

Female Policymaker and Educational Expenditure: Cross-Country Evidence

Li-Ju Chen

This paper investigates the influence of women's participation in politics on decision making. I take public educational expenditure as the target. The results suggest that an increase by one percentage point in the share of female legislators increases by 0.034 percentage points the ratio of educational expenditure to GDP. Moreover, one percentage point increases in the fraction of female legislators would lead to an estimated 0.54% rise in educational expenditure per capita. The positive effect of female legislators on educational policies is strengthened by forms of government. This study also supports the hypothesis that the identity of legislators matter for policy.

Field research: gender economics, political economy.

1. Introduction

This paper takes the policy of educational expenditure as the target and investigates whether women as policy makers matter in policy decisions using fixed effect model on cross-country data. It then analyzes whether other political factors matter for the representation of female legislators or for the decision of educational expenditure in order to clarify the effect of female legislators. Given that political institutions play an important role in policy making and are led by politicians of different political persuasions, it is interesting to investigate whether characteristics of these parliamentarians determine the type of policies implemented. The motivation behind this study is therefore to understand whether the increasing fraction of female legislators in the OECD countries raises the focus of issues, such as educational expenditure, which in the literature are shown to be women's concern. I find that the greater the representation of women in parliament, the higher the educational expenditure as the percentage of GDP and the higher the educational expenditure per capita. Specifically, the result suggests that increasing one percentage point of female legislators increases 0.034 percentage points of the ratio of educational expenditure to GDP. Moreover, one percentage point increase in the fraction of female legislators would lead to an estimated 0.54% rise in educational expenditure per capita.

* Li-Ju Chen, Department Economics, Stockholm University 106 91 Stockholm Sweden. E-mail: li-ju.chen@ne.su.se

A possible explanation for these results is based on the fact that female politicians may care about women's issues more than their male colleagues. Since women and men play different roles in society and therefore have different interests and priorities, it follows that women also cannot be adequately represented in decision-making by men. Ideally, representatives of groups with specific interests and perspectives should participate directly in decision-making processes and leadership to ensure that both the agenda of issues to be considered and the decisions subsequently made incorporate their views. Therefore, it has been increasingly desirable for women to share in decision-making and leadership since 1960s, the second wave of the feminist movement. Nevertheless, even if male politicians are aware of this difference and seek to represent women, they lack information in the same way that mainstream decision makers are unable to capture the perspectives and needs of minorities in the society. This failure to incorporate women's concerns in decision-making brings a loss for society as a whole because women represent both the needs of women themselves and of those people whom they take care of. Wängnerud (2005) uses parliamentary survey studies conducted in The Swedish Parliament and finds that female parliamentarians consider the duty of promoting the interests/views of women much more important than their male colleagues. Moreover, female members in the parliament have more contacts with women's organizations than male members. Since female politicians take women as a group, they, to a greater extent than male politicians, represent the interests of women.

Chattopadhyay and Duflo (2004) study the effect of women as policy makers through a randomized policy experiment in India. They find that the reservation of one-third of the seats for women in Panchayats (local rural self-government) in the states of West Bengal and Rajasthan has a positive effect on investment in infrastructure related to women's needs, such as drinking water and roads. Specifically, gender is a relevant factor when making decisions on different kinds of investments in the case of India. Therefore, incorporating women's perspective in decision-making should result in better decisions that more adequately reflect the needs of women, children and families. In other words, women are more liberal on average. We can also find evidence that women prefer a big government or become more left-wing (Lott and Kenny (1999) and Edlund and Pande (2002)). As women's participation in decision-making process in the world increases, women sit in certain committee reflecting their traditional interests and giving it greater priority. Data collected by Inter-Parliamentary Union (IPU) in 1992 highlight the fact that it is in the areas of family, social affairs, health and education that women are most numerous in the parliamentary committee among countries in Western Europe. While the representation of women in legislatures grows, female parliamentarians may begin to resemble male parliamentarians less than beforeⁱ and are freer to pursue a different agendaⁱⁱ, which probably has an impact on policy decisions. In addition, the "critical mass" argument may explain why women's representation can also have an indirect influence by increasing men's attention to women and children policies.

Most of recent studies about the effect of female legislators on policies, such as Besley and Case (2000) and Clots-Figureas (2007). Besley and Case (2000) assume there is effect of female legislators on worker's compensation benefits and use female legislators as IV to understand the effect of these benefits on employment. Clots-Figureas (2007) uses quasi-experimental election outcomes to estimate the

causal effect of the gender of politicians. She finds that primary educational attainment is higher in urban areas of India when female political representation is higher. However, most of studies focus on within-country data. The contribution of my paper is therefore to analyze the effect of women's representation on educational expenditure using cross-country data. The remainder of the paper is organized as follows. Section 2 provides the theoretical background and describes the history of female participation in politics and their policy preference. Section 3 discusses the data collection and empirical strategy. Section 4 presents the results of the paper. Section 5 discusses whether the effect of female politicians on education depends on other political factors. Section 6 concludes.

2. Background

2.1 Theoretical Background

The theoretical background for this study is based on models supporting the fact that the identity of the legislator matters for policy. According to the median voter model, if the candidates only care about winning the elections and can commit to implement specific policies once elected, political decisions should only reflect the preferences of the median voters (Downs (1957)), and female legislators would not matter for policy outcomes. However, if the candidates have commitment problem, the identity of the legislator matters for policy determination. This influence in policy increase when there is increasing political representation of a certain group (Besley and Coate (1997) and Osborne and Slivinski (1996)). According to this set of models, if politicians can not commit to implement a given set of policies once in power, the gender of a politician would matter for policy. That is, the representation of female politicians would support issues reflecting women's preference as long as women could vote in the elections. This line of models has been applied by Pande (2003)ⁱⁱⁱ and Svaleryd (2007)^{iv}.

