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국제학석사 학위논문

The Effects of Female Representation in Government on Public Expenditures

정부의 여성대표자가 공공지출에 미치는 영향

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The Effects of Female Representation in Government on Public Expenditures

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Abstract

This thesis endeavors to answer the question: does the percentage of women in national parliaments effect government policies? For this thesis government expenditures are used as a measure of government policies and issue interest. Government expenditures are divided into public health, education, and military expenditures. These three categories were chosen because prior literatures illustrates a women and men make different decisions concerning health, education, and conflict. Both cross-sectional and time-series regressions are run to determine the correlations between the variables. The evidence illustrates that, in most cases, an increase in the percentage of women in parliament correlates to an increase in public health expenditures. A positive correlation is also usually found between the percentage of women in parliaments and education expenditures; however education expenditures are difficult to account for and further research needs to be done to elucidate other possible influences. Lastly, in some models military expenditures are negatively correlated with the percentage of women in parliament. The level of freedom, however, has a greater impact on military expenditures than the percent of women in national parliaments. These findings demonstrate that women holding political office pursue different policies than their male-counterparts. Therefore, gender equality in decision making bodies is essential to create truly representative institutions.

Keyword: public expenditures, women in parliament, female empowerment, gender equality, public health expenditures, public education expenditures, military expenditures

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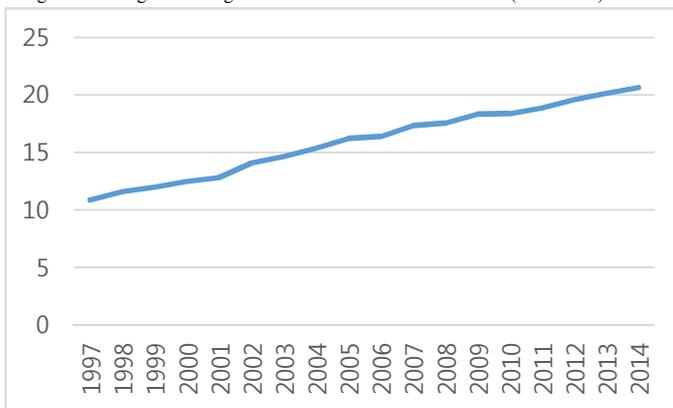
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I. Introduction

Globally, the average number of women in national parliaments has increased in recent years, from just over ten percent in 1997 to slightly greater than twenty percent in 2014. In 1997, there were roughly 3,430 women in single or lower houses of parliament. In 2014, that number had nearly doubled to 8,357 female representatives. All regions saw an increase

Figure 1. Average Percentage of Women in National Parliaments (1997-2014)



in the percentages of women in national parliaments, with the exception of the Pacific which remained relatively constant.¹ Worldwide the number of women in national parliaments is growing.

This increase of women in national parliaments signals not only a change in the status of women but is also likely to indicate a shift in government policies. Previous research has shown that women in decision making roles have different preferences and make different decisions than men.² Female empowerment has also been shown to correlate with changes in

¹ "Archived Data." Women in National Parliaments. Inter-Parliamentary Union.

² The following articles are only a few among many that demonstrate different female preferences and decisions. See the 'Literature Review' for further details. Chattopadhyay, Raghavendra, and Esther Duflo. 2004. "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India." *Econometrica* 72(5): 1409-443, Saint-Germain, Michelle A. 1989. "Does Their Difference Make Difference? The Impact of Women on Public Policy in the Arizona Legislature." American Political Science Association, ERIC Document Reproduction Service No. ED314324.

a wide range of social, economic, and even security related policies.³

As members of national parliaments women are able to shape policy and spread their agenda. Within a household, female empowerment and female decision-makers change how money is spent and how decisions are made. Furthermore, women in local level political positions have been shown to make different decisions than their male counterparts. This gender difference in priorities and policy decisions also exists on a national level. Therefore, democracies cannot rightfully claim to represent the interests of all their citizens if women are not included in national decision making bodies.

Female representation in national parliaments is an issue for all countries. Although the global average is increasing, low female representation in national parliaments is not isolated to a single region or level of economic development. Some regions have higher percentages of women in parliament than others; however no regional average surpasses the fifty percent split that is needed for (roughly) equal gender representation in national parliaments. Furthermore, the global average is well below the fifty percent mark. Globally there needs to be more done to promote gender equal representation in national parliaments. Figures 2 and 3 (below) illustrate the percentage of women in national parliaments by region and by groups of countries with similar levels of GDP/capita. Equal representation in national decision making bodies needs to be addressed in almost all countries, regardless of location or

³ The following are just a few examples of research that has demonstrated the correlation between women and different policy outcomes. For more information see the 'Literature Review'. Thomas, Duncan. 1990. "Intra-Household Resource Allocation: An Inferential Approach." *The Journal of Human Resources* 25(4): 635-664; Duflo, Esther. 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intra-Household Allocation in South Africa." *The World Bank Economic Review* 17(1): 1-25; Hudson, Valerie M., Mary Caprioli, Bonnie Ballif-Spanvill, Rose McDermott, and Chad F. Emmett. 2009. "The Heart of the Matter: The Security of Women and the Security of States." *International Security* 33(3): 7-45

level of economic development. Women have made strides towards equality; however there is still a long way to go before true equality can be achieved.

Figure 2. Percent of Women in Parliament – Countries Grouped by Region

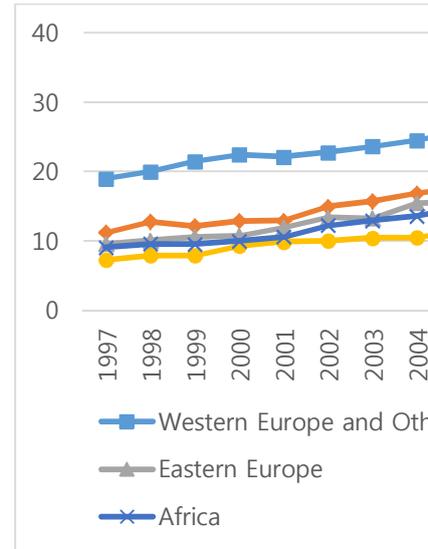
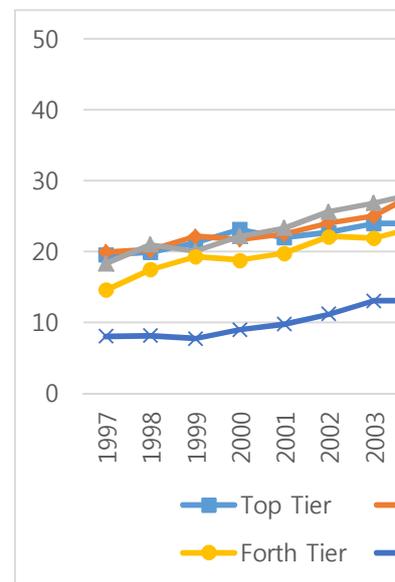


Figure 3. Percent of Women in Parliament – Countries Grouped by GDP/Capita



This thesis will focus on how, if at all, the gender composition of national

parliaments affect government policies. Public expenditures are used as a measure of government policy for this thesis. National parliaments often influence how the national budget is proportioned; therefore a shift in the composition of the parliament should lead to a change in how public money is allocated. The shift in budget allocation is used as an indicator of a shift in issue interest and prioritization. Furthermore, public expenditures are an operationization of how the national government interacts with the general population and as a measure of government services provided to the people. This thesis seeks to find if the gender composition of national parliaments is one such shift that influences parliaments' priorities and decision making process by measuring the allocation of public expenditures.

More precisely this thesis addresses the question of: how does female participation in parliament affect public spending on health, education, and the military? This thesis puts forth three separate hypotheses for examination: H1. That an increase in female participation in national parliaments will lead to an increase in public health expenditures. H2. That an increase in female participation in national parliaments will lead to an increase in public education expenditures. H3. That an increase in female participation in national parliaments will lead to a decline in military expenditures. Government expenditures were divided into these three categories due to data availability, but more importantly because prior studies demonstrate that men and women have different preferences and make different decisions regarding healthcare, education, and conflict. To examine and test these hypotheses, this thesis will use regression analysis to quantitatively answer these questions. Additionally,

this thesis will work on a global scale. Therefore, the patterns observed in the regression results are generalizable and provide an overview of global trends.

II. Literature Review

There is a wealth of literature that deals with how women in decision making roles affect policy. When looking at decision making on a household level, previous literature often rejects the assumptions that within a household income is pooled and decisions are made as a unit to maximize the welfare of all members. Instead, the literature finds a difference when households are broken down into individuals – mother, father, grandmother, grandfather, sons, and daughters. The literature demonstrates that women (both mothers and grandmothers) have different priorities and preferences that lead them to make different decisions than their male counterparts. As women earn their own income and/or gain more decision making power, differences in household expenditures, familial health, and educational attainment are observed. The development literature illustrates that female decision-makers have a particularly strong effect on health and education spending and outcomes. As female empowerment increases different preferences and outcomes manifest. Furthermore, recent literature has demonstrated that increasing gender equality is correlated with higher levels of peacefulness. The prior literature indicates that decision making bodies that include women are less likely to take risks and make less violent decisions. Women influence decisions related to security and violence. Additionally, women

have been shown to aid the peace process. Women affect decisions related to conflict and violence at all stages – before potential conflicts can manifest and when a conflict has already erupted. This research suggests that women have a far-reaching effect, beyond the confines of traditionally ‘female’ areas. Moreover, gender based differences have also been observed in politics both on a local and a national scale. Female members of local councils and national legislatures alike have been shown to have different priorities and thus introduce different legislation and policies. Gender based differences in decision making is found on both a household level as well as on a larger scale when women hold political office. The following sections will provide a concise overview of the relevant literature and demonstrate that women have different preferences and those differences manifest in different policies when women hold political office; thus gender equality in decision making bodies is need to create truly representative institutions.

The first section of this literature review will discuss the connection between women and health related decisions. The following section will illustrate the connection between women and educational attainment. The third section will focus on the findings that connect female empowerment and peacefulness. The final section will discuss the connections between female office holders and different policy outcomes.

2.1. Gender Based Preferences and Decisions in Development: Health

Economic and social development literature emphasizes that women have different

preferences than men. As a result of these difference women make different choices than their male counterparts. This section will illustrate the connection between female decision makers and improved health outcomes. Women, on average, have been observed to prioritize their family's health, in comparison to men who do not appear on average, to have this same preference.

The first example of this difference can be found in research conducted by Duncan Thomas. He conducted a study of household unearned income spending preferences in Brazil.⁴ He found that there was a larger impact on the family's health when women were in control of the income, as opposed to men. The impact is so significant Thomas finds that child survival is twenty times higher when women were in control of the money. Thomas also notes that women devote more resources to increasing the height and weight of their daughters, while fathers show a son preference. However, Duncan emphasizes that when the income is controlled by the mother both daughters and sons see more improvement than when the income is controlled by fathers. The conclusion that can be drawn from Thomas' work is that when women are in control of the income they spend the differently than men and in ways that improve the health of the family.

Ester Duflo's 2003 research also supports the conclusion that female controlled income increases familial health in a way that male controlled income does not. Duflo's research focuses on how funds from a pension program in "relatively

⁴ Thomas, Duncan. 1990. "Intra-Household Resource Allocation: An Inferential Approach." *The Journal of Human Resources* 25(4): 635-664

disadvantaged” homes in South Africa were allocated.⁵ She divides the pension-receivers by gender to measure if the gender of the pension-receiver affects how the money was spent. The research uses height as an indicator for early childhood nutrition, as it is a better indicator of health over time verse simply looking at weight. Duflo finds that young girls “who live with a grandmother who receives the pension are taller than those who live without one.” Her findings suggest that when women are in charge of the pension money they are more likely to put the money towards nutritional health needs. Duflo also notes that the same effect is not found when “the pension is received by a man.” The gender of the pension-receiver changes how the money is allocated. This research adds further evidence to support the theory that women prioritize their family’s health in a way that men do not.

