ELECTORAL GENDER QUOTAS AND MEASURES OF INSTITUTIONAL GENDER INEQUALITY

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ABSTRACT

Women experience discrimination and gender-based inequality in numerous ways, from the unequal property and custody rights found within legal systems to the acceptance of domestic violence or sexual harassment that still prevails throughout the world. Collectively, these types of occurrences are termed “institutional gender discrimination,” or “those established laws, customs, and practices which systematically reflect and produce group-based inequities in any society” based on gender or sex (Henry 2010, p. 427). Institutional gender discrimination is a global problem, inhibiting women’s property rights, civil liberties, economic opportunities, and physical integrity. Gender discrimination is associated with poor performance on development indicators ranging from education to children’s nutrition (OECD, 2012a). This paper examines the relationship between electoral gender quotas and measures of institutional gender equity in developing countries.

Electoral gender quotas have been established worldwide as a tool to mitigate gender discrimination and inequality in the institutions of government and law-making bodies. Several studies (Chattopadhyay and Deflo 2004, Chen 2010) have found a statistically significant positive relationship between electoral gender quotas and government social programs and building projects that reflect women’s interests. While most of the literature has examined the relationship between gender quotas and government spending on social welfare programs or
infrastructure, this study explores specifically the relationship between gender quotas and the prevalence of inequality and discrimination.

Using an Ordinary Least Squares model, this study tested whether there was a statistically significant negative relationship between the existence of an electoral gender quota in a particular country and a high prevalence of gender inequality in five different types of social institutions: family code, civil liberties, physical integrity, son bias, and access to resources. This study showed little evidence for this hypothesis. There was no statistically significant relationship between electoral gender quotas and inequality in family code, son bias, and access to resources. There was, however, a small positive relationship between gender quotas and gender inequality related to physical integrity. The relatively recent introduction of electoral gender quotas in many countries, and the percentage of gender quotas that were enacted after conflict and during political transitions may have an impact on the ability for electoral gender quotas to mitigate gender inequality in many of the countries that have adopted this electoral mechanism.
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I. INTRODUCTION

Institutional gender discrimination refers to the multitude of ways that governments and societies differentiate between the means by which women and men can interact within primary social institutions, including banks, lending organizations, courts of law, and criminal justice systems. Practices of institutional gender discrimination can create legal and social barriers that inhibit women’s access to credit, property, marriage rights, inheritance, civil rights, mobility, or physical safety collectively. Institutional gender discrimination is associated with poor performance on a number of development indicators, suggesting that gender inequity has far reaching social and economic implications (OECD 2012a; World Bank, 2011).

Worldwide, law-making bodies exhibit institutional gender discrimination. Women are underrepresented at every level of government. From 2003-2010, no region of the world had more than 14 percent of its top local or district government leadership positions held by women. Approximately 20 percent of parliament seats across the globe were held by women and only about 5 percent of elected Heads of State or Government positions were held by women. These numbers are in striking contrast to women’s share of the population, which continues to stand at approximately 50 percent (The World Factbook, 2013). To achieve greater gender balance among elected officials, an increasing number of countries have instituted gender quotas, mandating that a minimum number of party nominations or elected seats are reserved for women.

Greater gender parity in government can do more than satisfy a claim for equality. Women in office often have different policy preferences than their male counterparts. Including more women in legislative bodies can change the political agenda, shedding more focus on issues that impact women and families. Studies suggest that greater gender equity in law-making bodies can impact the types of policies pursued (Welch and Thomas, 1991; Pande and Ford 2007;
Chattopadhyay and Deflo 2004, Chen 2010). For example, increasing the proportion of female representatives in the political process is positively related to greater funding for programs and projects preferred by women. Welch and Thomas (1991) found that female politicians in the United States were more likely to support policies that would spend more on social welfare programs. Chen (2010) came to similar results, finding that across countries, increased percentages of women in government through gender quotas is positively related to greater social welfare spending. Chattopadhyay and Deflo (2004) found that gender quotas in regional government in certain areas of India were associated with greater spending on public works projects prioritized more by women in that region than by men in those regions.

This study looked more closely at the relationship between electoral gender quotas and the prevalence of gender inequality in important social institutions. While other studies have looked at the relationship between electoral gender quotas and policies that may be beneficial to women, this study examined the relationship between quotas and policies and practices that differentiate between the way that women and men are treated under the law or custom. Using an OLS regression, this study will test whether there is a negative relationship between electoral gender quotas and inequality in key social and legal institutions.

II. LITERATURE REVIEW

a. Gender Discrimination in Social Institutions

Institutional gender discrimination takes on a variety of forms across the globe. The 2012 World Bank’s Women, Business, and the Law provided a snapshot of gender differentiations in access to institutions from a dataset of 141 countries (World Bank, 2012). According to the report, in 71 countries (50.4 percent), women were restricted from working in certain industries, while in 44 countries (31.2 percent) women were constrained by restrictions on working hours.
In 52 countries, women had a younger mandatory retirement age than men, even though women are demographically more likely to live longer. Five countries (3.5 percent) allowed more personal income tax deductions for men, while only 15 (10.6 percent) allowed childcare payments to be tax-deductible. Policies such as these reinforce traditional roles of men as the primary earner and women as the primary childcare provider. In terms of parental leave, many countries offer paid leave to one or both parents, but differences in the amount of time (paid or unpaid) varied greatly by gender and by country. In general, paternal leave is unequal to maternal leave or absent entirely, providing incentives for women in many countries to stay at home and remain out of the workforce longer than their husbands or male partners because maternal leave is often better subsidized (Ray, Gornick and Schmitt, 2008, p. 5). In terms of access to a fair legal process, 11 countries (7.8 percent) had laws that made “the testimony of a woman carries less evidence than that of a man”, and in one country, Democratic Republic of Congo, “married women need(ed) the permission of their husbands in order to initiate legal proceedings in court” (World Bank, 2012, p. 22-23).

The OECD Social Institution Gender Index measures institutional gender equity in non-OECD countries. The OECD used this index in connection with social outcomes and found:

“in 21 countries where social institutions discriminate against women the most……primary school completion is on average more than 15 percent lower, nearly twice as many children suffer from malnutrition, and maternal mortality rates are twice as high when compared with other developing countries.” (OECD, 2010, p.2).

These findings indicate a widespread ripple effect of institutional gender discrimination on social and economic indicators of development. In many countries, women are responsible for childcare, and any lack of access to resources or gender differentiations in social institutions can result in a diminished capacity to provide for families. For example, the number of child malnourishment is 60 percent higher than average in countries that restrict women’s land
ownership, and 85 percent higher in countries that restrict women’s access to credit (OECD, 2010, p.2-3). In countries with high rates of early marriage, school attendance and completion were lower than average, with as few as “half the primary school aged children….in school” (OECD, 2010, p.4). Not only do many girls fail to finish primary or secondary education if they marry before the age of 19, but very young mothers tended to have less decision making capacity in their households, making it less likely that their children will attend school. The OECD report suggested that acceptance of gender-based violence, domestic abuse, and female genital mutilation- all restrictions on women’s physical integrity- can create medical complications (as can pregnancy at a young age).

b. Policy Implications of Women’s Political Participation

Literature has suggested that increasing the number of women in government and public life can substantially refocus policies toward issues that impact women or that women tend to prioritize. Lovenduski and Norris (2003) looked at the outcomes of the 1997 cohort of female politicians in British national politics. After controlling for political party, social background, age, income, and education, Lovenduski and Norris (2003) found a statistically significant preference among female candidates for issues that relate specifically to women’s lives, including affirmative action and gender equality. The differences in policy preferences between male and female politicians were even more dramatic in the United States. Welch and Thomas (1991) studied female legislators in the United States in the late 1980s and 1990s. They found that female politicians tended to be more supportive of traditional “women’s issues” (i.e. issues pertaining to equal pay, women’s reproductive and sexual health, etc.). Yet across party lines, women also tended to place a higher priority on domestic social issues, including education, childcare, and healthcare (Welch and Thomas, 1991, p. 14-17).
c. **Critical Mass Theory**

Critical Mass Theory is an important and reoccurring topic in discussion of women’s political representation, used to explain the value of promoting greater gender equity within governing bodies. Childs and Krook (2008) explain Critical Mass Theory as the argument that “women are not likely to have a major impact on legislative outcomes until they grow from a few token individuals into a considerable minority of all legislators: only as their numbers increase will women be able to work more effectively together to promote women-friendly policy change and to influence their male colleagues to accept and approve legislation promoting women’s concerns” (Childs and Krook, 2008, p. 725). Supporter of this theory argue that true representation of women’s interests requires that the percentage of women in government reach a “critical mass,” making up at least a sizeable minority in law-making bodies.

Rosabeth Moss Kanter’s research on minority behavior provides the basis for much of the academic literature surrounding Critical Mass Theory in the context of women’s political representation. Her work built from the research of George Simmel, who studied the impact of changing numbers of group on group interactions (Kanter 1977).

In the 1970’s, Kanter studied women in corporate business, looking specifically at the impact that minority status in a primarily male workplace had on women’s performance and behavior. Many women in her study said that they felt their “token” status made their work more visible, creating greater “performance pressure” and more often “the subject of conversation, questioning, gossip, and careful scrutiny” (Kanter, 1977, p. 972). These conditions encourage and create several outcomes: a demand to overachieve or limit visibility, isolation, and role entrapment “which obliges them to choose between alternative female stereotypes like the mother, the seductress, the pet or the iron maiden” (Childs and Krook, 2008, p.727). Under
these circumstances, token women are pressured to adopt the behavior and mannerisms of the majority, thus limiting their positions as outsiders. Token status creates incentives for women to maintain the status quo in corporate and public policy, because advocacy for greater gender equity or more favorable conditions for women come at great personal cost to the few token women in power. According to Childs and Krook, “Tokenism in this manner becomes self-perpetuating: rather than paving the way for others, it reinforces low numbers of women, leaving outside intervention as the only means for increasing their presence” (Childs and Krook, 2008, p.727).

