Natural Resources Dependency and Gender Equality: Evidence from Extractive and Renewable Energy Industries

by

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1. INTRODUCTION

1.1 Objectives

The relationship between economic growth and inequality, including gender inequality, is a common issue that economists often concern about. As higher income countries are associated with less gender inequality (Jayachandran, 2015), the question is which actually spurs which. The natural resource industries – renewable and extractive – offer a unique opportunity to identify the impacts of economic development on gender equality and not the other way around due to the industry nature of dependency on random geological endowments. For clarification, in this paper, extractive industries implies oil, natural gas, commercial forestry, coal and minerals mining, while renewable energy largely come from solar, hydro, wind, tidal, geothermal and biomass resources.

According to ECLAC (2021), there are still gaps in the policies for addressing the relationships between gender and natural resources. The 2030 Agenda emphasizes the need for gender mainstreaming, with nine Sustainable Development Goals (SDGs) and a total of 29 indicators that can be broken down by sex. Significantly, none of these gender-sensitive indicators are related to the environment or natural resources. Progress must therefore be made in analysing the interdependence between natural resources (environmental dimension), gender issues (social dimension) and productive activities (economic dimension) to encourage the design of more comprehensive policies within the framework of the 2030 Agenda.

A review of the literature illustrates that there exists gender-based impacts for booms and bursts of extractive industries, noticably in the comprehensive review and quantitative analysis named 'Extractive Industries and Gender Equality' by Baum and Benshaul-Tolonen (2021). Meanwhile, the gender-based impacts by the energy transition to renewable resources are merely covered in the literature, despite being a timely matter. As a result, this paper aims to empirically examine (in a broad sense) whether dependence on extractive resources correlate with dependence on renewable resources, whether the empirical impacts of extractive industries on gender equality can be replicated, and how natural resource (extractive and renewable) dependency impacts gender equality.

1.2 Literature Review

There has been little research on the gender-specific impacts of dependency on natural resources (extractive and renewable) as a whole. Although the economics field has emphasized the natural resource curse, "the perverse effects of a country's natural resource wealth on its economic, social, or political well-being", the scope for natural resource limits to extractive resources meaning petroleum, gemstones, narcotics and other types of minerals (Vahabi, 2018). A relevant article by the Economic Commission for Latin America and the Caribbean (2021) analyses relationships between gender and key natural resources (biodiversity, water, energy, food and mining) in Latin America and the Caribbean. There are structural inequalities that place women at clear economic and social disadvantage: pronounced inequalities in ownership of and access to key resources such as land and water, inequalities in the quality of employment and in decision-making venues, and inequalities in the economy of time. The latter has been particularly aggravated in the current context of the COVID-19 pandemic.

In terms of gender-specific impacts by extractive industries, the majority of economics research papers on extractive industries have implicitly assumed that the industry is gender neutral or that gender-related impacts are negligible or of second-order importance. However, after reviewing 35 published studies that cover a time period of more than 150 years across developing and developed countries, Baum and Benshaul-Tolonen (2021) suggests that extractive industries have highly gender-specific impacts on labor markets, health outcomes, gender-based violence, and political participation that are a "mixed blessing" for women. These impacts are highly context specific. Baum and Benshaul-Tolonen's empirical analysis (2021), using several composite indexes measuring gender inequality, find that countries in which natural resource rents (from oil, natural gas, coal, minerals, and forests) account for a greater share of GDP have higher levels of gender inequality, lower levels of absolute female welfare (in terms of female reproductive health, political participation, and economic status), more conservative attitudes toward women, and negatively correlated with education for both men and women. This correlation persists when they control for the level of economic development.

In terms of gender-specific impacts by the renewable energy industries, similar to that of extractive industries, gendered nature of energy transitions is often implicit and unexplored (Lieu et al., 2020). According to the OECD (2021), in developing countries, lack of access to energy is an obstacle to women's and girls' well-being and economic opportunities, as it strongly affects their living conditions and time-use, and undermines their educational and economic opportunities. Therefore, the energy transition can expand acccess to energy and bring enormous economic, environmental and social benefits, although many challenges remain regarding the gender perspective and the active inclusion of women (ECLAC, 2021). Energy is a largely male-dominated sector, although women are in general better represented in the renewable energy sector (OECD, 2021) According to ILO/IDB (2020), over 80% of the jobs created in decarbonization programmes will be in male-dominated sectors, and so women will not benefit from this job creation unless the current occupational segregation is addressed.

