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In Depth Analysis:
Female Legislators and their impact on Military Spending

Abstract:

With modern times has come many successful social movements worldwide advocating for women's rights. Much research has been done on how increased women's rights have impacted economies across the globe. This paper will highlight some of that past research as well as seek to answer the question "Do countries with higher percentages of women serving in parliament have lower military expenditures as a percentage of total government expenditure?". This analysis includes several regression models that look through time from 2000-2012 at data from 85 nations. Evidence was found that increased participation by women in parliaments around the world does decrease military expenditures as a percentage of total government spending.

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Econ 499

Brother Barrus

1. Introduction

Throughout the world's history, governments have been comprised almost entirely of males which have imposed their thoughts on what was best for the people they governed. However, in recent decades, the world has seen a vast increase in the percentage of women who are members of their country's parliament, which is the body of government that deals with writing laws and passing bills, known differently by each country. A few of the names describing these legislative bodies include but are not limited to congress, national assembly, legislative council, house of representatives, among others. Throughout this analysis the term Parliament, while it may differ slightly throughout the nations of the world today, will refer the legislative body who is charged with writing and passing bills.

Gender stereotypes paint the picture that women are the softer, more compassionate sex and as a result less likely to favor wars and large militaries. Over the past century there is a list of very prominent women who have more or less fit this stereotype, having voiced their opposition to war, among them are Bella Abzug, Hillary Clinton, and Jeannette Rankin. Dr. Aletta Jacobs, a co-organizer of the conference known as the International Congress of Women 1915 wrote soon after in her autobiography that, "Women will soon have political power. Woman suffrage and permanent peace will go together…Women don't feel as men do about war. They are the mothers of the race. Men think of the economic results, women think of the grief and pain" (Jacobs 1995). That being said, there have been other renowned women who have pledged their support for war efforts like Madeline Albright and Hattie Carraway. The fact of the matter is that parliaments all around the world are becoming more diversified and a major part of that is in the inclusion of more women. Some nations have gone as far as imposing

quotas which make it so that a certain number of seats are reserved for women in their parliaments.

With existing gender stereotypes and increasing amounts of women participating in parliaments the question that comes to mind is, “how are women impacting national policies?”. These policies can be foreign or domestic and range anywhere from agriculture, healthcare, education, the environment, national defense, and to a lot more. This analysis is meant to focus solely on national defense with the question of interest being, “Does higher percentages of women serving in parliament result in lower military expenditures as a percentage of total government expenditure?”.

2. Literature Review

Some of the earliest research on whether or not gender could truly impact national policies came in the early 1990s which was a time when major strides were being made with women in government. These studies focused on some of the core characteristics held by both sexes that were different from each other. Because the political arena has been dominated by males for so long there exists a strong association between masculine characteristics and politics, especially when it comes to international matters. The conclusion was that increasing the participation of women in national government would very likely result in altered outcomes than if it were left to men alone (Charlesworth 1993; Tickner 1993).

2.1 General women’s view on military spending

Several studies have sought to understand the general public’s views on a variety of national policies. In 1993, Conover and Sapiro found that American women feared the possibilities of future international conflicts and were not as supportive of military involvement

as a means to resolve crises in comparison to men. A significant finding of theirs was that the disparity between men's and women's views increased when looking at actual conflicts, like the then recent Gulf War, instead of hypothetical ones. However, even feminists recognize that in some cases the use of military force is an option that must be considered to resolve conflicts (Conover and Sapiro 1993). Other countries around the world have followed the United States in that gender plays a role in the viewpoint that an individual takes on national defense policies (Jelen, Thomas, & Wilcox 1994).

2.2 Gender & Politicians

When it comes to passing new bills, increased representation of women may lead men to behave in a way to block legislation proposed by women (Koch and Fulton 2011, Kathlene 1994). Thus, adding more women to the legislature may hurt the odds of women passing what is in women's interest (Crowley 2004). In fact, some research shows that women's social movements may be more effective way of pushing for women's interests that increased participation of women in legislature (Weldon 2002).