2.2 Women In Politics

During 1960s-1980s, the second wave of the feminist movement, political parties across Western Europe came under pressure to adopt policies attractive to female voters and to provide greater opportunities for women's participation in the formal political arena, even in those countries in which a well-organized women's movement was not developed. However, there existed differences in family background among male and female legislators. According to Davis (1997), female legislators were less likely than male legislators to be married, to enter politics without spousal support, or to have children. Even in the cases when female legislators did have children, the children tended to be older than the offspring of male counterparts. Political careers for women, much like careers in other professions, had often entailed an either/or choice. For this reason, female legislators tended to enter politics later than their male counterparts in the early period. Furthermore, the role perceptions of female representatives seem to differ from their male counterparts in some ways. Thomas (1994) points out that in United States female delegates have been found to value aspects of their jobs related to civic duty, while men have been more inclined to highlight legislative effectiveness or status within the legislative chamber. Although women are just as likely as men to see themselves as delegates or trustees, women are more likely to see themselves as representatives of other women. Therefore,

women would like to give priority to legislation about women, and they would also like to take pride in legislative accomplishments in areas of traditional concern for women^v. In other words, women tend to support those policies related to children and family, such as education and welfare issues, once they take participation in the process of decision making.

Though party discipline may restrict female legislators' work on women's issues, it appears that they are usually working across party lines to the extent permissible by party discipline, which probably leads to a policy impact. As women have a sizeable presence, their policy impact is even greater because male legislators are also more likely to sponsor legislation concerning the social, legal, and economic position of women than are male legislators in arenas in which women do not have a significant numeric presence^{vi}. The dynamics of electoral competition may play a role here. If male politicians do not sponsor more legislation concerning women, female politicians might take over their vote shares from voters who pay attention to women's concerns. Davis (1997) points out that most of women in government leadership of countries in Western Europe are in such ministries as cultural, social welfare, women's affairs and education once they are elected in parliament and appointed to government^{vii}. From this point of view, I therefore take educational policy as the target and study the influence of female politicians on it. In the field of education, women care about both the quantity and quality of children's education. When the economy is at developing stage, women support educational policies which fit people's basic needs, such as increasing schooling attainment rate and literacy rate^{viii}. After the infrastructure of compulsory education is well-provided, women turn to support policies about improving quality of education. It is not only for knowledge development, but also to address long-standing inequalities^{ix}. I therefore expect to observe a positive effect of female parliamentarians on educational expenditure.

3. Data And Strategy

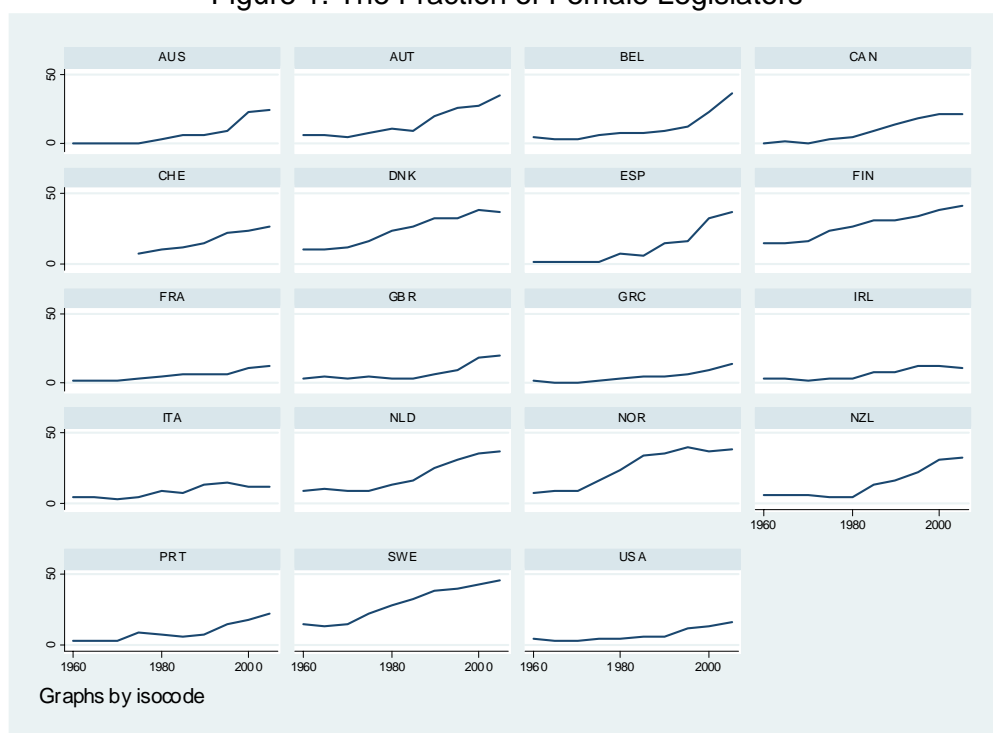
3.1 Data Description

The panel dataset used here covers 19 OECD countries between 1960 and 2005, which includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States. The measure of female involvement in politics mainly comes from the IPU's survey, *Women in Parliaments: 1945-1995*^x. This publication lists the proportion of parliamentary seats that were held by women in the upper and lower houses in each country. I only consider women's representation in lower chamber^{xi}. The variable FEM is set equal to the proportion of women in lower chamber. Figure 1 presents the fraction of female legislators in each country from 1960 to 2005 at 5-year intervals. Nordic countries have a marked increase in the number of women serving over this period, while most of Southern European countries have a relative flat pattern.

