

# The Blessings of Exit: Female Labor Migration and Gender Equality in Countries of Origin.

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## Abstract

Can women's work abroad improve gender equality at home? This paper examines the impact of female labor migration (FLM) on gender equality in female migrants' countries of origin. We measure this impact using annual variations in oil prices as a source of exogenous change in demand for female labor from countries with high levels of FLM to major oil exporting economies. We find that FLM is on average positively associated with improvements in gender equality in female migrants' countries of origin. These gains, however, are modest and concentrated in narrowing gender gaps in human capital, like education, not in political representation or economic policy. Remittances could help explain these uneven improvements in gender equality. Female labor migrants may more effectively channel their foreign earned income into advancing women's access to education back home, than expanding women's political representation or reforming policy.

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# 1 Introduction

In 2020 more than 135 million women were international migrants, representing half of the world’s migration population (“International Migrant Stock” 2020). The number of international female migrants has more than doubled over the past thirty years (United Nations Population Division 2019). Workers constitute a large share of female migration. Roughly three-quarters of international migrants are of working age<sup>1</sup> (United Nations Department of Economic and Social Affairs 2019). Many herald labor force participation as a catalyst for women’s empowerment (Iversen et al. 2008; Moghadam 2003). But can women’s work abroad advance gender equality at home?

Scholars disagree whether female labor migration is a blessing or curse for gender equality in migrants’ country of origin. Optimists argue that women’s labor force participation, whether at home or abroad, promotes gender equality by giving working women resources, skills and financial autonomy. Female labor migrants can channel those benefits to ameliorate gender equality back home through remittances or upon their return to their home country. Pessimists, however, warn that female labor migration deprives home or “source” countries of the women needed to mobilize for gender equality. Female migrants tend to be better educated than those who stay (Dumont et al. 2007). Their exit may weaken local efforts to mobilize for gender equality. It is also unclear that female labor migrants would necessarily reinvest their earnings and greater human capital into bolstering gender equality back home. They may be gone for good.

Estimating the impact of female labor migration (FLM) on gender equality in female migrants’ source countries is difficult. There may be reverse causality. Low levels of source country gender equality can fuel high levels of FLM (Bang et al. 2011; Ferrant et al. 2015; Nejad et al. 2014). There are many confounding factors - like a source country’s level of economic development - that could influence *both* FLM and gender equality. Finally, the relationship between FLM and gender equality may be spurious. Global gains in gender equality (Figure 4) have coincided with growing FLM. Separate factors could explain the growth in global gender equality and FLM.

We confront these empirical challenges by using oil prices as a source of exogenous variation in demand for female labor from source countries with high levels of FLM to major oil exporting economies. We rely on international migration data from the United Nations Population Division of the Department of Economic and Social Affairs (UNDESA) to estimate source country levels of FLM across time, and to identify source countries with high levels of FLM to states that belong to the Organization of the Petroleum Exporting Countries (OPEC). We merge this data with a host of time varying, cross-national gender equality indicators.

We first demonstrate that oil prices positively correlate with FLM in *OPEC Destination* source countries. We then interact global oil prices with whether a source country is an *OPEC Destination* source country to assess the relationship between FLM and source country gender equality. In the last stage of our analysis we use oil prices and *OPEC Destination* source country status as instrumental variables (IV) to estimate levels of FLM and its association with gender equality.

We find that, on average, FLM is positively associated with source country gender equality. The magnitude of this association is modest. One of our models estimates that a one percent increase in FLM correlates with a 0.08 increase in a source country’s gender

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1. This is between the ages of twenty and sixty.

equality score, a score ranging from 0 to 100 with a median value of 57. This positive association is robust to different model specifications and measures of *OPEC Destination* source countries.

When we disaggregate the different components of gender equality, however, we find mixed evidence of FLM improving source country gender equality in political representation and economic policy. Instead, FLM is strongly correlated with source country gains in girls' primary and secondary school enrollment rates. It is also associated with a closing of the gender gap at these lower levels of educational attainment. We suspect that remittances from FLM underpins these uneven improvements in gender equality. Female labor migrants may more effectively channel their foreign earned income into advancing women's and girl's educational opportunities back home, than expanding women's political representation or reforming policy.

This paper contributes to several strands of scholarship. Most broadly, it speaks to a robust literature on migration politics. Much of this research examines the political consequences of migration on host countries (Dancygier 2010; Dancygier et al. 2014; Peters 2017; Shin 2017). Less work explores migration politics in home or source countries (Ahmadov et al. 2016; Goodman et al. 2008; Meseguer et al. 2014a). This project adds to a growing research agenda on the political consequences of migration for source countries' gender equality (Dumont et al. 2007; Ferrant et al. 2015; Jones-Correa 1998; Lodigiani et al. 2020; Tuccio et al. 2018; Wampler et al. 2009). Much of this strand of migration studies research relies on case studies or cross-national analyses of South-North migration. Yet we know much international migration occurs between low and middle-income countries. This scholarship also focuses on migration writ-large, seldom female labor migration in particular. The consequences of working women's exit for source country gender equality may be very different than that of working men's departure, or migration for non-economic reasons. We broaden the study of female labor migration by exploring its effects across a larger set of countries over a longer period of time.

We also step into another well established stream of scholarship: women's employment and empowerment. This is the first project to our knowledge to quantitatively assess whether female employment abroad can advance gender equality at home. Our findings suggest that it can, but largely through gains in human capital in like education.

Lastly, through our research design, we add to the resource curse literature. In his classic study of gender equality in oil states, Ross (2008) argues that oil extraction undermines gender equality in oil exporting economies by suppressing women's incentives to enter the labor force. The oil-backed means to hire cheap foreign labor was one factor that depressed native women's economic participation (p.110). While oil may undermine gender equality in oil economies, our work proposes that oil exports can strengthen gender equality in sending or source countries through FLM.

This paper proceeds as follows. Section 2 summarizes existing research on international labor migration and gender equality. We then derive our hypotheses. Section 3 describes our data and identification strategies. The next section presents our results. Section five concludes and proposes future pathways of research.

## 2 Literature Review

Existing scholarship on migration and diaspora politics presents opposing expectations of whether female labor migration would promote or undermine gender equality in migrants'

source countries. Pessimists warn of political brain drain (Goodman et al. 2008; Hiskey et al. 2012). Kapur (2010) calls this the *absence* channel. Migration can deplete countries of their most skilled and politically assertive citizens (Goodman et al. 2008, p.170; Meseguer et al. 2014b, p.3). These citizens are most likely to mobilize for their group’s interests. “Emigration can thus rob the country of influential voices for reform,” concludes migration scholar Kapur (2010, p.27).