Certainly, political parties as well as the electoral system play a massive part in how and where funds are allocated. There exist two major systems that a nation may have with the first being party-centered, which means that the voters are more likely to vote for candidates of the exact same party. As a result, these parties are somewhat able to sift out candidates that do not match their particular views. Thus, in highly developed party systems, candidates generally have to meet the party's requirements, otherwise they risk losing election (Muller 2000). With a candidate-centered system, the voter tends to focus more on the individual candidate's views instead of the party they are affiliated with. Thus, the political parties that do exist are not as

unified and are less influential when it comes to passing specific legislation such as spending amounts for different departments.

2.3 Behavior in Politics

A major impediment that women face when it comes to being elected/supported is the strong presence of gender stereotypes. Unsurprisingly, cross-national research shows that women are thought of as having softer traits while men possess rougher more forceful traits (Williams and Best 1990). A resulting factor of this is that voters show less support to women and more for men when it comes to tackling international issues (Dolan 2004). Because these gender stereotypes set women at a disadvantage in certain political topics, women have been found to compensate for this by adjustments in their behavior to mimic that of their male counterparts (Eagly 2007). Further, a study looked at the general attitudes of government employees toward issues like military spending, public schools, the environment, health care, and others across the two largest departments being the Department of Defense and the Department of Health and Human Services (Dolan 2002). While attitudes do vary significantly by department, "males and females within each department largely resemble one another in their attitudes about government spending". One caveat brought up in this study relates that it is impossible to know whether or not males and females' views were different when they began employment in their department because this analysis did not include time.

2.4 Women Executives

Perhaps the closest previous research to this current analysis comes from Koch and Fulton in their 2011 article *In Defense of Women: Gender, Office Holding, and National Security Policy in Established Democracies*. Their analysis covered a 30-year period from 1970-2000 as

they sought to know what impact women in legislatures and women chief executives had on defense spending in relation to GDP. Women chief executives describes when a woman is the head of the nation's defense department. Their results were surprising in the fact that they showed that increased proportions of women in parliaments decreased military spending as a percentage GDP, while the presence of Women Chief executives actually increased military spending.

While it may appear that this analysis is merely a replica of what Koch and Fulton have done, the main difference is in the dependent variable because they looked at predicting Military spending as a percentage of GDP. Subject to one's belief, a more accurate measure of whether or not women's participation in parliament decreases military spending is to compare spending to total government expenditures and not GDP. It is true that government spending is a component of GDP, however, legislators are tasked with setting federal budgets and therefore are able to directly impact Military Spending. This being said, GDP contains other components such as consumer and business spending which are not as directly tied to those members of parliament and subject to the year, may be growing faster rates than Military Spending. Therefore, there is value adding on to what Koch and Fulton did by specifically using Military Spending as a percentage of total government expenditures as the key dependent variable.

3. Data & Results

For this analysis, data was collected from the World Banks' list of economic indicators as well as from their Database of Political Institutions. The data on military figures originates from the Stockholm International Peace Institute (SIPI) but was downloaded from the World Banks' website. The dependent variable in this study is Military Spending as a percentage of government spending, which has several benefits over other measures because it is not subject to

inflation and currency exchange rates which would further complicate the analysis (Koch & Fulton 2011). It is important to note that categories that make up Military Spending for one country may not apply to another. For example, one country may include the civilian police force in their Military Spending while another does not. For this reason, the data collected from (SIPI) specifies that Military Spending as a percentage of government spending consists of NATO's classification[1].

The main independent variable of interest is the percentage of a nation's parliament that is made up of female legislators. Other variables that are straightforward and included in the regression are the number of arms imports, the percentage of population who are members of the military, income group of the nation, and political spectrum. As spoken of earlier in the literature review, political parties heavily shape the views an individual has toward different policies such as healthcare, foreign aid, housing, defense spending, among others. To take this into account a variable is added which describes if the majority party currently serving in parliament is left wing, center, or right wing in their ideology.