Furthermore, data of public educational expenditure as the percentage of GDP, which is named EDU here, between 1950 and 1995 at 5-year intervals is obtained directly from Vandebussche, Aghion and Meghir (2006). They rely on Unesco's Statistical Yearbook (1999), which provides public expenditure data between 1970 and 1995, and construct the early part of the series by working backward through

previous Yearbooks. The series after 1995 is collected from Education at a Glance 2006 published by OECD, also based on the survey by Unesco^{xii}. Figure 2 presents the ratio of total public educational expenditure to GDP in each country. Belgium and France have a relative stable weight of education on GDP, while Portugal and Greece keep raising this weight over decades. In general, all countries invest less than 10% of GDP in education. Though it is not always true, there are some interesting common patterns comparing Figure 1 and Figure 2. Greece, Portugal and Switzerland have the representation of women in politics increasing over the sample period. All of them have increasing weight on educational investment at the same time. On the other hand, the fraction of female politicians in Ireland, Italy and Norway decrease in late 1990s, and there is a drop in educational expenditure as the percentage of GDP in these three countries. Therefore, there might be correlations between female legislators and educational investment.

Figure 1. The Fraction of Female Legislators



Note: 1. x-axis is year, and y-axis is percentage. 2. Country isocodes are "AUS" for Australia, "AUT" for Austria, "BEL" for Belgium, "CAN" for Canada, "DNK" for Denmark, "FIN" for Finland, "FRA" for France, "GRC" for Greece, "IRL" for Ireland, "ITA" for Italy, "NLD" for Netherlands, "NZL" for New Zealand, "NOR" for Norway, "PRT" for Portugal, "ESP" for Spain, "SWE" for Sweden, "CHE" for Switzerland, "GBR" for United Kingdom, and "USA" for United States.

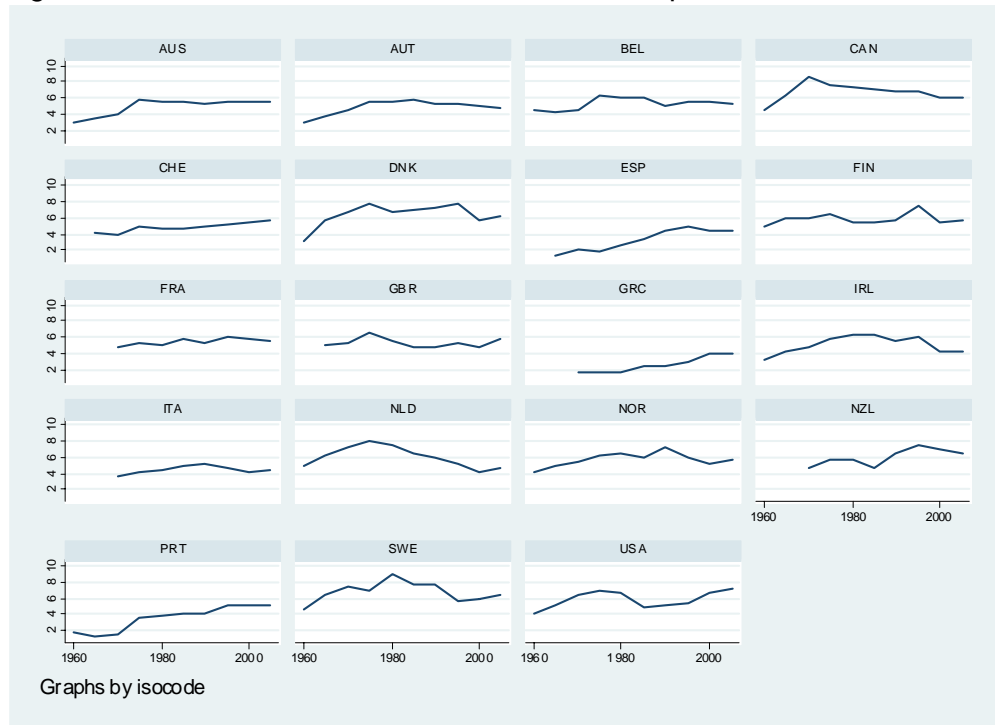
3.2 Empirical Strategy

I consider the following empirical specification:

$$EDU_j = \alpha_j + \beta_j t + \gamma FEM_j + \varepsilon_j \quad (1)$$

where j denotes country indices. α_j reflects country dummies which control for unobserved permanent differences in the weight of education on GDP that may exist among OECD countries. Similarly, β_j will capture trend in individual country which may exist in both time series data of the percentage of female legislators and educational expenditure. Here I expect γ to be positive if larger size of women in parliament leads to higher weight on education given by government.