While numerous contemporary scholars have offered competing arguments to classic Critical Mass Theory, it remains an important condition in dialogue surrounding women’s political participation, particularly in advocacy for electoral gender quotas. Drude Dahlerup made the argument that the conversation regarding critical mass is important in itself. While rejecting the concept that a specific uniform percentage of women in parliament is necessary for reaching a critical mass for adequate women’s representation, Dahlerup argued that “the story of critical mass” (Dahlerup, 2006a, p. 514) has created an environment more conducive to women pursuing women’s issues in political office. While studying Nordic states with relatively high percentages of female representation, Dahlerup argued that there is no single specific number or percentage of women in parliament that will create prime working conditions for women in all cases. She argued “that no turning point can be identified, and that consequently the critical mass perspective should be replaced by a focus on critical acts that will empower women in general, for example, gender quotas” (Dahlerup, 2006a, p. 513). Dahlerup argues that gender quotas go beyond creating a “critical mass” of women, but rather help create an environment that supports women and enables them to form alliances to pursue women’s issues, even while in the minority.
Dahlerup rejects there is an ideal percentage that can change the impact of women’s representation, but that the very act of legislating a quota percentage can change the political environment in favor of women.

d. Gender Quotas

While increasing gender equality in government and public life provides a platform for women’s policy, women are still widely underrepresented in governing bodies across the world. One increasingly popular solution to gender inequity in public office is the establishment of a gender quota. In countries with a gender quota, seats or party nominations are reserved for women, mandating that a specific number or percentage of elected officials or candidates is female. Proponents of quotas argue that these measures improve both “descriptive” and “substantive” representation (Wangnerud, 2009). They improve the gender balance in law-making bodies. By doing so, the change in the gender balance increases the representation of issues prioritized more often by women (Pande and Ford, 2007, p. 11).

Many different varieties of gender quotas exist around the world. Quotas can be legally-binding constitutional mandates, or they can be voluntary intra-party policies. Quotas can be set or established for the pool of potential candidates, for the pool of candidates who actually run for office, or for the actual seats in an elected body, whereby a minimum number of seats would be reserved for women. Quotas can establish a minimum percentage of female representation, or they can mandate so-called “gender neutral” quotas, which require either 50:50 male to female ratio or establish a maximum percent of representation for both women and men, which in some leftist Scandinavian parties has actually increased the representation of men. Argentina and Belgium have in place additional requirements to their list quota system- women not only have
to represent a certain proportion of candidates, but they must also be represented near the top of a list, increasing their chances of being elected (Dahlerup, 2003, p.4).

Because many quota systems establish quotas for candidates, not seats, they do not guarantee an automatic shift in the gender balance of political institutions. Enforcement of quotas and sanctions for non-compliance also impact the efficacy of quota policies. Yet quotas have created enormous shifts in women’s political representation. Scandinavian countries have a long history of gradual gender equality and for years had the highest proportions of women in elected offices worldwide through incremental progress. In the last decade, countries with quota systems have increasingly been at the top of the world’s ranking in terms of proportion of women in parliament. In 2012, for example, Rwanda ranked highest for women in parliament, with 56.3 percent of its parliament consisting of female members (UNDATA). In 2002, a year before Rwanda passed its new constitution mandating gender quotas (Powley, 2005, p. 155), women made up only 25.7 percent of Rwanda’s parliament (UNDATA). Other countries with quota systems, including Costa Rica, Argentina, Mozambique, and South Africa have also rapidly improved their rankings for share of women politicians, often surpassing Scandinavian countries with the before mentioned gradual process of gender equality (Dahlerup, 2005, p.145).

e. Policy Implications of Gender Quotas

Quotas are by no means a flawless solution to increasing the percentage of women in legislatures. Dahlerup and Freidenvell (2005) argue that the quota system allows women to overcome structural barriers and resource limitations to reach positions of power, but that this “fast track” may create sentiments that a female candidate “only got the position because she was a woman,” making some women token representatives without real power or influence. Meanwhile, incremental improvements in gender ratios, such as was the case in Scandinavia,
ensure that women actually have a base of power and support (Dahlerup and Freidenvall, 2005, p. 42). Dahlerup and Freidenvall suggested that certain design and enforcement mechanisms can mitigate some of these obstacles to an effective quota system.

Moreover, research suggests that gender quotas can have a meaningful impact on public policy. Studies by Chen (2010), Sacchet (2008), Pande (2003, 2007), and Chattopadhyay and Deflo (2004), provide some evidence that gender quotas can have a substantial impact on the prioritization of women’s issues.

Chen (2010) studied the impact of electoral gender quotas on policy outcomes. She examined government spending before and after the introduction of electoral gender quotas. Across countries and type of quota systems, the introduction of electoral gender quotas had a statistically significant positive relationship with government social welfare expenditures, spending 3.38 percentage points more on social welfare than those countries without gender quotas (Chen, 2010, p. 21).

Sacchet (2008) suggested that the institution of gender quotas may have an additional influence on the political agenda unrelated to increasing the proportion of women in government. According to Sacchet (2008), the very institution of gender quotas, and even the controversies that surround them can raise awareness of more issues traditionally associated with women. In the case of Brazil, Sacchet (2008) argued that quotas “encouraged debates inside political parties and in social movements, propelling a greater questioning of women’s political under-representation and increased understanding of gender issues” (Sacchet, 2008, p.381).

Chattopadhyay and Deflo (2004) published a pivotal paper on the impact of gender quotas on policy outcomes. They studied the impact of a unique policy change in India that organically created a controlled environment for social science research. In 1992, India instituted gender
quotas for lawmakers in all village, block, and district governments. The Indian states of West Bengal and Rajastjan extended this policy, creating a system in the late 1990’s which reserved certain Pradhan (council chief) positions for women as well. One third of the Gram Pachayats (the village level government) were selected to reserve their Pradhan position for women. The selection process was random, essentially creating a randomized controlled policy experiment, in which some otherwise similar local law-making bodies in the same two states in India had leadership positions reserved for women and others did not (Chattopadhyay and Deflo, 2004, 1410-1413). They concluded that:

“Mandated representation of women has important effects on policy decisions in local government. Women elected as leaders under the reservation policy invest more in the public goods more closely linked to women’s concerns: drinking water and roads in West Bengal and drinking water in Rajasthan. They invest less in public goods that are more closely linked to men’s concerns: education in West Bengal and roads in Rajasthan.” (Chattopadhyay and Deflo, 2004, p. 1440).

In India, in addition to quotas for women, seats in government are also reserved for other historically marginalized minority groups. In a study about the impact of mandated political representation in India, Pande (2003) found that there is a positive correlation between minority quotas and financial transfers that specifically benefit the particular groups that hold those reserved seats. These results provide further support for the argument that including marginalized voices in the political process changes the conversation and may better address the needs of traditionally under-represented groups.

If electoral gender quotas are positively related with greater gender equity in social institutions, policy makers might consider the benefit of mandating women’s representation in government. The appropriate type of quota- candidate list, reserved seat, etc.- may differ across countries and electoral systems. Some countries- particularly those without a proportional representation system, the system that is most compatible with gender quotas- might find a
legislated quota to be politically infeasible, unpopular with constituents, or otherwise unsuitable. Yet if gender quotas are associated with a decrease in gender discrimination, countries might still want to further study the impact of women’s participation in government, and to explore voluntary means to improve gender equity in government.

This literature suggests that greater gender equality in government, and the establishment of electoral gender quotas to increase women’s participation, can have a substantial impact on policy preferences. Gender quotas are positively related to government spending on projects valued by women. Yet while studies have researched the impact of gender quotas on decreasing the gender gap among elected officials, there are few quantitative studies that examine the impact of gender quotas on specific indicators of gender discrimination in social institutions. Gender quotas can be a powerful way to improve women’s representation in government- and which in turn might improve women’s access to social institutions, personal physical integrity, and equal rights under law and custom. Building from prior research, this study will further explore the relationship between gender quotas and gender equality in social institutions. Is there a relationship between electoral gender quotas and measures of gender inequality in social institutions? Are gender quotas related to policies and practices that dictate the way women and men are treated in terms of family code, physical integrity, marriage, property rights, and civil liberties?

III. HYPOTHESIS

Across developing countries, gender quotas for elected officials and gender inequality in social institutions are negatively related. The presence of gender quotas are related to lower scores of gender inequality on the OECD Social Institution and Gender Index indicators (lower scores on these indexes indicate less gender inequality, i.e. greater gender equality).
IV. DATA

The data used in this paper are from the OECD’s Social Institutions Gender Index, a subset of the Gender, Institutions, and Development Database. It has information from 121 countries that are non-OECD and non-European, that have a national population of over one million, and that have available information regarding discriminatory laws and institutions [OECD], 2012a, p.10). This database provides information about specific indicators of gender equity and an overall score based on sub-index scores for gender equality in the following areas: discriminatory family code, restricted physical integrity, son bias, restricted resources and entitlements, and restricted civil liberties. Sub-index scores are assigned to each country by combining weighted variables in each category heading. Using these sub-index scores, an overall index is provided, ranking countries in terms of gender equality. In determining the overall index, each sub-index score is weighted equally, giving no additional significance to one area of gender equality over another (OECD, 2012b).

The main challenge to this proposed model is the sample size of the dataset. While the dataset consists of 121 countries, only 86 countries have data available for all variables and are included in the general index ranking in 2012 (OECD 2012a).

V. METHODLOGY AND MODEL

a. Theoretical Foundation and Methodology

This study uses an OLS model to examine the relationships between gender quotas (the independent variable) and the OECD’s measures of gender inequality (the dependent variables).

The models used in this study are based primarily on two studies – Chen (2010) and Chattopadhyay and Deflo (2004)- that found a positive relationship between gender quotas and social outcomes that benefit women. Studies such as these rely on the concept of Critical Mass
Theory (Kanter, 1977, and Dahlerup, 2006a) as applied to women’s political participation, promoting the idea that increased percentages of women in law-making bodies is related to more policies that promote women’s interests.

b. Model Description

This analysis is based on the research model used by Chen (2010) and Chattopadhyay and Deflo (2004), Critical Mass Theory, and the OECD Social Institutions Gender Index (SIGI)’s design as a measure of socially relevant variables. To capture the relationship between quotas and equity, it is important to control for other influences. These control variables in the models are chosen based on prior research related to gender quotas and analyses that have used the SIGI dataset. The model will control for:

- **Region of country** - While gender inequality varies from country to country, the OECD reports using the SIGI dataset suggest distinct regional trends. Some of the variation in discriminatory social institutions might be explained by regional factors. The control variables to be included for region will follow OECD classifications: Latin America/ Caribbean, East Asia/ Pacific, Europe/Central Asia, South Asia, Middle East/ North Africa, and Sub-Saharan Africa. Dummy variables will be used for each region with Europe/Central excluded as the baseline (OECD, 2012a).