In the introduction of this paper it mentioned that the world has seen dramatic increases in the proportion of women participating in parliaments. Figure 1 shows the boxplot that represents this with the median percentage of women participating increasing from 12.5% in 2000 to 22.9% in 2012. During that same time period Military Spending as a percentage of total

[1] includes all current and capital expenditures on the armed forces, including peacekeeping forces; defense ministries and other government agencies engaged in defense projects; paramilitary forces, if these are judged to be trained and equipped for military operations; and military space activities. Such expenditures include military and civil personnel, including retirement pensions of military personnel and social services for personnel; operation and maintenance; procurement; military research and development; and military aid (in the military expenditures of the donor country).

government spending across all countries has remained relatively constant at about 4%. The country with the highest percentage of women serving in parliament was Sweden with 47.3% in 2007. Belarus was the country with the greatest Military Spending as a percentage of government spending at 35% nearly twice as much as the next closest country being Israel. Perhaps the most surprising find was that nations with the highest median value for Military Spending as a percentage of government spending were those that fell in the center of the political spectrum with right wing nations spending less. Both regression models will compare left and right-wing countries against the omitted variable which is those that fall in the center category, because of this the expectation is that the betas for left and right will be negative. Figures 2 and 3 provide extra summary statistics for both the balanced and unbalanced panel data sets.

Both regression models using Ordinary Least Squares (OLS) in this analysis were tested for heteroskedasticity using the Breusch-Pagan method and both models rejected the null hypothesis that they were homoscedastic. Heteroskedasticity was therefore assumed to be a present and was corrected for using Generalized Least Squares (GLS). Multicollinearity was found to be non-existent as both models had Variance Inflation Factors (VIF) well below 10. The unbalanced panel data set was tested for autocorrelation since it was a time series ranging from 2000-2012, however, a Durbin-Watson test yielded a p-value of .778 meaning that there was no autocorrelation present. The completion of these tests and corrections made assures that these models have the best linear unbiased estimators making them ready for interpretation in the sections below.

Model 1: Balanced

The regression outputs in figures 4 & 5 gave an adjusted r-squared of .658 meaning that the regression explained about 65.8% of the total deviation in the data. All beta coefficients were found to be significant at the 95% confidence level except for the variable capturing the political spectrum. It is important to note that even with insignificant betas the model as a whole was found to be working together to predict Military Spending with a high F-stat of 23.024. With significant results, military spending values can be plugged in to see how large an impact increasing women's participation in parliament truly has. For example, in fiscal year 2018 the United States federal government spent $4.1 trillion with NATO's definition of Military Spending making up about 9.014% of total government expenditures or $369 billion. Therefore, model 1 yields that a 1% increase in the percentage of women participating in U.S. congress decreases Military Spending by $206 million dollars. This negative relationship can clearly be seen when plotted in figure 6 of the appendix.

A final note for model 1 was that of the 27 countries that were used in the balanced panel data there were no countries that were defined as low-income. This means that this group is underrepresented and a major reason why a second model was created to see the effects of low-income countries on Military Spending.

Model 2

Regression outputs for the unbalance data set can be found in figures 7 & 8 which provide that the adjusted r-squared fell to .525 meaning that roughly 52.5% of the deviation was explained. Plugging in the same U.S. Military Spending values from 2018 with the newly obtained beta coefficients, a 1% increase in the percentage of women participating in U.S. congress decreases Military Spending by $125 million dollars. Overall results were very similar to the previous model.