Overall, gender inequalities translate into a pattern of economic growth characterized by exclusion, since women are not as well positioned as men to take advantage of the opportunities generated by economic growth (ECLAC, 2021). This is evident in the extractive industries, where the benefits are mainly reaped by men, due to the predominance of male employees. Accordingly, the gender perspective must be included in job creation policies to reduce the gap and to avoid its reproduction in the new schemes for changing the energy matrix from fossil fuels to renewables, where the gender aspect can made invisible through the better environmental conditions achieved.

1.3 Dependency on extractive and renewable energy resources

Dependency on extractive resources is measured by a country's total natural resources rents from oil, gas, coal, minerals and forestry as a percentage of GDP, the same indicator that Baum and Benshaul-Tolonen (2021) used for the empirical analysis. Dependency on renewable resources is measured by a country's renewable energy consumption as a percentage of total energy consumption. As the GDP-equivalent valuation for total energy consumption is not available, there would not be an identical

ground for comparison between the two dependency patterns, rather a compromise due to lack of a better indicator.

Figure 1a illustrates the world heat map for dependency on extractive resources, with highly dependent countries concentrated in Sub-Saharan Africa, North Africa and the Middle East. Timor-Lester in Asia with the highest dependency (rents = 81.9%) is excluded to remove noise from the map. Figure 1b presents the world heat map for dependency on renewable energy resources, with highly dependent countries concentrated in Sub-Saharan Africa and America.

Figure 1a: World map: Extractive dependency

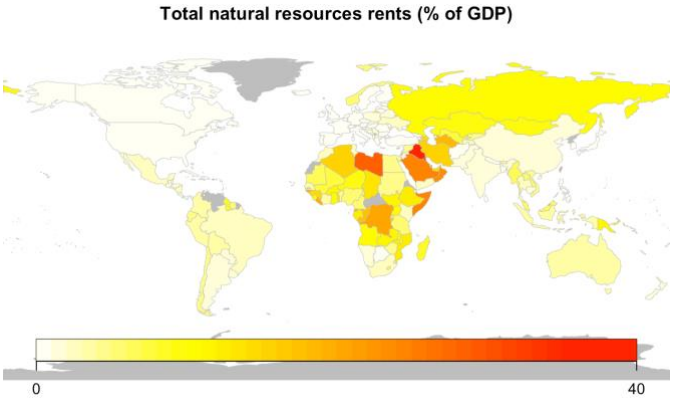

Figure 1b: World map: Renewable dependency

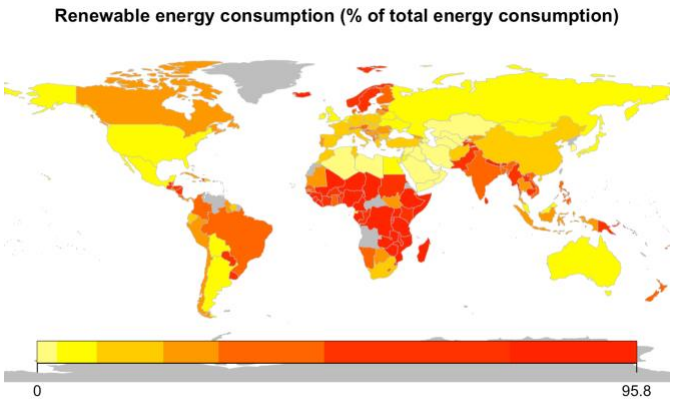

Table 1 shows the regression results for regressing natural resource rents on renewable energy consumption. As the coefficient's p-value is not statistically significant, there is no correlation found between a country's dependence on extractive resources and dependence on renewable resources. This finding aligns with the exogenous nature of both industries, where location largely depends on random geological endowments.

