Final part

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Research question

rappeler que ce sont les parlementaires qui votent les lois; rappeler qu'on pourrait étudier le contraire (estce que le dev impacte les femmes ?) mais que c'est pas notre but

Data sets descriptions

We will use one dataset that contains the variables that we want to study and some variables that will be used to compare the countries (income group, region of the world).

Loading the dataset

Size of the dataset

The dataset has 119 rows (countries) and 14 columns (variables).

Production condition

To create our dataset we used databases from the World Bank and the UNDP websites where we chose the variables we wanted to study in our project. Then we cleaned and we joined the different databases to keep all the information in one database. The process to clean and to join the databases is explained with more details in the annex.

Main variables

All the data is for the year 2021.

Proportion of seats held by women in national parliaments(in %)

We want to study the impact of the *share of women in parliament* on other variables. It is the percentage of parliamentary seats (single or lower chamber) held by women in a country.

Human Development Index

The *Human Development Index (HDI)* is a composite index that measures a country's average achievement in human development. It takes into account three dimensions: health, education, and standard of living. The HDI is calculated by taking the geometric mean of three normalized indices for each dimension: life expectancy at birth (health), mean years of schooling for adults aged 25 years and older, and expected years of schooling for children of school-entering age (education), and the gross national income per capita measured in logarithm (standard of living). (UNDP , 2023)

Gender Development Index

The *Gender Development Index (GDI)* is a variant of the HDI which measures gender inequalities in the achievement of human development. It takes into account the same dimensions as HDI while considering the disparities between men and women. The indicators for each dimensions are : female and male life expectancy at birth (health) , female and male expected years of schooling for children and female and male mean years of schooling for adults ages 25 years and older (education) and female and male estimated earned income (standard of living/command over economic resources).(UNDP , 2023)

Gini Coefficient

The *Gini coefficient* aims to measures income inequality within a population. It takes a value from 0 (perfect equality) to 1 (perfect inequality).

GDP Growth (annual %)

The *Annual GDP Growth* is the annual percentage growth rate of GDP at market prices based on constant local currency. According to the World Bank's (2023) definition , the GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It aims to measure economic growth.

Planetary Pressures- Adjusted Human Development Index

The *Planetary Pressures-Adjusted Human Development Index (PHDI)* is also a variant of the HDI which discounts from the HDI the pressures on the planet. It is the level of HDI adjusted by carbon dioxide emissions per person (production-based) and material footprint per capita to account. With no pressures on the planet, it is equal to the HDI. It integrates environmental and sustainability concerns into the measurement of Human Development. (UNDP , 2023)

Labor force participation rate , total (% of total population ages 15+)(modeled ILO estimate)

The *Labor force participation rate* is the proportion of the population ages 15 and older that are economically active. Here "economically active" concerns "all people who supply labor for the production of goods and services during a specified period". (World Bank , 2023).

Labor force participation rate , female (% of female population ages 15+)

The *Female Labor force participation rate* is the proportion of the female population ages 15 and older that are economically active.

Women Business and the Law Index Score (scale 1-100)

The *Women Business and the Law Index Score* is an Index developed by the World Bank that measures on a scale from 1 to 100 how laws and regulations affect women's economic opportunity. It is computed by taking the average score of 9 indices (Mobility, Workplace, Pay, Marriage, Parenthood, Entrepreneurship, Assets and Pension). (World Bank, 2023)

Military expenditure (% of GDP)

The *Military expenditure* (% of GDP) includes the proportion in the GDP of all current and capital expenditures on the armed forces, including peacekeeping forces; defense ministries and other government agencies engaged in defense projects; paramilitary forces. It aims to measure a nation's prioritisation of defense spending relative to its overall economic activity. (World Bank , 2023)