Figure 2. The Ratio of Total Public Educational Expenditure to GDP



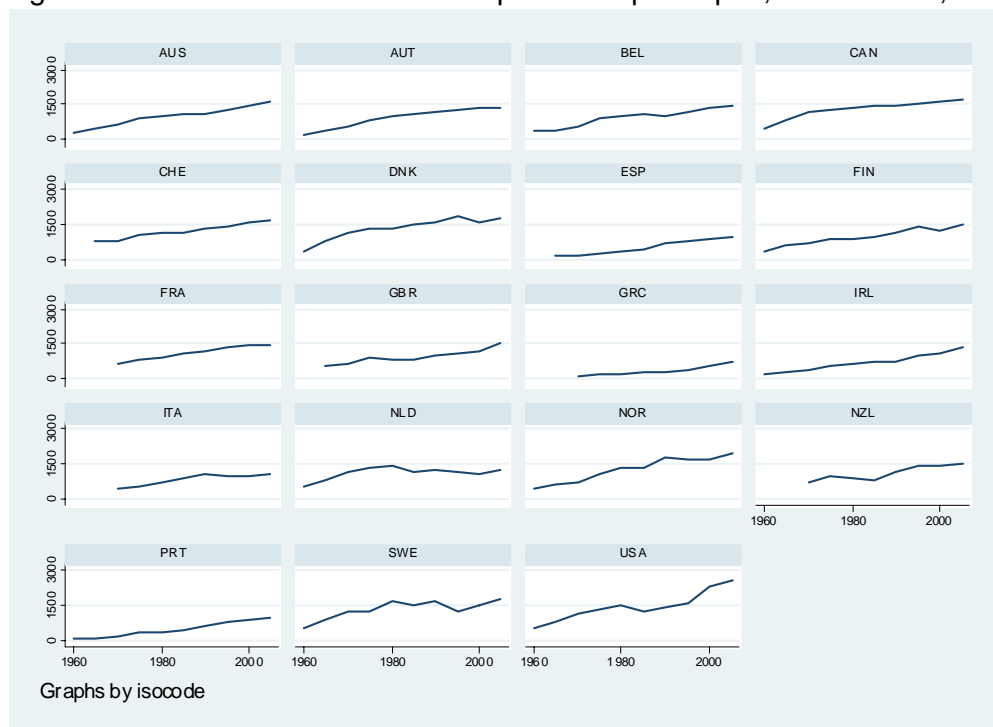
Note: x-axis is year, and y-axis is percentage.

4. Results

Besides using the percentage of educational expenditure on GDP as the dependent variable, which captures the extent a country's investments in education, this study uses total public educational expenditure per capita as another dependent variable, which helps understand the quantitative effect of female legislators on educational spending. Figure 3 presents total public educational expenditure per capita at constant prices in 2000 USD, obtained multiplying the ratio of total public educational expenditure to GDP by real GDP per capita^{xiii}. The figure shows a long-run linear growing pattern of expenditure in most countries, except Netherlands. Estimation of Equation (1) is reported in Table 1. When country dummies are included^{xiv}, increasing one percentage point of female legislators increases 0.029 percentage points of the ratio of educational expenditure to GDP. This effect is statistically significant. Since there is evidence that the Nordic countries continued to elect the highest number of women to their parliaments and Southern European countries have relative lower participation rate of women in politics, it is more likely that there exists group effect on politics when countries are grouped according to factors, such as geographical proximity and/or institutional proximity. I therefore use these criteria

and introduce group dummies^{xv}. Vandenbussche, Aghion and Meghir (2006) use the same criteria to group countries, and their results become statistically significant after substituting group dummies for country dummies. Statistical efficiency may provide a good reason for this. Compare the results in column (1) and (2) of Table 1, the standard error is smaller in the case using group dummies. In other words, group dummies keep more information and therefore provide better estimation.

Figure 3. Total Public Educational Expenditure per capita, 2000 Prices, USD



Note: x-axis is year, and y-axis is total public educational expenditure in 2000 constant prices of USD.

In column (2), female politicians have a positive impact on educational expenditure when group trend is not included. However, group dummies should be considered because of a growing pattern in the percentage of female legislators among countries. Column (3) shows the result with group trend, which is closer to the result with country dummies. Nonetheless, those factors which influence the decision of educational expenditure in individual countries should also be at work when once group dummies are included. I expect both the educational expenditure and political opportunities available to women to be affected by the overall level of social and economic development. Demographical factors, such as the proportion of population under 25 or above 65 influence the allocation of government budget to education. Besides, more women in politics may reflect the higher female participation rate in labor market and increasing attainment rate of women in higher education as well. Hence, I add real GDP per capita, fraction of population under 25, fraction of population above 65, female labor participation rate and lagged female attainment rate in higher education as controls when using group dummies. The results are presented in column (4). The group dummies are jointly significant with a p-value of

Table 1. Effect of Female Legislators on Educational Expenditure

Dependent Variables	% of Edu Expenditure on GDP				Log(Total Edu Expenditure per capita)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FEM	.029 (.014)*	.041 (.010)***	.028 (.013)**	.034 (.012)**	3.854 (.513)***	3.183 (.459)***	.259 (.404)	.541 (.217)**
Log(real GDP per capita)	-	-	-	.002 (.009)	-	-	-	1.014 (.167)***
Population under 25 years old	-	-	-	.185 (.091)*	-	-	-	3.725 (1.531)**
Population above 65 years old	-	-	-	.088 (.064)	-	-	-	1.530 (1.202)
Female labor force participation rate	-	-	-	.044 (.043)	-	-	-	1.116 (.769)
Female attainment rate in higher education	-	-	-	.034 (.018)*	-	-	-	.417 (.353)
Country dummies	Yes	-	-	-	Yes	-	-	-
Group dummies	-	Yes	Yes	Yes	-	Yes	Yes	Yes
Group trend	-	No	Yes	Yes	-	No	Yes	Yes
R ²	0.97	0.97	0.97	0.98	0.99	0.99	0.99	0.99
Observations	177	177	177	138	177	177	177	138

Note: 1. standard errors in parentheses. One, two and three * indicate significance at the 10, 5 and 1% level respectively. 2. Standard errors are corrected for clustering at the country level. 3. Group dummies are formed in the following way: Group 1: Belgium, France, Italy, Netherlands; Group 2: the four Scandinavian countries, Austria, Switzerland, UK; Group 3: Canada, US; Group 4: Australia, New Zealand; Group 5: Portugal, Spain; Group 6: Greece; Group 7: Ireland. 4. Data for GDP is collected from Penn World Table 6.2, distribution of population by age and female labor participation rate are collected from SourceOECD Employment and Labour Market Statistics, and female attainment rate in higher education is collected from Barro and Lee (2001).

