 per cent more in real terms than in 2014. When the conflict began, Ukraine reinstated conscription and planned to call up to 40 000 recruits to join its armed forces. The government also sought to allocate more resources to procure arms, both imported and domestic. The funds probably came at the expense of social payments.⁴¹

The rise in military spending took place as the economy withered. Ukraine was already in the midst of an economic downturn even before 2014, which deteriorated further with the war. The economy shrank by 14 per cent in 2014–15 and returned to pre-war levels only in 2021. The combination of heavy economic losses and rising military spending pushed Ukraine's military spending as a share of GDP from 2.2 per cent up to 3.8 per cent between 2014 and 2020 (see figure 6). Military spending as a share of government expenditure has also grown considerably, from 3.3 per cent in 2013, before the conflict, to 8.3 per cent in 2020.

Despite the growing need for resources, taxation as a share of GDP increased only slightly in 2015 and has since remained stable at 25–26 per cent. The moderate hike in 2015 is partially explained by rising inflation, excise taxes on alcohol and tobacco, and the introduction of a military levy.⁴² The special military levy—which was initially presented as a temporary measure but is still in place—takes 1.5 per cent of the income from transactions involving transfer of ownership of goods valued in foreign currencies.⁴³

Because of the war, levying tax became increasingly difficult. For example, some of Ukraine's most important industries were concentrated in Luhansk, mostly chemical and petrochemical, iron and steel industries, and generation of electric power.⁴⁴ In 2015 the Luhansk customs office of the State Fiscal Service reported a 52 per cent drop in revenue transfers to the Ukrainian state.⁴⁵ Income from corporate tax in the oblast fell from \$355 million in 2013 to \$45 million in 2016.⁴⁶ Levying tax became even more difficult with the imposition of a blockade on the breakaway regions of Donbas in early

⁴⁰ Themnér, I. and Melander, E., 'Patterns of armed conflict, 2006–15', *SIPRI Yearbook 2016: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2016).

⁴¹ Deutsche Welle, 'Ukraine plans to double military budget against fighting in east', 12 Dec. 2014.

⁴² Adarov, A. et al., *How to Stabilise the Economy of Ukraine* (Vienna Institute for International Economic Studies: Vienna, Apr. 2015); and Law of Ukraine 'Про внесення змін до Податкового кодексу України та деяких інших законодавчих актів України' [On amendments to the Tax Code of Ukraine and some other legislative acts of Ukraine], *Bulletin of the Verkhovna Rada of Ukraine*, no. 39 (Jan. 2015).

⁴³ Jurgens, P., 'Tax developments in Ukraine as of March 2, 2022', AirShare, 7 Mar. 2022; and National Bank of Ukraine, 'National Bank hosts a regular meeting with CEOs of the 40 largest Ukrainian banks', 30 Mar. 2015.

⁴⁴ Ukraine Today, 'Luhansk region', [n.d.].

⁴⁵ Shemayeva, L. G. et al., 'Оцінка впливу економічної блокади окупованих територій на фінансову безпеку України' [Assessment of the impact of the economic blockade of the occupied territories on the financial security of Ukraine], National Institute for Strategic Studies, Apr. 2017.

⁴⁶ Milakovsky, B., 'Cut off: What does the economic blockade of the separatists territories mean for Ukraine?', Focus Ukraine, Wilson Center, 9 Jan. 2018.



Figure 6. Ukraine's military spending and military spending as a share of gross domestic product, 1993–2020

Note: Military spending data for Ukraine is unavailable for 1991–92.

Source: SIPRI Military Expenditure Database, Apr. 2022, <<http://milex.sipri.org>>.

2017. According to one estimate for 2015–16, between \$98 million and \$151 million was lost in personal tax, corporate tax and value added tax (VAT) and about \$44 million in provincial taxes from the government-controlled part of Donetsk.⁴⁷ The significant loss of revenue can partially explain the stagnation of Ukraine's military spending in 2015–17.

During the war, the shadow economy—the production of goods and services that is deliberately concealed from the state to evade taxation and compliance with administrative procedures—has grown larger. Its growth began to slow down after the government reduced social contributions and replaced progressive income tax rates with a flat rate of 18 per cent in 2016.⁴⁸ These changes contributed to a shift in Ukraine's tax composition (see figure 7): direct taxes as a share of GDP fell in the first years of the war, mostly due to a drop in income tax; conversely, tax on goods and services pushed up reliance on indirect taxes from 14 per cent to 17 per cent of GDP.