Table 1: Regression results: natural resource rents and renewable energy consumption

	Natural resource rents		
	Estimates	*CI*	*p*
(Intercept)	4.47	2.48 – 6.47	**<0.001**
Renewable energy consumption	0.03	-0.02 – 0.08	0.189
Observations	181		
R^2 / R^2 adjusted	0.010 / 0.004		

2. METHODOLOGY

2.1 Assessment and Modifications

Since this paper aims to replicate the empirical analysis and examine extractive industries' impacts on gender outcomes (Baum & Benshaul-Tolonen, 2021) and use the same method to explore the impacts of renewable energy industries on gender outcomes, the method used by Baum and Benshaul-Tolonen is described as follow:

All country data are for the year 2015 from the World Bank (gender statistics, total natural resources rents, regulatory quality, rule of law), the UNDP (GDI, HDI, and GII), International Labour Organization (female labor force participation rate), and Inter-parliamentary Union (parliament seats held by women). The authors conduct cross-sectional regressions with robust standard error, control for country-level GDP, region fixed effects (Africa, Asia, America, Middle East and North Africa, Europe), and institutional quality and rule of law. Dependent variables includes Gender Development Index (GDI), Female Human Development Index (HDI), Male HDI, Gender Inequality Index (GII), Female labor force participation rate, Parliament seats held by women, Maternal mortality ratio, Female education, Male education, Domestic violence adjusted. Regressor is Total natural resources rents (% of GDP).

To ensure replication success, the same use of data sources and indicators, scope and year, and method are required. However, after conducting data sourcing and processing, three issues come up. Firstly, though coming from the same source, several gender statistics have significantly less observations, so this paper only include five dependent variebles instead of ten. Secondly, the authors restricts the dataset to countries where natural resource rents make up at least 1 percent of GDP, but missing country data (though identical data source) would shrink the observation size significantly. Therefore, this paper would include both (no restrcition and with restriction). Finally, a multicollinearity check for all regressors via the 'VIF' function in R results in high VIF values for regulatory quality and rule of law, which implies strong. To ensure accurate estimations of the regressors, variable rule of law is removed despite having similar standard deviation and number of observations, as regulatory quality is more relevant. Once the rule of law is removed, the VIF values for all variables decrease to less than 1.5.

2.2 Data and Variables

Table 2a provides information for all independent variables and regressors. Year is 2015, 185 countries divided into five regions - Africa, Asia, America, Middle East and North Africa, and Europe.

Table 2a: Explanation and source of all variables

Symbol	Name and unit	Explanation	Data source
GII	Gender Inequality Index	Covers three dimensions: reproductive healt –h, empowerment, and economic status. Clo ser to 1 indicates higher inequalities.	UNDP
GDI	Gender Development Index	Covers existing gender gaps in the human development index – life expectency, education, standard of living. Closer to 1 indicates smaller gender gap.	UNDP
felabor	Female labor force participation (% of female population ages 15+)	The proportion female ages 15 and older that is economically active out of all female population.	International Labour Organization
mmorta	Maternal mortality ratio (per 100,000 live births)	The number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births.	World Bank

feseat	Proportion of seats held by women in national parliaments (%)	The percentage of parliamentary seats in a single or lower chamber held by women.	Inter-Parliamentary Union
nrrent	Natural resources rents (% of GDP)	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. Calculated as the difference between the price of a commodity and the average cost of extracting/harvesting it.	World Bank
renewe	Renewable energy consumption (% of total energy consumption)	Renewable energy consumption is the share of renewables energy in total final energy consumption (including electricity, transport, heating).	World Bank
lGDP	Log GDP (current US$)	Log is computed from GDP values.	World Bank
regulat	Regulatory Quality: Estimate	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate ranging from approximately -2.5 to 2.5.	World Bank

Figure 2a and 2c shows the plot of each dependent variable versus natural resource dependency. Figure 2b are from Baum & Benshaul-Tolonen. The color reflects the region of a particular country.

Figure 2a: Correlations between extractive resource dependence and gender inequality, female labor force participation, parliament seats held by women, and maternal mortality