The previous research demonstrates a link between women and increased health expenditures and outcomes. The literature clearly illustrates how the gender of the decision-maker correlates to different preferences and corresponding decisions. These differences in preferences and decisions have the possibility to scale up beyond a household level. Similar preferences towards improving healthcare and outcomes should also be observed on a national or even international level.

2.2. Gender Based Preferences and Decisions in Development: Education

Female empowerment, and an increased voice in decision making, has been linked

⁵ Duflo, Esther. 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intra-Household Allocation in South Africa." *The World Bank Economic Review* 17(1): 1-25

to host of positive development outcomes, including more education for the woman's family. Dr. James Emmanuel Kwegyir-Aggrey is famously quoted saying "if you educate a man you educate an individual, but if you educate a girl you educate a nation."⁶ As female empowerment increases and women become more educated, women place a higher preference on education, especially the education of girls, than their male counterparts.

In their 1998 study, Christian et al. investigate how different factors affect children's skill acquisition prior to kindergarten.⁷ The authors find that family's literacy rate has a positive correlation with four of the five achievement outcomes they measured in their study: reading, verbal, general information, and letter recognition. These results suggest that overall family literacy rates influence a child's academic performance. Furthermore, Christian et al. find that maternal education is alone is positively correlated with verbal and general information achievement outcomes. The level of the mother's education has a measurable effect on the education of her children prior to kindergarten.

Moreover, Duncan Thomas et al. study how the education levels of fathers and mothers in Brazil over a 50 year period affect the education of their children.⁸

⁶ Isaacs, David. 2013. "Editorial: Female Education." *Journal of Paediatrics and Child Health* 49(6): 425-426

⁷ Christian, Kate, Frederick J. Morrison, and Fred B. Bryant. 1998. "Predicting Kindergarten Academic Skills: Interactions Among Child Care, Maternal Education, and Family Literacy Environments." *Early Childhood Research Quarterly* 13(3): 501-521

⁸ Thomas, Duncan, Robert F. Schoeni, and John Strauss. 1996. "Parental Investments in Schooling: The Roles of Gender and Resources in Urban Brazil." *Labor and Population Program: Working Paper Series* 96(02)

Thomas's analysis also looks at the differences in education based on the gender of the child. He finds that "maternal education has a bigger impact on schooling of children and it has a bigger impact on education of daughters, relative to sons. In contrast, paternal education has a bigger impact on schooling of sons relative to daughters." The authors find evidence that educated women are more likely to invest in their children's education and in particular their daughter's education, as compared to men.

Female empowerment, in this case, operationalized as higher levels of education, has a positive correlation with educational outcomes. Women, as compared to men, have been shown to invest more in their children's, particularly their daughters', education. This literature further demonstrates that men and women have different preferences that lead to different outcomes – in this instance in regards to education attainment.

2.3. Women and Conflict

Although women are not traditionally linked to issues related to conflict and the military, prior research has shown that a society's treatment of women is correlated with a country's peacefulness. Gender equality has been linked to lower levels of international conflict, as women in decision making roles make less aggressive decisions thus preventing conflict. Additionally, women also hold unique positions within society that makes them ideal peace negotiators thus helping to end conflicts.

The work done by Hudson et al. in their article *The Heart of the Matter: The*

*Security of Women and the Security of States*⁹ and also their book *Sex & World Peace*¹⁰ demonstrates a correlation between poor gender relations/high gender inequality and conflict. The authors find that states with poor gender relations/high gender inequality are more likely to be involved in “intra- and interstate conflict, to be the first to resort to force in such conflicts, and to resort to higher levels of violence.”¹¹ The authors use the Physical Security of Women Index and the Variant of Physical Security of Women Index, both compiled by the WomanStats Database, to measure the treatment of women. Furthermore, they use the Global Peace Index, Relations with Neighbors, and States of Concern to the International Community – the first two variables are coded by the Economist Intelligence Unit (EIU) and the latter created by Valerie Hudson and Carl Brinton – to operationalize conflict. The authors find statistically significant correlations for all three measures of peacefulness and the physical security of women. Hudson et al. bases their findings on the theory that: “when evolutionary forces predisposing to violent patriarchy are not checked through the use of cultural selection and social learning to ameliorate gender inequality, [they] assert that dysfunctional templates of violence and control diffuse throughout society and are manifested in state security and behavior.”¹² The treatment of women is an

⁹ Hudson, Valerie M., Mary Caprioli, Bonnie Ballif-Spanvill, Rose McDermott, and Chad F. Emmett. 2009. "The Heart of the Matter: The Security of Women and the Security of States." *International Security* 33(3): 7-45

¹⁰ Hudson, Valerie M., Bonnie Ballif-Spanvill, Mary Caprioli, and Chad F. Emmett. 2012. *Sex & World Peace*. New York: Columbia UP

¹¹ Hudson, Valerie M. 2012. "What Sex Means for World Peace." *Foreign Policy*.

¹² Hudson, Valerie M., Mary Caprioli, Bonnie Ballif-Spanvill, Rose McDermott, and Chad F. Emmett. 2009. "The Heart of the Matter: The Security of Women and the Security of States."

operationalization of 'violent patriarchy.' If violent patriarchy declines (measured as the better treatment of women) then states become less violent on an international level and democracy may even take hold.

Furthermore, Hudson in an article for Foreign Policy states that, "all-male groups take riskier, more aggressive, and less empathetic decisions than mixed groups."¹³ Female empowerment leads to more women in decision making bodies. This in turn creates mixed groups that will lead to "less risky, less aggressive, and more empathetic decisions" than male-only groups. Hudson et al.'s research not only demonstrates that gender equality leads to less conflict, but more relevant to this thesis they find that women change how groups make decisions.

In addition to preventing conflict, women are effective peace makers after the conflict has begun. Swanee Hunt and Cristina Posa claim that "women are often the most powerful voices for moderation in times of conflict."¹⁴ The authors focus on 'inclusive security' – "a diverse, citizen-driven approach to global stability."¹⁵ Inclusive security emphasizes the role of the community in the peace building process. As a result, this model of peace building leads to the inclusion of women, who are often important members of civil society organizations (CSOs), non-governmental organizations (NGOs), and influential members in their communities. Moreover, Hunt and Posa argue that women are able to bridge the gap between to the fighting

International Security 33(3): 7-45

¹³ Hudson, Valerie M. 2012. "What Sex Means for World Peace." Foreign Policy.

¹⁴ Hunt, Swanee, and Cristina Posa. 2001 "Women Waging Peace." Foreign Policy: 38-47

¹⁵ Ibid.

parties easier than men. In general, women do not participate in armed conflicts on the same scale as men. Therefore, women have greater ties to their communities and “less psychological distance” between themselves and the opposing party. Additionally, the opposing party is more likely to accept women as negotiators and peace makers as “they did not do any of the actual killing.” Women are also “more inclined toward consensus and compromise” than men; thus making compromise more natural. Women are thus in an ideal position to create a compromise and implement a sustainable peace. The authors point to examples of women working towards and even building peace during the Sudanese civil war, between India and Pakistan, and between Palestine and Israel. Women are often excluded from the peace process; however when they are involved they have been able to produce results.

Hunt and Posa’s research illustrates that women come from different positions in the community and therefore approach issues differently. Furthermore, women have a different perspective of compromise and thus are able to bring peace where men cannot. Their research demonstrates that women change and shape the peace process differently than men.

The literature illustrates the influential role women play in preventing conflict and also in crafting lasting peace. Women change group dynamics in a way that produces less aggressive decisions. Moreover, women have different roles within the society and therefore have different priorities and pursue different policies. Including women in decision-making bodies has an effect on the outcome of those bodies, including in areas of peace, security, and conflict.

2.4. Gender Based Preferences and Decision in Politics

Women have different policy preferences; thus when women are present in government bodies there is a change in the types of policies pursued by the government. Female representatives in government change policy choices and fund allocation. Although many factors influence decision making, the gender of the policy maker has been shown to impact the decisions of government bodies.

On a personal level, there is a well-documented gender gap in political orientation. Shelah G. Leader's 1977 research demonstrates that women are more liberal than men.¹⁶ Edlund and Pande reconfirm this finding in 2001.¹⁷ Lott and Kenny add to this body of research with their findings that the political gender gap found in the United States dates back to women's suffrage in 1920.¹⁸ Furthering these findings in 2009, Gallup found evidence of a partisan gap between men and women regardless of age. Women of all ages are more likely to identify as Democrats, the United States' liberal party.¹⁹ In July of 2016, the Pew Research Center analyzed this partisan gap as it pertains to presidential voting. The Pew Research Center also found that women

¹⁶ Leader, Shelah Gilbert. 1977. "The Policy Impact of Elected Women Officials." *The Impact of the Electoral Process*: 265-284

¹⁷ Edlund, Lena, and Rohini Pande. 2001. "Why Have Women Become Left-Wing? The Political Gender Gap and the Decline in Marriage." *Quarterly Journal of Economics* 117: 917-961

¹⁸ Lott, John R., and Lawrence W. Kenny. 1999. "Did Women's Suffrage Change the Size and Scope of Government?" *Journal of Political Economy* 107(6): 1163-1198

¹⁹ Newport, Frank. 2009. "Women More Likely to Be Democrats, Regardless of Age." Gallup.

are more likely to identify as Democrats.²⁰ A multitude of scholars looking at different years have found a persistent difference between men and women's political affiliation and preferences. These differences in political affiliation are associated with different policy preferences and priorities. The differences observed in the general population are likely to remain when women join decision making bodies; thus leading them to pursue different policies and legislation than their male counterparts.

Chattopadhyay and Duflo, in their 2004 article find evidence that supports the claim that women in decision making bodies pursue different policies than their male counterparts.²¹ The authors study the impact of gender on policy decisions by looking at the political reservation system in India. The political reservation system mandates that a third of Village Council positions must be randomly reserved for women. The authors use "the types of formal requests brought to the GP [Gram Panchayats or local village councils]" to model the differences in policy preference based on gender. Across their sample area, they find that women have different policy preferences than men. Moreover, the Village Council positions reserved for women are randomly assigned; thereby controlling for any external variables and thus the results can be attributed to the reserved (female) status of the Councils. Chattopadhyay and Duflo's analysis demonstrates that local councils with are female members invest more in policies that are advocated by the women in that area. They find that "...a

²⁰ 2016. "Women More Likely than Men to Identify as a Democrat or Lean Democratic." Pew Research Center.

²¹ Chattopadhyay, Raghavendra, and Esther Duflo. 2004. "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India." *Econometrica* 72(5): 1409-1443

politician's gender does influence policy decisions." The authors conclude that the Indian reservation system, mandating a greater inclusion of female council members, does impact policy decisions. Investment in policies prioritized by women increases and there is less investment in policies favored by men.

On a local level in India, female participation in government has been shown to affect policies outcomes and promote investment in areas that are prioritized by women. Chattopadhyay and Duflo's research demonstrates that women have different policy preferences than men and that the gender of political leaders does translate into different in policies that match these preferences, at least on a local level. Their findings highlight gender as an important factor to consider when creating a truly representative government as women do pursue different policies than men.

Gender based differences have also been recorded at the state legislature level in the United States. Michelle A. Saint-Germain conducted a longitudinal analysis of the Arizona State Legislature from the years 1969 through 1986.²² She analyzed the types of bills proposed by the legislators to gauge if the gender of the legislator impacted the types of bills they introduced. Saint-Germain finds that female legislators are more likely to introduce legislation concerning female issues than male legislators. She defines female issues as "issues associated with the domestic concerns of women such as, children, nurturance, child care, welfare, reproduction, and

²² Saint-Germain, Michelle A. 1989. "Does Their Difference Make Difference? The Impact of Women on Public Policy in the Arizona Legislature." American Political Science Association, ERIC Document Reproduction Service No. ED314324.

education, or associated with their civic worker function, such as prostitution, schools, and public health.” In her research, Saint-Germain also finds that female legislators propose more ‘feminist’ legislation – which she differentiates from ‘female issues’ – than their male counter parts. Saint-Germain describes ‘feminist’ policies as “policies that will improve the status of women.” She concludes that “women do make a difference in state legislatures.” Saint-Germain’s research demonstrates that female legislators propose more bills concerning ‘female’ issues and also ‘feminist’ issues than their male counterparts. Importantly, Saint-Germain also finds that female legislators not only propose more bills concerning these two issue areas, female legislators are able to secure the passage more of these bills than male legislators. Saint-Germain’s research adds to the body of literature that demonstrates the differences between male and female legislators.