These dynamics are in line with the findings of section III. The regression analysis shows that indirect taxation is associated with military spending during conflict in autocracies. Indirect taxation is commonly attributed with lower institutional costs; that is, it is easier to collect. However, it seems that in the case of Ukraine this association is also related to the geographical aspect of the conflict: the concentration of Ukraine's heavy industry in the

⁴⁷ Milakovskiy (note 46). See also Shemayeva et al. (note 45).

⁴⁸ Ivanchuk, N. V. and Mamontova, N. A., 'Payroll tax increase reserves in Ukraine', *Independent Journal of Management and Production*, vol. 12, no. 2 (Mar.–Apr. 2020).

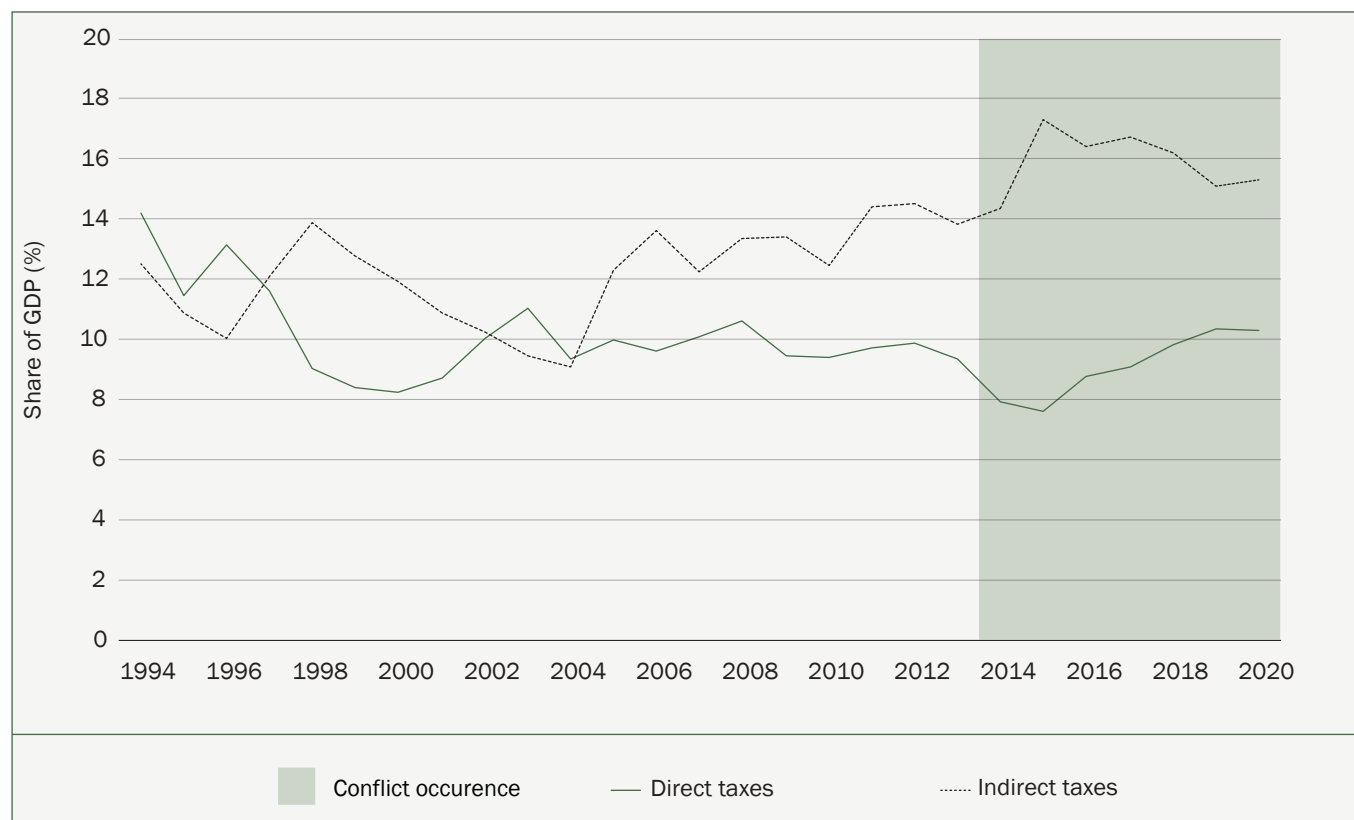


Figure 7. Ukraine's revenue from direct and indirect taxes as shares of gross domestic product, 1994–2020

Note: Tax data for Ukraine is unavailable for 1991–93.