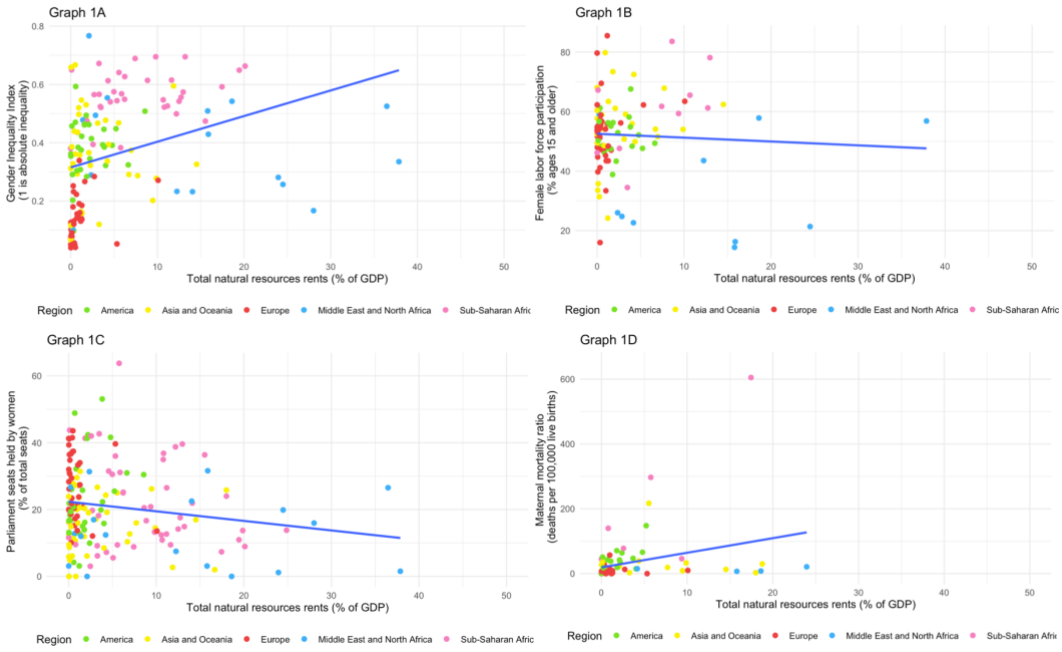

Figure 2b: Correlations between extractive resource dependence and gender inequality, female labor force participation, *female education*, and maternal mortality (Baum & Benshaul-Tolonen, 2021)

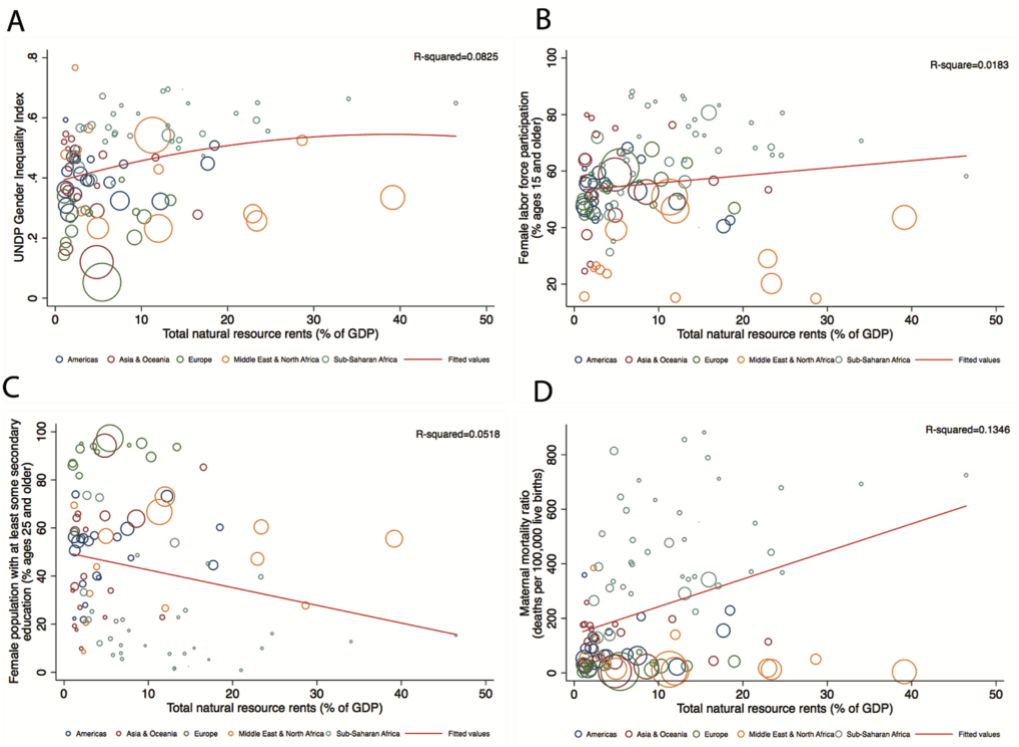

Figure 2c: Correlations between renewable resource dependence and gender inequality, female labor force participation, parliament seats held by women, and maternal mortality