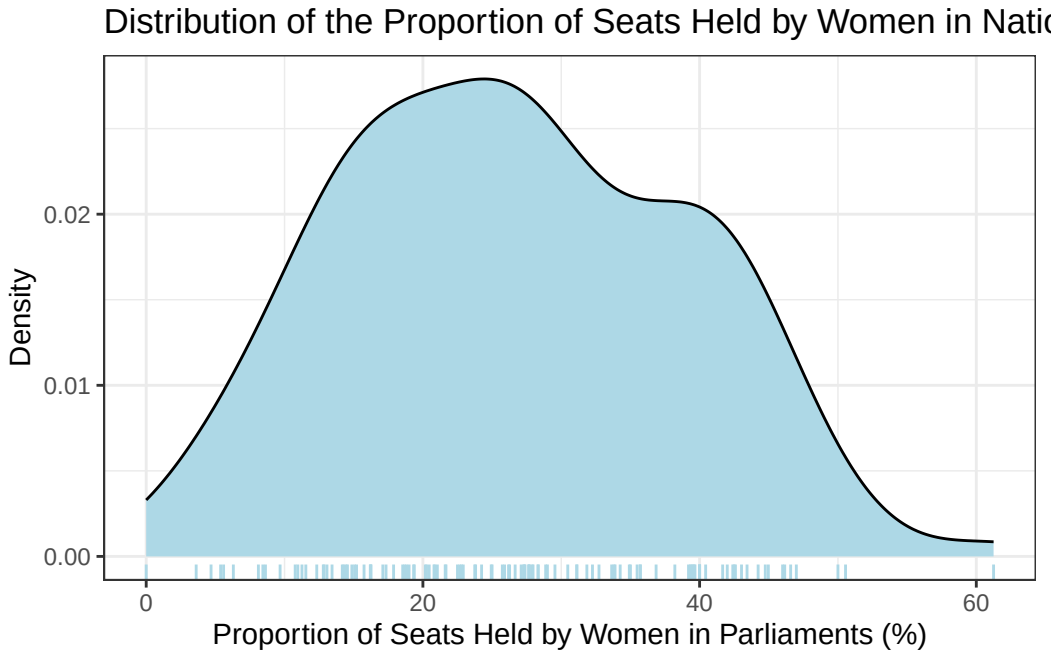
Data analysis

General presentation of our main variable

We will start by giving a general presentation of our main variable: the **Proportion of seats held by women in national parliaments in 2021**.