Source: UN University World Institute for Development Economics Research (UNU-WIDER), Government Revenue Dataset, Oct. 2022.

Donbas and the ongoing conflict there meant that the state could not levy specific types of direct tax.

Regarding the importance of political regimes, Ukraine was categorized as an electoral autocracy for 21 of the 30 years between independence in 1991 and 2020. It was only in 2020 that Ukraine was classified as an electoral democracy—that is, a state with periodic multiparty and free and fair elections, albeit short of individual and minority rights beyond electoral matters.⁴⁹ Despite holding de jure multiparty elections for the chief executive and legislature, electoral autocracies have severe shortcomings regarding party competition and political accountability. It is thus safe to say that, historically, Ukraine has been an electoral autocracy, and is therefore in line with the findings of the statistical analysis in section III.

Because Ukraine did not increase taxation, but rather changed the mix of taxes, it had to rely on alternative financing sources to fund higher military expenditure. Debt became the most important of these sources in the first years of the war as the country's reserves quickly ran dry.⁵⁰ In 2014 reserves shrank to \$7.5 billion, the equivalent to two months of imports or 20 per cent of short-term debt.⁵¹ After the annexation of Crimea, debt levels rose acutely.

⁴⁹ V-Dem Project (note 24); and Lührmann et al. (note 24).

⁵⁰ Moore, E., 'Explainer: Ukraine's debt crisis', *Financial Times*, July 2015.

⁵¹ International Monetary Fund (IMF), 'Ukraine', IMF Country Report no. 17/83, Apr. 2017, pp. 51–52.