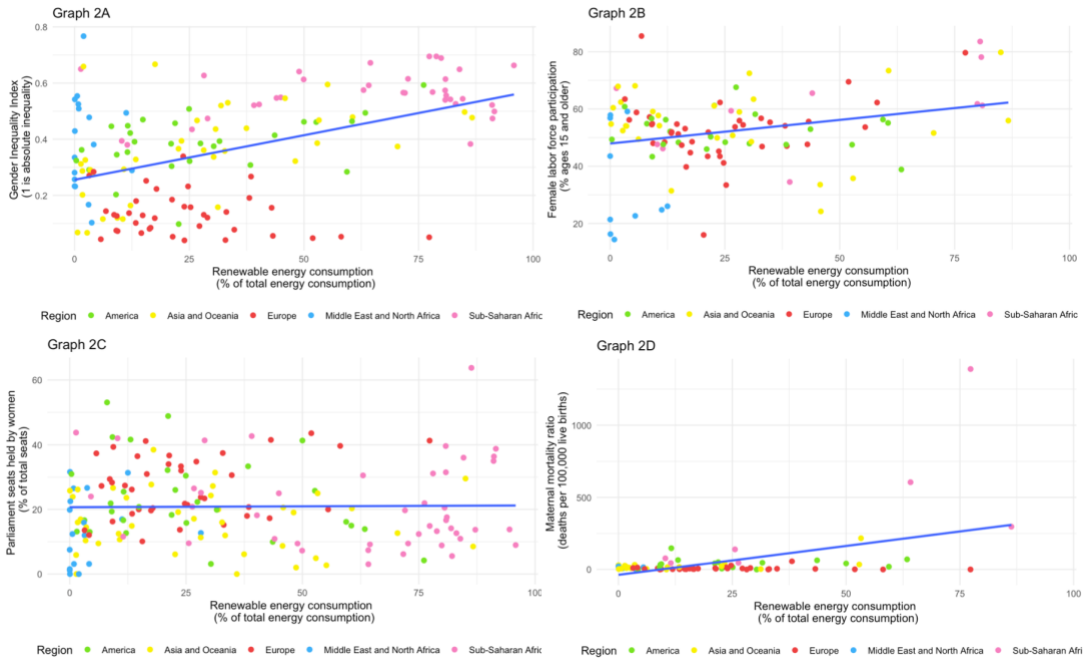

Table 2b shows descriptive statistics for each of the variable.

Table 2b: Descriptive statistics for 2015 data

	Mean	Standard Deviation	Minimum	Maximum	Observations
GII	0.4	0.2	0	0.8	154
GDI	0.9	0.1	0.5	1	161
felabor	52.1	13.3	14.4	85.5	109
mmorta	51.2	172.2	0	1389	79
feseat	21	12.2	0	63.8	175
nnrent	5.4	8.9	0	81.9	185
renewe	32.1	28.3	0	95.8	181
lGDP	10.6	1	8.2	13.3	181
regulat	0	1	-2.2	2.3	183

2.3 Method

As mentioned, the method used by Baum & Benshaul-Tolonen (2021) is cross-sectional regression with robust standard error. Standard errors varies when using heteroskedasticity robust standard errors, therefore the homoskedasticity assumption for OLS estimator can be relaxed. A total of 30 regressions will be computed under three panels or models, where Y_i is a vector for gender statistics of country i (GDI, GII, felabor, feseat, mmorta), X_i is a vector for natural resource dependency (nnrent, renewe), and u_i is the error term. To identify the relationship between resource dependency and gender outcomes, panel A presents a basic model that control for country economic development using $lGDP_i$:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 lGDP_i + u_i$$

In order to account for regional differences or variances, region fixed effects α_i are included in panel B, including fixed effects for America, Asia and Oceania, Europe, Middle East and North Africa, and Sub-Saharan Africa:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 lGDP_i + \alpha_i + u_i$$

As a country governance capacity is an important determinant to ensure people well-being, panel C adds a dummy variable for regulatory quality $regulat_i$:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 lGDP_i + \beta_3 regulat_i + \alpha_i + u_i$$

3. EMPIRICAL ANALYSIS

3.1 Regression Results: Extractive Industries – Replication

Table 3a: Regression results: natural resource rents and gender equality measures (All countries)