- **Income** - Chen (2010) found that the outcomes of gender quotas vary between developed and developing countries. While all countries in this data-set are non-OECD countries, they vary greatly in GDP and economic growth. The OECD SIGI dataset (2012) categorizes countries as High Income Group (HIC), Upper Middle Income Countries (UMIC), Low Middle Income Countries (LMIC), and
Other Low Income Countries (OLIC) (OECD, 2012b). The model will include dummy variables for these categories, with HIC omitted as a baseline.

- **Proportional Representation System** - In his book *Women, Quotas, and Politics*, Dahlerup argued that some types of electoral systems are more amenable to establishing gender quotas (Dahlerup, 2006b, p. 10-12, 20-21). Gender quotas are most frequently introduced in proportional representation systems. A dummy variable for proportional representation systems will be used in this model.

c. **Definition of Variables and Calculations**

**OLS Model**

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon \]

where:

\[ \beta_0 = \text{Y-intercept} \]

\[ \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 = \text{Coefficients of respective independent variables: partial slope coefficients} \]

**Independent Variables**

- **Electoral Gender Quotas**
- **Region of Country**
  - \( X_{2a} = \text{lac} \) = Dummy variable for Latin America/Caribbean region
  - \( X_{2b} = \text{easiapac} \) = Dummy variable for East Asia/Pacific region
  - \( X_{2c} = \text{safrica} \) = Dummy variable for Sub-Saharan Africa
  - \( X_{2d} = \text{sasia} \) = Dummy variable for South Asia region
  - \( X_{2e} = \text{mena} \) = Dummy variable for Middle East/North Africa region

- **Socioeconomic Status of Country**
  - \( X_{3a} = \text{olic} \) = Dummy variable for other low income countries
$X_{3b} = \text{lmic} = $ Dummy variable for low middle income countries

$X_{3c} = \text{umic} = $ Dummy variable for upper middle income countries

$X_4 = \text{proprep}= $ Dummy variable for proportional representation electoral system

### Dependent Variables

The dependent variables in the model are calculated by the OECD using variables that fall within one category of gender inequality or discrimination. Individual variables are measured, weighted, and aggregated to create five sub-indices of the Social Institution Gender Index\(^1\).

**$Y_1$ Family Code:** Index measuring gender discrimination and inequality in laws and attitudes related to marriage and family, where 0= no gender discrimination and 1= high prevalence of gender discrimination. Score is calculated from the following variables:

- **Early Marriage:** Percentage of women married between 15-19 years of age.
- **Parental Authority (in marriage):** Ordinal measure of gender discrimination in laws regarding legal guardianship of a child during marriage
- **Parental Authority (after divorce):** Ordinal measure of gender discrimination in laws regarding legal guardianship of a child after divorce
- **Inheritance Rights for Daughters:** Ordinal measure of gender discrimination in laws regarding inheritance rights for daughters

\(^1\) Technical notes from the OECD describe the process of weighting variables and creating the sub-index scores: "Step 1: For each sub-index, we want to combine variables that are assumed to belong to one dimension of discrimination against women. The statistical association and correspondence of the variables in each sub-index is tested to ensure the variables belong to a distinct dimension of discrimination against women. This is undertaken using two tools. The first tool is a Kendall Tau b rank correlation analysis. The second tool is a Multiple joint Correspondence Analysis (MCA). The variables for each sub-index of the 2012 SIGI were found to be statistically associated and have a significant degree of correspondence.

Step 2: Each sub-index is constructed to provide a summary measure for each dimension of social institutions. The construction of each sub-index consists of aggregating the variables with a reasonable weighting scheme. This is done through a polychoric Principal Component Analysis (PCA). The weights capture the contribution of each variable to the phenomenon of discrimination that the sub-index is intended to capture." (OECD, 2012c, para. 2-3).
Inheritance Rights for Wives: Ordinal measure of gender discrimination in laws regarding inheritance rights for widows

Y₂ Civil Liberties: Index measuring gender discrimination and inequality in laws and attitudes related to civil liberties, where 0= no gender discrimination and 1= high prevalence of gender discrimination. Score is calculated from the following variables:

Access to Public Space: Ordinal “score based on legal restrictions or discriminatory practices affecting women’s access to public space, for example the restrictions on women’s choice of domicile, restricted ability to visit family and friends, requirements for husband’s approval to apply for a passport or widespread threats of political violence” (OECD, 2012a, p.33)

Women in Parliament: “Percentage of women in national parliament” (OECD, 2012a, p.33)

Gender Quotas: Existence of electoral gender quotas²

Y₃ Physical Integrity: Index measuring gender discrimination and inequality in laws and attitudes related to physical integrity (physical, psycho-social safety, protection from gender-based violence, genital mutilation, and domestic abuse), where 0= no gender discrimination and 1= high prevalence of gender discrimination. Score is calculated from the following variables:

Violence Against Women (Laws): Ordinal measure of strength of laws that protect against gender-based violence

Violence Against Women (Attitudes): “Percentage of women who agree that a husband/partner is justified in beating his wife/partner under certain circumstances” (OECD, 2012a, p.31)

Prevalence of Domestic Violence: “Percentage of women who have experienced physical and/or sexual violence from an intimate partner at some time in their life” (OECD, 2012a, p.31)

Female Genital Mutilation: “Percentage of women aged 15-49 who have undergone female genital mutilation” (OECD, 2012a, p.31)

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² Results of regression with Electoral Gender Quotas as independent variable and Civil Liberties index score as dependent variable may have model specification issues as existence of gender quotas is used as one of the variables to determine the Civil Liberties score.
**Reproductive Integrity:** “Percentage of married women aged 15-49 with unmet need for family planning. Defined by the Demographic Health Surveys and World Health Organization as married women who do not want any more children for the next two years and are not using contraception” (OECD, 2012a, p.31)

**$Y_4$ Son Bias:** Index measuring gender discrimination and inequality in laws and attitudes related to family and societal preferences for sons over daughters, where $0$= no gender discrimination and $1$= high prevalence of gender discrimination. Score is calculated from the following variables:

**Missing Women:** Score calculated to measure imbalance in male-to-female sex ratio, particularly during youth, which can be attributed to “sex selective abortions, female infanticide or insufficient care given to baby girls” (OECD, 2012a, p.32)

**Fertility Preferences:** “Percentage share of males as the last child in the household, calculated from household surveys” (OECD, 2012a, p.32)

**$Y_5$ Restricted Resources:** Index measuring gender discrimination and inequality in laws and attitudes related to access to important resources, where $0$= no gender discrimination and $1$= high prevalence of discrimination/ inequality. Score is calculated from the following variables:

**Access to Land:** “Score based on women’s legal rights and de facto rights to own and/or access agricultural land” (OECD, 2012a, p.32)

**Access to Credit:** “Score based on women’s legal and de facto access to credit” and banking services (OECD, 2012a, p.32)

**Access to Property Other Than Land:** “Score based on women’s legal and de facto access to property other than land” (OECD, 2012a, p. 32)
### Variable Matrix and Charts

**Table 1: Variable Matrix and Rationale**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
<th>Expected Sign</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_1$</td>
<td>PV_QuotasA 1=quota 0= no quota Dummy variable for whether or not country has a national or sub-national gender quota</td>
<td>N/A</td>
<td>Chen 2010, Chattopadhyay and Deflo 2004</td>
</tr>
<tr>
<td>$X_{2a}$</td>
<td>lac Dummy variable for Latin America/ Caribbean region</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{2b}$</td>
<td>easiapac Dummy variable for East Asia/ Pacific region</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{2c}$</td>
<td>safrica Dummy variable for Sub-Saharan Africa</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{2d}$</td>
<td>sasia Dummy variable for South Asia region</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{2e}$</td>
<td>mena Dummy variable for Middle East/ North Africa region</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{3a}$</td>
<td>olic Dummy variable for other low income countries</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{3b}$</td>
<td>lmic Dummy variable for lower middle income countries</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_{3c}$</td>
<td>umic Dummy variable for upper middle income countries</td>
<td>N/A</td>
<td>OECD 2012, Chen 2010</td>
</tr>
<tr>
<td>$X_4$</td>
<td>proprep Dummy variable for proportional representation electoral system</td>
<td>N/A</td>
<td>Dahlerup 2006b</td>
</tr>
</tbody>
</table>

**Independent variables**

**Dependent Variables**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
<th>Expected Sign</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_{1a}$</td>
<td>familycode Index measuring gender discrimination and inequality in laws and attitudes related to marriage and family, where 0= no discrimination/ equality and 1= high prevalence of discrimination/ inequality.</td>
<td>-</td>
<td>OECD 2012, Chen 2010, Chattopadhyay and Deflo 2004</td>
</tr>
<tr>
<td>$Y_2$</td>
<td>civilliberties Index measuring gender discrimination and inequality in laws and attitudes related to civil liberties, where 0= no discrimination/ equality and 1= high prevalence of discrimination/ inequality.</td>
<td>-</td>
<td>OECD 2012, Chen 2010, Chattopadhyay and Deflo 2004</td>
</tr>
<tr>
<td>$Y_3$</td>
<td>physicalintegrity Index measuring gender discrimination and inequality in laws and attitudes related to physical integrity (physical, psycho-social safety, protection from gender-based violence, genital mutilation, and domestic abuse), where 0= no discrimination/</td>
<td>-</td>
<td>OECD 2012, Chen 2010, Chattopadhyay and Deflo 2004</td>
</tr>
</tbody>
</table>
equality and 1= high prevalence of discrimination/ inequality

<table>
<thead>
<tr>
<th>$Y_4$</th>
<th>sonbias</th>
<th>Index measuring gender discrimination and inequality in laws and attitudes related to family and societal preferences for sons over daughters, where 0= no discrimination/ equality and 1= high prevalence of discrimination/ inequality.</th>
<th>-</th>
<th>OECD 2012, Chen 2010, Chattopadhyay and Deflo 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_5$</td>
<td>restrictedresources</td>
<td>Index measuring gender discrimination and inequality in laws and attitudes related to access to important resources, where 0= no discrimination/ equality and 1= high prevalence of discrimination/ inequality.</td>
<td>-</td>
<td>OECD 2012, Chen 2010, Chattopadhyay and Deflo 2004</td>
</tr>
</tbody>
</table>

Source for definitions of variables: *OECD Social Institutions and Gender Index 2012* (OECD, 2012b); *IDEA Quota Project*, (IDEA, 2012); *Inter-Parliamentary Union* (2013)