4. Conclusion

The question of interest was “Do countries with higher percentages of women serving in parliament have lower military expenditures as a percentage of total government expenditure?”. The data used for this analysis does provide evidence that increased percentages of women in parliament decreases Military expenditures as a percentage of government expenditure. Both regression models provided similar results which leads to increased confidence that this hypothesis holds true. To find out exactly how much increased proportions of women in parliament are decreasing Military Spending one has to plug in numbers for specific countries. While not all countries are going to see a decrease in Military Spending of hundreds of millions of dollars, like the United States, many are going to see decreases in the tens of millions of dollars which is a significant amount. This being said, they are no doubt many variables that were not included in the models that most likely would have made for a more accurate prediction of Military Spending. These variables include whether or not the country was involved in an ongoing war, the economic conditions of that country, and more details about the nation’s parliamentary system, such as year term of legislators. In this analysis there was a control for the left-right political spectrum of the political party in control, however, there was no true knowledge of what percentage of women made up those parties. It is important to recognize that these variables were not included simply because accurate and consistent data was not easily accessible. Another important point to recognize is that while this analysis found increases in proportions of women in parliaments to decrease military spending, it could be potentially undermined by shifting societal inclinations. Future research may be geared toward understanding if in fact shifting societal inclinations are really the reason for decreased spending and also including the omitted variables from this analysis.