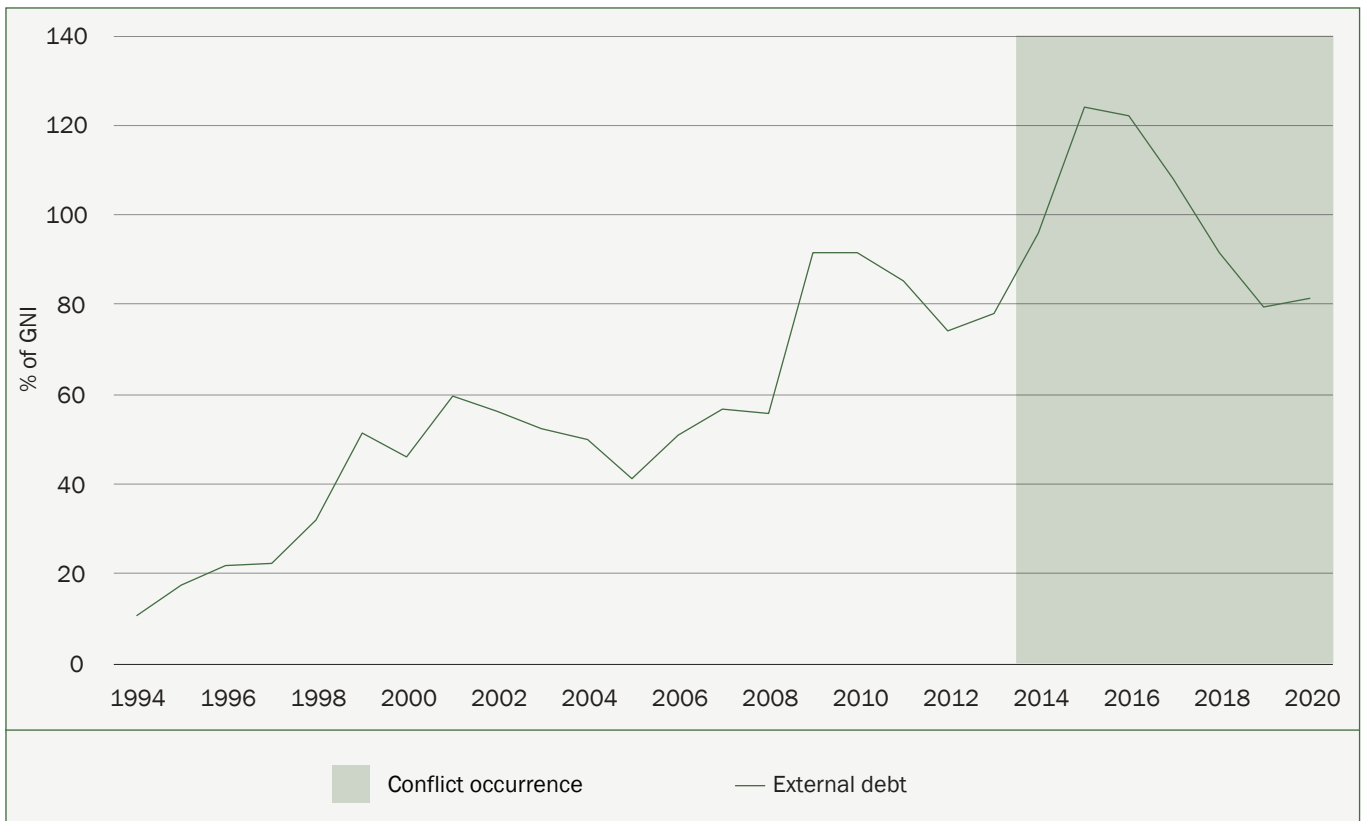


Figure 8. Ukraine’s external debt as a share of gross national income, 1994–2020

Note: Debt data for Ukraine is unavailable for 1991–93.

Source: World Bank, ‘World Development Indicators’, 16 Sep. 2022.

Around half was short-term debt, with repayment needed within a year.⁵² Meeting payment obligations became more difficult with the depreciation of the Ukrainian currency, the hryvnia, and economic recession.⁵³ As a result, the debt-to-GNI ratio soon reached 124 per cent (see figure 8).⁵⁴

Debt, however, was not a source of financing throughout the war. Having risen substantially at the beginning of the conflict, debt peaked in 2016 and then began to fall. At that time, indirect taxation as a share of GDP remained roughly unchanged and direct taxation as a share of GDP began to recuperate from the losses of the first years of the war. This partly filled the gap left by declining levels of external indebtedness. These shifts illustrate the complex link between debt and military spending. Their association is contingent on a series of factors, and thus it may not be observed in general quantitative analysis with a large number of countries and years.

Another alternative source to fund Ukraine’s war effort was financial military aid from abroad (see figure 9). The two largest donors of military aid to Ukraine in 2014–20 were the United States and the United Kingdom: together they provided 98 per cent of all aid.⁵⁵ Military aid became more

⁵² Sadowski, R., ‘Ukraine on the financial front—The problem of Ukraine’s foreign public debt’, Centre for Eastern Studies (OSW) Commentary no. 178, 5 Aug. 2015.

⁵³ Åslund, A., ‘Will the Ukrainian economy collapse in 2015?’, Peterson Institute for International Economics, 17 Mar. 2015.

⁵⁴ Sadowski (note 52).

⁵⁵ Arabia, C. L., Bowen, A. S. and Welt, C., ‘U.S. security assistance to Ukraine’, In Focus, US Congress, Congressional Research Service, 21 Oct. 2022; and Zabakhidze, R., ‘Continuity and