	GDI	GII	Female labor force participation rate	Parliament seats held by women (%)	Maternal mortality ratio
Panel A					
Total natural resource rents (% of GDP)	–0.0015* (0.0008)	0.0078*** (0.0022)	–0.1322 (0.3076)	–0.0382 (0.1541)	8.685 (6.123)
Log GDP (current US$)	0.0123* (0.0051)	–0.1037*** (0.0123)	–0.5458 (1.393)	2.909** (0.8943)	–37.42* (17.86)
Observations	160	154	109	174	79
R^2	0.06557	0.33515	0.00426	0.05608	0.13656
Panel B					
Total natural resource rents (% of GDP)	0.0002 (0.0007)	0.0011 (0.0022)	0.5760 (0.3056)	0.1216 (0.1412)	9.093 (5.099)
Log GDP (current US$)	0.0037 (0.0050)	–0.0522*** (0.0115)	1.028 (1.307)	3.060*** (0.8260)	–2.907 (10.68)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	160	154	109	174	79
R^2	0.29634	0.6672	0.25227	0.19933	0.40272
Panel C					
Total natural resource rents (% of GDP)	0.0008 (0.0008)	–0.0021 (0.0020)	0.8065** (0.2907)	0.1418 (0.1406)	–0.0021 (0.0020)
Log GDP (current US$)	–0.0054 (0.0048)	–0.0259* (0.0109)	–0.6988 (1.338)	2.833** (0.9276)	–0.0259* (0.0109)
Regulatory quality	0.0307*** (0.0073)	–0.0808*** (0.0141)	4.368* (2.066)	0.8352 (1.217)	–0.0808** (0.0141)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	160	154	109	174	154
R^2	0.39194	0.76108	0.30902	0.2018	0.76108

Note: Robust standard errors. *p < 0.1; **p < 0.05; ***p < 0.01

Table 3b: Regression results: natural resource rents and gender equality measures (Countries with at least 1 percent of GDP from resource rents)

	GDI	GII	Female labor force participation rate	Parliament seats held by women (%)	Maternal mortality ratio
Panel A					
Total natural resource rents (% of GDP)	–0.0008 (0.0007)	0.0029 (0.0022)	–0.0750 (0.3350)	–0.0682 (0.1755)	7.081 (6.546)
Log GDP (current US$)	0.0107 (0.0079)	–0.0815*** (0.0162)	–3.199 (2.232)	0.7384 (1.309)	–78.51 (45.10)
Observations	104	96	57	109	37
R^2	0.02576	0.18334	0.02671	0.00672	0.12033
Panel B					
Total natural resource rents (% of GDP)	0.0006 (0.0009)	0.0016 (0.0024)	0.8880*** (0.2374)	0.0978 (0.1516)	9.122 (6.037)
Log GDP (current US$)	0.0047 (0.0079)	–0.0319* (0.0157)	–0.2623 (1.522)	2.163 (1.489)	–10.45 (35.13)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	104	96	57	109	37
R^2	0.27938	0.59243	0.45295	0.11383	0.44469
Panel C					
Total natural resource rents (% of GDP)	0.0009 (0.0009)	–0.0029 (0.0023)	0.9128*** (0.2473)	0.1171 (0.1481)	–0.0029 (0.0023)
Log GDP (current US$)	–0.0003 (0.0073)	–0.0174 (0.0151)	–0.7906 (1.738)	1.891 (1.530)	–0.0174 (0.0151)
Regulatory quality	0.0303** (0.0096)	–0.0593** (0.0181)	1.806 (2.502)	1.269 (1.521)	–0.0593** (0.0181)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	104	96	57	109	96
R^2	0.35457	0.66249	0.4603	0.11932	0.66249

Note: Robust standard errors. *p < 0.1; **p < 0.05; ***p < 0.01

Table 3c: Regression Results: natural resource rents and gender equality measures (Countries with at least 1 percent of GDP from resource rents) (Baum & Benshaul-Tolonen, 2021)