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Appendix

Figure 1

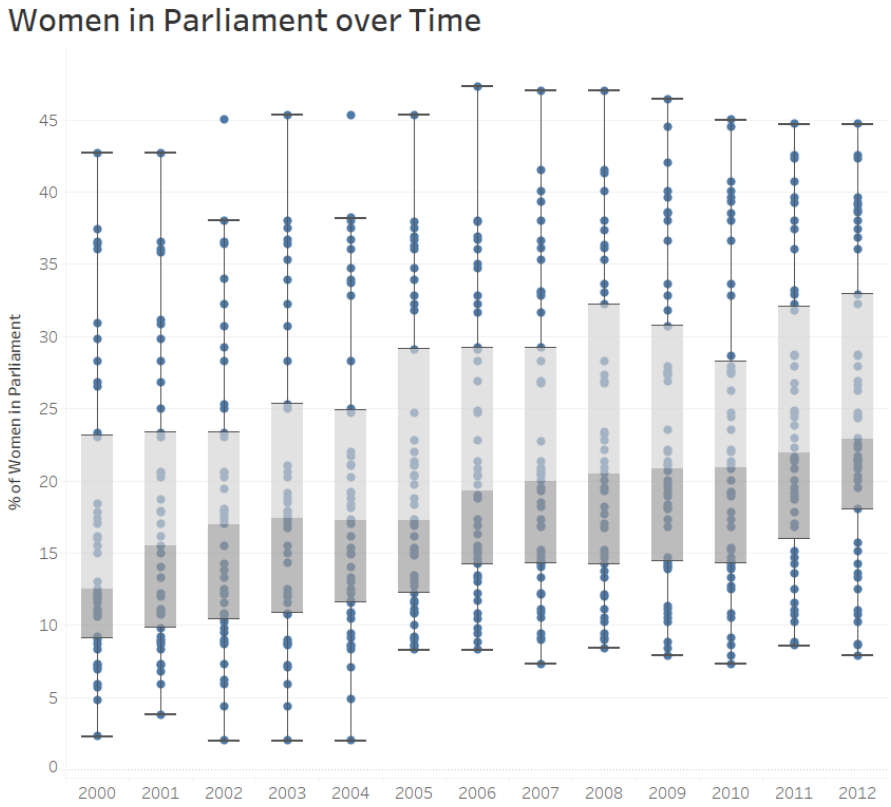


Figure 2

Model 1: Balanced Summary Statistics

	2002 (N=27)	2006 (N=27)	2012 (N=27)	Overall (N=81)
Military Spending % Govt Spending				
Mean (SD)	5.91 (3.61)	5.79 (4.01)	5.13 (3.63)	5.61 (3.73)
Median [Min, Max]	4.61 [1.91, 16.2]	3.78 [1.52, 17.5]	3.70 [1.22, 15.0]	3.95 [1.22, 17.5]
Women in Parliament %				
Mean (SD)	21.2 (11.1)	24.0 (11.2)	26.1 (10.6)	23.8 (11.0)
Median [Min, Max]	17.9 [5.90, 45.0]	20.8 [8.30, 47.3]	24.4 [8.60, 44.7]	22.5 [5.90, 47.3]
Population in Military %				
Mean (SD)	1.41 (1.22)	1.26 (1.18)	1.12 (1.05)	1.26 (1.14)
Median [Min, Max]	0.987 [0.364, 5.92]	0.863 [0.357, 5.83]	0.730 [0.320, 5.07]	0.901 [0.320, 5.92]
Log of Arms imports				
Mean (SD)	18.3 (1.80)	18.9 (1.62)	18.4 (1.84)	18.5 (1.76)
Median [Min, Max]	18.1 [13.8, 21.4]	19.1 [15.4, 21.2]	18.6 [14.5, 22.2]	18.7 [13.8, 22.2]
Political Spectrum				
Center	4 (14.8%)	5 (18.5%)	2 (7.4%)	11 (13.6%)
Left	11 (40.7%)	11 (40.7%)	12 (44.4%)	34 (42.0%)
Right	12 (44.4%)	11 (40.7%)	13 (48.1%)	36 (44.4%)
Income Group				
High income	21 (77.8%)	21 (77.8%)	21 (77.8%)	63 (77.8%)
Lower middle income	2 (7.4%)	2 (7.4%)	2 (7.4%)	6 (7.4%)
Upper middle income	4 (14.8%)	4 (14.8%)	4 (14.8%)	12 (14.8%)

Figure 3

Model 2: Unbalanced Summary Statistics

	High income (N=436)	Low income (N=15)	Lower middle income (N=97)	Upper middle income (N=129)	Overall (N=677)
Military Spending % Govt Spending					
Mean (SD)	4.69 (3.36)	5.94 (2.19)	7.46 (2.96)	7.00 (5.81)	5.55 (4.05)
Median [Min, Max]	3.59 [0.725, 18.6]	6.21 [2.81, 9.77]	7.04 [1.47, 13.9]	5.10 [0, 35.0]	4.28 [0, 35.0]
Women in Parliament %					
Mean (SD)	22.6 (10.4)	20.8 (13.3)	14.7 (6.50)	20.1 (10.5)	20.9 (10.3)
Median [Min, Max]	20.0 [5.90, 47.3]	12.2 [5.90, 39.2]	15.0 [2.00, 38.6]	19.7 [2.30, 44.5]	18.9 [2.00, 47.3]
Population in Military %					
Mean (SD)	1.27 (1.04)	0.316 (0.295)	1.03 (0.752)	1.21 (0.912)	1.20 (0.983)
Median [Min, Max]	1.00 [0.320, 6.52]	0.210 [0.102, 1.10]	0.600 [0.0758, 2.70]	0.964 [0.213, 6.51]	0.968 [0.0758, 6.52]
Log of Arms Imports					
Mean (SD)	17.9 (2.88)	12.8 (6.73)	16.1 (4.70)	17.1 (3.25)	17.4 (3.51)
Median [Min, Max]	18.3 [0, 21.5]	15.8 [0, 18.6]	16.5 [0, 22.2]	17.6 [0, 22.0]	17.9 [0, 22.2]
Political Spectrum					
Center	55 (12.6%)	6 (40.0%)	17 (17.5%)	22 (17.1%)	100 (14.8%)
Left	175 (40.1%)	8 (53.3%)	57 (58.8%)	74 (57.4%)	314 (46.4%)
Right	206 (47.2%)	1 (6.7%)	23 (23.7%)	33 (25.6%)	263 (38.8%)