Note: Reference groups are Europe/ Central Asia for regional variables and High Income for income variables.
VII. ANALYSIS

a. Descriptive Results Analysis

Table 2: Prevalence of Electoral Gender Quotas and SIGI Scores (for selected countries, 2012)

<table>
<thead>
<tr>
<th>Prevalence of Gender Discrimination in Social Institutions</th>
<th>Average Overall SIGI Score</th>
<th>Countries with Electoral Gender Quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0.11605753</td>
<td>19 (67.9 percent)</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.2360076</td>
<td>17 (58.2 percent)</td>
</tr>
<tr>
<td>High</td>
<td>0.4032007</td>
<td>16 (55.2 percent)</td>
</tr>
</tbody>
</table>

Source for definitions of variables: OECD Social Institutions and Gender Index 2012 (OECD, 2012b); IDEA Quota Project, (IDEA, 2012); Inter-Parliamentary Union (2013)

Table 1 displays the prevalence of electoral gender quotas within countries with different scores on the Social Institutions and Gender Index (SIGI). The overall SIGI score is calculated for each country using the measurements of each of the five sub-category indices (Family Code, Civil Liberties, Physical Integrity, Son Bias, and Restricted Resources). Low index scores indicate a low prevalence of gender discrimination, while high scores indicate a high prevalence of gender discrimination. The results suggest that electoral gender quotas and the prevalence of gender discrimination may be related, as countries with quotas also are more likely to have less discrimination practices related to women. Among the lowest third of countries with the least discrimination, an average score of 0.11605753, 19 countries had electoral gender quotas (67.9 percent). In the highest third of countries with the highest prevalence of gender discrimination, an average score of 0.40320069, 16 countries had electoral gender quotas (55.2 percent).
### b. Regression Results Analysis

Table 3: OLS Regression Results with Indicators of Gender Equality as Dependent Variables

<table>
<thead>
<tr>
<th>Independent (Explanatory Variables)</th>
<th>Dependent Variables</th>
<th>(1) Family Code</th>
<th>(2) Civil Liberties</th>
<th>(3) Physical Integrity</th>
<th>(4) Son Bias</th>
<th>(5) Restricted Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electoral Gender Quotas</td>
<td></td>
<td>-0.0172</td>
<td>-0.461***</td>
<td>0.0884*</td>
<td>0.0429</td>
<td>0.0620</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.39)</td>
<td>(-12.71)</td>
<td>(2.03)</td>
<td>(1.09)</td>
<td>(1.16)</td>
</tr>
<tr>
<td>Latin America/Caribbean</td>
<td></td>
<td>0.0757</td>
<td>0.00830</td>
<td>-0.0776</td>
<td>-0.238***</td>
<td>-0.0144</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.44)</td>
<td>(0.19)</td>
<td>(-1.45)</td>
<td>(-5.20)</td>
<td>(-0.20)</td>
</tr>
<tr>
<td>East Asia/ Pacific</td>
<td></td>
<td>0.0314</td>
<td>0.0599</td>
<td>-0.0853</td>
<td>-0.112*</td>
<td>0.0441</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.55)</td>
<td>(1.22)</td>
<td>(-1.37)</td>
<td>(-2.07)</td>
<td>(0.56)</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td></td>
<td>0.313***</td>
<td>0.144**</td>
<td>0.160**</td>
<td>-0.258***</td>
<td>0.196**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6.07)</td>
<td>(3.34)</td>
<td>(2.98)</td>
<td>(-5.49)</td>
<td>(2.80)</td>
</tr>
<tr>
<td>South Asia</td>
<td></td>
<td>0.247**</td>
<td>0.159*</td>
<td>-0.0418</td>
<td>0.0835</td>
<td>0.0760</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.27)</td>
<td>(2.41)</td>
<td>(-0.56)</td>
<td>(1.22)</td>
<td>(0.79)</td>
</tr>
<tr>
<td>Middle East/ North Africa</td>
<td></td>
<td>0.340***</td>
<td>0.289***</td>
<td>0.190**</td>
<td>-0.0548</td>
<td>0.137</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.46)</td>
<td>(5.61)</td>
<td>(2.78)</td>
<td>(-0.79)</td>
<td>(1.72)</td>
</tr>
<tr>
<td>Other Low Income Countries</td>
<td></td>
<td>0.0801</td>
<td>0.0421</td>
<td>0.133</td>
<td>-0.0602</td>
<td>0.242*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.05)</td>
<td>(0.65)</td>
<td>(0.73)</td>
<td>(-0.39)</td>
<td>(2.53)</td>
</tr>
<tr>
<td>Lower-Middle Income countries</td>
<td></td>
<td>0.0580</td>
<td>0.0300</td>
<td>0.0263</td>
<td>0.00572</td>
<td>0.193*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.83)</td>
<td>(0.51)</td>
<td>(0.15)</td>
<td>(0.04)</td>
<td>(2.24)</td>
</tr>
<tr>
<td>Upper Middle Income Countries</td>
<td></td>
<td>-0.101</td>
<td>-0.0189</td>
<td>-0.0988</td>
<td>-0.0288</td>
<td>0.114</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.40)</td>
<td>(-0.31)</td>
<td>(-0.55)</td>
<td>(-0.19)</td>
<td>(1.29)</td>
</tr>
<tr>
<td>Proportional Representation System</td>
<td></td>
<td>-0.00751</td>
<td>0.0167</td>
<td>-0.123**</td>
<td>-0.0610</td>
<td>0.0334</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.21)</td>
<td>(0.55)</td>
<td>(-3.09)</td>
<td>(-1.70)</td>
<td>(0.74)</td>
</tr>
<tr>
<td>_cons</td>
<td></td>
<td>0.191*</td>
<td>0.539***</td>
<td>0.348</td>
<td>0.738***</td>
<td>0.0708</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.58)</td>
<td>(8.59)</td>
<td>(1.96)</td>
<td>(4.93)</td>
<td>(0.75)</td>
</tr>
</tbody>
</table>

N = 114

_t_ statistics in parentheses * _p < 0.05, ** _p < 0.01, *** _p < 0.001
Overall, the results do not show strong support for the initial hypothesis that electoral gender quotas are associated with lower rates of gender discrimination in social institutions.

Table 1 displays the results of ordinary least squares regressions of electoral gender quotas, region, socioeconomic status, and proportional representation electoral system on various measures of gender inequality. The hypothesis tested is that there is a negative relationship between electoral gender quotas and gender discrimination in social institutions. That is, gender quotas could be a useful policy tool to improve the standing of women in society.

Columns 1-5 show the results of the regressions with each of the respective inequality indexes as the dependent variable. Ordinary least squares regression shows that only two of the relationships between electoral gender quotas and the various inequality indexes are statistically significant. All other variables in the model held constant, electoral gender quotas had a statistically significant relationship with the Civil Liberties Index and the Physical Integrity Index scores.3

Regression results show a strongly significant negative relationship between electoral gender quotas and inequality in laws and institutions related to civil liberties ($p < 0.001$). These findings support the hypothesis, and suggest that on average, electoral gender quotas are related to lower rates of gender discrimination related to civil liberties. However, there is likely a model specification error in the form of simultaneity bias. Part of the index for civil liberties is determined by the presence of electoral gender quotas. In this case, the strong statistically significant relationship between electoral gender quotas and the Civil Liberties Index may be due

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3 Diagnostic tests suggest that Model 3 (those with Physical Integrity Resources as the dependent variables) had no specification errors. See Appendix.
to the construction of the index. It could be that higher rates of violence toward women are prompting countries to enact quotas for women in government.\(^4\)

Columns 1, 4, and 5 display that no statistically significant relationship was found between electoral gender quotas and discrimination related to family code, son bias, or restricted resources\(^5\).

While electoral gender quotas were not found to have strong statistically significant relationships with measures of gender discrimination, other factors in the analysis were found to have strong significant relationships with the dependent variables. For example, several of the regional variables were found to have statistically significant relationships with several of the dependent variables.

Column 1 displays that Sub-Saharan Africa has a statistically significant positive relationship with all the measures of gender discrimination. This means that on average, countries in this region are more likely to have higher rates of gender discrimination.

South Asia, and Middle East/North Africa are also more likely to have higher rates of gender discrimination in the laws and customs related to civil liberties, as well as family size.

Middle Eastern/North African countries are on average more likely to experience discrimination in areas related to physical integrity, including laws and restrictions regarding gender-based violence, female genital mutilation, and reproductive rights.

Column 4 shows that Latin American (\(p < 0.001\)), East Asian/Pacific (\(p < 0.05\)), and Sub-Saharan Africa (\(p < 0.001\)) have a statistically significant negative relationships with the Son

\(^4\) The link test and the plot of residuals against the dependent variable suggest specification errors for Model 2 (Civil Liberties as dependent variable). See Appendix.

\(^5\) Diagnostic tests suggest that Models 1 and 5 (those with Family Code and Restricted Resources as the dependent variables) have no specification errors. The Ramsey’s RESET test and plot of residuals against dependent variable suggest there may be an omitted variable problem for Model 4 (Son Bias as dependent variable). See Appendix.
Bias Index, indicating that on average, women in these regions were less likely to experience discriminatory issues such as a preference for sons and the “gender bias in mortality due to sex selective abortions, female infanticide or insufficient care given to baby girls,” more frequently referred to as “missing women” (OECD, 2012a, p. 32).

Some of these results support the findings of the OECD Social Institution Gender Index (SIGI) 2012 analysis regarding gender and development in different regions of the world. The OECD ranked the Sub-Saharan Africa and Middle East/North Africa (the two regions in this study most often associated with indicators of greater gender discrimination) as the regions with greatest gender discrimination. Latin America/Caribbean and East Asian/Pacific (the only two regions in this analysis to be significantly associated with less gender discrimination) were ranked first and second on the OECD regional rankings, indicating that these regions were found to have the least institutional gender discrimination.

Income or socioeconomic status did not have a statistically significant relationship with most of the indicators of gender inequality. The regression results did show that the countries within the lowest socio-economic brackets were on average more likely to have greater discrimination in access to resources. However the direction of the relationship is not clear from the results of this study. It may be that gender inequality in access to resources might be a causal factor in perpetuating low-income status, rather than low income status contributing to gender inequality. These findings support prior research that suggests that extreme poverty is related to gender inequality in access to resources. A World Bank report suggested that gender inequality in access to resources is a barrier to economic development, which might help explain the statistically significant relationship between these two variables in this study. A World Bank report described gender inequality as an inefficient use of a country’s resources and that by
“hindering the accumulation of human capital in the home and the labor market, and by systematically excluding women or men from access to resources, public services, or productive activities, gender discrimination diminishes an economy’s capacity to grow and to raise living standards.” (King and Mason, 2000, p.10).