In the context of gender politics, female labor migration may deprive gender egalitarian movements of their most resourceful and engaged members. A higher share of educated women migrate than men, making women disproportionately represent the brain drain (Beneria et al. 2012; Docquier et al. 2009; Dumont et al. 2007).<sup>2</sup> Dumont et al. (2007) find that the poorer the country of origin, the higher the emigration of highly skilled women. Even migrant women employed in low-skilled occupations tend to have higher educational qualifications than their male counterparts (Dumont et al. 2007). These women’s exit may compromise advocacy for gender equality in their home country.

Optimists counter that migrants can still be active and influential in their home countries’ politics (Ahmadov et al. 2016). Political, social and economic remittances can buttress migrants’ source country influence. Many states allow migrants to vote from abroad. Some states have representative institutions and electoral bodies for their migrant communities (Burgess 2014). Host countries may give migrants greater space and resources to organize and lobby than their source countries, especially if their source countries are autocratic. Migrant women could use their host country’s political processes to raise awareness and pressure their host government to push for gender reform in their home country.

Much work on migrants’ political activism, however, suggests that migrant men are more active in their source countries’ politics than women (Ahmadov et al. 2016, p.103; Burgess 2014, p.18). Female migrants have stronger desires to stay (Wampler et al. 2009, p.97) and are more likely to orient their political interests towards their host countries (Jones-Correa 1998, p. 326).

Migrants can also remit their host country’s social norms. These “social remittances” (Levitt 2001, p.11) could motivate citizens in migrant sending countries to challenge traditional gender norms (Levitt 2001; Lodigiani et al. 2020). Ferrant et al. (2015) find that source countries’ gender equality improves when migrants move to more gender egalitarian countries. However, they also warn that gender equality worsens when migrants move to less gender egalitarian countries. Likewise, Tuccio et al. (2018) reveal that Jordanian women with a returnee migrant family member espouse more conservative views towards gender. They demonstrate that these results are driven by returnees from more conservative Arab countries, suggesting a transfer of patriarchal gender norms. Female labor migrants could bring back their host countries’ gender norms - egalitarian or not - upon their return.<sup>3</sup>

Economic remittances can underpin migrants’ political influence. Migrants can use their earnings to fund parties and civil society organizations (Ahmadov et al. 2016). They can also finance access to public services (Adida et al. 2011), which may empower women

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2. However, in a more recent article, Docquier et al. (2012) argue that once accounting for interdependencies between migrant couples, skilled women are not more internationally migratory than skilled men.

3. Kapur (2010, p.38) calls this the *return* channel.

in the long-term.

Unlike with social remittances (Ferrant et al. 2015), scholars are largely skeptical that economic and political remittances can promote gender equality migrants' source countries. Though female migrants remit a larger share of their income than men (Burgess 2014), they tend to be less politically engaged than their male counterparts (p.18). Women's remittances could reinforce patriarchal norms and divisions of labor too, especially if they flow to male heads of households. Dumont et al. (2007, p.19) demonstrate that higher rates of female brain drain relative to male brain drain correlate with lower levels of female secondary school enrollment, higher rates of infant and under-5 mortality in source countries. Economic remittances can also weaken citizens' political engagement and demands for accountability by reducing their dependency on the state (Ahmed 2019; Goodman et al. 2008, p.170).

Finally, a parallel avenue of research examines gender inequality as a catalyst for female migration, particularly educated female migration (Bang et al. 2011; Ferrant et al. 2015; Nejad et al. 2014). This scholarship generally finds that female brain drain is higher in countries with less gender equality, though researchers debate whether this relationship is linear (Nejad et al. 2014). This work, however, misses that female migration may in turn depress gender equality. This endogeneity clouds empirical assessments of the relationship between female migration and source country gender equality.

Existing literature presents three hypotheses on the relationship between female labor migration (FLM) and source country gender equality.

1. H0. There is no relationship between levels of FLM and gender equality in migrants' source countries.
2. H1. There is a negative relationship between levels of FLM and gender equality in migrants' source country.
3. H2. There is a positive relationship between levels of FLM and gender equality in migrants' source country.

In testing these hypotheses, we advance the study of migration and gender equality in two ways. First, most work on the political ramifications of female migration on source countries apply in-depth case studies (Jones-Correa 1998; Levitt 2001) or surveys from one country (Ahmadov et al. 2016; Kapur 2010; Wampler et al. 2009) to infer the political ramifications of female migration on source country politics. Though these studies disclose important micro-level behaviors and attitudes, their case specific depth compromises breadth.

These studies also predominantly capture South-North migration, especially to the United States (Burgess 2014, p.18) or Organization of Economic Cooperation and Development (OECD) countries (Dumont et al. 2007). The source country political ramifications of female migration to high-income, democracies where migrants have pathways to citizenship are likely to differ from the ramifications of South - South migration, which makes up more than a third of the world's total migrant stock (World Bank 2016, p.11). Broadening the analysis to include high and low income host countries offers a more balanced assessment of female labor migration on source country gender equality. There are a few cross-national studies on female migration and gender equality that include low and high income countries. Much of this work examines gender equality as a determinant of female migration (Bang et al. 2011; Nejad et al. 2014), as opposed to the consequences

of female migration on gender equality in source countries (Dumont et al. 2007; Ferrant et al. 2015).

Second, most scholarship either employs an index of gender equality that combines gender equality markers in household, political and economic realms (Ferrant et al. 2015; Nejad et al. 2014), or zeros in on one measure of gender equality, like women’s political representation (Lodigiani et al. 2020). FLM may impact different facets of gender equality. Women’s remittances could more easily and directly influence girls’ primary school enrollment rates than women’s share of elected seats in parliament. Our analysis combines both aggregate and disaggregate measures to help clarify whether and how FLM affects source countries’ gender equality.

### 3 Variables, Data and Identification Strategy

*Gender Equality* is the outcome of interest. We measure a source country’s level of gender equality with the United Nation’s Gender Inequality Index (GII). GII covers 162 countries from 1990 to 2020, making it one of the most comprehensive cross-national gender inequality indices. The GII is a composite index that captures the disadvantages experienced by women relative to men across three dimensions: health, empowerment, and the labor market (UN Development Report 2023).<sup>4</sup> The index ranges from 0 to 1, with 0 representing equality between men and women and 1 representing the most significant level of inequality. For ease of reading we reverse the GII index so that a higher number signifies more *Gender Equality*. Thus higher *Gender Equality* scores indicate greater gender equality. We multiply the scale by one hundred. A country with a *Gender Equality* score of 100 has perfect gender equality.

We then disaggregate gender equality across three dimensions: politics, economics and human capital. For political gender equality, we use the Cingranelli and Richards (CIRI) Human Rights Data Project (Cingranelli et al. 2021), which has annual country measures of women’s political rights from 1981 to 2011 for 200 countries. The dataset’s women’s political rights index measures the extensiveness of laws pertaining to women’s political rights (such as the right to vote, to run for political office, and to petition government officials) and how effectively the government enforces these laws. This index is on a four point scale from 0 to 3, with higher numbers indicating greater female political rights. We complement this measure of women’s political equality with a measure of the share of elected female representatives in a country’s legislative assembly (Varieties of Democracy 2023).