To further support this research, a larger study that includes survey data from the lower houses in twelve states legislatures, conducted by Sue Thomas and Susan Welch in 1988 demonstrated that female legislators are more likely to introduce bills concerning children, women, and families.²³ The authors claim that differences in legislation patterns are due to women’s preferences and not due to legislative activities or discrimination of committee membership. Thomas and Welch find that male and female legislators participate in “similar legislative activities,” which the authors operationalize as: “levels of floor and committee speaking, meeting with lobbyists,

²³ Thomas, Sue, and Susan Welch. 1991. "The Impact of Gender on Activities and Priorities of State Legislators." *The Western Political Quarterly* 44(2): 445-456

bargaining activity, and having difficulty bargaining.” Although women are more likely to be members of health and welfare committees and less likely to be on business of economic committees, the authors attribute this difference to “men’s somewhat greater likelihood of being appointed to prestigious committees, especially finance and revenue, rather than women’s disproportionately being likely to receive assignments to health and human services committees that they did not request.” Thus, the authors identify differences in preferences as the main motivator for the different patterns of legislation between male and female legislators. These findings provide further evidence that male and female legislators pursue different types of legislation.

The previous research demonstrates that men and women have different political preferences and that these differences translate into different policies pursued by male and female legislators. The gender composition of decision-making bodies influences policies and gender equality should, therefore, be achieved to create representative institutions.

2.5. Implications

On different continents and in a different contexts, the previous research has shown that women have different priorities than men and these differences translate into difference in outcomes. Although some of the literature reviewed deals with preferences on a house hold level, the literature also shows that those gender-based preference differences are also seen when men and women hold public office. The

preference differences, at a governmental level, translates into differences in policies as well. Female legislators and members of local governments put forward policies that align with the preferences associated with their gender. The gender of the legislator changes what policies are put forward and ultimately policies are passed into law. Furthermore, the previous research demonstrates that gender differences in preferences and decision-making are seen in all nations, developed and developing regardless of location.

This thesis seeks to answer the questions: do these differences in preferences, outcomes, and policy decisions seen in the existing literature remain globally on a national level? Do gender-based policy differences affect public expenditures? This thesis will operationalize gender by looking at the percentage of women in parliament. Women in parliament is in itself a measure of female empowerment and gender equality. In democratic systems, women must have some standing within a society if they are to be popularly elected to office. Even if women representatives are aided by a quota system, parliament presents women with a platform to spread and make substantive changes based on their preferences and values. Additionally, participation in parliament gives women access to resources that may have previously been unavailable and with these resources women are able to pursue their own projects and promote their own agendas. This thesis will use a variable measuring the percentage of women in national parliaments to gauge the effect of gender on a national level policy and expenditures.

To operational government policies this thesis will look at government

expenditures. Government expenditures are an easily quantifiable measure of government interest and support, in a way that individual pieces of legislation are not. Governments spend public money on a variety of sectors and projects. However, based on the prior literature this thesis will focus on three categories where men and women have been shown to have different preferences. Therefore, this thesis will look at how the percentage of women in parliament affects public health, education, and military expenditures. The following selection will further elaborate on the research methods and data used to conduct this research.

III. Research Methodology and Data

This thesis seeks to answer the question: how does having more women in national parliaments affect government expenditures? To answer this question more completely, expenditures are broken into to three categories: health, education, and military. The three hypotheses have been devised based on the previous literature. The three hypotheses are as following:

H1. That an increase in female participation in national parliaments will lead to an increase in public health expenditures.

H2. That an increase in female participation in national parliaments will lead to an increase in public education expenditures.

H3. That an increase in female participation in national parliaments will lead to

a decrease in military expenditures.

This thesis will use regression analysis to answer these questions. The variable measuring female representation in parliament is consistently available starting in 1997; therefore this thesis's analysis will also begin in 1997. Furthermore, at the time of writing, 2014 is the last year with a wide range of data available. As a result, this thesis's scope is limited to the eighteen years between 1997 and 2014. Moreover, this thesis will look at a global scale to the extent that the data is available.

To operationalize female participation in government, this thesis uses a variable created by the Inter-Parliamentary Union (IPU) and available through the World Bank Database that reports the percentage of female members in national parliaments. For this variable single or lower houses (in the case of bicameral legislatures) are used to operationalize national parliaments. This variable is coded as *parliafem*.

Additionally, the author uses the World Health Organization Global Health Expenditure database, available through the World Bank Database, to operationalize public health expenditures. The variable aggregates public health expenditures including a variety of both central and local government spending, borrowing, grants, and donations. The final variable is reported as a percentage of GDP. The variable is coded as *expendhealth*.

Moreover, to capture public education expenditures the author uses a variable compiled by the United Nations Education, Scientific, and Cultural Organization

(UNESCO) Institute for Statistics, also available via the World Bank Database. The variable combines local, regional, and central government spending as well as transfers from international sources. This variable is also presented as a percentage of GDP. This variable is coded as *expendedu*.

Furthermore, the variable quantifying military expenditures is put together by the Stockholm International Peace Research Institute (SIPRI) for their SIPRI Yearbook: Armaments, Disarmament and International Security. This variable is available through the World Bank Database. The SIPRI variable is a complex conglomeration of expenditures based on the NATO definition of military expenditures (see appendix for further details). This variable similar to the previous two is conveyed as a percentage of GDP. The variable is coded as *expendmilitary*.

In addition to the variables listed above, three control variables will also be accounted for - GDP/capita PPP, Islamic Civilization, and the Level of Freedom. With these control variables, the author wants to determine that the results were driven by the presence of women in national parliaments and not other economic, social, or political factors.

GDP/capita PPP is also provided by the World Bank Database and uses 2011 as a base year. This variable is coded as *gdpcap*. GDP/capita was chosen as control variable to operationalize wealth and economic development.

Furthermore, Freedom House's three point scale is used as the measure of the level of freedom with in a country. This thesis codes "not free" as 0, "partly free" as 1, and "free" as 2. This variable is coded as *freedom*. According to the Freedom

House, their data reports on the political and civil rights for each country mainly derived from the principals and standards in the Universal Declaration of Human Rights (1948).²⁴ Freedom House's measure of freedom was chosen to capture the amount of protection for political and civil rights.

Lastly, 'Islamic Civilization' was coded by the author from data provided by the Pew Research Center. 'Islamic Civilization' is coded as a dummy variable where 0 equates to countries where less than 50 percent of the population identifies as Muslim and 1 equates to countries where greater than 50 percent of the population identifies as Muslim. The variable is coded as *islam*. Culture is notoriously difficult to pin down let alone operationalize. Therefore, for this thesis the presence of a majority Muslim population was chosen as a crude measure of culture. Although the presence of an Islamic majority is not a perfect operationalization of culture, it was chosen because the variable is objectively quantifiable. Furthermore, Islam in particular was chosen because in some states Islamic beliefs have been invoked to limit women's rights and decrease gender equality.

Figure 4. (below) provides an empirical description of the variables mentioned above. When looking at the data it is important to note that *islam* is a dummy variable with only 0s and 1s. Additionally, that *freedom* is ordinal variable. In contrast, the other variables are all interval variables. Furthermore, this thesis works on a global scale; therefore for all variables there is a possibility of data from 217

²⁴ 2016. "Methodology: Freedom in the World 2016." Freedom House.

countries. In reality, however, observations are limited by the availability of data.

Figure 4. Description of Independent and Dependent Variables

	<i>parliafem</i>	<i>expendhealth</i>	<i>expendedu</i>	<i>expendmilitary</i>	<i>gdp</i>	<i>islam</i>	<i>freedom</i>	<i>laghealth</i>	<i>lagedu</i>	<i>lagmilitary</i>
Mean	15.43	3.78	4.60	2.17	14314.08	0.21	1.20	3.73	4.58	2.20
Max	63.80	21.65	19.26	39.61	141968.10	1.00	2.00	21.65	19.26	39.61
Min	0.00	0.04	0.81	0.00	370.30	0.00	0.00	0.04	0.81	0.00

This thesis will use both a cross-section analysis and a time series analysis to demonstrate the correlation between the percent of women in national parliaments and the three (health, education, military) categories of government expenditures. A cross-sectional analysis looks at many different data points gathered at a single point in time. This type of analysis illustrates on a global scale, in a given year, if the percentage of women in parliament and the respective public expenditure are correlated, the direction of the correlation, and the magnitude of the correlation. This thesis looks at two different types of cross-sectional regressions, single variate and multivariate. The single variate, cross-sectional regressions compares the independent variable (*parliafem*) with each of the different types of government expenditures, independently. This single variate regression shows the correlation between the two variables. In reality, however, a multitude of variables impact government expenditures; therefore this thesis will also use multivariate, cross-sectional regressions to analyze how, in addition to the percent of women in national parliament (*parliafem*), other variables (in this case *gdpcap*, *freedom*, and *islam*) affect the level of expenditures. Cross-sectional regressions have been calculated for every year between 1997 and 2014. Each regression illustrates how, on a global scale, the percentage of women in national parliament correlates to each respective category of

public expenditure. However, the results of these regressions are limited by the fact that they cannot show how the variables change over time.

To complement the findings in the cross-sectional regressions, this thesis will also look at time-series regressions to judge the impact of the percent of women in national parliaments on the same three (health, education, military) types of government expenditures over time for regional groups of countries. Time-series regressions, in contrast to cross-sectional, analyze how variables change over time. Variations over time are especially important when analyzing expenditures because the current level of spending is highly dependent on the previous year's level of spending. Therefore, the following regressions will include *lag* variables, in addition to the independent variable (*parliafem*). These *lag* variables are the previous year's level of spending. By including this variable, the regressions are able to illustrate which of the results are due to a change in the independent variable (*parliafem*) and not simply the result of the level of spending in the previous year. It is important to note that the other control variables (*islam*, *freedom*) will not be included in these regressions as these regressions use averages which makes them unsuitable to ordinal and dummy variables.

To conduct the time series analysis on a global scale, this thesis will analyze the global average as well as divide the countries into geographic regions and within each regions separate the countries into five tiers based on their level of GDP/capita PPP. The first time-series regression, the global analysis, is created by calculating the average of each variable (*parliafem*, *expendhealth*, *expended*, *expendmilitary*,

lagheath, lagedu, lagmilitary) for each of the eighteen years (1997-2014). This process creates a global average of the percent of women in parliament, public health expenditures, public education expenditures, military expenditures and a lag variable that corresponds to each of the three expenditures, respectively, for each of the eighteen years. Three separate regressions are then run for, the variable representing the percentage of women in national parliaments, each type of public expenditure, and the corresponding *lag* variable.