This study also found that the variable for proportional representation system, the only independent variable related to electoral systems, also had a statistically significant relationship with one of the gender index dependent variables. Results shown in Column 3 portray a statistically significant negative relationship between the variable for proportional representation system and the Physical Integrity Index (p < 0.01). Countries with proportional representation systems are less likely to exhibit gender discrimination in the laws and customs related to physical integrity. Literature has suggested that proportional representation systems offer more opportunities for minority or female representation through greater opportunity for “descriptive representation” or the “extent to which a representative resembles those being represented” (Dovi, 2011, para. 15). Norris writes that “A series of studies since the mid-1980s have confirmed that more women have usually been elected to parliament under party list proportional representation (PR) than under majoritarian electoral systems… . This pattern holds both within established democracies and also across a broader range of developing societies worldwide” (Norris, 2006, 201). The statistically significant relationship in this study suggests that proportional representation systems may also encourage “substantive representation”, defined as the “activity of representatives…taken on behalf of, in the interest of, as an agent of, and as a substitute for the represented” (Dovi, 2011, para. 16). This study suggests that proportional representation systems may encourage voting behavior that protects women’s rights to physical integrity, without taking into account whether the representatives passing such legislation are women themselves.
VII. CONCLUSIONS AND POLICY IMPLICATIONS

a) Electoral Gender Quotas

The regression results of this study did not show strong support for the hypothesis that electoral gender quotas are related to gender inequality.

These results may in part be due to the circumstances in which gender quotas are established in many countries. Quota systems and changes in electoral systems in general often occur after periods of conflict or transition, when institutional change is already occurring and constitutions are sometimes re-written. Dahlerup (2005) writes that:

“In post-conflict societies, the international community today is putting strong pressure on the actors of reconstruction to take effective measures to include women. Thus we see gender quotas of 25–35 percent being introduced in strongly patriarchal cultures where very few women were represented earlier, for example, in the post-conflict societies of Afghanistan and Iraq.” (Dahlerup, 2005, 148).

The lack of significance between electoral gender quotas and most of the discrimination measures index scores may be due to the fact of the different environments in which gender quotas are initiated. In some countries, gender quotas may be an indicator of a country’s existing progress toward gender equality; in other countries, quotas may be a reaction to a long-standing discriminatory system and discrimination may still be strongly embedded in the country’s social practices. Gender quotas are also a fairly recent innovation in electoral construction, only becoming common in the 1990’s and 2000’s (Dahlerup, 2005). The full impact of instituting gender quotas may not be realized until after more election cycles.

Further study regarding the influence of electoral gender quotas could take into account other control variables such as prevalence of recent conflict or political transition and years since a gender quota has been instituted.
b) Results and Critique of Critical Mass Theory in Women’s Political Representation

While many proponents of quotas cite the importance of a critical percentage of women in law-making bodies in order to foster pro-women policy, critics of Critical Mass Theory claim that numbers and percentages of women in legislatures are not strong predictors of successful women’s interest policies. Dahlerup, while a great proponent for electoral gender quotas, did suggest that numerous other factors may also impact women’s substantive representation and the success of pro-women’s policy. She also suggested that it may be the circumstances that surround electoral gender quota enactment and the empowering nature of these inclusive policies that makes them successful, not the actual percentage of women in government (Dahlerup, 2006).

Kathleen Bratton explored Critical Mass Theory in the context of state legislatures in the United States, studying whether the percentage of women in a state legislature impacted the success of bills they sponsored, and additionally the success of women’s interest bills. She argued that “a ‘critical mass’ is not necessary for substantive representation on the part of individual female state legislators” (Bratton, 2005, p.97). Instead, her results suggested the opposite, and she found that women might even benefit from “their token status” (Bratton, 2005, p. 115). As she explored the success rate of women’s bill sponsorship in numerous states over time, she found several examples of women’s success rate decreasing as the percentage of women in the legislature increased (Bratton, 2005). In her results, she observed that

“women are generally at least as likely as men to pass legislation even when they make up a very small minority of the institution. In two states (California and Illinois), token women are actually more successful relative to men achieving passage of the bills they sponsor.” (Bratton, 2005, p. 121).

These results were similar even when she narrowed her study to examine only the success of bills related to women’s interests that were sponsored by female legislators.
While Bratton agrees with Kanter’s conclusions that token women face increased visibility and pressures to perform, she argues that more women than expected might take the route of overachievement over group assimilation or efforts to diminish the appearances of their differences. She also makes the arguments that other factors “including the mass public, institutional climate and culture, individual partisanship and ideology, and majority party status” (Bratton, 2005, p. 122) may have as much or more of a difference on women’s behavior in legislature and the success of women’s interest legislation as the number and percentages of women in office.

The results of this study may provide additional skepticism for Critical Mass Theory in the study of women’s political participation. Additional research could look further into the role of other factors that support and encourage women in politics, and the possible interactions among the percentage of women in government and other environmental factors and their combined relationship on the success of women’s interest policy.

c) Geographic Region, Socio-Economic Status, and Electoral System

This study found evidence that geographic region, socio-economic status, and existence of a proportional representation electoral system were related to various indicators of gender inequality. These findings suggest further areas of study and areas of need for policy intervention.

The most substantial findings in this study were the statistically significant relationships between certain geographic regions—primarily Sub-Saharan Africa and North Africa/ Middle East and nearly every indicator of gender inequality. These findings support the research in OECD’s 2012 summary of gender discrimination in social institutions, which details the prevalence of gender inequality by geographic region. The OECD found that Sub-Saharan
Africa, followed by North Africa/ Middle East, were the two poorest performing regions in terms of gender equality. The OECD report also describes unique obstacles to reform through electoral and legislative means. In Sub-Saharan Africa, for example,

“Discrimination in the family and in accessing resources often stems from dual or tri-partite legal systems, where customary or religious laws often discriminate against women. Even where civil laws have been introduced to provide equal rights to inheritance and ownership, these are not necessarily implemented or respected at a local level due to persistent social norms and discriminatory attitudes.” (OECD 2012a).

The OECD report describes similar challenges in the Middle East, where:

“In many countries in the region, women’s rights within the family are restricted due to the application of religious law. This includes rights in relation to consent to marriage, choice of marriage partner (women cannot marry outside the faith), equality within marriage (with the husband named head of household), inheritance rights, rights to divorce and custody rights in the event of divorce.” (2012a).

In regions where enforcement of civil law is a challenge, and where customary law often takes precedence, more women in government office and more laws promoting gender equality may not be sufficient to mitigate discriminatory practices.

The results of this study indicate that countries Sub-Saharan Africa and the Middle East/ North Africa are more likely to discriminate against women. Evaluating successful policies and remaining obstacles in these regions can help suggest future area of research and policy development. Two countries in particular are of key interest: South Africa and Morocco. While these countries are in the two regions ranked by the OECD as having the most gender discrimination, they are the best-performing scoring countries in each of their respective regions, with the low prevalence of discrimination against women. Policies that have been successful in these two countries- and the challenges that remain- offer important feedback for policy makers.

In South Africa, recent policies have addressed discrepancies between civil and customary law. For example, South African law now recognizes women’s custody and inheritance rights in
customary and polygamous marriages. South African policymakers have also tried to address problems of gender-based violence and rape from a social perspective. In addition to strengthening laws that protect women against domestic violence, South Africa has also established care centers for survivors of sexual assault to provide more holistic support and to encourage more effective reporting and conviction of offenders (OECD, 2012a).

Like South Africa, Morocco created programs that educate citizens, support women, and address gender discrimination on a social and community-based level. The Moroccan government particularly addressed inequalities in employment and business ownership and “launched numerous initiatives to support women’s entrepreneurship, including numerous trainings, income-generating projects and micro-credit initiatives targeted at women” (OECD 2012a).

Yet even in these high-performing countries, certain obstacles to gender equality remain. South Africa struggles with enforcement of laws that protect against domestic violence. The OECD summary also noted that “new laws to ensure women’s inheritance and property rights also need to be accompanied by awareness-raising and enforcement efforts” (OECD 2012a). In Morocco, gender discrimination still exists in the legal code that governs inheritance rights. Morocco also has a high prevalence and acceptance of gender-based violence. (In Morocco “64% of women agree that domestic violence is justified in certain circumstances”) (OECD 2012a).

These high-scoring countries illustrate many regional best practices and highlight important challenges to gender equality and important policy implications.

i.) Improving policy implementation: This study primarily evaluated the relationship between electoral gender quotas and measures of gender inequality. Quotas can impact the make-up and the functioning of regional and federal governments, potentially
changing the type of legislation passed. Implementation of those laws can still remain a challenge. Yet the OECD cited policy implementation as a key challenge even for high-performing countries such as South Africa, Morocco, and numerous other countries. The overall impact of legislation is only as powerful as the ability to implement new policy. For example, while South Africa has legislation against rape and sexual violence, implementation of these laws is inadequate and these crimes often go unreported.

ii.) Addressing gender discrimination on a community level through supportive programs:

South Africa and Morocco have both passed laws that reform their legal code to criminalize acts of gender discrimination or gender-based violence. But they also had programs that supported victims or increased education on gender-based issues. Many of the variables used to calculate OECD index scores focus on more macro-level reforms that prohibit cases of legal discrimination. Future research on the impact of gender quotas- and future policy designed to promote gender equality- might focus on prescriptive measures that directly impact communities, rather than just proscriptive measures that ban discriminatory behavior. Many of the successful programs in South Africa and Morocco were community-based initiatives that promote gender equality, such as the centers for victims of sexual violence in South Africa, or the educational programs for potential female entrepreneurs in Morocco. These programs directly support women in their communities. Through social services and advocacy, they have a unique opportunity to provide support, educate communities, and change public views and opinions about gender equality.
c) Conclusions

In social institutions ranging from inheritance rights to marriage customs, women face discrimination and separate treatment. When women lack the capacity to control core elements of their own lives such as their financial stability, their children’s education, or their personal physical integrity, other areas of society can be negatively impacted.