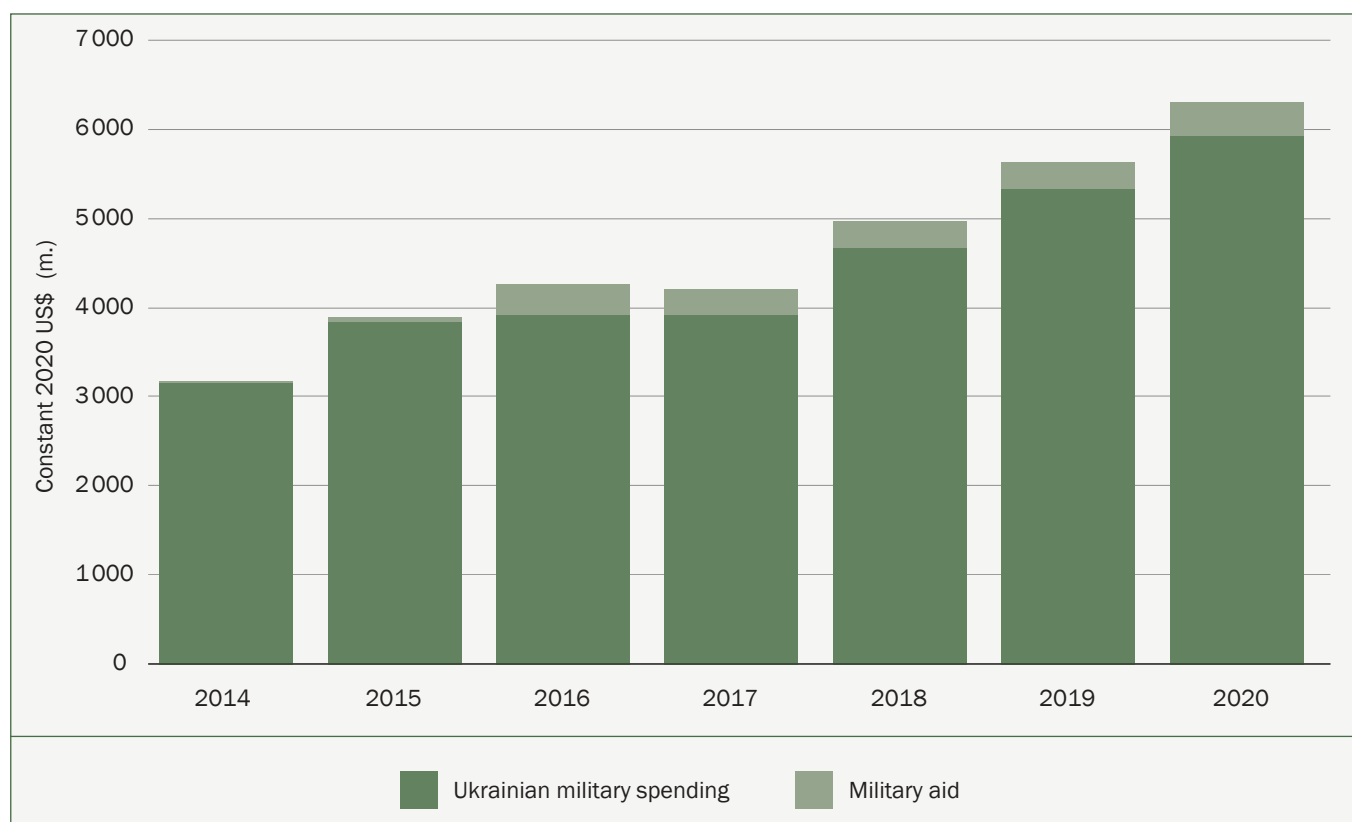


Figure 9. Military aid to Ukraine from the United States and the United Kingdom, 2014–20

Note: SIPRI counts military aid as spending by the donor country; it is thus not included in Ukraine’s military expenditure figures.

Sources: Arabia, C. L., Bowen, A. S. and Welt, C., ‘U.S. security assistance to Ukraine’, In Focus, US Congress, Congressional Research Service, 21 Oct. 2022; British Ministry of Defence, ‘Defence secretary announces further UK support to Ukrainian armed forces’, 6 Mar. 2015; Williamson, G., ‘Ukraine: Military aid’, Answer to parliamentary question, House of Commons, 8 Dec. 2017; and Wallace, B., British Secretary of State for Defence, Statement, House of Commons, 17 Jan. 2022.

important from 2016 onwards. On average, military aid from the USA and UK was equivalent to 5.2 per cent of Ukraine’s military spending, ranging from a negligible 0.3 per cent in 2014 to 8.7 per cent in 2016. Up to 2020 the USA had provided Ukraine with more than \$1.6 billion within the framework of the 2014 Ukraine Freedom Support Act.⁵⁶

The case of Ukraine—a conflict-affected, lower-middle-income and historically autocratic country—exemplifies some of the features observed in the regression analysis. For instance, the shift in the tax composition towards indirect taxes to fund military spending during conflict closely fits the quantitative results. Moreover, this case provides some nuance to the relationship between debt and military spending. It also shows the difficulties of funding military spending during a conflict. The loss of control over territory can lead to a sharp cut in specific types of taxation, leading to a shift in tax composition that may not be deliberate. Finally, the case of Ukraine illustrates how certain strategies to continue the war effort and maintain military spending at high levels may be unsustainable.

change in America’s military partnership with Ukraine’, Middle East Institute, 28 Oct. 2020.

⁵⁶ Ukraine Freedom Support Act of 2014, US Public Law 113-272, signed into law 18 Dec. 2014.