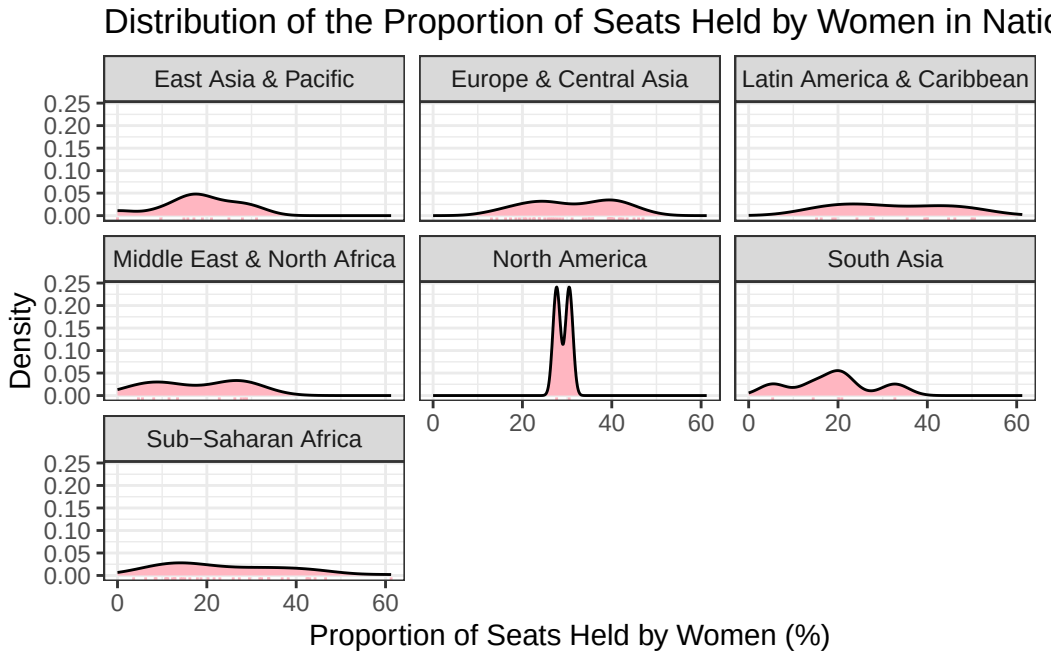
Distribution

In the World

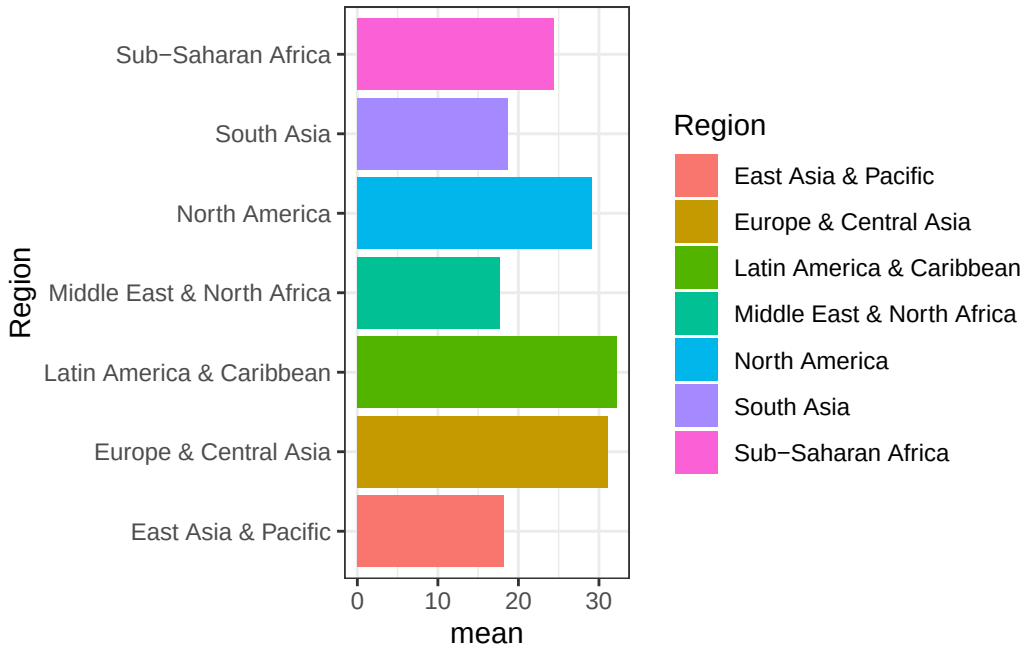


The worldwide mean share of female parliamentarians is 26.5388061. Thus , at the world level , women occupy less than half of the seats in parliaments.

Distribution conditioned on the region

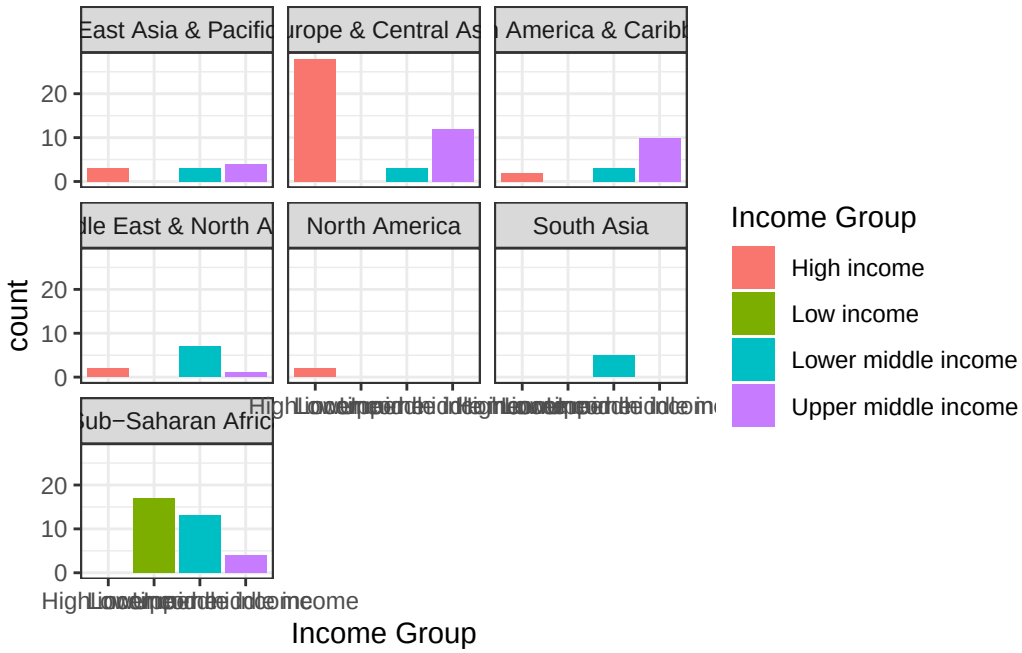


Region	mean
East Asia & Pacific	18.14650
Europe & Central Asia	31.06523
Latin America & Caribbean	32.19103
Middle East & North Africa	17.73248
North America	29.06157
South Asia	18.71709
Sub-Saharan Africa	24.38087



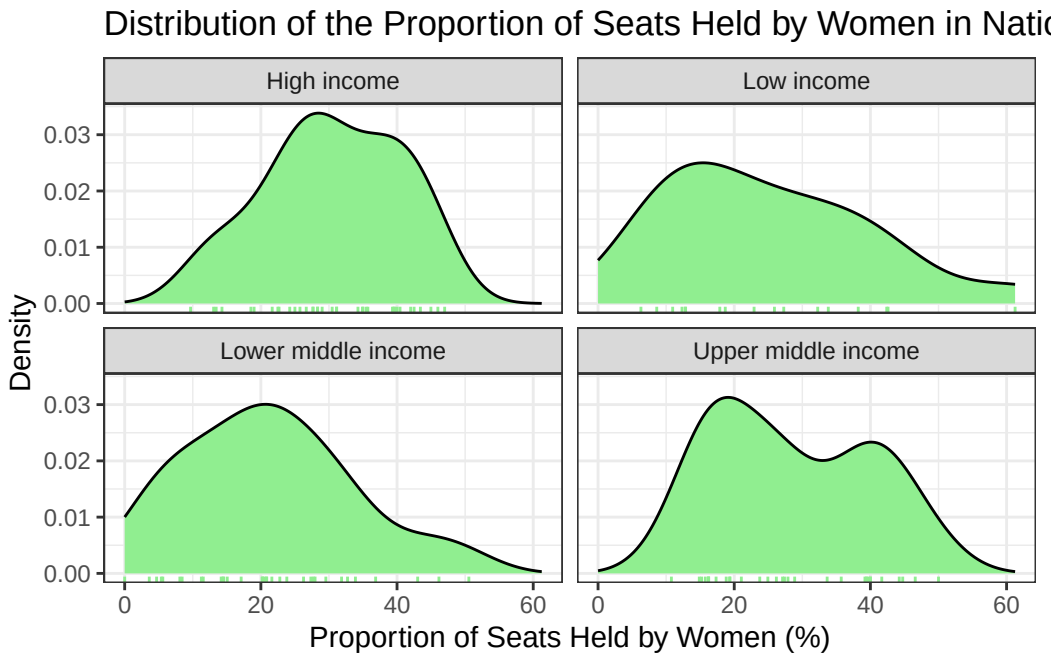
The average proportion of seats held by women in national parliaments is the highest in Latin America & Caribbeean region followed by European & Central Asia . The lowest share of women parliaments is in the East Asian & Pacific region and South Asia.