We also use CIRI data to assess gender equality in a source country’s economy. CIRI women’s economic rights index measures the extensiveness of laws related to women’s economic rights (such as the right to equal pay for equal work, free choice of profession without needing to obtain consent from a husband or male relative, and the right to be free from sexual harassment in the workplace) and how effectively the government enforces these laws. It is also on a scale from 0 to 3. The World Bank’s Women, Business and the Law (WBL) score is our second measure of women’s economic equality. The World Bank’s WBL score captures legal differences between women’s and men’s access to economic opportunities. It spans 190 economies from 1971 to 2023. Higher scores indicate greater equality between the sexes (Hyland et al. 2020).

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4. See the Appendix for more information about the components of the GII index.



Finally, with regards to gender equality in human capital, we examine levels and differences in boys and girls' primary and secondary school enrollment rates. Higher girls' enrollment rates and lower differences in enrollment rates indicate greater human capital gender equality. We collected this data from the World Bank (World Bank 2020).

*Female labor migration (FLM)* is the independent variable. We measure a country's FLM with the UNDESA's 2019 Migrant Stock dataset (United Nations Population Division 2019). This dataset compiles national statistics and censuses from over 200 countries to estimate international migrant populations in five year intervals. It begins in 1990, and includes country level estimates from 1995, 2000, 2010, 2015 and 2019. The Migrant Stock dataset disaggregates migrant populations by sex, age and country of origin. This allows us to identify "source" or home countries' aggregate levels of female migration across time. The Migrant Stock dataset also discloses the "host" or destinations of source countries' female migration.

Crucially, the 2019 Migrant Stock dataset calculates international *migrant* populations. The UN defines international migrants as anyone who has moved across international borders away from their habitual place of residence regardless of their legal status or whether their move was voluntary. Though three quarters of international migrants in 2019 were of working age (United Nations Department of Economic and Social Affairs 2019), and could therefore be considered as source of labor, many migrants are refugees and asylum seekers. The UN estimates that there were roughly 85 million displaced persons in 2019 (Natarajan et al. 2022), constituting almost a third of the total global migrant population. We focus on female labor migration by excluding migrant source countries in years where they were involved in civil conflicts with over 1000 deaths (Davies et al. 2022), and in years when source countries are listed as one of the world's ten most fragile states by the Fund for Peace's Fragile States Index (The Fund for Peace 2020).<sup>5</sup> Merging the subsetted Migrant Stock dataset with the gender equality index generates a dataset of 1016 source country-year observations representing 168 source countries.

Numerous confounders can influence a home country's level of FLM and gender equality. We control for a source country's economic wealth, as measured by its logged GDP per capita (World Bank 2020). Regime type may also impact a migrant's ability and willingness to leave, as well as gender equality. We control for regime type based on Luhrmann's Regimes of the World classification, where regimes are ranked according to degree of democratic freedoms on a scale of 0 (Closed Autocracy) to 3 (Liberal Democracy) (Lührmann et al. 2018). We create a dummy variable equal to one if a source country receives greater than 1 on the democratic freedom scale (*Democracy*). Oil production is negatively associated with gender equality (Ross 2008). Hence, we control for oil rents as a percentage of GDP (World Bank 2020). Lastly, all our models include country and year fixed effects to account for both spatial and temporal determinants of gender equality.

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5. Note that because this index began in 2006, we can only exclude observations from 2010, 2015 and 2019.

### 3.1 Instrumental Variable: Oil prices and OPEC Destination Countries

Even with these controls, however, unobservable factors may still confound the relationship between FLM and source country gender equality. There could also be reverse causality. Perhaps gender equality (or lack thereof) determines levels of FLM.

We tackle these endogeneity concerns with an instrumental variable (IV) approach that harnesses changes in global oil prices as an exogenous source of variation in FLM from source countries with high levels of FLM to oil exporting economies. An IV research design applies a set of variables - the instrument - to predict variation in an explanatory variable (FLM) that is endogenous with an outcome of interest (source country gender equality). This design depends on two conditions: 1) the instrument is a “strong” predictor of the explanatory variable, and 2) the only way the instrument can influence the outcome variable is through the explanatory variable. We infer, and will demonstrate, that oil prices strongly correlate with FLM in source countries with high levels of FLM to major oil exporting countries. These exogenously induced changes in FLM in these types of source countries can help us assess the relationship between FLM and source country gender equality.

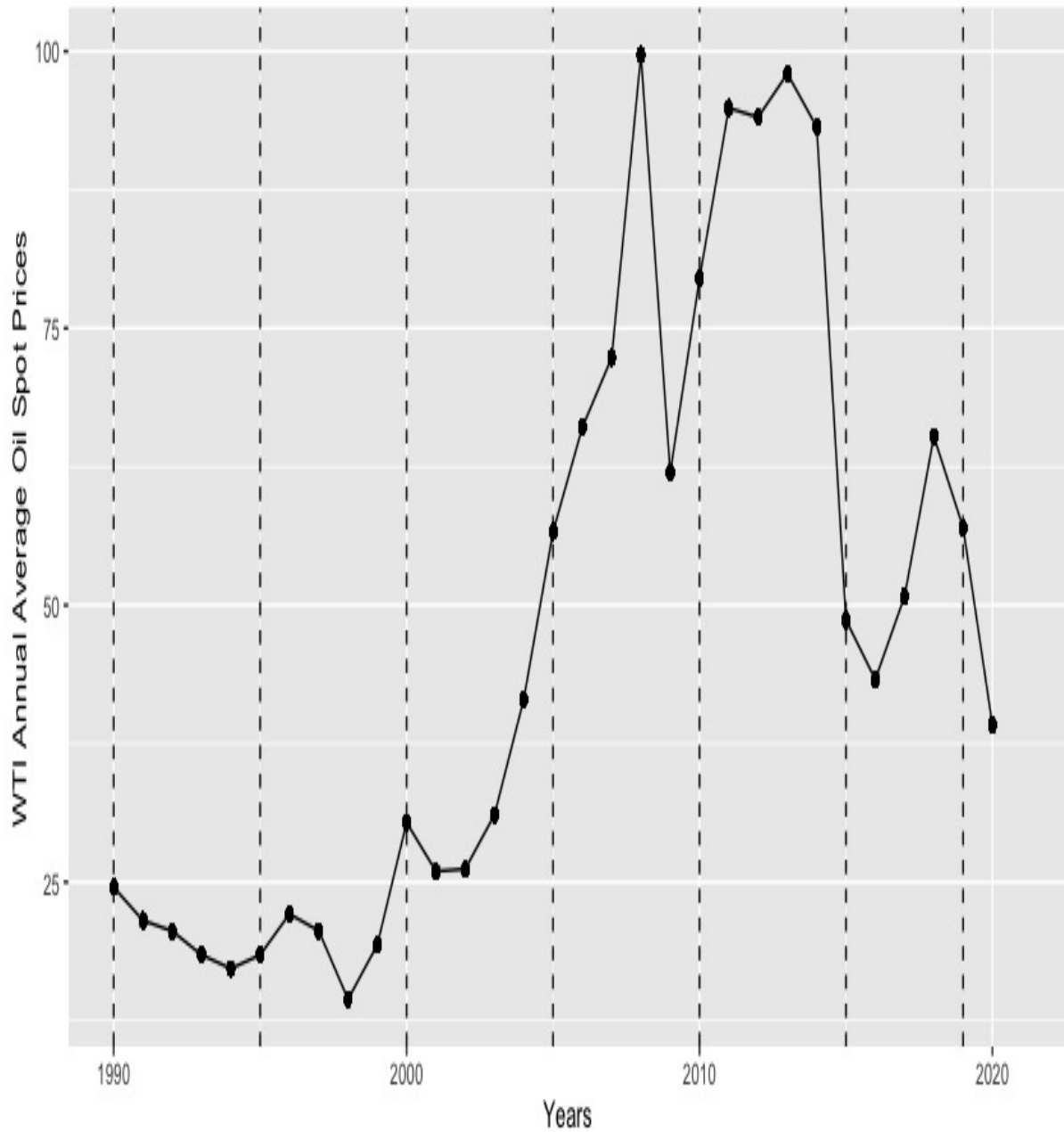
While high oil prices are likely to amplify demands for foreign labor to oil exporting economies, they may congruently depress demands for foreign labor in non-oil exporting economies. Higher oil prices could reduce oil consumption and consequently production of goods and services where oil is a major input. A reduction in production may reduce demand for labor, thus depressing employment opportunities and migration flows into non-oil exporting host countries. Simply using oil prices to capture the effects of FLM on gender equality would incorporate both effects, thus muting the magnitude of the estimate irrespective of its sign.

