



Military Spending



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Introduction

Countries have limited resources to manage; the allocation of public funds for one purpose has at a minimum the opportunity cost of not allocating it to other purposes, such as public health and education. Some countries allocate up to 25% of their GDP to the military effort, while others allocate less than 1%[1].

We wanted to check what are the factors influencing military spending in key countries. We considered key countries the ones that had a higher military spending in 2019, according to the World Bank database, plus some additional countries that are in “hot zones” - Ukraine, Israel, Iran, North and South Korea, Taiwan[2].

Research shows that this allocation of resources is influenced by political and socioeconomic characteristics of the countries[1, 3].

We created a panel data with information from the World Bank[4], between the years of 2010 and 2019. We tried to include other factors mentioned in existing research, such as the political regime ruling each country, whether or not the country is participating in some form of war, and the level of corruption/scrutiny that exists in each society. This information proved to be hard to get for some of the most relevant countries, namely China, India and Russia. We opted for abandoning it.

Research question

“What are the factors that impact military spending, per capita?”

Methodology

To answer our research question, we extracted timeseries data on Military expenditure and the total population, per country and combining it to produce Military expenditure per capita, as our response Variable.

Using the World Bank Open Data, we also collected several variables regarding the education and health expenditure per country, GDP per capita, net migration, surface area, imports of weapons, and others that we thought might have an impact on, how much a country spends on the military[1, 4].

We performed the Pooled OLS, Fixed Effects, and Random Effects models on the data. And tested various combinations of this three.

Results

In our research, we found that the country with the highest total spending in military expenses spends more than the next nine countries combined, as we can see in Figure 1.[5]

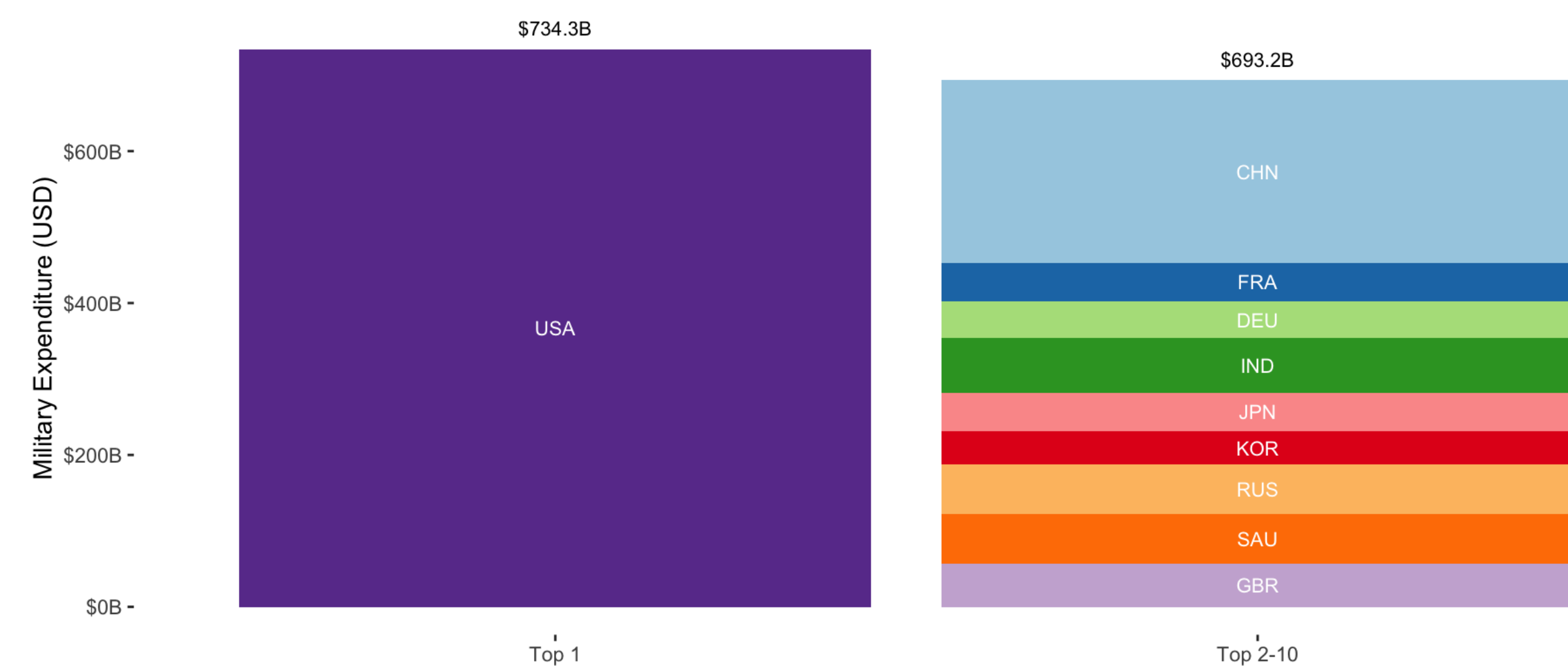


Figure 1: Military Spending in 2019 (Billions of \$US)