0^{xvi}. The result is very encouraging in this respect because the coefficient is consistent with the expectation. Increasing one percentage point of female legislators increases 0.034 percentage points of the ratio of educational expenditure to GDP. In other words, the demand for education is increasing when the targeted group has a sizeable presence. Results with total public educational expenditure per capita as dependent variable are presented in column (5)-(8). In column (8), increasing 1% in GDP per capita raises total public educational expenditure per capita by 0.95%, which implies that education is a normal good in developed countries. The effect of female legislators on educational expenditure is positive and statistically significant when controlling for this income effect. In addition, total public educational expenditure per capita grows 0.54% when the fraction of female legislators increases by one percentage point.

5. Contextual Effects Of Female Politicians On Educational Expenditure

Though there is evidence of positive effect of female parliamentarians on educational expenditure, does such an effect depend on other contexts? For example, it is argued that left-wing governments expand total educational investment more than the investment made by right-wing governments. Unicameralism may reflect the influence of urban areas, where voters demand more educational expenditure than in rural ones. Electoral systems probably affect women's representation, which in turn affects educational expenditure. In addition, a country with parliamentary regime may prefer a large government and support policies that benefit the majority. Moreover, the more frequent are elections, the more representatives are accountable to their mandate and hence the less influence of female's preference in educational expenditure. This section discusses the effect of these contexts on educational expenditure in order to clarify the effect of female legislators. Table 2 presents the summary of these contexts among countries^{xvii}.

5.1 Does A Left-Wing Government Prefer More Education?

Left-wing governments are believed to favor policies concerning child and family care more than right-wing governments. Specifically, it has been suggested that left-wing governments prefer education more. In addition, the rise in female labor force participation, which may account for the rise in women's participation in politics, makes women more likely to favor the left by raising demand for welfare policies concerning women's traditional role in family (Edlund and Pande (2002)). I therefore include the left-wing government effect in the regression. I have data from Mapping Policy Preferences: Estimates for Parties, Electors, and Governments 1945-1998 and Mapping Policy Preferences II: Estimates for Parties, Electors, and Governments in Eastern Europe, European Union and OECD 1990-2003. In fact, education expansion is one of the criteria deciding the right-left position of each party in both dataset^{xviii}. I calculate the percentage of seats of left-wing parties in the result of each election to represent the intensity of left-wing government. Table 3 provides the results. Column (1) replicates the result from column (4) in Table 1, while column (4) replicates the result from column (8) in Table 1. I take them as the baseline results. I control in all the regressions for group dummies and individual trends^{xix}. Whether the government is left-wing intensive or not, it does not impact the decision of

Table 2. Summary of contexts

	Left	Majoritarian	Unicameral	Presidential	Terms
Australia	.307	1	0	0	2.9
Austria	.586	0	0	0	3.4
Belgium	.682	0	0	0	3.3
Canada	.597	1	0	0	3.9
Denmark	.482	0	1	0	3
Finland	.713	0	1	0	4.2
France	.543	1	0	0	4.6
Greece	.805	0	1	0	4.7
Ireland	.625	0	0	0	4.2
Italy	.616	0	0	0	4.3
Netherlands	.696	0	0	0	4.1
New Zealand	.765	1	1	0	3
Norway	.832	0	1	0	4
Portugal	.645	0	1	0	3.3
Spain	.809	0	0	0	3.7
Sweden	.656	0	1	0	3.5
Switzerland	.441	0	0	1	4
United Kingdom	.545	1	0	0	4.3
United States	.503	1	0	1	2

Note: the value of left-wing government and terms are the average value during the sample period.

educational expenditure at all. In column (2) and (5) female politicians keep a significant and positive effect on educational spending, where the extent is closer to the baseline result. I add the interaction term of left-wing government effect and female legislators in column (3) and (6). When the government is right-wing intensive, the percentage of female politicians have no influence on educational policies. However, more female politicians result in higher educational expenditure given the government is left-wing intensive, which is proved by the joint test. One percentage point increasing in the representation rate of female politician raises the ratio of educational expenditure on GDP by 0.048 percentage point. Besides, left-wing governments distribute more money on education in net given the number of female politicians fixed.

Table 3. Does left-wing government matter?

Dependent Variables	% of Edu Expenditure on GDP			Log(Total Edu Expenditure)		
	(1)	(2)	(3)	(4)	(5)	(6)
FEM	.034 (.012)**	.033 (.011)***	.011 (.015)	.541 (.217)**	.543 (.195)**	.127 (.300)
Log(GDP per capita)	.002 (.009)	.003 (.009)	.001 (.009)	1.014 (.167)***	1.013 (.168)***	.978 (.165)***
Population under 25 years old	.185 (.091)*	.184 (.093)*	.177 (.095)*	3.725 (1.531)**	3.730 (1.569)**	3.601 (1.590)**
Population above 65 years old	.088 (.064)	.087 (.065)	.098 (.073)	1.530 (1.202)	1.532 (1.197)	1.738 (1.321)
Female labor force participation rate	.044 (.043)	.045 (.044)	.035 (.040)	1.116 (.769)	1.112 (.792)	.924 (.730)
Female attainment rate in higher education	.034 (.018)*	.034 (.019)*	.036 (.020)*	.417 (.353)	.418 (.362)	.465 (.378)
Left-wing government	-	.001 (.003)	-.004 (.003)	-	-.002 (.043)	-.090 (.060)
Left-wing government*FEM	-	-	.037 (.030)	-	-	.687 (.493)
R ²	0.98	0.98	0.98	0.99	0.99	0.99
F test (Left-wing government = 0)	-	-	0.80	-	-	1.19
F test (FEM = 0)	-	-	3.74	-	-	3.10
Observations	138	138	138	138	138	138

Note: standard errors in parentheses. One, two and three * indicate significance at the 10, 5 and 1% level respectively.