Moreover, further time-series regressions are run with the countries divided into regional groups. These groups are based on the United Nations Regional Groups. ‘Region’ was chosen as the method for grouping countries as countries in the same region generally share a common history, culture, and other similar ideologies. Therefore, grouping countries by region and running the regressions will demonstrate how these regional difference affect the variables. The regional groups are divided as

follows:

Figure 5. Regional Groupings

Western Europe and Others		
Andorra	Iceland	Portugal
Australia	Ireland	San Marino
Austria	Italy	Spain
Belgium	Liechtenstein	Sweden
Canada	Luxembourg	Switzerland
Denmark	Malta	United Kingdom
Finland	Monaco	United States
France	Netherlands	
Germany	New Zealand	
Greece	Norway	

Figure 6. Regional Groupings

Latin America			
Antigua and Barbuda	Cuba	Jamaica	Trinidad and Tobago
Argentina	Dominica	Mexico	Uruguay
Bahamas, The	Dominican Republic	Nicaragua	Venezuela, RB
Barbados	Ecuador	Panama	
Belize	El Salvador	Paraguay	
Bolivia	Grenada	Peru	
Brazil	Guatemala	St. Kitts and Nevis	
Chile	Guyana	St. Lucia	
Colombia	Haiti	St. Vincent and the Grenadines	
Costa Rica	Honduras	Suriname	

Figure 7. Regional Groupings

Eastern Europe		
Albania	Estonia	Poland
Armenia	Georgia	Romania
Azerbaijan	Hungary	Russian Federation
Belarus	Latvia	Serbia
Bosnia and Herzegovina	Lithuania	Slovak Republic
Bulgaria	Macedonia, FYR	Slovenia
Croatia	Moldova	Ukraine
Czech Republic	Montenegro	

Figure 8. Regional Groupings

Asia Pacific				
Afghanistan	Indonesia	Kyrgyz Republic	Nepal	Solomon Islands
Bahrain	Iran, Islamic Rep.	Lao PDR	Oman	Sri Lanka
Bangladesh	Iraq	Lebanon	Pakistan	Syrian Arab Republic
Bhutan	Japan	Malaysia	Palau	Tajikistan
Burundi	Jordan	Maldives	Papua New Guinea	Thailand
Cambodia	Kazakhstan	Marshall Islands	Philippines	Timor-Leste
China	Kiribati	Micronesia, Fed. Sts.	Qatar	Tonga
Cyprus	Korea, Dem. People's	Mongolia	Samoa	Turkmenistan

	Rep.			
Fiji	Korea, Rep.	Myanmar	Saudi Arabia	Tuvalu
India	Kuwait	Nauru	Singapore	United Arab Emirates

Figure 9. Regional Groupings

Africa					
Algeria	Comoros	Gambia, The	Mali	Senegal	Tunisia
Angola	Congo, Dem. Rep.	Ghana	Mauritania	Seychelles	Uganda
Benin	Congo, Rep.	Guinea	Mauritius	Sierra Leone	Zambia
Botswana	Cote d'Ivoire	Guinea-Bissau	Morocco	Somalia	Zimbabwe
Burkina Faso	Djibouti	Kenya	Mozambique	South Africa	
Burundi	Egypt, Arab Rep.	Lesotho	Namibia	South Sudan	
Cabo Verde	Equatorial Guinea	Liberia	Niger	Sudan	
Cameroon	Eritrea	Libya	Nigeria	Swaziland	
Central African Republic	Ethiopia	Madagascar	Rwanda	Tanzania	
Chad	Gabon	Malawi	Sao Tome and Principe	Togo	

Moreover, within each of the regions countries are grouped by their average level of GDP/capita. This will allow the regressions to illustrate how, if at all, the level of GDP/capita influences the variable. These groups were created by finding each countries average GDP/capita over the eighteen year period (1997-2014). GDP/capita is measured using the same World Bank data as in the multivariate-cross-

sectional regressions (see above for further description). After finding each country's average over the eighteen year period, the countries were grouped into five roughly equal groups. The groups are not perfectly equal due to the number of countries with available data not being perfectly divisible. The five groups are labeled from "Top Tier", the group with the highest average GDP/capita, to "Lowest Tier", the group with the lowest average GDP/Capita.

It is important to note that the research is limited by the availability of data. Data is not available for all countries for all years in the study. However, there is a sufficient number of observations to still be able to draw meaningful conclusions.

IV. Empirical Analysis

4.1. Single-Variate, Cross-Sectional

This section presents the results from the single-variate, cross-sectional regression analysis (Figure 10). The regression only includes only two variables: the independent variable (the percentage of women in national parliament, *parliafem*) and each dependent variable in turn (public expenditures as a percent of the GDP on health, education, and military – *expendhealth*, *expendedu*, and *expendmilitary* respectively). Over the eighteen year period (1997-2014) the data shows a statistically significant correlation between the percentage of women in national parliaments (*parliafem*) and respective public expenditures (as a percent of GDP) on health (*expendhealth*), education (*expendedu*), and the military (*expendmilitary*).

For all years in the study (from 1997 through 2014) the percentage of women

in national parliaments is statistically significant and positively correlated with public health expenditures. The results from the single variable regression analysis supports H1. On a global scale, as the percentage of women in national parliament increases, so does the public expenditures on health. These results indicate that female members of national parliaments push for increases in government expenditures on health. Prior research has demonstrated that women place a higher value on health than their male counterparts. This regression indicates that a similar connection can be seen globally in national parliaments as well.

Public education expenditures present a slightly more complicated result. The percentage of women in national parliaments and public health expenditures are also statistically significant and positively correlated for the years 1998 through 2012. Between 1998 and 2012 the single variable regression analysis supports H2. For the years that the correlation is significant, increases in the number of women in parliament is correlated with higher public education spending. Like the previous regression results, this also suggests that women favor more investment in education and this corresponds to higher levels of government expenditures on education. Curiously, the correlation is not statistically significant for the years 1997, 2013, and 2014. I assert that the reason for the sudden change in the results has to do with the availability of data and is not indicative of a change in the overall pattern of correlation. Between the years 1998 to 2012 (the years where the data was statistically significant and positively correlated) there is an average of 100 observations per year. In contrast, in 1997, only 30 observations were available. In 2013, 55 observations were

available and only 28 in 2014. The years 1997, 2013, and 2014 all show a sharp decline in the number of observations available for analysis. I predict that if more data was available for the years 1997, 2013 and 2014 the positive, statistically significant correlation between public education expenditures and the percentage of women in national parliaments would continue. Perhaps in the future more data will be available for 2013 and 2014 and this hypothesis can be tested.

In contrast to public health and education expenditures, there is a negative correlation between the percentage of women in national parliaments and military expenditures, when the results are statistically significant. The correlation becomes statistically significant starting in 2004 and remains so through 2014. The data from 2004 through 2014 supports H3. Prior literature asserts that women make less aggressive decisions. Favoring less aggression on a national scale would lead to lower levels of military expenditures, as without aggression excessive offensive military capacity and high levels of military spending would be unnecessary. This regression supports this theory. It finds that as the percentage of women in national parliaments increases, correlating military expenditures decrease. From the analysis it is unclear what is responsible for the sudden change in statistical significance in 2004. However, the negative correlation remains throughout the last ten years studied and presents compelling evidence of a pattern.

Figure 10. Single Variate, Cross Section (1997-2014):
Parliafem and Government Expenditures

	Health	Education	Military
1997	0.1149**	0.09099	-0.0204

	(0.0157)	(0.0561)	(0.01908)
Obvs	149	30	123
1998	0.1023**	0.0682**	-0.0046
	(0.0152)	(0.0199)	(0.0368)
Obvs	148	72	116
1999	0.1064**	0.0588**	-0.0217
	(0.0153)	(0.0217)	(0.0454)
Obvs	140	93	111
2000	0.0871**	0.0439*	-0.0145
	(0.0193)	(0.0213)	(0.0329)
Obvs	145	99	116
2001	0.0779**	0.0522*	-0.0213
	(0.0185)	(0.0203)	(0.024)
Obvs	155	99	125
2002	0.0868**	0.0685**	-0.0036
	(0.0178)	(0.0176)	(0.0235)
Obvs	150	102	121
2003	0.0789**	0.0534*	-0.002
	(0.0157)	(0.0213)	(0.0192)
Obvs	164	102	137
2004	0.0659**	0.0669**	-0.0288*
	(0.0165)	(0.0211)	(0.0134)
Obvs	168	114	140
2005	0.0658**	0.0621**	-0.0312*
	(0.0166)	(0.0235)	(0.0126)
Obvs	172	103	142
2006	0.06212**	0.0542*	-0.0351**
	(0.0163)	(0.0209)	(0.0118)

Obvs	176	102	143
2007	0.0578** (0.0167)	0.0481* (0.0192)	-0.028** (0.0107)
Obvs	177	103	139
2008	0.0625** (0.0164)	0.0519** (0.019)	-0.0227* (0.0101)
Obvs	175	112	143
2009	0.0617** (0.0165)	0.0507* (0.0215)	-0.0308** (0.0107)
Obvs	174	105	139
2010	0.0728** (0.0157)	0.0605** (0.0194)	-0.0225* (0.0101)
Obvs	174	111	138
2011	0.0602** (0.0165)	0.0342 (0.01845)	-0.0318** (0.0107)
Obvs	177	102	139
2012	0.0541** (0.0155)	0.0522** (0.0149)	-0.0335* (0.0131)
Obvs	180	81	145
2013	0.0489** (0.016)	0.0062 (0.0185)	-0.0296* (0.0132)
Obvs	180	55	144
2014	0.0426** (0.0159)	0.0353 (0.0249)	-0.0282* (0.0139)
Obvs	180	28	143

*p ≤ 0.05 ** p ≤ 0.01

Figure 10. Presents the correlation coefficients, the corresponding standard error (listed underneath in parentheses), and lastly the number of observations for each single variate, cross-sectional regressions between *parliafem* and the respective category of government expenditure for the years 1997 through 2014. Further information is available in the appendix.

4.2. Multivariate, Cross-Sectional

Determining government expenditures is a complex process and a variety of factors are influential. Therefore, this thesis will also use multivariate regressions to illustrate how multiple factors affect public expenditures. These regressions will include the respective public expenditure (as a percentage of GDP) – health, education, or military – and four other variables including: the percentage of women in national parliaments (*parliafem*), GDP/capita (*gdpcap*), Freedom House’s rating of the level of freedom (*freedom*), and the presence of a majority Muslim population (*islam*). Similar to the previous analysis, the following regressions are also cross-sectional regressions run for each individual year and the specific public expenditure. These regressions also use data from every available country for a single year at a time. As a result, the following regressions demonstrate how multiple factors impact public expenditures for the respective year.

Looking first at health expenditures (Figure 11), the data show that the percentage of women in national parliaments, GDP/capita, and the level of freedom are all positively correlated. For most of the years analyzed, ten of the eighteen years, female representation in national parliaments was positively correlated with health expenditures. This regression also supports H1. As with the previous regression, increases in female representatives in national parliaments increases public health expenditures; thus demonstrating that female members of parliament, as opposed to their male counterparts, place a greater importance on health and seek to increase

public health expenditures which in turn should lead to better health outcome for the citizenry.

Furthermore, GDP/capita is statistically significant for all years in the study; however the close to zero coefficients indicate that the variable has little to no effect on health expenditures. A country's level of GDP/capita is unlikely to make a meaningful change in how much relatively, as the variable is measured as a percentage of GDP, the country spends on public health expenditures. Moreover, the level of freedom is statistically significant for all years, except 1998. The level of freedom also has the largest effect on public health spending. Countries that have a high level of freedom are more likely to have higher relative levels of health expenditures (measured as a percent of GDP). A country's level of freedom significantly correlates with government health expenditures and often has more of an effect than the percentage of women in parliament; thus this variable should also be taken into consideration when looking at health expenditures. In contrast, having a majority Muslim population is not statistically significant for any of the years. The presence of a Muslim majority population, according to this analysis, does not influence public health expenditures.

The next multivariate regression looks at the correlations between education expenditures and the percent of women in parliament, GDP/capita, the level of freedom, and the presence of a Muslim majority population (Figure 12). The variable measuring the percentage of women in national parliaments is the only variable that has statistically significant results for more than a single year. Education expenditures and the percent of women in national parliaments are significant and

positively correlated for ten years of the eighteen. Therefore, this multivariate regression also supports H2. This further demonstrates that women change national parliaments. In this case, women prioritize education and thus more women in national parliaments corresponds to increases in public spending on education.

On the other hand, GDP/capita and the level of freedom are only statistically significant for one year each, 1998 and 2013 respectively. Furthermore, the variable measuring the presence of a majority population that identifies as Muslim is insignificant for all eighteen years. Of the factors in this particular model the percentage of women in national parliaments is the only variable in this regression that influences the level of public education expenditures. The control variables – GDP/capita, the level of freedom, and the presence of a majority population that identifies as Muslim – do not influence public education expenditures. The lack of significant results demonstrates that more research needs to be conducted to illuminate the alternative variables that have an impact on public education expenditures.