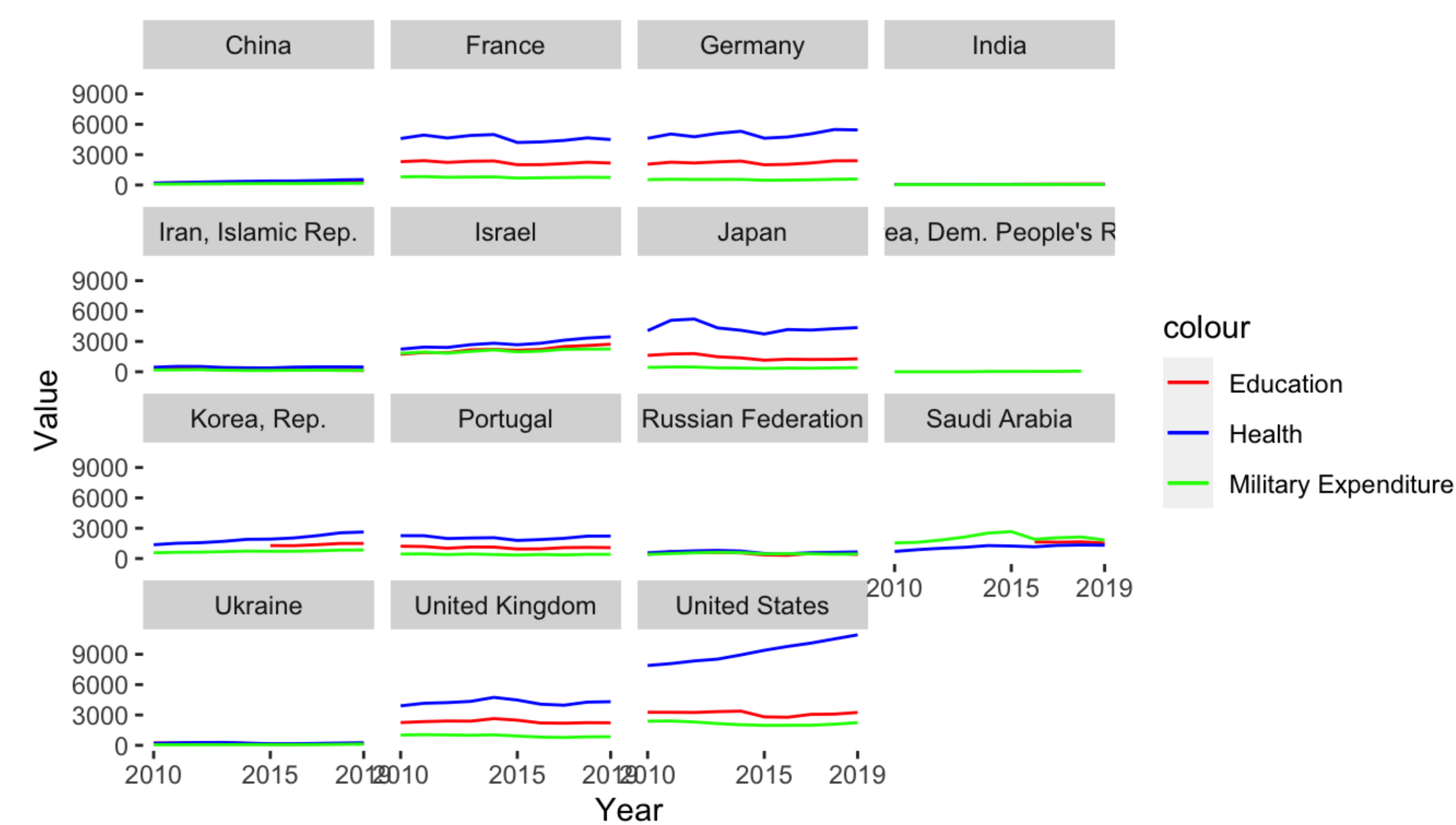


Figure 2: Education, Health and Military Expenditure per capita, of our selected countries, from 2010 - 2019

We plotted for each country the dependent variable, Military expenditure per capita, and the most significant explanatory variables, Education and Health expenditure per capita.

Test	P_Value	H0	Conclusion
Lagrange Mult	1.248e-08 ***	no panel effects	panel effects
Robust Hausman	0.3083	use random effects	use random effects
Breusch Pagan (Pooled OLS, Homosk.)	1.248e-08 ***	Homosk.	Heterosk.
Breusch Pagan (FE, Homosk.)	1.643e-15 ***	Homosk.	Heterosk
Breusch Pagan (RE, Homosk.)	1.643e-15 ***	Homosk.	Heterosk

We tested our models (FE and RE) with the Robust Hausan test and concluded that both the Fixed Effects and the Random Effects models are consistent since we achieved a p-value of 0.3083.

To test for the presence of heteroskedasticity, we used the Breusch Pagan test and identified heteroskedasticity in the data.

Model	Educ	Health	Migration	Area
Pooled OLS	< 2.2e-16 ***	1.045e-10 ***	2.023e-05 ***	0.03118 *
Fixed Effects	< 2.2e-16 ***	0.0008609 ***	-	-
Random Effects	<2.2e-16 ***	0.000973 ***	-	-
Robust Pooled	0.0005557 ***	0.0300622 *	0.0054489 **	0.2169538
Robust Fixed Effects	2.416e-16 ***	3.045e-14 ***	-	-
Robust Random Effects	2.2e-16 ***	3.974e-16 ***	-	-

Using per capita expenditure on health and education, we were able to account for 57,1% of the variation. A lot is therefore explained by these two variables, education and health, yet more than 40% is unexplained by the model.

Conclusion

The significance of per capita education an health spending in predicting per capita military spending proved to be higher than what we had anticipated. All panel models that we created - Pooled OLS, Random Effects and Fixed Effects, with or without the robust matrix application, showed these two variables as being significant at least at the 5% level. It is, in fact, higher than that of GDP per capita, which we thought would be more significant. Depending on the model, given the R squared that we obtained, these two variables account for close to 60% of the variation.

Next Steps

Further research could be done, both in literature and in publicly available data, to check whether any of these variables is actually a confounding variable, maskering other factors that directly influence military spending. These could include the degree of freedom, political regime, influence from the investment in neighboring countries and some measure of political participation by the citizens.

References

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