	GDI	Female HDI	Male HDI	GII	Female labor force participation rate	Parliament seats held by women (%)	Maternal mortality ratio	Female education	Male education	Domestic violence justified
Panel A										
Total natural resource rents	−0.003***	−0.009***	−0.008***	0.010***	0.383**	−0.200**	12.967***	−1.461***	−1.233***	0.011
(% of GDP)	(0.001)	(0.002)	(0.002)	(0.002)	(0.183)	(0.087)	(2.650)	(0.279)	(0.264)	(0.007)
GDP (current US$)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	153	153	153	152	168	178	171	153	153	22
R^2	0.125	0.250	0.252	0.221	0.040	0.020	0.254	0.176	0.160	0.189
Panel B										
Total natural resource rents	−0.003	−0.002*	−0.002**	0.002	0.275*	−0.228**	4.506**	−0.215	−0.074	0.0136*
(% of GDP)	(0.001)	(0.001)	(0.001)	(0.001)	(0.145)	(0.103)	(1.813)	(0.225)	(0.193)	(0.007)
GDP (current US$)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	153	153	153	152	168	178	171	153	153	22
R^2	0.390	0.634	0.657	0.628	0.420	0.138	0.675	0.571	0.600	0.257
Panel C										
Total natural resource rents	0	−0.001	0	0.001	0.259*	−0.128	2.182	0.186	0.257	0.014*
(% of GDP)	(0.001)	(0.001)	(0.001)	(0.001)	(0.151)	(0.107)	(1.412)	(0.166)	(0.175)	(0.007)
GDP (current US$)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institutional quality and rule of law	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	152	152	152	151	166	176	169	152	152	22
R^2	0.613	0.909	0.908	0.844	0.483	0.297	0.797	0.73	0.706	0.449

After restricting to only include countries with high resources rents, the number of observations significantly decreases for all variebles in Table 3b. Most noticably, female labor force participation is positively correlated with extractive resource dependency for all tables in panel C, with much higher coefficients for the replication results. The R-squared, although improves after each panel for both Table 3a and 3b, is higher for Table 3a. Compared to Table 3c results of Baum & Benshaul-Tolonen, both Table 3a and 3b have much less statistically significant correlations across 3 panels, with vastly different coefficient and R-square values. However, Table 3a at panel A successfully shows the negative impacts of extractive resource dependency on gender inequality, specifically how it negatively correlate with GDI and positively correlate with GII with smaller values of coefficient. Overall, the results are quite different compared to that of Baum & Benshaul-Tolonen (2021) even when restricting to only include high-dependent countries, possibly due to reasons mentioned in section 2.1.

3.2 Regression results: Renewale Energy Industries

R-square improves after each panel, indicates that the fitness improves after controlling for region fixed effect and regulatory quality. The more dependent a country is on renewable energy, the higher its GDI (higher gender inequality) and lower its GDI (wider gender gap) get. Although the value of coefficients are quite small, the correlations for GDI and GII are consistent across three panels, except for the coefficient of GII in panel C. Other statistically significant relationships found includes renewable dependency positively correlates with female labor force participation (panel A) and maternal mortality ratio (panel C).

Table 3d: Regression results: renewable energy consumption and gender equality

	GDI	GII	Female labor force participation rate	Parliament seats held by women (%)	Maternal mortality ratio
Panel A					
Renewable energy consumption (% of total energy consumption)	−0.0006** (0.0002)	0.0022*** (0.0005)	0.1794** (0.0670)	0.0393 (0.0377)	3.706 (2.034)
Log GDP (current US$)	0.0077 (0.0055)	−0.0840*** (0.0141)	1.066 (1.438)	3.307*** (0.9562)	−28.02* (12.52)
Observations	160	154	109	174	79
R^2	0.08314	0.3527	0.08174	0.06294	0.24183
Panel B					
Renewable energy consumption (% of total energy consumption)	−0.0007*** (0.0002)	0.0013** (0.0004)	0.0910 (0.0655)	−0.0174 (0.0457)	3.050 (1.599)
Log GDP (current US$)	0.0010 (0.0046)	−0.0475*** (0.0115)	1.613 (1.404)	2.943*** (0.8771)	1.549 (11.18)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	160	154	109	174	79
R^2	0.33363	0.68515	0.23596	0.19364	0.44568
Panel C					
Renewable energy consumption (% of total energy consumption)	−0.0005** (0.0002)	0.0006 (0.0004)	0.1099 (0.0696)	−0.0150 (0.0475)	3.160* (1.535)
Log GDP (current US$)	−0.0067 (0.0045)	−0.0268* (0.0109)	0.3800 (1.459)	2.849** (0.9491)	20.33 (16.92)
Regulatory quality	0.0265*** (0.0069)	−0.0724*** (0.0146)	3.419 (2.147)	0.3509 (1.212)	−49.83* (22.51)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	160	154	109	174	79
R^2	0.40355	0.76221	0.27333	0.19409	0.50194

Note: Robust standard errors. *p < 0.1; **p < 0.05; ***p < 0.01

3.3 Limitations

Due to difficulty in accessing complete data, this analysis fails to examine other dimensions of gender inequality such as education and gender norms, and fails to replicate all the impacts of extractive industries on chosen gender outcomes. There is also an unequal ground for comparison, % of total energy consumption vs % of GDP, for extractive and renewable resource dependency. Additionally, the smeasure of renewable resource dependency only examines the energy sector, excluding other sector such as land use, agricultural products or non-commercial forestry, which makes it harder to generalize the findings. Finally, this paper only conduct a empirical correlation analysis, and not causal as it can be difficult to identify causes of the gender effects, because natural resources industries result in changes to society at a macrolevel. The causal links can be identified with the help from the literature.