A stronger measure of oil prices’ effect on FLM demand would interact oil prices with source countries that have high levels of FLM to oil exporting economies. The interaction of the two terms effectively restricts the effect of oil prices to only countries with FLM flows to oil exporting countries. These countries already have migrant ties to oil exporting countries. There is an infrastructure and networks to enable greater(or lower) FLM in response to changes in oil prices. As such, we isolate the positive correlation between oil prices and economic activity witnessed in oil exporting host countries from the opposite relationship we suspect is present in other host countries, especially those with high oil imports.

We use average annual West Texas Intermediate (WTI) crude oil prices to measure global oil prices (U.S Energy Information Administration 2023). WTI oil prices are a common benchmark in oil markets. Table 1 illustrates WTI oil prices from 1990 to 2019. Because we have FLM data at five year intervals, our main analysis applies the WTI crude oil price at the year of the source country observation. This generates seven WTI crude price observations, which are marked with dotted vertical lines in Table 1.



Figure 1: WTI Annual Average Oil Prices (1990 - 2019)



The second interaction term, *OPEC Destination*, is a dummy variable equal to one if a source country's primary FLM destination is a state that belongs to the Organization of Petroleum Exporting Countries (OPEC). We categorize a state an OPEC member if it belonged to OPEC continuously from 1990 to 2019. These are: Algeria, Iran, Iraq, Kuwait, Libya, Nigeria, the United Arab Emirates (UAE), Saudi Arabia, Venezuela and Qatar.<sup>6</sup> All of these states' economies are highly dependent on oil. Some of these states host the highest number of international migrants the world (Natarajan et al. 2022). Saudi Arabia had the third highest number of international migrants in 2020. The UAE

6. Note that Qatar left OPEC on January 1st 2019.

was the sixth (Natarajan et al. 2022). OPEC states' demand for foreign female labor is likely to be highly sensitive to fluctuations in global oil prices.

A source country is an *OPEC Destination* country if an OPEC member represented at least one of a source country's top three female migrant destination countries in a given year. We exclude OPEC states as source countries because they are price makers in oil markets. World oil prices are *not* exogenous to local conditions in OPEC states.

This produces 111 source country year observations of *OPEC Destination* states. This is roughly eleven percent of the observations in our main analysis. Twenty-two countries were *OPEC Destination* states in at least one year of our analysis (Table 1). *OPEC Destination* states are present in Africa, Asia and Latin America. In robustness checks, we substitute the *OPEC Destination* variable with an estimate of a source country's share of FLM to OPEC Destinations (*OPEC Destination share*).<sup>7</sup>

Table 1 lists the *OPEC Destination* states in our analysis, their average rates of FLM (in millions), gender equality score, OPEC Destination share, and survey year observations.

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7. This is the sum of FLM to OPEC countries among the top three FLM destination countries divided by a source country's total FLM in a particular year.

Table 1: OPEC Destination Source Countries

Country	FLM (millions, mean)	Gender Equality (mean)	OPEC Share of FLM (mean)	Survey Waves
Afghanistan	1.76	25.2	0.92	(2005)
Bangladesh	2.38	36.2	0.85	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Benin	0.21	34.97	0.74	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Chad	0.1	25.5	0.85	(2005)
Colombia	1.12	52.78	0.80	(1990, 1995, 2010, 2015, 2019)
Ecuador	0.17	43.03	0.81	(1990, 1995, 2000)
Egypt	0.79	41.71	0.53	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Ethiopia	0.39	46.9	0.52	(2015, 2019)
Ghana	0.31	41.27	0.54	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
India	4.59	41.58	0.52	(1990, 2005, 2010, 2015, 2019)
Indonesia	1.32	46.87	0.57	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Jordan	0.19	45.31	0.57	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Lebanon	0.34	56.8	0.44	(2019)
Mali	0.45	33.46	0.69	(2000, 2005, 2010, 2015, 2019)
Nepal	0.58	40.58	0.86	(1990, 1995, 2000, 2010, 2015, 2019)
Niger	0.11	27.66	0.72	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Pakistan	1.57	29.44	0.72	(1990, 1995, 2000, 2005, 2019)
Philippines	2.18	52.66	0.62	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Sri Lanka	0.61	58.12	0.44	(1990, 2005, 2010, 2015, 2019)
Sudan	0.54	35.3	0.69	(2005)
Syria	0.32	49.74	0.65	(1990, 1995, 2000, 2005, 2010)
Togo	0.19	34.61	0.69	(1990, 1995, 2000, 2005, 2010, 2015, 2019)
Yemen	0.23	19.93	0.77	(2000, 2005)

On average, OPEC countries have had lower levels of gender equality over the past three decades than non-OPEC states - though these differences are narrowing (See Figure 5). Extensive work shows that migrants transfer their host countries' gender norms back to their home countries, for better or worse (Ferrant et al. 2015; Lodigiani et al. 2020; Tuccio et al. 2018). Because gender norms transfer from host to source country is one mechanism for FLM to influence source country gender equality, our models do not control for host country levels of gender equality. Nevertheless, that OPEC countries have traditionally low levels of gender equality makes our analysis a hard case finding a positive association between FLM and source country gender equality (H2). The magnitude of a positive association would likely be bigger if OPEC countries had on average higher levels of gender equality.