The difference might be driven by the level of economic development in this region. Thus, we will further our analysis by looking at the distribution of income groups within those regions.

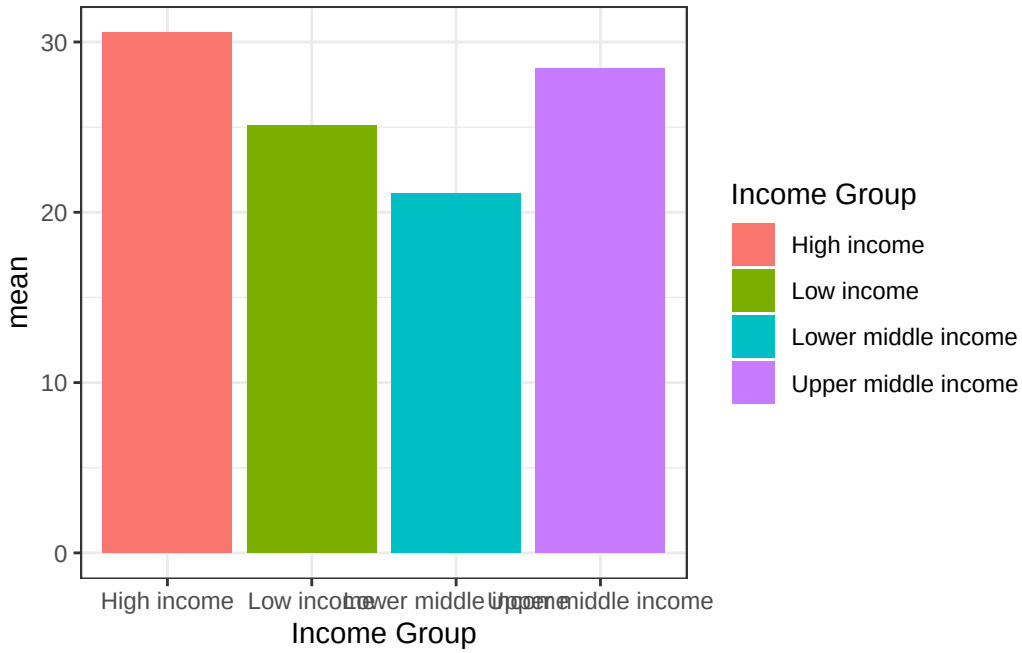


We see that the average share of female Parliamentarians is lower in East Asia & Pacific than in Sub-Saharan Africa whereas most of Sub-Saharan countries have a lower income than East Asia & Pacific countries . Thus, we could think that national income and share of female parliamentarians are not really related. However, we also observe that for almost all the regions, the share of female parliamentarians vary a lot within the region. The exception is North America where we see that we have a spike around 30%. We know North America is mostly composed of high income countries whereas in other regions the level of development can vary a lot from a country to another. This can lead us to think that for countries that are part of the same income group the proportion of seats held by women in national parliament would not vary a lot so that is what we are going to see now.

Distribution conditioned on the Income Group



Income Group	mean
High income	30.55118
Low income	25.12003
Lower middle income	21.13467
Upper middle income	28.45499



Thanks to the plots, we can clearly see that the proportion of female parliamentarians vary within the countries that are part of the same income group. We also see that higher income countries have a higher average share of women parliamentarians than the others but the difference is not huge. Also, we see that low income countries have more female parliamentarians than lower middle income countries.

In conclusion, based on these basic plots and statistics, we would be tempted to say that there is no evident correlation between the proportion of female parliamentarians and national income or region of the world.

Correlation matrix

To try to go deeper, we will study the correlation matrix between our variables.

The correlation matrix gives us a general idea about relationships between our target variable (share of women in Parliaments) and the other variables. We can see that the variables that are more correlated (positively) with the share of women in national parliaments are the Women Business and Law Index Score, the GDI, the HDI and the PHDI. We also see that the HDI and the PHDI are strongly positively correlated which we will have to take into account later in our analysis.