Figure 4

Model 1: OLS balanced

	Dependent variable:
	Military Spending % of Total Government Spending
Women in Parliament %	-0.056**
	(0.026)
Military Population %	2.027***
	(0.240)
Log of Arms Imports	0.675***
	(0.150)
Majority party Left	-0.917
	(0.806)
Majority party Right	-1.306
	(0.819)
Low Middle Income	3.184***
	(1.054)
Upper Middle Income	1.473**
	(0.735)
Constant	-7.610**
	(2.926)
Observations	81
R^2	0.688
Adjusted R^2	0.658
Residual Std. Error	2.177 (df = 73)
F Statistic	23.024*** (df = 7; 73)
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 5

Model 1: GLS balanced

	Dependent variable:
	Military Spending % of Total Government Spending
Women in Parliament %	-0.056**
	(0.026)
Military Population %	2.027***
	(0.240)
Log of Arms Imports	0.675***
	(0.150)
Majority party Left	-0.917
	(0.806)
Majority party Right	-1.306
	(0.819)
Low Middle Income	3.184***
	(1.054)
Upper Middle Income	1.473**
	(0.735)
Constant	-7.610***
	(2.926)
Observations	81
Log Likelihood	-176.496
Akaike Inf. Crit.	370.992
Bayesian Inf. Crit.	391.606
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 6