While female labor migrants' choice of migrating to an OPEC country is not exogenous to observable and unobservable factors that influence gender equality in their home country, oil prices' impact on demand for foreign female labor in *OPEC Destination* countries plausibly is. And if high oil prices reflect or provoke larger economic forces that can shape an *OPEC Destination* country's economy, those factors are likely to influence Non-OPEC Destination countries as well. Interacting *OPEC Destination* with *Oil price* offers an exogenous source of variation in FLM levels in OPEC destination states that can help clarify the relationship between FLM and source country gender equality.

To demonstrate that oil prices for OPEC destination countries is a reasonable instrument, we first determine that this instrument actually influences levels of FLM in OPEC destination countries. Table 2 plots the relationship between WTI oil prices (x axis) and FLM (y axis) between OPEC and non-OPEC Destination countries. It illustrates a positive relationship between oil prices and FLM levels among OPEC Destination countries (red circles). There is no clear relationship between oil prices and FLM levels among Non-OPEC Destination countries (purple circles).

Figure 2: Female Labor Migration and Oil Prices (OPEC vs. Non-OPEC Destination States)

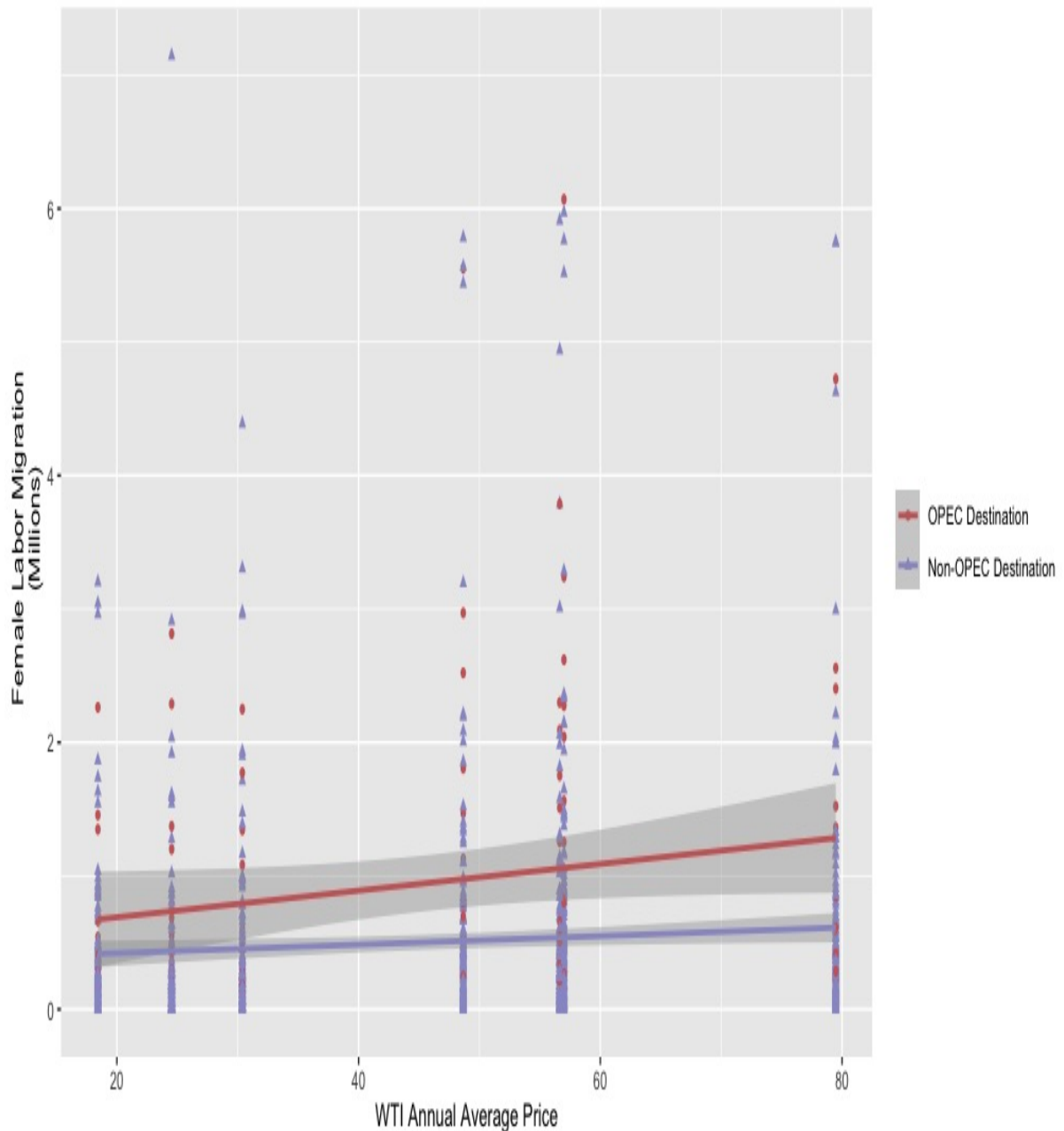


Table 2 examines the relationship between oil prices and FLM in OPEC and non-OPEC Destination countries with an Ordinary-Least Squares (OLS) regression. Each model applies country and year fixed effects. The outcome, FLM, is logged because of its skew.  $Oil\ Price * OPEC\ Destination$  is the interaction term of interest. Model 1 excludes controls. Models 2 and 3 add lagged control variables that may also explain levels of FLM. Models 3 and 4 lag FLM and the interaction terms. Standard errors are clustered at the year level given the few source country observations per country. Model 4, however, clusters standard errors at the country level. Echoing Figure 2, Table 2 presents a positive statistically significant relationship between oil prices and FLM in OPEC Destination countries. Higher oil prices correlate with greater FLM in OPEC

Destination countries.