The third multivariate regression concerns military expenditures and the percentage of women in national parliaments, GDP/capita, the level of freedom, and the presence of a majority of population that identifies was Muslim (Figure 13). In this regression, the variable measuring the level of freedom has the strongest negative correlation indicated by the largest coefficient, in terms of absolute value. There is a negative correlation found for fourteen of the eighteen years. Indicating that the countries level of freedom is a significant factor influencing their level of military spending. The percentage of women in national parliaments is also negatively

correlated with military expenditures. However, the percentage of women in national parliaments is only statistically significant for two years during the period; thus making it difficult to discern a definite pattern. The multivariate regression thus does not support H3. When more factors are added to the model the significance of women in national parliaments declines, as other factors play a more important role.

Additionally, GDP/capita is statistically significant for seven of the eighteen years; however the variable has almost no effect on military expenditures. Regardless of the level of economic development, in general countries will continue to spend on their military. Moreover, the variable measuring the presence of a majority Muslim population is significantly correlated with military expenditures for ten years. The multivariate regression analyzing military expenditures is the only multivariate regression where the presence of a majority Muslim population has any statistically significant results. In the eight of the ten years the variable was statistically significant, there was a positive correlation between having a Muslim majority population and military expenditures. However, in 1999 and 2000 the correlation is reversed and a majority Muslim population is negatively correlated with military expenditures. The contradictions in directionality of the correlation make it difficult to discern a pattern in relation to the presence of a Muslim majority population and military expenditures.

The multivariate regressions, presented in Figures 11, 12, and 13, provide support for H1 (health expenditures) and H2 (education expenditures). However, these multivariate regressions do not find convincing evidence to support H3 (military

expenditures). The regressions do demonstrate that a range of variables impact government expenditures and need to be taken into account when studying the factors that influence public spending.

Figure 1.1. Multivariate, Cross-sectional Regression: Public Health Expenditures

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>paritqem</i>	0.0695** (0.0163)	0.0461** (0.0143)	0.0488** (0.0155)	0.0358 (0.021)	0.01917 (0.01856)	0.0313 (0.0171)	0.03308* (0.0148)	0.0178 (0.0159)	0.035* (0.0158)	0.0308* (0.0155)	0.0303 (0.0162)	0.0425** (0.0157)	0.0355 (0.0152)	0.0478** (0.0143)	0.0389* (0.0157)	0.0327* (0.0143)	0.0231 (0.0149)	0.0138 (0.0153)
<i>gdpcap</i>	0** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0** (0)	0** (0)	0** (0)	0** (0)	0.0001** (0)	0** (0)	0** (0)	0** (0)	0** (0)	0** (0)
<i>freedom</i>	0.5538** (0.1915)	0.264 (0.1649)	0.5319** (0.1758)	0.812** (0.2597)	0.8044** (0.214)	0.7196** (0.2075)	0.6591** (0.1962)	0.8685** (0.2058)	0.9231** (0.2103)	0.9523** (0.2082)	0.9838** (0.2233)	1.1441** (0.2333)	0.949** (0.233)	0.9654** (0.2148)	1.0808** (0.2486)	0.9942** (0.2266)	1.0206** (0.2477)	1.0384** (0.2492)
<i>islam</i>	-0.5479 (0.3517)	-0.4576 (0.3125)	-0.23 (0.3464)	-0.2169 (0.4827)	-0.1627 (0.4053)	-0.3917 (0.4082)	-0.2599 (0.3633)	-0.2867 (0.3903)	-0.4556 (0.3923)	-0.724 (0.3879)	-0.5776 (0.4083)	-0.2525 (0.4196)	-0.3634 (0.4344)	-0.5003 (0.3982)	-0.572 (0.4575)	-0.6265 (0.4157)	-0.6265 (0.4563)	-0.391 (0.4593)
Obsvs	141	141	135	138	151	145	159	167	167	171	172	170	169	168	171	173	173	168

*p ≤ 0.05 ** p ≤ 0.01

Figure 1.1. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate regressions using the variables: *paritqem*, *gdpcap*, *freedom*, *islam* and public health expenditure for the years 1997 through 2014. Further information is available in the appendix.

Figure 12. Multivariate, Cross-sectional Regression: Public Education Expenditures

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>parliqem</i>	0.0584 (0.0661)	0.0431† (0.0219)	0.0495 (0.0263)	0.0292 (0.026)	0.0387 (0.0242)	0.0503* (0.0202)	0.0433 (0.0258)	0.0512* (0.0239)	0.0548* (0.0254)	0.0453† (0.0234)	0.0489* (0.0221)	0.0493* (0.0218)	0.0479† (0.0249)	0.0588** (0.0211)	0.0282 (0.021)	0.0408* (0.0158)	0.0211 (0.0188)	0.0269 (0.0254)
<i>gdpcap</i>	0 (0)	0.0001* (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	-0 (0)	-0 (0)
<i>freedom</i>	0.3192 (0.8501)	0.4168 (0.2725)	0.3453 (0.3281)	0.4212 (0.3074)	0.1150 (0.2927)	0.2331 (0.2655)	0.0540 (0.3695)	0.2557 (0.3138)	0.4004 (0.3358)	0.3730 (0.3256)	0.4229 (0.3424)	0.4150 (0.3454)	0.0023 (0.4283)	0.4057 (0.3306)	0.5426 (0.3828)	0.3884 (0.2535)	0.8379** (0.3067)	0.2268 (0.4597)
<i>islam</i>	-0.8620 (1.2972)	0.3522 (0.5898)	-0.758 (0.5965)	0.0529 (0.5776)	-0.5637 (0.5335)	-0.3886 (0.506)	-0.5469 (0.6484)	-0.6054 (0.59)	-0.7429 (0.6373)	-0.5784 (0.5922)	0.0463 (0.61)	-0.5512 (0.5847)	-1.1183 (0.7207)	-0.6177 (0.6166)	-0.2822 (0.6343)	-0.3507 (0.4326)	-0.4271 (0.4614)	-1.0340 (0.7333)
Obsv	28	70	92	97	98	99	99	109	101	98	99	108	101	107	97	79	53	28

†p ≤ 0.06 *p ≤ 0.05 ** p ≤ 0.01

Figure 12. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate regressions using the variables: *parliqem*, *gdpcap*, *freedom*, *islam* and public education expenditure for the years 1997 through 2014. Further information is available in the appendix.

Figure 13. Multivariate, Cross-sectional Regression: Public Military Expenditures

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>partiafem</i>	-0.0159 (0.0218)	0.0127 (0.0434)	0.0119 (0.0521)	0.0052 (0.039)	-0.0055 (0.0272)	0.0159 (0.026)	0.0111 (0.0212)	-0.0254 (0.0138)	-0.0233 (0.0128)	-0.0224 (0.0121)	-0.018 (0.0115)	-0.0163 (0.0107)	-0.0275* (0.0107)	-0.0179 (0.01)	-0.0243* (0.0102)	-0.0237 (0.0127)	-0.0202 (0.0118)	-0.0161 (0.0126)
<i>gdpcap</i>	0 (0)	(-) 0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0* (0)	0 (0)	0 (0)	0** (0)	0** (0)	0** (0)	0** (0)	0** (0)	0** (0)
<i>freedom</i>	-0.4042 (0.2792)	-0.758 (0.5523)	-2.1559** (0.5802)	-1.4413** (0.4865)	0.9942** (0.3226)	-1.1552** (0.5289)	-0.6742* (0.2899)	-0.5842** (0.1879)	-0.4956** (0.176)	-0.4041* (0.1643)	-0.2476 (0.1567)	-0.2768 (0.1592)	-0.6277** (0.1679)	-0.4717** (0.1525)	-0.6881** (0.1605)	-0.8184** (0.1987)	-0.8985** (0.194)	-0.9179** (0.2015)
<i>islam</i>	-0.2716 (0.4619)	-1.0006 (0.5902)	-2.4329* (1.135)	-1.609† (0.8475)	-0.5788 (0.5683)	-0.5815 (0.5885)	0.1225 (0.5038)	0.7201* (0.3843)	0.6264* (0.3159)	0.6493* (0.3027)	0.5963* (0.2894)	0.4665 (0.2819)	0.2946 (0.3048)	0.5783* (0.2794)	0.6488* (0.2917)	0.5956 (0.3579)	0.8978* (0.365)	1.0524* (0.37)
Obs	121	114	110	114	124	119	135	138	140	141	137	142	138	137	138	143	142	140

†p ≤ 0.06 *p ≤ 0.05 **p ≤ 0.01

Figure 13. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate regressions using the variables: *partiafem*, *gdpcap*, *freedom*, *islam* and military expenditure for the years 1997 through 2014. Further information is available in the appendix.

4.3. Multivariate, Cross-Sectional: Excluding *Islam*

The initial multivariate regressions (see above) run with *parliafem* and all three control variables (*gdpcap*, *freedom*, *islam*) demonstrate that the variable *islam* is rarely statistically significant. The variable only returns statistically significant results for ten years and only when correlated with military expenditures and even then the directionality of the correlation is mixed. Having a majority population that identifies as Muslim does not correlate with government expenditures on health or education. The lack of statistically significant results suggests that the variable does not affect public health and education expenditures and has a mixed effect in some years on military expenditures. Therefore, the following section looks at the same multivariate regressions run without the variable *islam* to demonstrate the relationship between the other variables without this insignificant variable potentially skewing the results.

When the variable measuring if the majority of the population identifies as Muslim is eliminated, the health expenditure multivariate regression returns more robust results (Figure 14). The percent of women in parliament is statistically significant and positively correlated with health expenditures for thirteen of the eighteen years in question. This regression also illustrates that female parliament members change how the government allocates funds, in this case to increase health expenditures. Additionally, GDP/capita and the level of freedom are both statistically significant for the entire eighteen year period. The level of freedom, in fact, has the greatest impact on health expenditures of the three variables measured in this regression, determined by the larger magnitude of its coefficients. On the other hand,

the data show that, although statistically significant, GDP/capita has only a minute coefficient and therefore only a very limited effect on health expenditures. This revised multivariate regression continues to support H1; however as mentioned previously the influence of the level of freedom should also be taken into account as an important factor.

Moreover, the next regression analyzes public education expenditures. Again, this regression demonstrates that accounting for public education expenditures is difficult. Even in the revised multivariate regression few of the results are statistically significant (Figure 15). The variable measuring the percent of women in national parliaments returns the highest number of significant results (eleven of eighteen). During the years when the data is statistically significant, the data demonstrates that the number of women in national parliaments is positively correlated with education expenditures. This regression also provides evidence supporting H2 and supports the theory that women prioritize education and thus more women in national parliaments leads to higher levels of government spending in that area. The variables measuring GDP/capita and the level of freedom collectively return three statistically significant results. GDP/capita is statically significant and positively for the year 1998; however the variable has a tiny coefficient and therefore little impact. The level of freedom is statistically significant and positively correlate for the years 2012 and 2013. However, two of eighteen years is not enough data to convey a convincing pattern. This revised multivariate regression presents stronger support of H2; however, as mentioned previously, the lack of statistically significant results presents an interesting puzzle and

the potential for future research.

The revised multivariate regression looking at military expenditures (Figure 16) shows a negative correlation between military expenditures with both the percentage of women in national parliaments and the level of freedom. Starting in 2004 and continuing through 2013 there is a statistically significant, negative correlation between the percentage of women in national parliaments and military expenditures. The previous literature connects women will higher levels of peacefulness which would in turn translate as lower levels of military spending, as peaceful countries spend less on their military. This regression indicates that such a connection exists between female member of national parliaments and military expenditures, providing support for H3. Furthermore, the level of freedom and military expenditures are statistically significant and negatively correlated for sixteen of the years, starting in 1999 and continuing through 2014. As mentioned previously, the level of freedom continues to significantly impact public expenditures. Contrastingly, GDP/capita is positively correlated with military expenditures for half of the years. Although the variable measuring GDP/capita is positively correlated with military expenditures, the effect is minimal. The GDP/capita of a country does not correlate to a meaningful change in military spending. The results from this regression continue to support the theory that on average countries, regardless of their income level, countries will allocate a certain percent of their GDP to military expenditures. This revised multivariate regression supports H3; however the level of freedom also significantly impacts military expenditures and should be included when evaluating military expenditures.