5.2 Does Electoral Rule Matter?

The electoral rules controlled here is whether one country adopts majoritarian or other electoral systems. In the literature, the use of proportional representation---the current system in all of the Nordic countries---is singled out as one of the most important factors behind a high representation of women. Besides, in the Netherlands and Spain, for example, the electoral system is proportional, and the share of female parliamentarians is large: 36% in the Netherlands and 30.5% in Spain in the end of 2006. In France, by contrast, a majoritarian electoral system is in use, and only 18% of parliamentarians are women. Does the electoral rule matter for the representation of women in politics and be the factor influencing the educational policy?

Results are given in Table 4. Majoritarian is a dummy variable, which equals 1 if all the lower house is elected under plurality rule and 0 otherwise^{xx}. In general, results in column (2) and (5) show that effect of female legislators on educational expenditure is positive with the variable electoral rules, but insignificant. Since countries with proportional system have usually a higher representation of women in politics, it is likely that effect of female legislators on education is strengthened by proportional representation. I therefore include the interaction of female parliamentarians and electoral rules. The effect of female legislators on educational expenditure does not vary a lot compared to the results without the interaction term. In addition, the interaction effect of female legislators and electoral rules is not significant, which indicates that electoral arrangements do not affect women's influence on educational policies. On the other hand, electoral rules have no effect on educational expenditure.

5.3 Does Parliamentary System Matter?

During the 1970s, the Nordic countries embarked on a distinct and rapid path to the representation of women. All of the Nordic countries have unicameral legislatures. According to the literature in political science, one feature of unicameralism is that urban areas with large populations have more influence than sparsely populated rural ones. Since the participation rate of female labor force is higher in urban areas than that in rural areas, women in urban areas may demand more policies concerning children and family once they choose to go to the labor market. Hence, unicameral system which reflects more demands in urban areas should have a positive impact on educational expenditure. Unicameral is a binary variable^{xxi}. In order to have consistency of data with respect of Unicameral, I use the average fraction of female parliamentarian in upper and lower houses as FEM if the country is bicameralism. The results are provided in Table 5. In column (2) and (5), unicameral legislature has a positive effect on educational expenditure, but not significant. However, the effect of female legislators is still strong even with the control for parliamentary system. In order to clarify whether women in unicameral legislatures have a larger influence on decision making, I include the interaction of female legislators and unicameral system in the regression. The results are given in column (3) and (6). In general, the joint tests point out that parliamentary system has no influence on educational policies, while the representation of female politicians keeps a positive and significant effect on educational expenditure. Moreover, this positive effect of female legislators does not depend on which parliamentary system is adopted within a country.

Table 4. Does electoral rule matter?

Dependent Variables	% of Edu Expenditure on GDP			Log(Total Edu Expenditure)		
	(1)	(2)	(3)	(4)	(5)	(6)
FEM	.034 (.012)**	.023 (.014)	.023 (.014)	.541 (.217)**	.319 (.250)	.327 (.247)
Log(GDP per capita)	.002 (.009)	.002 (.010)	.000 (.011)	1.014 (.167)***	1.031 (.177)***	1.008 (.185)***
Population under 25 years old	.185 (.091)*	.208 (.102)*	.210 (.104)*	3.725 (1.531)**	3.964 (1.711)**	4.004 (1.753)**
Population above 65 years old	.088 (.064)	.113 (.066)	.114 (.065)*	1.530 (1.202)	2.040 (1.149)*	2.066 (1.139)*
Female labor force participation rate	.044 (.043)	.052 (.042)	.047 (.044)	1.116 (.769)	1.146 (.736)	1.066 (.761)
Female attainment rate in higher education	.034 (.018)*	.040 (.019)**	.046 (.022)*	.417 (.353)	.564 (.341)	.681 (.393)*
Majoritarian	-	-0.04 (.002)	-0.02 (.003)	-	-0.077 (.047)	-0.046 (.063)
Majoritarian*FEM	-	-	-0.027 (.030)	-	-	-0.471 (.522)
R ²	0.98	0.98	0.98	0.99	0.99	0.99
F test (Majoritarian = 0)	-	-	1.96	-	-	2.06
F test (FEM = 0)	-	-	2.18	-	-	1.47
Observations	138	136	136	138	136	136

Note: standard errors in parentheses. One, two and three * indicate significance at the 10, 5 and 1% level respectively.

Table 5. Does parliamentary system matter?

Dependent Variables	% of Edu Expenditure on GDP			Log(Total Edu Expenditure)		
	(1)	(2)	(3)	(4)	(5)	(6)
FEM	.038 (.011)***	.029 (.010)***	.028 (.013)**	.609 (.195)***	.434 (.194)**	.551 (.246)**
Log(GDP per capita)	.002 (.009)	.004 (.010)	.004 (.010)	1.013 (.164)***	1.034 (.172)***	1.036 (.167)***
Population under 25 years old	.187 (.092)*	.162 (.096)	.161 (.094)	3.748 (1.550)**	3.284 (1.604)*	3.370 (1.556)**
Population above 65 years old	.087 (.066)	.073 (.066)	.072 (.068)	1.521 (1.234)	1.253 (1.256)	1.415 (1.234)
Female labor force participation rate	.040 (.043)	.028 (.045)	.028 (.049)	1.050 (.764)	.833 (.804)	.913 (.867)
Female attainment rate in higher education	.033 (.016)**	.025 (.016)	.024 (.017)	.399 (.312)	.238 (.317)	.272 (.299)
Unicameral	-	.004 (.003)	.003 (.003)	-	.071 (.043)	.098 (.049)*
Unicameral*FEM	-	-	.002 (.015)	-	-	-.208 (.286)
R ²	0.98	0.98	0.98	0.99	0.99	0.99
F test (Unicameral = 0)	-	-	1.07	-	-	2.12
F test (FEM = 0)	-	-	4.32	-	-	2.85
Observations	138	138	138	138	138	138

Note: standard errors in parentheses. One, two and three * indicate significance at the 10, 5 and 1% level respectively.