Table 2: First stage: Oil Prices and Female Labor Migration (FLM) in OPEC Destination countries

	<i>DV: log(FLM)</i>			
	(1)	(2)	(3)	(4)
<b>Oil Price*</b>	0.004***	0.003***	0.003***	0.003**
<b>OPEC Destination</b>	(0.001)	(0.001)	(0.0004)	(0.001)
Oil Price	0.020***	0.014***	0.008***	0.008***
	(0.0002)	(0.002)	(0.001)	(0.001)
OPEC	-0.387***	-0.352***	-0.444***	-0.444*
Destination	(0.068)	(0.098)	(0.078)	(0.261)
log(GDPpc)		0.003	0.002	0.002
		(0.045)	(0.045)	(0.055)
Democracy		0.089	0.081	0.081
		(0.055)	(0.060)	(0.052)
log(Oil Rents)		0.008	0.015	0.015
		(0.048)	(0.040)	(0.046)
Constant	13.730***	12.447***	12.386***	12.386***
	(0.063)	(0.313)	(0.322)	(0.386)
Observations	942	684	684	684
Countries	155	129	129	129
R <sup>2</sup>	0.981	0.986	0.981	0.981

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Oil price is the WTI annual average price. OPEC destination is a dummy variable equal to 1 if a state's major female labor migration destination is an OPEC country. FLM, Oil price and OPEC destination are lagged in models 3 and 4. Standard errors are clustered at the year level in models 1, 2 and 3. They are clustered at the country level in model 4.

As a last check to ascertain whether the *Oil Price \* OPEC Destination* interaction term is positively associated with FLM and not simply female migration, we examine the interaction term's relationship with source countries' female labor force participation rates. This is the percentage of working age women in a country with paid employment. This data is from the World Bank (World Bank 2020). If high oil prices increase demand for female labor from OPEC Destination countries, we would expect a negative association between oil prices and female labor force participation in OPEC Destination countries. This would suggest that employed women are leaving their *OPEC Destination* source countries, making the denominator of female labor force participation rate calculation consist of a larger share of women who are not in the labor force. Conversely, higher female labor force participation rates would imply that women outside of the paid labor force are migrating.

The coefficient of the *Oil Price \* OPEC Destination* interaction term is negatively associated with source countries' female labor force participation rates across all model



specifications (Table 3) We lag both variables in the interaction term to account for the time it would take for female labor to respond to heightened demands for labor from oil exporting states. This strengthens our confidence that the *Oil Price \* OPEC Destination* term is capturing female *labor* migration, and not female migration more broadly.

Table 3: Oil Prices and Female Labor Force Participation (FLP) in OPEC Destination Countries

	<i>DV: FLP</i>		
	(1)	(2)	(3)
<b>Oil Price*</b>	-0.027***	-0.032**	-0.039**
<b>OPEC Destination</b>	(0.007)	(0.013)	(0.018)
Oil Price	0.038***	0.049**	0.048**
	(0.002)	(0.024)	(0.024)
OPEC	-0.409	-0.274	-0.783
Destination	(1.069)	(1.380)	(2.159)
log(GDPpc)		0.046	0.021
		(1.409)	(1.432)
Democracy		-0.345	-0.357
		(1.008)	(1.012)
log(Oil Rents)		-1.924	-1.914
		(1.180)	(1.164)
Constant	73.141***	79.288***	79.454***
	(0.594)	(4.906)	(5.050)
Observations	618	551	551
Countries	141	128	128
R <sup>2</sup>	0.957	0.956	0.956

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Oil price is the WTI annual average price. OPEC destination is a dummy variable equal to 1 if a state's major female labor migration destination is an OPEC country. In Model 3, OPEC destination is the share of FLM in an OPEC destination country. All variables are lagged except FLP. Standard errors are clustered at the year level.

For the first stage of our instrumental variable analysis, we apply the *Oil Price \* OPEC Destination* interaction term to test the relationship between FLM and gender equality in source countries. This generates the following model:

For source country  $i$  in year  $t$ , we model:

$$Gender\ Equality_{it} = \beta + \lambda(Oil\ Price_{t-1} \times OPEC\ Destination_{it-1}) + Controls_{it-1} + \epsilon_{it} \quad (1)$$

Because there might be a temporal lag between FLM and its impact on source country gender equality, we lag the interaction terms and control variables to the the previous

country year observation. This produces a five year differential between the dependent and independent variables for all observations, except for source country year observations in 2019.<sup>8</sup> All models use year and country fixed effects. We cluster standard errors at the year level because of the dearth of within country observations.

Hypothesis 1, which views FLM as a detriment to source country gender equality, expects the  $\lambda$  coefficient to be negative. Hypothesis 2 expects the  $\lambda$  to be positive. The null hypothesis (H0) expects the  $\lambda$  coefficient to not be statistically significant.

The previous section demonstrates that oil prices and being an OPEC Destination country can explain variation in levels of FLM. Oil prices are plausibly exogenous to levels of gender equality in a non-OPEC country except through a channel of FLM. Being an OPEC Destination country is not exogenous to a source country's levels of gender equality. Female labor migrants from countries with low levels of gender equality may be more likely to emigrate to OPEC countries, which also have low levels of gender equality (Ross 2008), than female labor migrants from countries with higher levels of gender equality. The instrument thus interacts a plausibly exogenous term (oil prices) with an endogenous one (OPEC Destination country). Nevertheless, because oil prices are independent of a source country's FLM and gender equality, the interaction term of *Oil Price* and *OPEC Destination* country is by extension exogenous to both the explanatory and outcome variables of interest.<sup>9</sup>

For the reduced form of the IV, we use the following two stage least squares (2SLS) regressions. Note that *FLM*, the instrument and control variables are all lagged. For source country  $i$  in year  $t$ ,

$$FL\hat{M}_{it-1} = \beta + \lambda(Oil\ Price_{t-1} \times OPEC\ Destination_{it-1}) + Controls_{it-1} + \epsilon_{it-1} \quad (2)$$

$$Gender\ Equality_{it} = \beta + \lambda FL\hat{M}_{it-1} + Controls_{it-1} + \epsilon_{it-1} \quad (3)$$

Hypothesis 1 expects the  $\lambda$  coefficient of the  $F\hat{L}M$  term in the second regression to be negatively associated with *Gender Equality*. Hypothesis 2 predicts the  $\lambda$  coefficient of the  $F\hat{L}M$  term to be positively correlated with *Gender Equality*. The null hypothesis expects no statistically significant relationship between  $F\hat{L}M$  and *Gender Equality*.

## 4 Results

We begin our analysis with Ordinary-Least Squares (OLS) regressions that do not take into account the unobservable and observable factors that could influence *FLM* and

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8. There is a four year lag for these observations.

9. See Nunn et al. (2014), Ahmed et al. (2016) and Werker et al. (2009) for examples of this method for instrumental variables.

source country *Gender Equality* (Table 4). These models use  $\log FLM$  as the independent variable and *Gender Equality* as the outcome. All control and independent variables are lagged. All models use country and year fixed effects.