Table 1: Correlation matrix

	GDI_val	HDI_val	Gini_coef	PHDI	Proportion of seats held by women in national parliaments (%)	Labor force participation rate, female (% of female population ages 15+) (modeled ILO estimate)	Labor force participation rate, total (% of total population ages 15+) (modeled ILO estimate)	GDP growth (annual %)	Women Business and the Law Index Score (scale 1-100)	Military expenditure (% of GDP)
GDI_val	1.000	0.673	-0.160	0.642	0.290	0.314	0.171	0.304	0.625	-0.146
HDI_val	0.673	1.000	-0.470	0.922	0.233	-0.099	-0.194	0.221	0.548	0.042
Gini_coef	-0.160	-0.470	1.000	-0.405	-0.026	0.222	0.294	0.041	-0.156	-0.042
PHDI	0.642	0.922	-0.405	1.000	0.230	-0.215	-0.291	0.289	0.472	0.070
Proportion of seats held by women in national parliaments (%)	0.290	0.233	-0.026	0.230	1.000	0.199	0.146	0.187	0.450	-0.148
Labor force participa-	0.314	-0.099	0.222	-0.215	0.199	1.000	0.925	-0.030	0.401	-0.304

Conclusion of our general analysis of the main variable

As we know this analysis is not sufficient to make deep conclusions, we will now see in more details the impact of a high or low share of female parliamentarians on more specific topics.

Impact of the share of women in parliament in the development of a country

Impact of the share of female parliamentarians on the annual growth rate of the GDP

According to the **Growth Theory and the Solow model**, countries that have a low growth rate of the GDP are the countries that are near their steady-state which means that they are already highly economically rich. We chose the GDP growth rate and not the GDP because the GDP growth rate reflects more the impact of the public policies.

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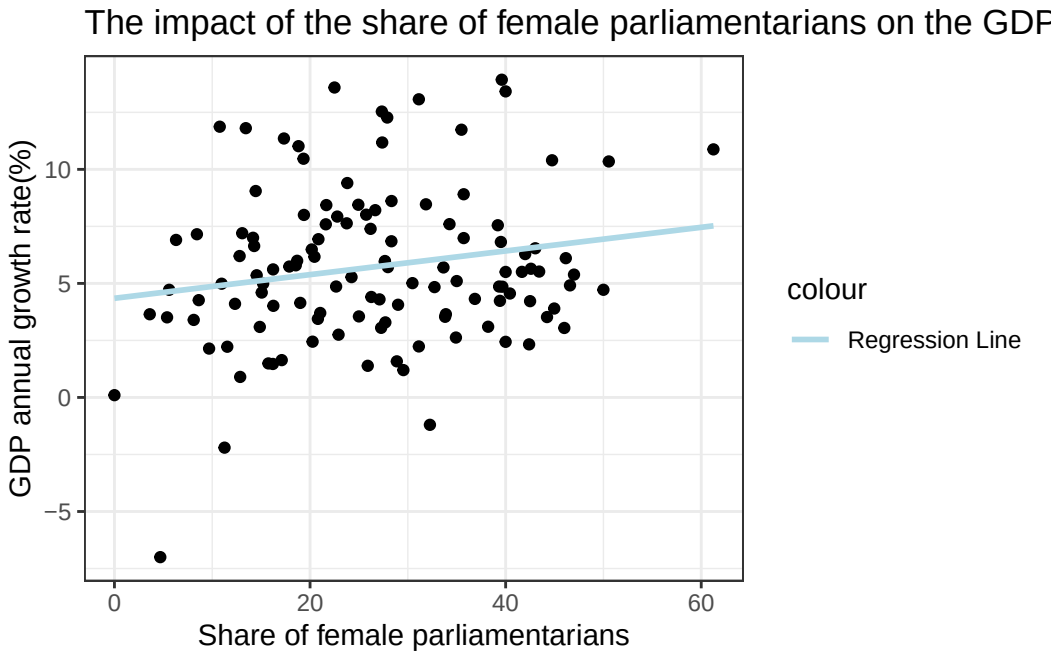

Based on the plot and the regression line, it seems that there is a slight positive correlation between the share of female parliamentarians and the GDP annual growth rate. However, the points are scaterred: the GDP annual growth rate vary a lot for the same level of share of female parliamentarians.

Table 2: Simple Linear Regression Results

term	estimate	std.error	statistic	p.value
(Intercept)	0.649	0.034	19.13	0.000
‘Proportion of seats held by women in national parliaments (%)‘	0.003	0.001	2.59	0.011