5.4 Do Forms Of Government Matter?

Several predictions are generated from the theoretical research on how policy outcomes are influenced by different forms of government. It has been suggested that parliamentary regimes should be associated with larger governments, i.e. higher taxes and overall spending, than presidential regimes. Persson and Tabellini (2003) provides two possible explanations. First, it is easier for politicians to collude with each other at the voters' expense because of the greater concentration of powers in parliamentary regimes, which results in higher rents and higher taxes. Second, parliamentary regimes need continuous confidence of majority in the legislature to maintain their powers throughout an entire election period. Spending thus optimally becomes directed towards broad programs benefiting a majority of voters. Educational policy may be one of the targets.

Presidential is a binary variable with the value 1 in presidential regimes and 0 otherwise^{xxii}. There are only two countries belonging to presidential regime in this study, which are Switzerland and United States. The results are provided in Table 6. The influence of presidential regime on educational expenditure is significant and negative, which supports the view in literatures that parliamentary regimes usually raise spending directed towards broad programs. Including the interaction of female politicians and presidential regime gives a positive and significant effect of female legislators on educational expenditure. When the government is in presidential regime, having more women in politics increases the weight of educational investment and therefore gives a larger net effect of female legislators than in parliamentary regime. Dollar, Fisman and Gatti (2001) claim that the greater the representation of women in parliament, the lower the level of corruption. Since presidential regime brings out a more honest government, the distribution of government budget might be more effective and therefore flow into the chapters which women care more about. Moreover, though presidential regime has negative effect on educational expenditure, the effect turns to positive when the parliament introduces female legislators.

5.5 Does Political Cycle Matter?

It has been suggested that accountability of politicians is stronger if their term in power is shorter. In other words, the policy decision may reflect the preference of median voters rather than the preference of politicians when elections are held more frequently. With respect to this point of view, I check whether the assumption behind this study, i.e. the identity of legislators matter for policy, is reasonable or not. Term is from the surveyed data by IPU, and it is variable across the sample period among countries^{xxiii}. When there are frequent elections, the value of Term is smaller. Table 7 presents the result. In column (2) and (5), term has no effect on educational policy, while female parliamentarians have a positive and significant effect on educational investment. The same conclusion is obtained from the joint tests in column (3) and (6), where the interaction term is included. This implies that the policy decision is determined by the preference of women in politics rather than the preference of median voters.

Table 6. Do forms of government matter?

Dependent Variables	% of Edu Expenditure on GDP			Log(Total Edu Expenditure)		
	(1)	(2)	(3)	(4)	(5)	(6)
FEM	.034 (.012)**	.027 (.012)**	.029 (.011)**	.541 (.217)**	.434 (.225)*	.466 (.206)**
Log(GDP per capita)	.002 (.009)	.015 (.012)	.017 (.012)	1.014 (.167)***	1.194 (.221)***	1.229 (.217)***
Population under 25 years old	.185 (.091)*	.162 (.093)	.169 (.091)*	3.725 (1.531)**	3.378 (1.583)**	3.499 (1.549)**
Population above 65 years old	.088 (.064)	.066 (.063)	.089 (.061)	1.530 (1.202)	1.203 (1.176)	1.602 (1.151)
Female labor force participation rate	.044 (.043)	.050 (.042)	.061 (.045)	1.116 (.769)	1.204 (.751)	1.394 (.799)*
Female attainment rate in higher education	.034 (.018)*	.022 (.015)	.020 (.014)	.417 (.353)	.245 (.264)	.200 (.249)
Presidential	-	-0.009 (.004)**	-0.019 (.005)***	-	-0.138 (.074)*	-0.298 (.082)***
Presidential*FEM	-	-	.085 (.025)***	-	-	1.458 (.437)***
R ²	0.98	0.98	0.98	0.99	0.99	0.99
F test (Presidential = 0)	-	-	7.75	-	-	7.08
F test (FEM = 0)	-	-	6.51	-	-	5.93
Observations	138	138	138	138	138	138

Note: standard errors in parentheses. One, two and three * indicate significance at the 10, 5 and 1% level respectively.

Table 7. Does political cycle matter?

Dependent Variables	% of Edu Expenditure on GDP			Log(Total Edu Expenditure)		
	(1)	(2)	(3)	(4)	(5)	(6)
FEM	.034 (.012)**	.035 (.013)**	.171 (.083)*	.541 (.217)**	.549 (.225)**	2.553 (1.275)*
Log(GDP per capita)	.002 (.009)	.004 (.010)	.004 (.009)	1.014 (.167)***	1.069 (.169)***	1.064 (.157)***
Population under 25 years old	.185 (.091)*	.180 (.095)*	.158 (.090)*	3.725 (1.531)**	3.467 (1.595)**	3.143 (1.542)*
Population above 65 years old	.088 (.064)	.097 (.066)	.076 (.057)	1.530 (1.202)	1.712 (1.148)	1.408 (1.007)
Female labor force participation rate	.044 (.043)	.049 (.043)	.047 (.042)	1.116 (.769)	1.086 (.744)	1.054 (.733)
Female attainment rate in higher education	.034 (.018)*	.033 (.019)*	.020 (.021)	.417 (.353)	.437 (.349)	.254 (.378)
Term	-	.001 (.001)	.004 (.003)*	-	.015 (.018)	.067 (.041)
Term*FEM	-	-	-.035 (.020)*	-	-	-.518 (.300)
R ²	0.98	0.98	0.98	0.99	0.99	0.99
F test (Term = 0)	-	-	1.67	-	-	1.50
F test (FEM = 0)	-	-	5.50	-	-	4.21
Observations	138	138	138	138	138	138

Note: standard errors in parentheses. One, two and three * indicate significance at the 10, 5 and 1% level respectively.