Under these model specifications,  $FLM$  is negatively correlated with *Gender Equality*. This negative correlation is statistically significant at the one percent level. The magnitude of the  $FLM$  coefficient is relatively small. Model 2 of Table 4 estimates that, holding all else equal, a one percent increase in  $FLM$  correlates with a 0.01 point decrease in a source country's *Gender Equality* score. The  $FLM$  coefficient is negative but not statistically significant when *Gender Equality* is disaggregated in terms of political (Model 3) and economic (Model 4) equality. Thus, on average, these more "naive" estimations support H1:  $FLM$  negatively correlates with source country gender equality.

Table 4: FLM and Gender Equality in Source Countries

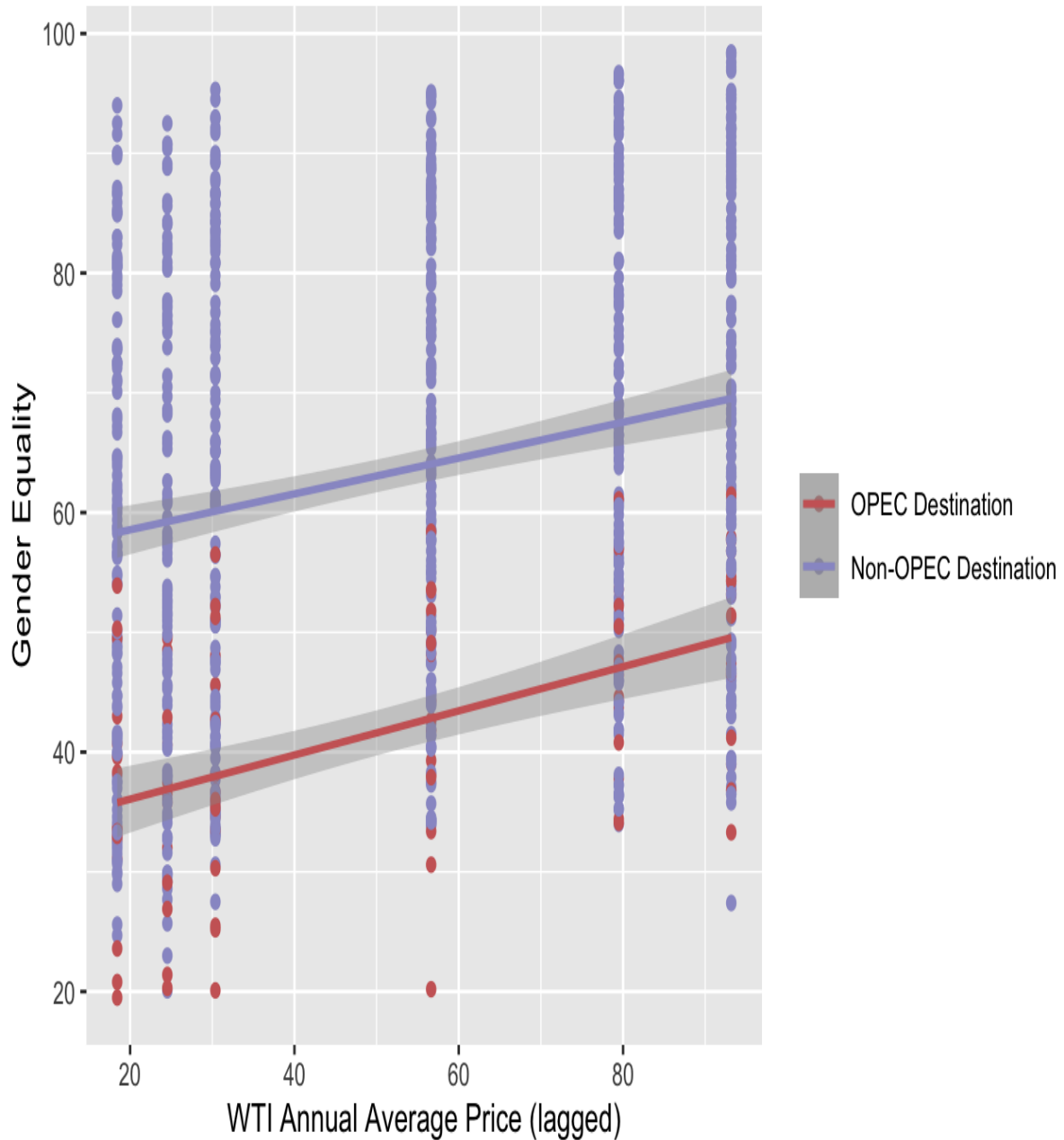
	<i>DV: Gender Equality (GE)</i>			
	(GE)	(GE)	(WOPOL)	(WECON)
	(1)	(2)	(3)	(4)
<b>log(FLM)</b>	-1.222*** (0.286)	-1.177*** (0.349)	-0.156 (0.097)	0.007 (0.051)
log(GDPpc)		0.646* (0.371)	-0.172*** (0.060)	0.153** (0.071)
Democracy		-0.512* (0.290)	0.024 (0.051)	0.062 (0.097)
log(Oil Rents)		-1.198 (0.941)	-0.037 (0.031)	0.041 (0.097)
Constant	42.461*** (3.314)	77.890*** (5.215)	4.892*** (1.099)	-0.308 (1.010)
Observations	804	689	427	424
Countries	153	130	126	126
R <sup>2</sup>	0.979	0.984	0.707	0.757

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 and 2 measure gender equality with the Gender Equality index. Model 3 measures gender political equality (WOPOL) and Model 4 measures gender economic equality (WECON). All variables except the dependent variables are lagged. Standard errors are clustered at the year level.

Table 5 applies the first stage of our IV analysis. It interacts *Oil Price* and *OPEC Destination* to provide an exogenous source of variation in source country levels of FLM. Unlike the *FLM* coefficient in Table 4, the interaction term coefficient in Table 5 is positive and statistically significant at the ten (Model 1) and five (Model 2) percent level. Higher oil prices are associated with greater gender equality in OPEC Destination source countries. These patterns hold when applying the share of FLM to OPEC countries as an alternative measure to *OPEC Destination* (Table 16), using Brent oil prices as a measure of oil prices (Table 17), and subsetting our analysis to low and middle-income source countries (Table 18).

The magnitude of the interaction coefficient is modest. Figure 3 plots estimated levels of gender equality in relation to oil prices between OPEC Destination (Red) and Non-OPEC Destination countries (Purple). OPEC Destination states have generally lower levels of gender equality. There is a positive relationship between oil prices and gender equality for both types of states, though the slope of that relationship is slightly more positive among OPEC Destination states.

Figure 3: Oil Prices and Gender Equality between OPEC and Non-OPEC Destination States)



When disaggregating gender equality, the *Oil Price* and *OPEC Destination* interaction coefficient is positively associated with greater political gender equality (Model 3). This positive association is statistically significant at the five percent level. In robustness checks, however, we do not find a statistically significant relationship between the interaction term and women’s political representation (Table 8). The *Oil Price* and *OPEC Destination* interaction coefficient is not associated with gains in gender equality in economic policy (Model 4). Under some model specifications, it correlates with a *decrease* in source country’s Women, Business and the Law (WBL) score (Table 9). Stepping back, our first identification strategy uncovers a *positive* association between *FLM* and source country *Gender Equality*. We do not find clear evidence, however, of *FLM* promoting

gender equality in politics or economics.