Impact of the share of female parliamentarians on the HDI

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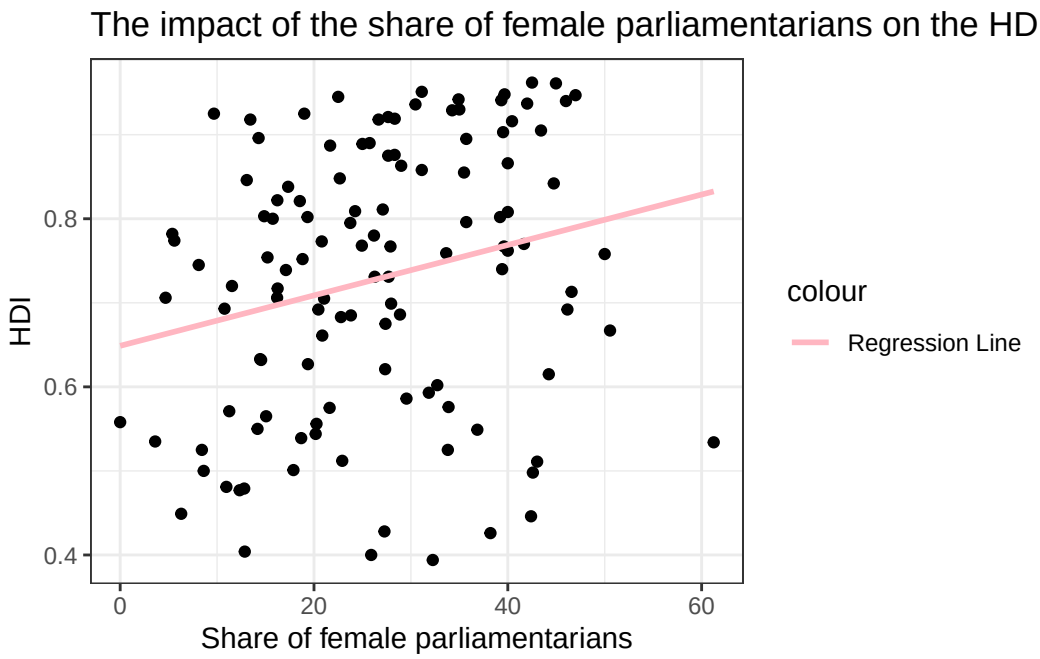

Again, we observe a lot of disparity between the points. For the same level of share of female parliamentarians we have countries that have a high HDI value and countries that have a low HDI value. Since the share of female parliamentarians is more correlated with the HDI than with the GDP annual growth rate, we will further the analysis of the relationship between the share of female parliamentarians and the HDI. We can do a t-test to see if our variable has a significant impact on the HDI.

At a significance level of 5%, the variable “Proportion of seats held by women in national parliaments (%)” is significant. At a significance level of 1%, the variable “Proportion of seats held by women in national parliaments (%)” is not significant.

Table 3: Simple Linear Regression Results

term	estimate	std.error	statistic	p.value
(Intercept)	66.758	2.883	23.16	0
‘Proportion of seats held by women in national parliaments (%)‘	0.537	0.099	5.45	0

Does female parliamentarians support women's status?

Now, we want to see if women that have the legislative power tend to favour women's conditions in the society. To illustrate that, we are going to study the impact of the share of female parliamentarians on the Women Business and the Law Index Score because we saw in the correlation matrix that these two variables had a higher correlation coefficient. We also could have used the female participation rate but the correlation coefficient is not really high so a further analysis will not be really useful.

Women Business and the Law Index Score Scale

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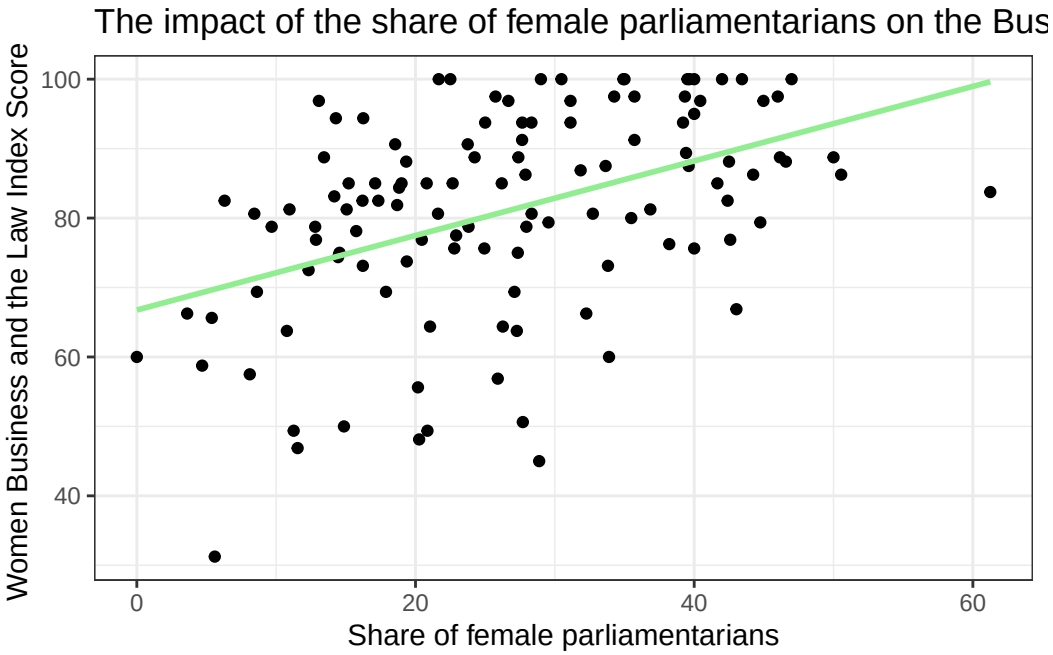

It seems that the relationship between the two variables have a positive relationship. To go deeper into the analysis, we will do a t-test.