4. CONCLUSION

To answer the questions in the objectives, first of all, a country's dependency on extractive resources and renewable resources is not correlated, although countries with high-dependent rate on both resources are concentrated in Sub-Saharan Africa. Secondly, the replication attempt to examine the impacts of extractive industries on various gender inequality measures is unsuccessful in terms of the number of statistically significant correlations found, but successful in terms of verifying the negative impacts it has on gender equality. Thirdly, although having better impacts on the environment and no significant correlation, higher dependence on renewable energy follows the same impact pattern on gender inequality as that of extractive industries, which is lower gender equality. The relationship is less consistent for extractive industries, although its coefficient implies larger impacts on gender outcomes than renewable energy industries.

The literature and this paper indicate that the impacts of natural resources industries are by no mean gender-neutral. Inequalities translate into a pattern of economic growth characterized by exclusion, since women are not as well positioned as men to take advantage of the opportunities generated by economic growth (ECLAC, 2021). Accordingly, the gender perspective must be included to reduce the gap and to avoid its reproduction in the new schemes for changing the energy matrix from fossil fuels of extractive industries to renewables, where the gender aspect can made invisible through the better environmental conditions achieved.

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APPENDIX

Appendix 1: Components of each region

#	REGION	COUNTRIES
1	America (34)	Argentina, Aruba, The Bahamas, Barbados, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, United States, Uruguay, Virgin Islands (U.S.)
2	Asia and Oceania (46)	Afghanistan, Armenia, Australia, Azerbaijan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Cyprus, Fiji, Georgia, Hong Kong SAR (China), India, Indonesia, Japan, Kazakhstan, Kiribati, Republic of Korea, Kyrgyz Republic, Lao PDR, Macao SAR (China), Malaysia, Maldives, Fed. Sts. Micronesia, Mongolia, Myanmar, Nepal, New Caledonia, New Zealand, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Tonga, Turkey, Turkmenistan, Uzbekistan, Vanuatu, Vietnam
3	Europe (40)	Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kosovo, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Montenegro,

		Netherlands, North Macedoniam, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom
4	Middle East and North Africa (19)	Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen
5	Sub-Saharan Africa (46)	Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Chad, Comoros, Democratic Republic of Congo, Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe

Appendix 2: Top 20 countries with the highest natural resources rents

Rank	Country Name	Total natural resources rents (% of GDP)	Parliament seats held by women (%)	Maternal mortality ratio	Labor force participation rate, female	GII	GDI
1	Timor-Leste	81.91293763	38.46153846				0.897
2	Kuwait	37.86353777	1.538461538		56.84999847	0.335	0.977
3	Iraq	36.46533651	26.52439024			0.525	0.788
4	Libya	28.01475485	15.95744681			0.167	0.964
5	Somalia	24.87228022	13.81818182				
6	Saudi Arabia	24.48319416	19.86754967		21.38999939	0.257	0.876
7	Oman	23.94649667	1.176470588	21		0.281	0.943
8	Congo, Dem. Rep.	20.11734792	8.943089431			0.663	0.829
9	Guinea-Bissau	19.87141771	13.7254902				
10	Liberia	19.44625803	10.95890411			0.649	0.877
11	Brunei Darussalam	18.77054986		30			0.978
12	Qatar	18.60413276	0	8	57.84999847	0.542	1.032
13	Equatorial Guinea	18.00896168	24				
14	Turkmenistan	18.00741785	25.80645161	3			
15	Congo, Rep.	17.45251379	7.352941176	605		0.59200001	0.927
16	Solomon Islands	16.67728424	2				
17	Algeria	15.87714704	31.6017316		16.29999924	0.42899999	0.854
18	Iran, Islamic Rep.	15.79968423	3.103448276	7	14.40999985	0.509	0.854
19	Burundi	15.53249535	36.36363636			0.47400001	0.991
20	Azerbaijan	14.5219617	16.93548387	13	62.40000153	0.32600001	0.943