The 2012 World Bank *Gender Equality and Development Report* emphasizes the importance of gender equality to successful economic growth and development:

“Gender equality is smart economics: it can enhance economic efficiency and improve other development outcomes in three ways. First, removing barriers that prevent women from having the same access as men to education, economic opportunities, and productive inputs can generate broad productivity gains—gains all the more important in a more competitive and globalized world. Second, improving women’s absolute and relative status feeds many other development outcomes, including those for their children. Third, leveling the playing field where women and men have equal chances to become socially and politically active, make decisions, and shape policies—is likely to lead over time to more representative, and more inclusive, institutions and policy choices and thus to a better development path.”(World Bank, 2011, p.3).

According to this logic, addressing the policies that perpetuate gender inequality will have lasting change on a country’s economic growth and development. The impact of gender quotas on economic and legal reform is important because it can have significant development repercussions for both women and men.

Further research on electoral gender quotas and these other variables is important to economic, political, and human development throughout the world, as gender discrimination is associated with poor performance on a number of development indicators. For example, according to OECD,

“in 21 countries where social institutions discriminate against women the most (those ranked in the top SIGI quintile), primary school completion is on average more than 15 percent lower, nearly twice as many children suffer from malnutrition, and maternal mortality rates are twice as high when compared with other developing countries.” (OECD, 2010, p.2).
It remains vitally important to study ways to combat gender inequality- not just to accomplish fairness and equity, but to achieve development goals and to mitigate poverty. The presence of women in elected office can be an important component to pursuing gender equity. Further study regarding electoral gender quotas is valuable to understanding the best ways to promote women’s descriptive and substantive representation, and to benefit from public policy that incorporates women’s voices in the political process.
Multicollinearity Tests

i. Correlation

. *look at correlations among variables in the model

. corr familycode PV_QuotaA lac easiapac safrica sasia mena olic umic umic proprep

<table>
<thead>
<tr>
<th>familycode</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PV_QuotaA</td>
<td>-.1130</td>
<td>1.0000</td>
<td>-.2861</td>
<td>-.1979</td>
<td>1.0000</td>
<td>-.5130</td>
</tr>
<tr>
<td>lac</td>
<td>.0184</td>
<td>-.1267</td>
<td>.0113</td>
<td>.5130</td>
<td>.1267</td>
<td>.0184</td>
</tr>
<tr>
<td>easiapac</td>
<td>-.1396</td>
<td>-.2792</td>
<td>-.2096</td>
<td>.0365</td>
<td>-.1927</td>
<td>.0213</td>
</tr>
<tr>
<td>safrica</td>
<td>.0110</td>
<td>.0848</td>
<td>.0148</td>
<td>.0110</td>
<td>.0848</td>
<td>.0110</td>
</tr>
<tr>
<td>sasia</td>
<td>.0198</td>
<td>-.0350</td>
<td>.0155</td>
<td>.0365</td>
<td>-.0197</td>
<td>.0198</td>
</tr>
<tr>
<td>mena</td>
<td>.0198</td>
<td>-.0350</td>
<td>.0155</td>
<td>.0365</td>
<td>-.0197</td>
<td>.0198</td>
</tr>
<tr>
<td>olic</td>
<td>.0105</td>
<td>.0137</td>
<td>.0192</td>
<td>.0105</td>
<td>.0137</td>
<td>.0105</td>
</tr>
<tr>
<td>umic</td>
<td>.0125</td>
<td>-.0376</td>
<td>.0192</td>
<td>.0125</td>
<td>-.0376</td>
<td>.0125</td>
</tr>
<tr>
<td>proprep</td>
<td>.0165</td>
<td>-.0288</td>
<td>.0121</td>
<td>.0165</td>
<td>-.0288</td>
<td>.0165</td>
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<table>
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</tr>
</thead>
<tbody>
<tr>
<td>lmic</td>
<td>1.0000</td>
<td>.04668</td>
<td>1.0000</td>
<td>.04668</td>
<td>1.0000</td>
<td>.04668</td>
</tr>
<tr>
<td>umic</td>
<td>.04668</td>
<td>1.0000</td>
<td>.04668</td>
<td>1.0000</td>
<td>.04668</td>
<td>1.0000</td>
</tr>
<tr>
<td>proprep</td>
<td>.04668</td>
<td>.04668</td>
<td>1.0000</td>
<td>.04668</td>
<td>.04668</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Multicollinearity Tests

- **Regression**

  . regress familycode PV_QuotaA lac easiapac safrica sasia mena olic umic proprep

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs</th>
<th>F( 10, 103) = 12.60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>3.70693557</td>
<td>10</td>
<td>.370693557</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>3.02911099</td>
<td>103</td>
<td>.029408845</td>
<td>0.5503</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6.73604655</td>
<td>113</td>
<td>.059611031</td>
<td>0.5067</td>
<td></td>
</tr>
</tbody>
</table>

  | familycode | Coef. | Std. Err. | t     | P>|t| | (95% Conf. Interval) |
  |------------|-------|-----------|-------|-----|---------------------|
  | PV_QuotaA  | -.0171551 | .043465 | -.39  | 0.694 | -.1033577 | .6904076 |
  | lac        | .0757492  | .0525579 | 1.44  | 0.153 | -.208487 | .1799853 |
  | easiapac   | .0314407  | .0576859 | 0.55  | 0.587 | -.1482959 | .158074 |
  | safrica    | .3130961  | .031558 | 6.07  | 0.000 | .2108429 | .4153492 |
  | sasia      | .2466514  | .0754172 | 3.27  | 0.001 | .0970791 | .3962237 |
  | mena       | .3395861  | .0622215 | 5.46  | 0.000 | .2161844 | .4629878 |
  | olic       | .0800583  | .0761493 | 1.05  | 0.296 | -.0706595 | .2310825 |
  | umic       | .5079619  | .0695045 | 0.83  | 0.406 | -.0798838 | .1958076 |
  | proprep    | -.1011588 | .0722254 | -1.40 | 0.164 | -.2444007 | .0420832 |
  | _cons      | .1916677  | .0742421 | 2.58  | 0.011 | .0441261 | .3386093 |
c.) Heteroskedasticity Tests

i. Breusch-Pagan test

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of familycode

\[ \chi^2(1) = 2.23 \]
\[ \text{Prob > } \chi^2 = 0.1355 \]


ii. White's test

. estat imtest, white

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

\[ \chi^2(40) = 50.53 \]
\[ \text{Prob > } \chi^2 = 0.1229 \]

Cameron & Trivedi's decomposition of IM-test

<table>
<thead>
<tr>
<th>Source</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heteroskedasticity</td>
<td>50.53</td>
<td>40</td>
<td>0.1229</td>
</tr>
<tr>
<td>Skewness</td>
<td>6.37</td>
<td>10</td>
<td>0.7837</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.10</td>
<td>1</td>
<td>0.7575</td>
</tr>
<tr>
<td>Total</td>
<td>56.99</td>
<td>51</td>
<td>0.2620</td>
</tr>
</tbody>
</table>

iii. Rvfplot

![Rvfplot Diagram]
**d. Specification Errors**

**i. linktest**

```stata
. quietly regress familycode PV_QuotasA lac easiapac safrica sasia mena olic lmic umic pro
> prep

. linktest

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 114</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>3.73188573</td>
<td>2</td>
<td>1.86594286</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Residual</td>
<td>3.00416083</td>
<td>111</td>
<td>0.027064512</td>
<td>R-squared = 0.5540</td>
</tr>
<tr>
<td>Total</td>
<td>6.73604655</td>
<td>113</td>
<td>0.059611031</td>
<td>Adj R-squared = 0.5460</td>
</tr>
</tbody>
</table>

| familycode   | Coef.     | Std. Err. | t    | P>|t|  | [95% Conf. Interval] |
|--------------|-----------|-----------|------|------|---------------------|
| _hat         | .5473459  | .4791243  | 1.14 | 0.256| -.40207083 - 1.496763|
| _hatsq       | .6319517  | .6581837  | 0.96 | 0.339| -.6722833 - 1.936187|
| _cons        | .05989    | .072355   | 0.83 | 0.410| -.0834864 - 0.2032663|

**ii. Ramsey’s RESET test**

```stata
. estat ovtest

Ramsey RESET test using powers of the fitted values of familycode
Ho: model has no omitted variables
F(3, 100) = 1.64
Prob > F = 0.1850

**iii. Plot of Residuals Against Dependent Variable**

![Plot of Residuals Against Dependent Variable](image-url)
Model 2: Dependent Variable: Civil Liberties

\[ \text{Civil Liberties} = \text{PV}_\text{QuotasA} + \text{lac} + \text{easiapac} + \text{sfrica} + \text{sasia} + \text{mena} + \text{olic} + \text{lmic} + \text{umic} + \text{proprep} \]

\[ \text{Number of obs} = 114 \]

\[ \text{R}^2 = 0.7168 \]
\[ \text{Root MSE} = 0.14312 \]

---

### Regression

\[ \begin{align*}
\text{Source} & \quad \text{SS} & \text{df} & \text{MS} & \text{Number of obs} = 114 \\
\text{Model} & 6.06268857 & 10 & 0.606268857 & \text{Prob > F} = 0.0000 \\
\text{Residual} & 2.10991828 & 103 & 0.020484644 & \text{Adj R-squared} = 0.7168 \\
\text{Total} & 8.17260685 & 113 & 0.072323954 & \text{Root MSE} = 0.14312 \\
\end{align*} \]