According to our results, the share of female parliamentarians is significant to explain the Women Business and the Law score index at a significance level of 1%.

We could ask ourselves if there is a reverse causality: is it the share of female parliamentarians that influence the Women Business and the Law score index or is it the opposite ? As we said earlier, the Women Business and the Law score index takes into account 9 indices: Mobility, Workplace, Pay, Marriage, Parenthood, Entrepreneurship, Assets and Pension. Some of this indices can influence women's empowerment and inclusion the political sphere. Therefore, we cannot assess the causality efficiently between the share of female parliamentarians and the Women Business and the Law score Index.

Women in Parliaments and policies favoring social justice

To assess potential shifts in policy orientation towards social justice and equality rather than economic growth and military spending , we will first assess the link between the **Military Expenditure (% of GDP)** and the proportion of women in parliaments to see whether women are more or concerned by defense matters. Then, we're going to analyse the link between women in parliaments and social justice by focusing on the correlations with the Gini coefficient to assess whether more gender representation in parliaments would favor more policies reducing inequalities .

Impact of the share of women parliamentarians on Military Spending.

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`geom_smooth()` using formula = 'y ~ x'
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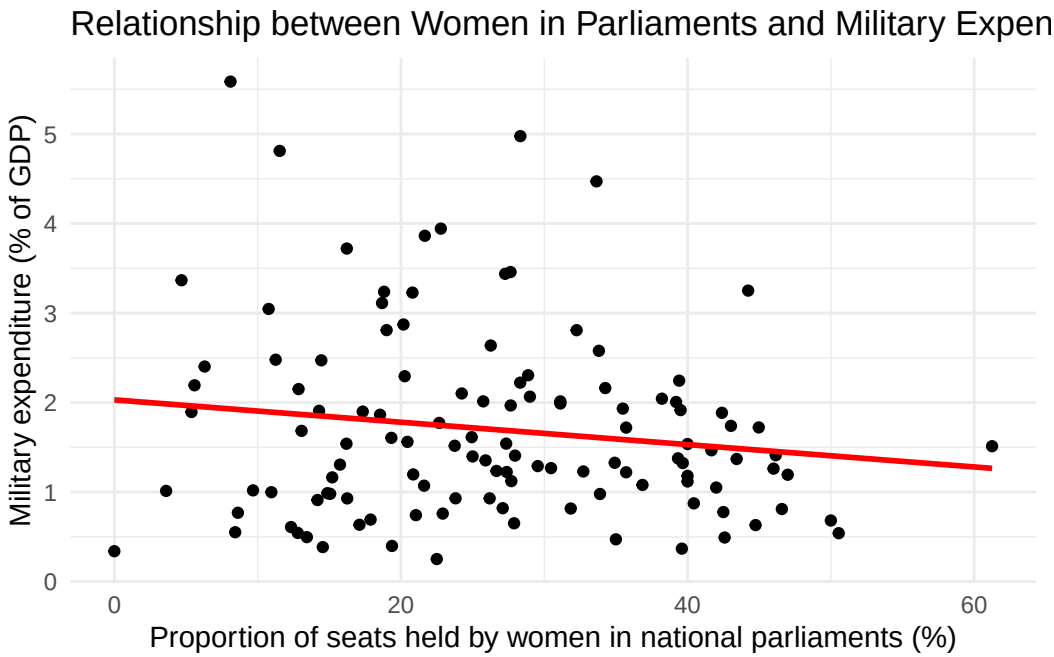

The correlation matrix suggests that that there is a weak negative correlation between Military Spending and Women in Parliaments , which is also illustrated the scatter plot. Thus , we can deduce that there is not a significant relationship between Military Spending and the proportion of seats held by women in national parliaments according to our dataset.

Impact of the share of women parliamentarians on inequalities.

The correlation coefficient between the proportion of seats of women is close to 0 (-0.026) according to the correlation matrix. Thus, we can deduce that there is no significant relationship between the Gini index and the share of women parliaments at the national level.

From this analysis , we can deduce that more representation of women in national parliaments does not significantly entails more public policies favoring social justice and equality or national defense.

Women in Parliaments and environmental policies

This section will focus on the impact of more women in legislative institutions on environmental policies by highlighting the correlation between the proportion of seats held by women in national parliament and the PHDI , which we chose as an indicator for the environmental performance of a country . The correlation matrix suggest that the Planetary Pressures-Adjusted Human Development Index and HDI are highly correlated , thus we expect similar conclusions.