V. Conclusions

Even before Russia's expanded invasion of Ukraine in February 2022, the world was returning to great-power competition between China, Russia and the United States. Global military spending was rising as countries looked towards improving their sense of national security. Coinciding with the brutal and unprovoked war in Ukraine are multiple unresolved conflicts around the world—such as in the Sahel region—and rising tensions—such as in the East and South China seas. The result has been that many countries have announced increases in military spending that will ultimately propel world military expenditure to even higher levels.⁵⁷ How these increases will be funded is an unanswered question.

One funding option for military spending, which is available to almost every government, is taxation. This paper uses multivariate regression analysis to explore taxation as a funding mechanism for military spending. Although no general association between tax and military spending was found, the results reveal a clear set of factors that influence the relationship between taxation and military expenditure.

Three main conclusions can be drawn. First, the presence of armed conflict matters. In times of conflict, on average, countries rely consistently on indirect taxation as the main form of revenue to fund military spending. Second, the type of tax that is most associated with higher military spending is indirect tax. Third, the use of indirect taxes as a funding source for military spending varies substantially across types of country, in particular by income level and by regime type. Low-income countries in conflict use indirect taxes to fund military spending, an association not found for the other three income groups. Similarly, autocratic governments in conflict also rely on indirect taxes as a financing source.

The above quantitative results are consistent after controlling for important influencing factors such as debt, non-tax revenue (i.e. different financing options), differences in government spending levels and levels of GDP per capita. This confirms the robustness of the quantitative results.

The reasons behind the tendency to use indirect taxation to fund military spending are inherent in the government's ability to collect tax and the political and economic consequences attached to these revenue-generating methods. In times of conflict, when the demand to increase military spending is most urgent, revenue from indirect taxation can be raised quickly and does not undermine the political support for the country's leadership. The nature of indirect taxation means that it is less visible, requires less tax-collection capacity and is thus simpler to implement.

The qualitative case studies of Burundi and Ukraine complement the regression analysis in two ways. First, the cases offer support to the quantitative results. The case of Burundi considers how indirect taxation was a core funding source for military expenditure in one of the world's poorest, least democratic and most conflict-ridden countries. For Ukraine, a historically autocratic country, the case puts into perspective how the demand for increased military spending due to a war could not be fulfilled by short-term

⁵⁷ Tian, N. et al., 'Global developments in military expenditure, 2021', *SIPRI Yearbook 2022: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2022).



financing options such as debt and reserves. In addition, the loss of territory hampered tax-collection efforts and caused a shift in tax composition towards indirect taxes. As a result, indirect taxation has become an attractive funding source for the increases in Ukraine's military spending.

Second, the case studies contextualize some of the consequences linked to funding military spending. In Burundi, tax reforms that shifted its fiscal policy stance to indirect taxes to fund the military may have worsened income inequality. In Ukraine, the economic fallout of excess debt and depletion of reserves quickly became clear: by 2015 its economy was on the verge of collapse with severe currency depreciation and inflation.

Funding military expenditure through indirect taxation could have adverse implications for the distribution of wealth. Consisting mostly of taxes on goods and services and trade, this form of tax is regressive and can burden the poor majority relatively more than the rich minority.⁵⁸ This result is particularly relevant given the well-established link between poorer countries and higher income inequality.⁵⁹ For policymakers with a concern about income inequality, there is a need to be more attentive to the long-term socioeconomic impact of the funding of military expenditure. Part of this is to consider which groups in society will be most affected by military spending increases.

As an original contribution assessing the use of taxation to finance military spending, the paper has shortcomings. In analysing how variations in tax correlate with changes in military spending, the paper does not differentiate between relatively steady upward trends in military spending and sudden short-term increases. This differentiation may be relevant because funding long-term modernization plans would require a steady source of finance, rather than a one-off payment. In addition, while the results point to indirect tax as a preferred funding mechanism for military expenditure for conflict-affected countries, the paper can only infer the negative redistributive effects of such choices.

Future work should, first, incorporate the distinction between steady increases in military expenditure and spikes in spending and, second, measure the impact on income inequality of funding these types of increase through tax. Such research will provide a valuable contribution for the academic community and policymakers.

⁵⁸ Martin, I. W. and Prasad, M., 'Taxes and fiscal sociology', *Annual Review of Sociology*, vol. 40 (2014).

⁵⁹ Roser, M. and Ortiz-Ospina, E., 'Income inequality', Our World in Data, Oct. 2016; and Ravallion, M., 'Income inequality in the developed world', *Science*, 23 May 2014.