Figure 14. Multivariate, Cross-sectional Regression Excluding *Islam*: Public Health Expenditures

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>partitem</i>	0.0734** (0.0162)	0.0504** (0.0141)	0.0508** (0.0151)	0.0375 (0.0206)	0.0206 (0.0182)	0.034* (0.0168)	0.0327* (0.0145)	0.0205 (0.0155)	0.0393* (0.0154)	0.0377* (0.0151)	0.0353* (0.0159)	0.0453** (0.0151)	0.0385** (0.0148)	0.0523** (0.0140)	0.0434** (0.0152)	0.0366** (0.0141)	0.0274 (0.0146)	0.0163 (0.0150)
<i>gdpccap</i>	0** (0)	0.0001** (0)	0.0001** (0)	0** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0.0001** (0)	0** (0)	0** (0)	0** (0)							
<i>freedom</i>	0.6912** (0.1708)	0.3656* (0.1502)	0.5756** (0.1627)	0.4624** (0.2335)	0.8378** (0.1973)	0.7897** (0.1941)	0.7133** (0.1807)	0.9283** (0.1888)	1.0213** (0.1946)	1.1112** (0.1915)	1.1183** (0.2026)	1.2056** (0.2093)	1.0436** (0.2035)	1.0939** (0.1892)	1.2297** (0.2186)	1.1478** (0.2031)	1.1884** (0.216)	1.1367** (0.2207)
Obs	141	141	135	138	151	145	159	163	167	171	172	170	165	168	171	173	173	168

*p ≤ 0.05 ** p ≤ 0.01

Figure 14. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate regressions using the variables: *partitem*, *gdpccap*, and *freedom* and health expenditure for the years 1997 through 2014. Further information is available in the appendix.

Figure 1.5. Multivariate, Cross-sectional Regression Excluding *Islam*: Public Education Expenditures

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>paritqem</i>	0.0612 (0)	0.0414† (0.0216)	0.0548* (0.0261)	0.0288 (0.0256)	0.0425 (0.024)	0.0526** (0.0199)	0.0456 (0.0256)	0.0559* (0.0234)	0.0607* (0.025)	0.0514* (0.0226)	0.0484* (0.0211)	0.0556** (0.0207)	0.0557* (0.0246)	0.0628** (0.0207)	0.0303 (0.0203)	0.0435** (0.0154)	0.0268 (0.0177)	0.0378 (0.0247)
<i>gdpccap</i>	-0 (0)	0.0001* (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	-0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	-0 (0)	-0 (0)
<i>freedom</i>	0.6499 (0.6812)	0.3923 (0.2681)	0.5228 (0.2979)	0.4102 (0.2815)	0.225 (0.2737)	0.3124 (0.2441)	0.2009 (0.3253)	0.407 (0.277)	0.5654 (0.3051)	0.5056 (0.2959)	0.4095 (0.2955)	0.5591 (0.3096)	0.3354 (0.3734)	0.5104 (0.3137)	0.6096 (0.3504)	0.471* (0.2316)	0.968** (0.2722)	0.5454 (0.4086)
Obsv	28	70	92	97	98	99	99	109	101	98	99	108	101	107	97	79	53	28

†p ≤ 0.06 *p ≤ 0.05 **p ≤ 0.01

Figure 1.5. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate regressions using the variables: *paritqem*, *gdpccap*, and *freedom* and education expenditure for the years 1997 through 2014. Further information is available in the appendix.

Figure 16. Multivariate, Cross-sectional Regression Excluding *Islam*: Public Military Expenditures

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>particdem</i>	-0.0145 (0.0216)	0.0223 (0.0425)	0.0329 (0.052)	0.0206 (0.0386)	0.0708 (0.0265)	0.0213 (0.0254)	0.0099 (0.0205)	-0.0324* (0.0136)	-0.0307* (0.0124)	-0.0299* (0.0117)	-0.0249* (0.0111)	-0.0216* (0.0103)	-0.0304** (0.0103)	-0.0229* (0.0099)	-0.0308** (0.0099)	-0.0286* (0.0124)	-0.0271* (0.0117)	-0.0231 (0.0127)
<i>gdpcap</i>	0 (0)	-0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0** (0)	0** (0)	0** (0)	0 (0)	0 (0)	0** (0)	0** (0)	0** (0)	0** (0)	0** (0)	0** (0)
<i>freedom</i>	-0.3214 (0.2404)	-0.4838 (0.4873)	-1.604** (0.585)	-1.0382** (0.4428)	-0.8678** (0.2978)	-1.0312** (0.3648)	-0.7008** (0.2675)	-0.7389** (0.176)	-0.6083** (0.1684)	-0.5338** (0.155)	-0.3616* (0.1484)	-0.3829** (0.1466)	-0.7014** (0.1496)	-0.6002** (0.141)	-0.8344** (0.1485)	-0.9466** (0.1844)	-1.1115** (0.1774)	-1.1505** (0.1889)
Obs	121	114	110	114	124	119	135	138	140	141	137	142	138	137	138	143	142	140

*p ≤ 0.06 **p ≤ 0.05 ***p ≤ 0.01

Figure 16. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate regressions using the variables: *particdem*, *gdpcap*, and *freedom* and education expenditure for the years 1997 through 2014. Further information is available in the appendix.

The exclusion of the variable *islam* has not dramatically changed the results of the regressions. The same general patterns remain in both the sets of regressions with and without the variable *islam*. However, these additional regressions provide a clearer picture of the data, as they do not include an insignificant variable.

Overall, the multivariate regressions, both the original regressions with four independent variables and the revised regressions with three independent variables, support H1 (health expenditures). Although the level of freedom has a larger effect on government expenditures, the percentage of women in parliament does still have a significant effect on the public expenditures. The percentage of women in national parliaments is positively correlated with health expenditures. These results support the previous literature that illustrates the connection between women and health outcomes. Globally, increases in the number of women in national parliaments corresponds to higher levels of government health expenditures. This higher level of expenditures indicates that the governments are placing a higher priority on health as they are allocating more resources and funding to that particular sector. H2 (education expenditures) and the regressions concerning public education expenditures present a more complex picture. For some of the years studied, the percentage of women in national parliaments is statistically significant and positively correlated with education expenditures. However, the public education expenditure regressions returned the lowest number of statistically significant results for all variables. Thus indicating that there are other variables not captured in this analysis that can better explain the variation public education expenditures. Further research should be

conducted to elucidate through alternative variables. However, this thesis finds tentative support for H2. Furthermore, the revised multivariate regression supports H3 (military expenditures). Increases in the percentage of women in national parliaments is correlated with a decline in military expenditures. However, as with previous regressions, the level of freedom has a larger impact on military expenditures than the percentage of women in national parliaments. Therefore, the negative correlation between the percentage of women in national parliaments and military expenditures is significant, but the level of freedom should be taken into account when analyzing military expenditures.

4.4. Time-Series Regressions

The time series regressions are designed to capture how the variables change over time. This section will analyze six different sets of regressions. The first is a global average for the years 1997 through 2014, an eighteen year period. The countries are then divided into five regional groups (Western Europe and Others, Latin America, Eastern Europe, Asia Pacific, and Africa) and within those regional groups further categorized by level of GDP/capita. Each set of regressions will analyze how the percentage of women in national parliaments (*parliafem*) correlates with each respective public expenditure (health, education, and the military). Note that all public expenditures are given as a percentage of the GDP. All regressions will also include a *lag* variable to take into account the previous year's level of spending.

The first time-series regression illustrates, on average, how the percent of

women in national parliaments affects the three different types of government expenditures (health, education, and military). This regression (Figure 17) demonstrates that the percent of women in parliament is positively correlated with health expenditures. These results add further support for H1. This regression adds further support to the theory that women change decision making bodies, especially in relation to healthcare and health expenditures. However, the regression does not return statistically significant results for the correlation between the percent of women in parliament and education or military expenditures. Therefore, this regression does not find evidence to support H2 or H3. The global averages find that women in national parliaments have the greatest influence over health expenditures, as compared to education or military expenditures. Furthermore, the regression returns positive, statistically significant results for both the health and military expenditures lag variables. This indicates that the two types of expenditures are influenced by the previous year's level of spending. Although this 'lag effect' influences the level of expenditures, other variables – in this case the percentage of women in national parliaments – still influence the level of public expenditures.

Figure 17. Time Series Regression (1997-2014) - Government Expenditures, All Countries

	Health	Education	Military
All Countries			
<i>parliafem</i>	0.0528** (0.0178)	0.0148 (0.0199)	-0.0245 (0.0234)
<i>lag</i>	0.4095* (0.199)	0.4116 (0.2289)	0.6758* (0.2406)
Obvs	18	18	18

†p ≤ 0.06 *p ≤ 0.05 ** p ≤ 0.01

Figure 17. Presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate, time-series regressions using the variables: *parliafem* and the corresponding. The time series runs from 1997 through 2014, covering 18 years. Further information is available in the appendix.

The following set of time series regressions is broken down by region then by level of GDP/capita within each of the regions. The regions are as following: Western Europe and Others, Latin America, Eastern Europe, Asia Pacific, and Africa (for more information see Section III).

For the region of Western Europe and Others (Figure 18) the percentage of women in national parliaments is only statistically significant and positively correlated with health expenditures in the third and fourth GDP/capita tiers. These findings support H1 and demonstrate that female representatives, as opposed to their male counterparts, are associated with higher levels of public health expenditures, likely the result of women prioritizing healthcare. Additionally, in the health expenditure regressions the lag variables are statistically significant in every tier except the fourth tier. For this region, the regressions concerning education expenditures do not return any statistically significant results. Lastly, the military expenditures regressions show

that the lag variable is positive and statistically significant for all of the tiers in the model. These results demonstrate that the level of spending in the previous year has a large influence on levels of spending in the following years. Furthermore, the regressions demonstrate that the percentage of women in national parliaments has the greatest influence over health expenditures. Providing further support for the connection between women and healthcare. Also demonstrating that the inclusion of women in national parliaments influences policy preferences and parliamentary decision making as indicated by a correlation between the percentage of women in national parliaments and government health expenditures.

Moreover, in the Latin America region (Figure 19) the percentage of women in national parliaments is positively correlated with health expenditures in the second tier and fourth tier. These results also support H1 and the connection between women and health outcomes. Additionally, the percentage of women in national parliaments is also statistically significant and negatively correlated military expenditures in the first tier but significant and positively correlated in the fourth tier. These regressions present mixed evidence in regards to H3. However, the results do suggest that women in national parliaments change the way governments appropriate funds. Furthermore, the first, third, and fourth tiers show a significant, positive correlation between health expenditures and the lag variable. This same correlation is also found between education expenditures in the second tier and military expenditures in the fourth and fifth tiers. These correlations between the expenditures and the respective lag variables illustrate the connection between the previous year's levels of spending

the following year.

Furthermore, the Eastern European group shows a positive and significant correlation between the percentage of women in national parliaments and health expenditures in the fourth and fifth tiers as well as a positive, significant correlation between education expenditures and the percentage of women in parliament in the lowest (fifth) tier. This supports H1 and H2 – an increase in the number of women in national parliaments leads to an increase in health and education expenditures, respectively. These results also demonstrate that female representatives in the lowest tier have a significant impact on government expenditures as higher numbers of women are correlated with higher levels of both health and education spending. These findings further support the connection between women and health and educational outcomes as well as the theory that female participation in national parliaments influences decisions. For this region, the lag variables are statistically significant and positively correlated for health expenditures in the second and fifth tier; for education expenditures in the first, fourth, and fifth tiers; and for military expenditures in the first, second, third, and fifth tiers. Like other regions, the statistically significant lag variables indicates that government expenditures are influenced by the previous year's level of spending.