### Multicollinearity Tests

#### i. Correlation

\[ \begin{align*}
\text{civilliber-s} & \quad \text{PV}_\text{QuotasA} & \quad \text{lac} & \quad \text{easiapac} & \quad \text{sfrica} & \quad \text{sasia} & \quad \text{mena} & \quad \text{olic} & \quad \text{lmic} & \quad \text{umic} & \quad \text{proprep} \\
\text{PV}_\text{QuotasA} & 1.0000 & -0.7786 & 1.0000 & -0.3720 & 0.2591 & 1.0000 & -0.1089 & -0.3231 & -0.2360 & 1.0000 \\
\text{lac} & -0.7786 & 1.0000 & -0.0991 & -0.2091 & 0.1091 & -0.0989 & -0.1089 & -0.3231 & -0.2360 & 1.0000 \\
\text{easiapac} & 0.3720 & -0.3720 & 1.0000 & -0.2222 & -0.1167 & 0.2222 & -0.1089 & -0.3231 & -0.2360 & 1.0000 \\
\text{sfrica} & -0.7786 & -0.3720 & -0.2222 & 1.0000 & -0.0991 & 0.0991 & -0.1089 & -0.3231 & -0.2360 & 1.0000 \\
\text{sasia} & -0.3720 & -0.7786 & -0.3720 & -0.2222 & 1.0000 & -0.0991 & 0.0991 & -0.1089 & -0.3231 & -0.2360 \\
\text{mena} & -0.7786 & -0.3720 & -0.7786 & -0.3720 & -0.2222 & 1.0000 & -0.0991 & 0.0991 & -0.1089 & -0.3231 \\
\text{olic} & 0.3720 & -0.7786 & -0.3720 & -0.3720 & 1.0000 & -0.0991 & 0.0991 & -0.1089 & -0.3231 & -0.2222 \\
\text{lmic} & -0.7786 & -0.3720 & -0.7786 & -0.3720 & -0.3720 & 1.0000 & -0.0991 & 0.0991 & -0.1089 & -0.3231 \\
\text{umic} & 0.3720 & -0.7786 & 0.3720 & 0.3720 & 0.3720 & 1.0000 & -0.0991 & 0.0991 & -0.1089 & -0.3231 \\
\text{proprep} & -0.7786 & -0.3720 & -0.7786 & -0.3720 & -0.7786 & -0.3720 & 1.0000 & -0.0991 & 0.0991 & -0.1089 \\
\end{align*} \]
c) **Heteroskedasticity Tests**

i. **Breusch-Pagan Test**

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of civilliberties

chi2(1) = 0.12
Prob > chi2 = 0.7295
```

ii. **White’s test**

```
. estat imtest, white

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

chi2(40) = 39.33
Prob > chi2 = 0.5003

Cameron & Trivedi's decomposition of IM-test

<table>
<thead>
<tr>
<th>Source</th>
<th>ch2</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heteroskedasticity</td>
<td>39.33</td>
<td>40</td>
<td>0.5003</td>
</tr>
<tr>
<td>Skewness</td>
<td>11.62</td>
<td>10</td>
<td>0.3110</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>5.62</td>
<td>1</td>
<td>0.0177</td>
</tr>
<tr>
<td>Total</td>
<td>56.57</td>
<td>51</td>
<td>0.2748</td>
</tr>
</tbody>
</table>
```

iii. **Rvfplot**
d. Specification Errors

i. link test

```
. linktest
```

```
<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 114</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>6.13033612</td>
<td>2</td>
<td>3.06516806</td>
<td>F( 2, 111) = 166.60</td>
</tr>
<tr>
<td>Residual</td>
<td>2.04227073</td>
<td>111</td>
<td>0.018398835</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>8.17260685</td>
<td>113</td>
<td>0.072323954</td>
<td>Adj R-squared = 0.7456</td>
</tr>
</tbody>
</table>

- _cons     = 0.0695444   
- F( 2, 111) = 166.60
- Prob > F = 0.0000

```

<table>
<thead>
<tr>
<th>_hat</th>
<th>.5630254</th>
<th>.2344539</th>
<th>.018</th>
<th>.0984395</th>
<th>1.027611</th>
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</thead>
<tbody>
<tr>
<td>_hat^2</td>
<td>.4878312</td>
<td>.2544126</td>
<td>.058</td>
<td>-.0163044</td>
<td>.9919667</td>
</tr>
<tr>
<td>_cons</td>
<td>.0695444</td>
<td>.0478501</td>
<td>.149</td>
<td>-.0252738</td>
<td>.1643627</td>
</tr>
</tbody>
</table>

ii. Ramsey’s RESET

```
. estat ovtest
```

Ramsey RESET test using powers of the fitted values of civilliberties
```
Ho: model has no omitted variables
F(3, 100) = 1.67
Prob > F = 0.1791
```

iii. Plot of Residuals Against Dependent Variable

```
. graph twoway scatter resid vs civilliberties, name(plot)
```

(Plot of Residuals vs Civil Liberties)
Model 3: Dependent Variable: Physical Integrity

a) Regression

. regress physicalintegrity PV_QuotasA lac easiapac safrica sasia mena olic lmic umic pro prep
   Source | SS df MS         Number of obs = 99
----------|-----------------+-----------------------------------
Model | 3.2020712 10  .32020712 Prob > F = 0.0000
Residual | 2.50184744 88  .028430085 R-squared = 0.5614
----------|-----------------+-----------------------------------
Total | 5.70391865 98  .058203252 Adj R-squared = 0.5115


b. Multicollinearity Tests

i. Correlations

. corr physicalintegrity PV_QuotasA lac easiapac safrica sasia mena olic lmic umic proprep
   (obs=99)
   physicalint-y PV_QuotasA lac easiapac safrica sasia mena olic lmic umic proprep _cons
   physicalint-y 1.0000
   PV_QuotasA  -0.0085  1.0000
   lac  -0.3486  0.2085  1.0000
   easiapac  -0.2036  -0.1911  -0.0977  1.0000
   safrica  0.5809  -0.1454  -0.3319  -0.2130  1.0000
   sasia  -0.0672  0.1768  -0.1445  -0.1048  -0.2340  1.0000
   mena  0.0656  -0.0669  -0.1541  -0.1118  -0.2496  -0.0938  1.0000
   olic  0.5064  -0.0150  -0.2271  -0.0382  0.5203  0.0328  -0.2185  1.0000
   lmic  -0.0750  -0.0622  -0.0485  0.0668  -0.2080  0.1611  0.1262  -0.0224
   umic  -0.4273  0.0992  0.2368  -0.0233  -0.2945  -0.1955  0.0973  -0.4557
   proprep  -0.3329  0.2656  0.0921  -0.0747  -0.3287  0.1417  0.1604  -0.1666
   _cons  0.3475991  0.1769015  1.96  0.053  -0.0039555  0.6991537

   proprep     0.1198   0.0738   1.0000
   umic    -0.4984   1.0000
   lmic     1.0000
   ...     olic
   (obs=99)

   prep 
   . regress physicalintegrity  PV_QuotasA lac easiapac safrica sasia mena olic lmic umic propre
c) **Heteroskedasticity Tests**

i. **Breusch-Test**

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of physicalintegrity

chi2(1)     =   17.04
Prob > chi2 =  0.0000
```

ii. **White’s Test**

```
. estat imtest, white

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

chi2(35)     =   39.80
Prob > chi2 =  0.2647
```

Cameron & Trivedi's decomposition of IM-test

<table>
<thead>
<tr>
<th>Source</th>
<th>chi2</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heteroskedasticity</td>
<td>39.80</td>
<td>35</td>
<td>0.2647</td>
</tr>
<tr>
<td>Skewness</td>
<td>12.67</td>
<td>10</td>
<td>0.2430</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.12</td>
<td>1</td>
<td>0.9292</td>
</tr>
<tr>
<td>Total</td>
<td>52.59</td>
<td>46</td>
<td>0.2341</td>
</tr>
</tbody>
</table>

iii. **Rvplot**

![Residual vs Fitted Values Plot](image)
**d. Specification Errors**

**i. link test**

```
. linktest

Source | SS   | df   | MS   | Number of obs =  99
--- | --- | --- | --- | ---
Model | 3.25072018 | 2 | 1.62536009 | F(  2,    96) = 63.60
Residual | 2.45319847 | 96 | .025554151 | Prob > F = 0.0000
Total | 5.70391865 | 98 | .058203252 | R-squared = 0.5699
Adj R-squared = 0.5609
Root MSE = .15986
```

| physicalin-y | Coef. | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|---------------|-------|-----------|------|-----|------------------|
| base          | .4285167 | .4237125 | 1.01 | 0.314 | -.4125459 - 1.269579 |
| hatsq         | .7263819 | .5246523 | 1.38 | 0.171 | -.3186177 - 1.771382 |
| cons          | .0886512 | .0741396 | 1.19 | 0.235 | -.0586339 - 0.2359363 |

**ii. Ramsey’s RESET**

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of physicalintegrity
Ho: model has no omitted variables
F(3, 85) = 1.43
Prob > F = 0.2408
```

**iii. Plot of Residuals Against Dependent Variable**
Model 4: Dependent Variable: Son Bias

a) Regression

```
. regress sonbias PV_QuotasA lac easiapac safrica sasia mena ollic lmic umic proprep

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1.67295919</td>
<td>10</td>
<td>.167295919</td>
<td>F( 10, 84) = 5.22</td>
</tr>
<tr>
<td>Residual</td>
<td>1.7094587</td>
<td>84</td>
<td>.02035069</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>3.38241789</td>
<td>94</td>
<td>.035983169</td>
<td>R-squared = 0.4946</td>
</tr>
<tr>
<td>Adj R-squared = 0.4344</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root MSE = .14266</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

| sonbias | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] |
|---------|-------|-----------|---|------|----------------------|
| PV_QuotasA | .0428525 | .0391474 | 1.09 | 0.277 | -.0349964 | .1207013 |
| lac | -.2379824 | .0457367 | -5.20 | 0.000 | -.3289349 | -.1470299 |
| easiapac | -.1119835 | .054185 | -2.07 | 0.042 | -.2197364 | -.0042306 |
| safrica | -.2584381 | .0478614 | -5.49 | 0.000 | -.3520248 | -.1648514 |
| sasia | .0835094 | .0683806 | 1.22 | 0.225 | .0524728 | .2194917 |
| mena | -.0547833 | .0693964 | -0.79 | 0.432 | -.1927853 | .0832194 |
| ollic | -.06022464 | .1543689 | -0.39 | 0.697 | -.3672258 | .2467331 |
| lmic | .0057153 | .1523064 | 0.04 | 0.970 | -.2971627 | .3085933 |
| umic | -.0288007 | .1512657 | -0.19 | 0.849 | -.3296155 | .2720015 |
| proprep | -.0610162 | .0358333 | -1.70 | 0.102 | -.1327474 | .0102423 |
| _cons | .7379824 | .1498084 | 4.93 | .000 | .440072 | 1.035893 |
```

b) Multicollinearity Tests

i. Correlation