Appendix A. Definitions and sources

Data sources and definitions

To test the relationship between taxation and military expenditure, this paper employs a time-series and cross-sectional multivariate analysis (i.e. panel analysis) across 100 countries from 1990 to 2020. The two main variables of concern are taxation measured as a share of GDP and the level of military expenditure. All other variables are controls. The variables used in the data exploration and quantitative analysis are described and defined below.

Military expenditure

Data on military expenditure is taken from the 2022 edition of the SIPRI Military Expenditure Database.⁶⁰ The specific variable used in the quantitative analysis is the level of military expenditure measured in constant 2020 US dollars. Military expenditure is defined as all spending on current military forces and activities.⁶¹

Taxation and non-tax revenue

The United Nations University World Institute for Development Economics Research (UNU-WIDER) provides data on government revenue that disaggregates total revenue by the different forms of tax, including direct taxation and indirect taxation. Direct taxation is further disaggregated into income tax and wealth tax, while indirect taxation is broken down into tax on goods and services and tax on international trade.⁶² All tax data is given as a share of GDP, also termed tax effort.

UNU-WIDER also provides information on non-tax revenue as a share of GDP. This includes revenue from natural resources (e.g. rents from oil, natural gas and mineral resources) along with all other revenue collected by government that is not classified as either tax, social contribution or grant. Despite its wide coverage, this variable is the best proxy for nature resource revenue since, according to UNU-WIDER, changes in resource revenue explain most of the variation in total non-tax revenue.⁶³

Additional data sources

Debt burden, measured as a share of GNI, is obtained from the World Bank's World Development Indicators (WDI).⁶⁴ It is defined as debt owed to non-residents repayable in foreign currency, goods or services. It consists of public debt (i.e. government debt), publicly guaranteed debt, private non-guaranteed long-term debt, government use of IMF credit and short-term debt.

⁶⁰ SIPRI Military Expenditure Database, Apr. 2022, <<https://milex.sipri.org/>>.

⁶¹ For the full definition of military spending see SIPRI Military Expenditure Database, 'Frequently asked questions: What is the SIPRI definition of military expenditure?', [n.d.].

⁶² UN University World Institute for Development Economics Research (note 28).

⁶³ UN University World Institute for Development Economics Research (note 20), p. 3.

⁶⁴ World Bank (note 10).



Regime type is taken from the Varieties of Democracy (V-Dem) data project.⁶⁵ It is used in the multivariate regression to account for the political factor affecting military spending. Type of regime is a categorical variable with four options: closed autocracies, electoral autocracies, electoral democracies and liberal democracies. In this study, these are gathered into two: autocracies and democracies.

The strategic factor affecting military spending is represented by episodes of armed conflict extracted from the Armed Conflict Dataset of the Uppsala Conflict Data Program (UCDP) and the Peace Research Institute Oslo (PRIO).⁶⁶ An armed conflict is considered to be active in a state in a calendar year if (a) there is a stated incompatibility between the government of the state and an organized group (in intrastate conflict) or between the state and another state (in interstate conflict); and (b) there are at least 25 battle-related deaths within that year. In all other years and states, there is no active armed conflict. Armed conflict is a categorical variable that takes the value of 1 in a year when conflict is active (following the above definition) and 0 otherwise. Of the 100 countries in the study, 54 were in armed conflict at some point between 1990 and 2020.

GDP per capita, from the WDI, is used to measure the wealth or income of a country.⁶⁷ This has typically been done in past research to capture the economic capacity linked to military spending and also the role of population. The World Bank defines four country income groups according to GDP per capita. In 2020 the thresholds were \$1035 or less for low-income countries; between \$1036 and \$4045 for lower-middle-income countries; \$4046 to \$12 535 for upper-middle-income countries; and \$12 536 or more for the high-income group.

⁶⁵ V-Dem Project (note 24); and Lührmann et al. (note 24).

⁶⁶ Davis, S., Pettersson, T. and Öberg, M., 'Organized violence 1989–2021 and drone warfare', *Journal of Peace Research*, vol. 59, no. 4 (2022); and Uppsala Conflict Data Program (UCDP), 'UCDP Conflict Encyclopedia', accessed 12 Dec. 2022.

⁶⁷ World Bank (note 10).

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USING TAXATION TO FUND MILITARY SPENDING

NAN TIAN, DIEGO LOPES DA SILVA AND XIAO LIANG

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