Additionally, in the Asia Pacific region the percentage of women in parliament is statistically significant and positively correlated with health expenditures in the fourth tier. This supports H1 and further illustrates the connection between female member of national parliaments and increased health expenditures. Furthermore,

the percentage of women in parliament is statistically significant when correlated with military expenditures. However, the directionality of the correlations are mixed. In the fourth tier, the correlation is positive and in the fifth tier, the correlation is negative. These correlations provide mixed evidence in relation to H3. Higher percentages of women in national parliaments have an impact on military expenditures; however the type of impact varies. However, the correlations between the percentage of women in national parliaments and health and military spending demonstrate that female representatives do have an effect on parliament. The lag variables are significant and positively correlated with health expenditures in the first and second tiers; with education expenditures in the third tier; and with military expenditures in first, third, fourth, and fifth tiers. Public expenditures in the Asia Pacific region continue the trend of displaying a strong relationship between levels of spending and the previous year's level of spending.

Lastly, in the African region the percentage of women in national parliaments is significant and positively correlate with health expenditures in the second and fifth tiers. Additionally, the percentage of women in national parliaments is statistically significant and negatively correlated with military expenditures in the third, fourth, and fifth tiers. Increases in the percentages of women in national parliaments are associated with changes in government spending on both health and the military. Indicating that in the African region female representatives impact government policies. Moreover, the lag variables are significant and positively correlated with health expenditures in the first, second, third, and fourth tiers; with education in the fifth tier;

and military expenditures in none of the tiers. These correlations demonstrate that in the African region, similar to other regions, the level of spending in the previous year affects the spending in the following year.

Throughout the various regions, women in parliaments in the countries within the lower economic tiers have the greatest influence on government expenditures. Furthermore, female member of national parliaments have the most influence on health expenditures and the least over education expenditures. These results demonstrate the strong connection between women and health policies. Additionally, they show that education expenditures remain difficult to the capture and explain. Lastly, women in national parliaments, particularly in African countries with lower levels of GDP/capita, have a significant impact on military expenditures. In all cases, except for one in the Asia Pacific, these correlations are negative. The time series regressions further support the theory that women influence government policies and expenditures differently than their male counterparts.

Figure 18. Time Series Regression (1997-2014) - Western Europe and Others

	Health	Education	Military
Top			
<i>parliafem</i>	0.035 (0.0256)	0.0713 (0.0645)	0.0014 (0.004)
<i>lag</i>	0.6785* (0.1795)	-0.1168 (0.3606)	0.6877* (0.2107)
Obvs	18	17 ^a	18
Second			
<i>parliafem</i>	0.0121 (0.0217)	0.0151 (0.0302)	-0.002 (0.0023)
<i>lag</i>	0.9961** (0.0737)	-0.1999 (0.3857)	0.8581* (0.0453)
Obvs	18	14 ^b	18
Third			
<i>parliafem</i>	0.0607* (0.0213)	-0.0316 (0.0395)	-0.0025 (0.0031)
<i>lag</i>	0.4543* (0.175)	0.569 (0.4362)	0.7631** (0.1673)
Obvs	18	14 ^c	18
Forth			
<i>parliafem</i>	0.0757* (0.027)	0.0182 (0.0276)	-0.0027 (0.0022)
<i>lag</i>	0.3335 (0.2329)	-0.1494 (0.3057)	0.5842* (0.1553)
Obvs	18	17 ^d	18
Lowest			
<i>parliafem</i>	0.0124 (0.0352)	0.0799 (0.043)	-0.0111 (0.0094)
<i>lag</i>	0.8575** (0.1787)	0.1944 (0.277)	0.6942* (0.2849)
Obvs	18	16 ^e	18

*p ≤ 0.05 **p ≤ 0.01

Figure 18. presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate, time-series regressions using the variables: *parliafem*, the respective public expenditure and corresponding *lag* variable. Each regression uses data from the years 1997 through 2014, except where otherwise indicated. Further information is available in the appendix.

^a data unavailable for years 2014, ^b data unavailable for years 2013 and 2014, ^c data unavailable for years 2013 and 2014, ^d data unavailable for year 2014, ^e data unavailable for years 2013 and 2014

Figure 19. Time Series Regression (1997-2014) - Latin America

	Health	Education	Military
Top			
<i>parliafem</i>	0.0024 (0.0117)	-0.0823 (0.046)	-.0048** (0.0012)
<i>lag</i>	0.6995* (0.1906)	0.2609 (0.2414)	0.3191 (0.1639)
Obvs	18	17 ^a	18
Second			
<i>parliafem</i>	0.1042** (0.0345)	-0.0942 (0.0517)	-0.0063 (0.0209)
<i>lag</i>	0.4477 (0.1767)	0.8623** (0.1298)	0.523 (0.4966)
Obvs	18	18	18
Third			
<i>parliafem</i>	-0.0337 (0.02)	-0.0706 (0.0612)	-0.0024 (0.0038)
<i>lag</i>	0.5646** (0.1867)	0.2183 (0.2574)	-0.0461 (0.2208)
Obvs	18	16 ^b	18
Forth			
<i>parliafem</i>	0.0224* (0.0099)	-0.0389 (0.0599)	0.0094† (0.0045)
<i>lag</i>	0.9532** (0.0944)	0.4179 (0.2282)	0.6456** (0.1547)
Obvs	18	18	18
Lowest			
<i>parliafem</i>	0.0171 (0.02)	-0.061 (0.0324)	0.0009 (0.0053)
<i>lag</i>	0.4848 (0.2276)	0.0942 (0.2514)	0.6641** (0.1935)
Obvs	18	16 ^c	18

† $p \leq 0.06$ * $p \leq 0.05$ ** $p \leq 0.01$

Figure 19. presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate, time-series regressions using the variables: *parliafem*, the respective public expenditure and corresponding *lag* variable. Each regression uses data from the years 1997 through 2014, except where otherwise indicated. Further information is available in the appendix.

^a data unavailable for year 2014, ^b data unavailable for year 1997, ^c data unavailable for year 1997

Figure 20. Time Series Regression (1997-2014) - Eastern Europe

	Health	Education	Military
Top			
<i>parliafem</i>	0.0275 (0.0164)	0.0109 (0.0229)	-0.0219 (0.0115)
<i>lag</i>	0.3884 (0.2366)	0.6986** (0.2044)	0.7127** (0.1576)
Obvs	18	16 ^a	18
Second			
<i>parliafem</i>	0.0171 (0.0135)	0.1042 (0.1173)	-0.0018 (0.0155)
<i>lag</i>	0.7463** (0.1546)	0.5301 (0.2856)	0.7589** (0.1956)
Obvs	18	16 ^b	18
Third			
<i>parliafem</i>	-0.0082 (0.0132)	-0.0312 (0.0443)	-0.0202 (0.0112)
<i>lag</i>	0.4767 (0.2172)	-0.0956 (0.2478)	0.6581** (0.1727)
Obvs	18	16 ^c	18
Forth			
<i>parliafem</i>	0.0509** (0.014)	-0.0012 (0.011)	-0.0254 (0.0129)
<i>lag</i>	0.0418 (0.2532)	0.5155* (0.2343)	0.4019 (0.2207)
Obvs	18	17 ^d	18
Lowest			
<i>parliafem</i>	0.0633* (0.0234)	0.1374* (0.0562)	0.1327 (0.0762)
<i>lag</i>	0.6417** (0.1285)	0.5698** (0.1495)	0.7201** (0.1443)
Obvs	18	18	18

*p ≤ 0.05 **p ≤ 0.01

Figure 20. presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate, time-series regressions using the variables: *parliafem*, the respective public expenditure and corresponding *lag* variable. Each regression uses data from the years 1997 through 2014, expect where otherwise indicated. Further information is available in the appendix.

^a data unavailable for years 2013 and 2014, ^b data unavailable for years 2013 and 2014, ^c data unavailable for year 1997, ^d data unavailable for year 2014

Figure 21. Time Series Regression (1997-2014) - Asia Pacific

	Health	Education	Military
Top			
<i>parliafem</i>	0.0318 (0.0186)	-0.0471 (0.0336)	-0.0209 (0.113)
<i>lag</i>	0.5658* (0.2327)	0.2943 (0.2607)	0.7911** (0.2296)
Obvs	18	18	18
Second			
<i>parliafem</i>	-0.0026 (0.0228)	-0.0984 (0.077)	-0.011 (0.0199)
<i>lag</i>	0.555* (0.2273)	0.4619 (0.2872)	0.4015 (0.2698)
Obvs	18	18	18
Third			
<i>parliafem</i>	0.0009 (0.0136)	-0.0686 (0.068)	-0.0435 (0.0291)
<i>lag</i>	0.2903 (0.2292)	0.4464* (0.1984)	0.7579** (0.1697)
Obvs	18	18	18
Forth			
<i>parliafem</i>	0.1038* (0.0445)	-0.0019 (0.0882)	0.0367* (0.0128)
<i>lag</i>	0.2631 (0.2557)	0.1762 (0.2512)	0.8366** (0.1325)
Obvs	18	18	18
Lowest			
<i>parliafem</i>	0.0198 (0.0119)	0.0694 (0.0487)	-0.0539** (0.0179)
<i>lag</i>	0.2535 (0.2767)	0.308 (0.2329)	0.4521* (0.1778)
Obvs	18	16 ^a	18

*p ≤ 0.05 **p ≤ 0.01

Figure 21. presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate, time-series regressions using the variables: *parliafem*, the respective public expenditure and corresponding *lag* variable. Each regression uses data from the years 1997 through 2014, except where otherwise indicated. Further information is available in the appendix.

^a data unavailable for year 1997

Figure 22. Time Series Regression (1997-2014) - Africa

	Health	Education	Military
Top			
<i>parliafem</i>	0.0273 (0.0154)	0.0254 (0.0419)	0.0043 (0.0228)
<i>lag</i>	0.6527** (0.2019)	-0.0807 (0.2443)	0.6455 (0.346)
Obvs	18	18	18
Second			
<i>parliafem</i>	0.045** (0.011)	0.1338** (0.0392)	0.014 (0.029)
<i>lag</i>	0.413* (0.1473)	-0.3202 (0.2275)	0.1198 (0.2626)
Obvs	18	17 ^a	18
Third			
<i>parliafem</i>	0.0136 (0.013)	-0.0838 (0.0494)	-0.0684** (0.0225)
<i>lag</i>	0.7466** (0.1565)	-0.2975 (0.2167)	0.2056 (0.225)
Obvs	18	18	18
Forth			
<i>parliafem</i>	0 (0.0113)	0.0593 (0.0386)	-0.2754† (0.1302)
<i>lag</i>	0.8871** (0.1497)	0.1012 (0.2657)	0.4155 (0.2242)
Obvs	18	18	18
Lowest			
<i>parliafem</i>	0.0531* (0.0203)	0.0334 (0.0276)	-0.0646** (0.0169)
<i>lag</i>	0.3696 (0.2186)	1.011** (0.2831)	0.3381 (0.1702)
Obvs	18	18	18

†p ≤ 0.06 *p ≤ 0.05 **p ≤ 0.01

Figure 22. presents the correlation coefficients and corresponding standard error (listed underneath in parentheses) for the multivariate, time-series regressions using the variables: *parliafem*, the respective public expenditure and corresponding *lag* variable. Each regression uses data from the years 1997 through 2014, expect where otherwise indicated. Further information is available in the appendix.

^a data unavailable for year 2014

5. Conclusion

Women matter. Women have different preferences than men and make different decisions. This difference in preferences and decision making remains visible when women hold political office. Therefore, the inclusion of women in national parliaments changes decision making processes and alters the allocation of government expenditures. This thesis analyzed the correlation between the percentage of women in parliament and public health, education, and military expenditures. Public expenditures were chosen as a measure of government policy and interest in the given area. Furthermore, the three categories of public expenditures were chosen because prior literatures had indicated that women view health, education, and conflict different than men.