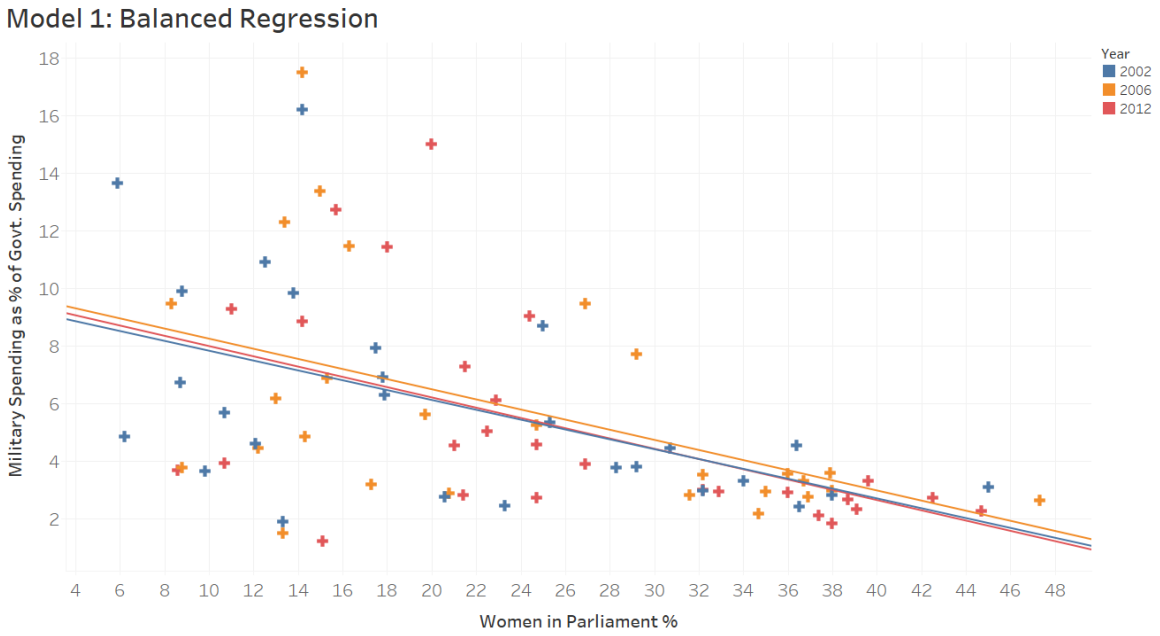


Figure 7

Model 2: OLS unbalanced

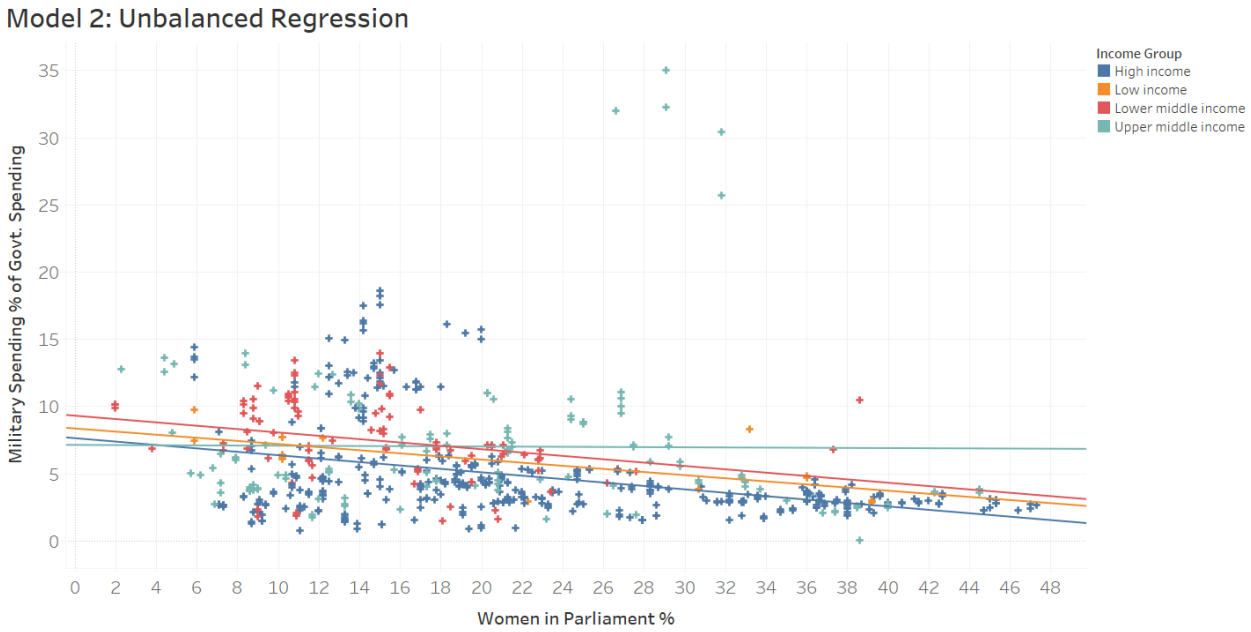
	Dependent variable:
	Military Spending % of Total Government Spending
Women in Parliament %	-0.034***
	(0.011)
Military Population %	2.492***
	(0.116)
Log of Arms Imports	0.224***
	(0.032)
Majority party Left	-0.082
	(0.326)
Majority party Right	-0.661**
	(0.336)
Low Income	4.467***
	(0.765)
Low Middle Income	3.382***
	(0.338)
Upper Middle Income	2.433***
	(0.287)
Constant	-1.389**
	(0.675)
Observations	677
R^2	0.530
Adjusted R^2	0.525
Residual Std. Error	2.793 (df = 668)
F Statistic	94.312*** (df = 8; 668)
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 8

Model 2: GLS unbalanced

	Dependent variable:
	Military Spending % of Total Government Spending
Women in Parliament %	-0.034***
	(0.011)
Military Population %	2.492***
	(0.116)
Log of Arms Imports	0.224***
	(0.032)
Majority party Left	-0.082
	(0.326)
Majority party Right	-0.661**
	(0.336)
Low Income	4.467***
	(0.765)
Low Middle Income	3.382***
	(0.338)
Upper Middle Income	2.433***
	(0.287)
Constant	-1.389**
	(0.675)
Observations	677
Log Likelihood	-1,661.021
Akaike Inf. Crit.	3,342.043
Bayesian Inf. Crit.	3,387.086
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 9


Model 2: Unbalanced Regression
Income Group
High income
Low income
Lower middle income
Upper middle income
Military Spending % of Govt. Spending
0
5
10
15
20
25
30
35
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48
Women in Parliament %