6. Conclusion

The purpose of this paper is to investigate the influence of women's participation in politics on decision making. I take educational expenditure as the target. The contribution of this study is to investigate the effect of female legislators on educational expenditure by cross-country data, while most of the previous literature studying effect of female legislators on policies is based on within country data. The results suggest that the greater the representation of women in parliament, the higher the educational expenditure as percentage of GDP and the higher the educational expenditure per capita. In addition, more balance between male and female legislators raises the educational expenditure as well, which may reflect the size effect of women. That is, women's policy impact is even greater as they have a sizeable presence because their male colleagues are also more likely to sponsor legislation concerning the social, legal, and economic position of women in order to prevent women's stealing their vote shares from voters who pay attention to women's concerns.

The positive effect of female legislators on educational policies does not depend on electoral rules. Although electoral rules have been believed to be the force behind the increasing representation of women in literature, it does not strengthen effect of female legislators on educational expenditure. Including the variable "left-wing government", which is believed to prefer more education than right-wing government, in the regression does not influence the effect of female legislators. Actually, more female politicians result in higher educational expenditure given the government is left-wing intensive. Also, left-wing governments allocate more money to education in net given the number of female politicians. Controlling for parliamentary system also gives a positive and significant effect of female legislators. I then check the influence of government forms. The results show that female politicians have effect on the weight of educational expenditure on GDP, and an effect on total public educational expenditure is also present. Even though presidential regime has negative effect on educational expenditure, the effect turns to positive when the parliament introduces female legislators. Finally, I check whether the assumption behind this study is reasonable or not. It shows that accountability of politicians does not influence the policy decision, which supports my assumption that the identity of politicians matters for policy. This study emphasis the effect of female legislators on educational policy on cross-country basis. However, it would be interesting as well to look at the effect of female legislators on other more relevant policies, such as social welfare and health. Consequently, this may constitute an area for future research of women's impact to the economy through politics.

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ⁱ "... Conformity pressures are greatest in institutional settings in which the majority culture is clearly predominant." See Davis (1997).

ⁱⁱ For example, Wängnerud (2000) states that "... Nordic parliamentarians agree that the gender composition of parliament matters for the political agenda." on page 146.

ⁱⁱⁱ The author finds that political reservation has increased transfers to groups which benefit from the mandate. In addition, the finding also suggests that complete policy commitment may be absent in democracies.

^{iv} The author studies whether the degree of women's representation in Swedish local councils affects local public expenditure patterns.

^v In the book "How Women Legislate", Thomas states that "... For most women, their public sphere role was only half of their job; they continued to bear the major responsibility for home and health. Given this dual role, it is not surprising that women have used their latitude to participate in the legislative arena to make private sphere issues legitimate governmental concerns."

^{vi} See Thomas (1994).

^{vii} "... If women are to be appointed to government, then they must first be elected to parliament." See Davis (1997).

^{viii} For example, Clots-Figueras (2007).

^{ix} Schwindt-Bayer (2007) points out that countries need to ensure that women are in the candidate pool by encouraging women to continue their education beyond secondary school and get degrees in professional fields that can be springboards to a political career such as a law degree, or by getting more women into the paid labor force and providing leadership training such that they can hold managerial positions.

^x The series after 1995 is collected from the website of IPU.

^{xi} The results using the average fraction of female parliamentarians in upper and lower houses are similar to the results using only the fraction of female parliamentarians in lower house.

^{xii} Data provided in this edition is only till 2003. I obtain the data in 2005 by assuming the growing rate of educational expenditure from 2003 to 2005 being the same as that from 2000 to 2003 in each country.

^{xiii} The data of real GDP per capita at constant prices in 2000 USD is collected from Penn World Table 6.2.

^{xiv} Since there are 19 countries in the sample and only 10 observations in each country, it has been suggested to ignore country trend when country dummies are included.

^{xv} I introduce group dummies in the model also for the purpose of discussing about contextual effects in the next section.

^{xvi} The p-value is 0 when testing whether group dummy equals country dummies in the same group, which implies that group dummies are a good approximation for country dummies.

^{xvii} I do not run the regression including all political factors at the same time for the purpose of clarifying each contextual effect of female politicians on educational expenditure more easily.

^{xviii} Education expansion in these dataset considers the need to expand and/or improve educational provision at all levels, and excludes technical training.

^{xix} The same structure applies to all following tables.

^{xx} This data is collected from Torsten Persson and Guido Tabellini (2003). They only consider legislative elections in lower house. For the value of Majoritarian equals 0 if the system is either strict proportionality or mixed.

^{xxi} Most of the countries have a stable parliamentary system during the sample period, except Spain and Sweden. Spain switched from unicameral system to bicameral system in 1977, and Sweden switched from bicameral system to unicameral system in 1970.

^{xxii} This data is collected from Torsten Persson and Guido Tabellini (2003). Most semi-presidential and premier-presidential systems are classified as parliamentary in their study. Countries are referred to presidential regime if the existence of a government is without a confidence requirement. For example, France is belonging to parliamentary regime since the legislature has an exclusive and unrestricted right of censure, even though the president is elected directly.

^{xxiii} New Zealands, Norway, Switzerland and US are exceptions. Term is fixed at 3 years in New Zealand, 4 years in Norway, 4 years in Switzerland, and 2 years in US.