```
. corr sonbias PV_QuotasA lac easiapac safrica sasia mena ollic lmic umic proprep (obs=95)
```

<table>
<thead>
<tr>
<th>sonbias</th>
<th>PV_QuotasA</th>
<th>lac</th>
<th>easiapac</th>
<th>safrica</th>
<th>sasia</th>
<th>mena</th>
<th>ollic</th>
<th>lmic</th>
<th>umic</th>
<th>proprep</th>
</tr>
</thead>
<tbody>
<tr>
<td>sonbias</td>
<td>1.0000</td>
<td>-0.2244</td>
<td>0.1954</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV_QuotasA</td>
<td>0.1602</td>
<td>1.0000</td>
<td>-0.02160</td>
<td>-0.1062</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lac</td>
<td>-0.0434</td>
<td>-0.2160</td>
<td>0.1954</td>
<td>-0.1062</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>easiapac</td>
<td>-0.4606</td>
<td>-0.2114</td>
<td>-0.3785</td>
<td>-0.2351</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>safrica</td>
<td>0.3698</td>
<td>0.2160</td>
<td>-0.1456</td>
<td>-0.1021</td>
<td>-0.2354</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sasia</td>
<td>0.1636</td>
<td>0.0166</td>
<td>-0.1341</td>
<td>-0.0940</td>
<td>-0.2167</td>
<td>-0.0732</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mena</td>
<td>-0.2760</td>
<td>-0.1226</td>
<td>-0.2683</td>
<td>0.0124</td>
<td>0.4698</td>
<td>0.0481</td>
<td>-0.1894</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ollic</td>
<td>0.2351</td>
<td>-0.0718</td>
<td>-0.0948</td>
<td>0.0483</td>
<td>-0.1400</td>
<td>0.1052</td>
<td>0.2363</td>
<td>-0.5827</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lmic</td>
<td>0.0413</td>
<td>0.2372</td>
<td>0.3534</td>
<td>-0.0590</td>
<td>-0.3375</td>
<td>-0.1640</td>
<td>-0.0514</td>
<td>-0.4242</td>
<td></td>
<td></td>
</tr>
<tr>
<td>umic</td>
<td>0.1295</td>
<td>0.2350</td>
<td>0.0841</td>
<td>-0.5288</td>
<td>-0.3776</td>
<td>0.1963</td>
<td>0.1807</td>
<td>-0.1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>proprep</td>
<td>0.1415</td>
<td>0.0946</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lmic</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>umic</td>
<td>-0.4644</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>proprep</td>
<td>0.1415</td>
<td>0.0946</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
c) **Heteroskedasticity**

i. **Breusch-Pagan Test**

```
estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of sonbias

<table>
<thead>
<tr>
<th>chi2(1)</th>
<th>Prob &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.94</td>
<td>0.1635</td>
</tr>
</tbody>
</table>
```

ii. **White’s Test**

```
estat imtest, white

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

<table>
<thead>
<tr>
<th>Source</th>
<th>chi2</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heteroskedasticity</td>
<td>34.36</td>
<td>33</td>
<td>0.0024</td>
</tr>
<tr>
<td>Skewness</td>
<td>14.08</td>
<td>10</td>
<td>0.1696</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.95</td>
<td>1</td>
<td>0.0835</td>
</tr>
<tr>
<td>Total</td>
<td>51.39</td>
<td>44</td>
<td>0.2068</td>
</tr>
</tbody>
</table>
```

iii. **Rvplot**

![Residuals vs Fitted values plot](image)
**d. Specification Errors**

**i. link test**

```
. linktest

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1.71412791</td>
<td>2</td>
<td>.857063957</td>
<td>F( 2, 92) = 47.26</td>
</tr>
<tr>
<td>Residual</td>
<td>1.66828997</td>
<td>92</td>
<td>.018133587</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>3.38241789</td>
<td>94</td>
<td>.035983169</td>
<td>R-squared = 0.5068</td>
</tr>
</tbody>
</table>

|      | Coef.       | Std. Err. | t     | P>|t|  | [95% Conf. Interval] |
|------|-------------|-----------|-------|------|----------------------|
| _hat | .1357864    | .582933   | 0.23  | 0.816 | -1.021969            | 1.293542 |
| _hatsq | .808079    | .5363052  | 1.51  | 0.135 | -.2570693            | 1.873227 |
| _cons | .2166818    | .1543208  | 1.40  | 0.164 | -.0898127            | .5231762 |
```

**ii. Ramsey’s RESET**

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of sonbias
Ho: model has no omitted variables
   F(3, 81) = 4.27
   Prob > F = 0.0075
```

**iii. Plot of Residuals Against Dependent Variable**

![Plot of Residuals Against Dependent Variable](image)
Model 5: Dependent Variable: Restricted Resources

a) Regression

```
. regress restrictedresources PV_QuotasA lac easiapac safrica sasia mena olic lmic umic p
> roprep

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 115</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1.89639117</td>
<td>10</td>
<td>.189639117</td>
<td>F(10, 104) = 4.28</td>
</tr>
<tr>
<td>Residual</td>
<td>4.60306458</td>
<td>104</td>
<td>.044260236</td>
<td>Prob &gt; F = 0.0001</td>
</tr>
<tr>
<td>Total</td>
<td>6.49945574</td>
<td>114</td>
<td>.05701277</td>
<td>R-squared = 0.2918</td>
</tr>
</tbody>
</table>

. lincom _cons     .0707864   .0937807     0.75   0.452    -.1151842     .256757
> roprep
```

b) Multicollinearity Tests

i. Correlation

```
. corr restrictedresources PV_QuotasA lac easiapac safrica sasia mena olic lmic umic propr
> ep
(obs=115)
```

```
<table>
<thead>
<tr>
<th>restricted-s</th>
<th>PV_QuotasA</th>
<th>lac</th>
<th>easiapac</th>
<th>safrica</th>
<th>sasia</th>
<th>mena</th>
<th>olic</th>
<th>lmic</th>
<th>umic</th>
<th>propr</th>
</tr>
</thead>
<tbody>
<tr>
<td>restricted-s</td>
<td>1.0000</td>
<td></td>
<td>0.0898</td>
<td>0.0898</td>
<td>0.08329</td>
<td>0.2810</td>
<td>1.0000</td>
<td>0.0536</td>
<td>-0.0517</td>
<td>-0.0517</td>
</tr>
<tr>
<td>PV_QuotasA</td>
<td>0.0898</td>
<td></td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lac</td>
<td>-0.2329</td>
<td></td>
<td>-0.2251</td>
<td>-0.1777</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>easiapac</td>
<td>-0.1258</td>
<td></td>
<td>-0.2251</td>
<td>-0.1777</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>safrica</td>
<td>0.4158</td>
<td></td>
<td>-0.0930</td>
<td>-0.3415</td>
<td>-0.2883</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sasia</td>
<td>0.0536</td>
<td></td>
<td>0.1833</td>
<td>-0.1255</td>
<td>-0.1059</td>
<td>-0.2035</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mena</td>
<td>-0.0517</td>
<td></td>
<td>-0.1326</td>
<td>-0.1777</td>
<td>-0.1500</td>
<td>-0.2883</td>
<td>-0.1059</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>olic</td>
<td>0.3365</td>
<td></td>
<td>0.0576</td>
<td>-0.2484</td>
<td>-0.0745</td>
<td>0.4910</td>
<td>0.0532</td>
<td>-0.2457</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>lmic</td>
<td>0.0632</td>
<td></td>
<td>-0.0252</td>
<td>-0.0541</td>
<td>0.0891</td>
<td>-0.0992</td>
<td>0.1533</td>
<td>0.0352</td>
<td>-0.4722</td>
<td></td>
</tr>
<tr>
<td>umic</td>
<td>-0.2505</td>
<td></td>
<td>0.1625</td>
<td>0.3294</td>
<td>-0.0676</td>
<td>-0.2596</td>
<td>-0.1698</td>
<td>-0.0100</td>
<td>-0.3939</td>
<td></td>
</tr>
<tr>
<td>propr</td>
<td>0.0064</td>
<td></td>
<td>0.2770</td>
<td>0.1574</td>
<td>-0.0280</td>
<td>-0.2649</td>
<td>0.1364</td>
<td>-0.0280</td>
<td>-0.1177</td>
<td></td>
</tr>
</tbody>
</table>

| lmic         | 1.0000     |     |         |         |       |       |       |       |       |       |
| umic         | -0.4622    |     |         |         |       |       |       |       |       |       |
| propr        | 0.1121     |     |         |         |       |       |       |       |       |       |
```

46
c) **Heteroskedasticity Test**

i. **Breusch-Pagan Test**

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of restricted resources

\[
\text{chi2(1)} = 0.96 \\
\text{Prob > chi2} = 0.3261
\]

ii. **White's Test**

. estat imtest, white

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

\[
\text{chi2(38)} = 31.47 \\
\text{Prob > chi2} = 0.7639
\]

Cameron & Trivedi's decomposition of IM-test

<table>
<thead>
<tr>
<th>Source</th>
<th>chi2</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heteroskedasticity</td>
<td>31.47</td>
<td>38</td>
<td>0.7639</td>
</tr>
<tr>
<td>Skewness</td>
<td>10.99</td>
<td>10</td>
<td>0.3587</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.64</td>
<td>1</td>
<td>0.4234</td>
</tr>
<tr>
<td>Total</td>
<td>43.10</td>
<td>49</td>
<td>0.7102</td>
</tr>
</tbody>
</table>

iii. **Ryflot**
d) Specification Error Tests

i. Link test

\[
\text{. linktest}
\]

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 115</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1.94778744</td>
<td>2</td>
<td>.973893719</td>
<td>F( 2, 112) = 23.96</td>
</tr>
<tr>
<td>Residual</td>
<td>4.5516683</td>
<td>112</td>
<td>.040639896</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>6.49945574</td>
<td>114</td>
<td>.05701277</td>
<td>R-squared = 0.2872</td>
</tr>
</tbody>
</table>

Adj R-squared = 0.2872
Root MSE = .20159

\[
\text{restricted-s} \quad \text{Coef.} \quad \text{Std. Err.} \quad t \quad P>|t| \quad [95\% \text{ Conf. Interval}]
\]

\[
\begin{array}{cccccc}
\_hat & 1.918198 & .8295011 & 2.31 & 0.023 & .274648 \quad 3.561748 \\
\text{hatsq} & -1.246626 & 1.107637 & -1.12 & 0.263 & -3.440266 \quad .9490152 \\
\_cons & -.1485192 & .1441054 & -1.03 & 0.306 & -.4348382 \quad .1377998 \\
\end{array}
\]

ii. Ramsey’s RESET

\[
\text{. estat ovtest}
\]

Ramsey RESET test using powers of the fitted values of restrictedresources
Ho: model has no omitted variables
F(3, 101) = 0.89
Prob > F = 0.4515

iii. Plot of Residuals Against Dependent Variable

![Plot of Residuals Against Dependent Variable](image-url)
WORKS CITED