Table 4: Simple Linear Regression Results

term	estimate	std.error	statistic	p.value
(Intercept)	0.599	0.023	25.89	0.000
‘Proportion of seats held by women in national parliaments (%)‘	0.002	0.001	2.56	0.012

Impact of the share of women parliamentarians on the PHDI

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`geom_smooth()` using formula = 'y ~ x'
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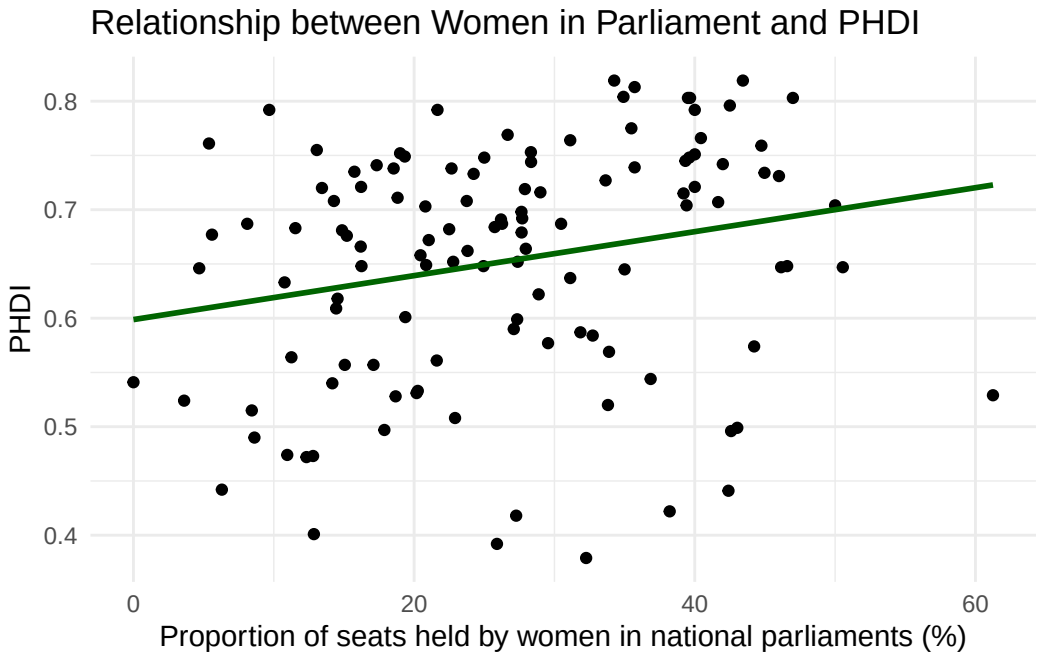

The correlation coefficient between the proportion of seats held by women in national parliaments and the PHDI (0.230) and the scatter plot suggest there is a positive correlation between women parliamentarians and the PHDI.

To assess whether there is causality , we will perform a linear regression to asses the impact of women parliamentarians on the PHDI. However , we also deduced that the PHDI and the HDI are highly correlated ,thus the HDI value was also added to our regression .Indeed , countries with higher standards of living might be more conscious towards environmental issues. Hence ; the HDI might be another variables that drives the PHDI.

The regression suggests …

Table 5: Simple Linear Regression Results

term	estimate	std.error	statistic	p.value
(Intercept)	0.193	0.019	10.267	0.000
'Proportion of seats held by women in national parliaments (%)'	0.000	0.000	0.462	0.645
HDI_val	0.625	0.025	24.772	0.000

Conclusion

In conclusion, according to our results, female parliamentarians do not seem to have a significant impact on the development of a country and on most of the governmental policies. It is often said that women concentrate more on social and environmental policies because they are more "emotional" but this does not seem to be true or at least there is no evident relationship between these variables. The only "social" variable that seems to be impacted by the share of female parliamentarians is the Women and Business Law Index Score which measures how laws and regulations affect women's economic opportunity. Thus, female parliamentarians have a positive impact on some of the women's conditions but this result has to be hold with a grain of salt since we may have a reverse causality: positive women's conditions can favor the access to political functions for women. Furthermore, our results show us that the national budget reserved to the military expenditure is slightly negatively impacted by the share of female parliamentarians. This means female legislators do not really impact the military spending either.

Based on our results we can make two major general conclusions. On one hand, we can reject the general opinion according to which women legislators favour social and environmental issues. On the other hand, since the gender of the parliamentarians does not have a significant impact on government policies there is no reason to reject the presence of women in the legislative body.
If it is really the case, why are there still countries that have a low share of female parliamentarians ? We saw that the share of female legislators does not depend on the income group, the disparities are more present between the different regions.

#JE PENSE QU'ON PEUT PAS METTRE CA PCQ DU COUP ON CHERCHE CE QUI IMPACTE LES FEMMES ALORS QUE NOTRE SUJET C'EST CE QUE LES FEMMES IMPACTENT As it seems that there is no evident relationship between development and the share of female parliamentarians, we will try to find comparer gdi et hdi pour amener l'idée du Japon (faire graph) les femmes changent culture = donner l'exemple du Japon VS latin America (comparer mean en Am latine et mean au japon)

Annex

Github link: https://github.com/NilaGo/DataManaProject.git