This thesis finds that the percentage of women in national parliaments is positively correlated with health expenditures in the single variate regressions and both multivariate regressions. The multivariate regressions also illustrate a positive correlation between GDP/capita and public health expenditures as well as the level of freedom and public health expenditures. GDP/capita although statistically significant, the extremely low coefficient indicates that the influence of this variable is minimal. The level of freedom, however, does have a substantial effect on health expenditures. Countries that are more 'free' have higher health expenditures. Furthermore, the time series regressions find the same positive correlation between the percent of women in parliaments and health expenditures in the global average regression and additionally

in at least one tier in all regions. These findings support H1, which sought to test the statement: that an increase in female participation in national parliaments will lead to an increase in public health expenditures.

These findings build on the existing literature that establishes the link between women and health outcomes. The previous literature demonstrates that female empowerment, female decision makers, and women in control of their own income better the health of the whole family.²⁵ These differences in preferences observed on a household level are also observable on a national scale. This thesis supports the existing literature and finds that the link between women and health continues to exist between female members of parliament and increases health expenditures. This link is important because it demonstrates that female representatives pursue policies in areas that women favor in a way that male representatives do not.

Additionally, this thesis analyzed the correlation between education and the percentage of women in parliament. There is a statistically significant, positive correlation between the percentage of women in parliament and public education expenditures in the majority of years in the single variate regressions. The results observed in both of the multivariate regressions also show a positive correlation; however the percentage of women in parliament and public education expenditures are

²⁵ See: Duflo, Esther. 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intra-Household Allocation in South Africa." *The World Bank Economic Review* 17(1): 1-25; Edmonds, Eric V. 2006. "Child Labor and Schooling Responses to Anticipated Income in South Africa." *Journal of Development Economics* 81(2): 386-414; Thomas, Duncan. 1990. "Intra-Household Resource Allocation: An Inferential Approach." *The Journal of Human Resources* 25(4): 635-664

only statistically significant for roughly half of the years in the study. Furthermore, the additional variables (GDP/capita, the level of freedom, and the presence of a Muslim majority population) in the multivariate regressions rarely return statistically significant results. This indicates that there are other factors that influence public education expenditures that are not being captured in the models and deserve further research. Furthermore, the positive correlation with observed in the lowest GDP/capita tier in the Eastern European region and in the second GDP/capita tier in the African region. Women in national parliaments may not be the most influential variable deciding public education expenditures; however a tentative positive correlation has been observed. These findings offer evidence, albeit wavering, to support H2 which sought to test if there was a positive correlation between the percent of women and public education expenditures.

Although these finds also partially support the previous literature, the variables studied also don't adequately capture the influences on public education expenditures. One possible reason for the lack of statistically significant results is that all countries, regardless of female involvement in decision making bodies, see education as a priority to achieve economic development, an outcome that is pursued by male and female politicians. Investments in education are credited as a condition necessary to achieve economic development.²⁶ Therefore, countries with lower GDP/capita who are more likely to pursue development related strategies, should invest more in education.

²⁶ "Goal 4: Ensure Inclusive and Quality Education for All and Promote Lifelong Learning." United Nations Sustainable Development Goals.

Furthermore, typically advanced economies require an educated labor force to manufacture high-tech goods and services and promote economies based on knowledge.²⁷ As a result, advanced economies also have an incentive to pursue education policies. Economic success is a driving force that is not bound by region, a country's level of freedom, or culture.

Regardless of the reason, the lack of results returned by not only the variable measuring the percentage of women in parliament but also the variables measuring GDP/capita, the level of freedom, and the dummy variable operationalizing the presence of a Muslim majority population is in itself is curious. The models presented by this thesis struggle to account for public education expenditures. Therefore, further research should be done to illuminate other factors that impact government education expenditures.

Lastly, the percentage of women in national parliaments is negatively correlated with military expenditures after 2004 through 2012 in the single variate, cross-sectional regressions. Furthermore, in the multivariate regression excluding the variable *islam* a negative correlation is visible between 2004 to 2014, although the regression including *islam* only returns two statistically significant, negative correlations. Additionally, the Latin American and Asia Pacific regions present mixed results with some tiers having negative correlation between the percentage of women in national parliaments and military expenditures while other tiers return a positive

²⁷ 1996. "The Knowledge-Based Economy." Organization for Economic Co-operation and Development (OECD)

correlation. In contrast, within the African region the percentage of women in national parliaments is statistically significant and negatively correlated in the three lower GDP/capita tiers. In lower income African countries, more women in national parliaments corresponds to lower levels of military spending and potentially less premeditated conflict. Although the majority of the evident supports H3 – that an increase in women members of parliament will correlate with a decrease in military expenditure – the findings in Latin America and the Asian Pacific contradict this hypothesis.

Military expenditures are influenced by a wide variety of factors. Although the general trend suggests that increasing the percentage of women in national parliaments negatively correlates with military expenditures, there are other intervening factors (such as ongoing conflicts and regional instability to name two) that may outweigh any other factors. Furthermore, women may have less of an effect on military matters as women are still underrepresented in military fields. For example, women compose less than fifteen percent of U.S. active duty Army personnel and less than 5 percent of U.S. Army Generals.²⁸ Women may need to equal representation beyond parliament to have a meaningful influence over military matters.

Furthermore, in both of the multivariate, cross-sectional regressions dealing with military expenditures the variable measuring the level of freedom returned robust results. All results found a negative correlation between a country's level of freedom

²⁸ Doll, Yvonne. 2007. "U.S. Army Women General Officers and Their Strategies for Ascension." *International Journal of Business Strategy* 7(3)

and military expenditures. This finding is unsurprising and supports previously liberal peace theory literature. Michael Doyle's 1986 article highlighted three pillars of liberal peace – Schumpeter's democratic capitalism, Machiavelli's republican imperialism, and Kant's liberal republican internationalism – that support the theory that liberal, democratic nations are more reluctant to go to war.²⁹ If liberal governments are less likely to go to war, they will also be less likely to put funds into their military. Therefore, the results found by this thesis lend support to these theories. Although female representative in parliaments may have an impact on military spending, the level of freedom is a variable that cannot be ignored and must be factored into the analysis.

This thesis also finds that the presence of a majority Muslim population does not affect government expenditures on health, education, or the military as it mostly returned statistically insignificant results. Countries with a majority Muslim population are very different politically, socially, and economically. Although they share a common religion, this research suggests that the religion alone does not explain variations in government expenditures. Further research should be done to identify possible cultural variables that do affect government expenditures. Although culture is infamously difficult to define and operationalize, some facets can be quantified and should be added to the research to divine the effects of culture on public expenditures.

Although this thesis presents compelling research with important implications,

²⁹ Doyle, Michael W. 1986. "Liberalism and World Politics." *The American Political Science Review* 80(4) : 1151-1169

there are limitations. This thesis focuses on a global scale and does not look in depth at a single country. As a result the conclusions are generalizable; however they are limited in their applicability to individual countries. The author does not conduct a specific case study because every country has a unique situation and environment; thus the conclusions drawn from a single country or a small group of countries are less likely to be applicable on a global scale. However, this thesis does demonstrate that there are global trends connecting women in national parliaments to government policies and expenditures. Therefore, this thesis can serve as a foundation for further, more country specific work.

Furthermore, there is a long history of striving towards equal participation in government, especially by international organizations. For instance, the UN Declaration of Human Rights adopted on December 19, 1948. Article 21(1) of the UN Declaration of Human Rights states that “everyone has the right to take part in the government of his country...”³⁰ Later, the UN Fourth World Conference on Women held in 1995 yielded the Beijing Platform for Action. This platform detailed twelve different objectives, among them being “women in power and decision-making.”³¹ Within this larger objective the conference identified two more narrow ‘strategic objectives.’ One being to “take measures to ensure women’s equal access to and full participation in power structures and decision-making.” The other stating, “[to]

³⁰ 1948. "Universal Declaration of Human Rights." United Nations.

³¹ "Fourth World Conference on Women: Beijing Platform for Action." United Nations Entity for Gender Equality and the Empowerment of Women.

increase women's capacity to participate in decision-making and leadership." The conference recommended that actions be taken to include more women in leadership and decision-making roles.

Declarations in of themselves are important; however it is time the world move beyond words and began to take steps towards greater equality in decision-making bodies on all levels. Equal, inclusive representation is intrinsically valuable. Moreover, this research demonstrates gender based differences manifest in changes in public expenditures when women are in national parliaments. Female representatives in parliament promote women's interests in a way their male peers do not. These results demonstrate that gender equality in decision-making bodies is necessary to create policies that accurately represent and benefit all of the people in the country. Women have different policies preferences than men and these differences are not adequately addressed by male representatives. Female representation in national parliaments influences governments' policy priorities represented by changes in the pattern of government expenditures. Therefore, women, specifically, are able to represent preferences always present in the population but that go under represented if national assemblies are composed only of men. In order to have a truly representational democracy both women and men need to be represented in the national assembly.

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Appendix

Variable	Stata Name	Source	Brief Description
Proportion of seats held by women in national parliaments (%)	parliafem	Inter-Parliamentary Union (IPU) (www.ipu.org).	Women in parliaments are the percentage of parliamentary seats in a single or lower chamber held by women.
Health expenditure, public (% of GDP)	expendhealth	World Health Organization Global Health Expenditure database (see http://apps.who.int/nha/database for the most recent updates).	Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds.
Government expenditure on education, total (% of GDP)	expendedu	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.	General government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. General government usually refers to local, regional and central governments.

<p>Military expenditure (% of GDP)</p>	<p>expendmilitary</p>	<p>Stockholm International Peace Research Institute (SIPRI), Yearbook: Armaments, Disarmament and International Security.</p>	<p>Military expenditures data from SIPRI are derived from the NATO definition, which 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). Excluded are civil defense and current expenditures for previous military activities, such as for veterans' benefits, demobilization, conversion, and destruction of weapons. This definition cannot be applied for all countries, however, since that would require much more detailed information than is available about what is included in military budgets and off-budget military expenditure items</p>
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GDP per capita, PPP (current international \$)	gdpcap	World Bank, International Comparison Program database.	GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices 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 is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars based on the 2011 ICP round.
Level of Freedom	freedom	Freedom House	The variable is coded on a scale from 0 to 2 where 0 represents "not free", 1 is "partly free", and 2 is "free." The Freedom House rates the countries every year. The rating are based the countries overall respect for a variety of political and civil rights. The UN Declaration of Human Rights is used as a standard to determine political and civil rights.
The presence of majority of Islam population	islam	Pew Research Center	This variable is a dummy variable where 0 represents countries where less than 50% of the population identifies as Muslim and 1 is countries where greater than 50% of the population identifies as Muslim.

논문 초록

정부의 여성대표자가 공공지출에 미치는 영향. 이 논문은 “정부에서 여성 대표자 비율이 공공지출에 영향을 미치는가” 라는 질문에 대한 답을 구하기 위한 시도를 하고 있다. 공공지출은 공중보건, 교육, 군비 지출로 나누어진다. 변수들의 상관관계를 알아내기 위해 단면적 연구와 시계열회귀분석 방법을 적용했다. 증거들은 대부분 의회의 여성비율 증가는 공중보건지출의 증가와 상관관계가 있다고 설명한다. 정적 상관관계는 주로 의회 여성비율과 교육지출 사이에서 발견된다. 그러나 교육지출은 설명하기 어려운 부분이며, 다른 가능한 영향을 설명하기 위해서는 더 많은 연구들이 행해질 필요가 있다. 마지막으로 어떤 모델들에서는 군비지출은 의회의 여성비율과 부적상관을 보였다. 그러나, 자유의 지수가 의회의 여성비율 보다 군비지출에 있어 더 큰 영향을 미쳤다. 이 조사 결과들은 정치적 지위에 재임 중인 여성들이 같은 자리에 있는 남성들과는 다른 정책을 추구한다는 것을 보여주었다. 그러므로, 의사결정에 있어 양성평등은 진정한 의회기관을 만드는데 있어 필수적이다.