Table 5: Reduced Form: Oil Prices, OPEC Destination and Gender Equality in Source Countries

	<i>DV: Gender Equality (GE)</i>			
	(GE)	(GE)	(WOPOL)	(WECON)
	(1)	(2)	(3)	(4)
<b>Oil Price*</b>	0.012*	0.019**	0.002**	-0.004
<b>OPEC Destination</b>	(0.007)	(0.008)	(0.001)	(0.004)
Oil Price	0.202***	0.187***	0.013***	0.002
	(0.001)	(0.005)	(0.001)	(0.002)
OPEC	-3.514*	-3.846*	-0.266	0.131
Destination	(1.958)	(2.041)	(0.308)	(0.134)
log(GDPpc)		0.636*	-0.165**	0.137
		(0.378)	(0.073)	(0.088)
Democracy		-0.631**	0.016	0.046
		(0.275)	(0.046)	(0.088)
log(Oil Rents)		-0.206	-0.050*	0.023
		(0.932)	(0.026)	(0.094)
Constant	62.015***	58.679***	2.557***	-0.163
	(1.792)	(2.073)	(0.468)	(0.523)
Observations	799	684	424	421
Countries	152	129	125	125
R <sup>2</sup>	0.979	0.983	0.705	0.760

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 and 2 measure gender equality with the Gender Equality index. Model 3 measures gender political equality (WOPOL) and Model 4 measures gender economic equality (WECON). All variables except the dependent variables are lagged. Standard errors are clustered at the year level.

Table 6 presents results from our instrumental variable (IV) estimates. Model 1 is the first stage of two stage least squares (2SLS) regression. It shows that the instrument - *Oil Price* and *OPEC Destination* - is positively correlated with *log(FLM)*. The instrument is almost “strong” by conventional standards<sup>10</sup>, and is just short of that standard, in Model 3. Models 2 to 5 apply the instrument estimated FLM to different measures of gender equality.

Models 2 and 3 demonstrate a positive relationship between *FLM* and *Gender Equality*. The coefficient of the instrumentalized *log(FLM)* variable in Model 3, which has the strongest instrument of the four models, is statistically significant at the five percent level. Model 3 estimates that, holding all else equal, a one percent increase in *FLM* correlates with a 0.08 point *increase* in a source country’s *Gender Equality* score. Considering that a country’s average *Gender Equality* score is 59, the magnitude of the instrumentalized variable is modest. The positive association between the instrumentalized *log(FLM)*

10. The conventional standard for a strong instrument is one with an F-Statistic greater than 10.



and *Gender Equality* is robust to different measures of OPEC Destination countries (Table 19), oil prices (Table 20) and limiting the analysis to low and middle-income countries (Table 21).

As in our previous analysis, we do not find strong evidence of *FLM* promoting women’s political and economic equality with our IV design. The instrument is weak when estimating *FLM* in relation to a source country’s WOPOL and WECON score (Models 4 and 5). The instrument is stronger though not statistically significant with regards to women’s source country legislative representation (Model 5, Table 8). It is also stronger, positive and statistically significant at the five percent level in relation to source country’s WBL scores (Model 5, Table 9).

Table 6: IV: Female Labor Migration (FLM) and Gender Equality in Source Countries

	(First Stage)	(2SLS)	(2SLS)	(2SLS)	(2SLS)
	(log(FLM))	(GE)	(GE)	(WOPOL)	(WECON)
<b>log(FLM)</b>		3.857***	7.848**	0.633	−0.334
		(1.116)	(3.055)	(0.393)	(0.350)
<b>Oil Price*</b>	0.003***				
<b>OPEC Destination</b>	(0.0004)				
Oil Price	0.008***				
	(0.001)				
OPEC Destination	−0.444***				
	(0.078)				
log(GDPpc)	0.002		0.606	−0.143	0.136
	(0.045)		(0.472)	(0.102)	(0.086)
Democracy	0.081		−1.295	−0.034	0.070
	(0.060)		(0.857)	(0.065)	(0.086)
log(Oil Rents)	0.015		−0.329	−0.096**	0.059
	(0.040)		(0.822)	(0.048)	(0.082)
Constant	12.386***	18.443	−35.354	−5.216	4.104
	(0.322)	(13.470)	(36.735)	(5.594)	(4.819)
Observations	684	684	684	424	421
Countries	129	129	129	125	125
R <sup>2</sup>	0.981	0.981	0.975	0.622	0.753
F-Statistic		4.70	8.55	4.27	4.31

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 2 and 3 measure gender equality with the Gender Equality index. Model 4 measures gender political equality (WOPOL) and Model 5 measures gender economic equality (WECON). All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

There is much stronger evidence of *FLM* promoting women’s human capital back home. Table 10 examines the relationship between *FLM* and source country’s female primary enrollment rates (World Bank 2020). This is the number of female students enrolled in each year divided by the population size of the age cohort corresponding to that level of education in each year. *Both* the reduced form and IV measurements uncover

a positive, substantive and statistically significant relationship between *FLM* and source country levels of female primary school enrollment. For example, Model 5 estimates that a one percent increase in *FLM* correlates with a 0.22 increase in a source country's female primary school enrollment rate. Stated differently, a one percent increase in *FLM* correlates with roughly two additional primary school aged girls enrolling in school out of 1000. Higher *FLM* also correlates with a narrowing of a source country's primary education gender gap (Table 11). These patterns hold at secondary levels of education as well (Table 12; Table 13). *FLM*, however, also correlates with lower female enrollment rates in tertiary education (Table 14) and a widening of the tertiary education gender gap (Table 15). Economic opportunity abroad may push working age to forfeit their tertiary education at home.

Table 7: Female Labor Migration (FLM) and Female Primary Education Rates in Source Countries

	(Primary)	(Primary)	(First Stage) (log(FLM))	(2SLS) (Primary)	(2SLS) (Primary)
<b>log(FLM)</b>				11.849*** (3.141)	22.047** (9.006)
<b>Oil Price*</b>	0.249*** (0.069)	0.269*** (0.069)	0.003*** (0.0004)		
<b>OPEC</b>					
<b>Destination</b>					
Oil Price	0.089*** (0.008)	0.130*** (0.026)	0.008*** (0.001)		
OPEC	-1.283 (3.770)	-1.893 (3.899)	-0.444*** (0.078)		
Destination					
log(GDPpc)		-2.941* (1.771)	0.002 (0.045)		-2.739 (2.127)
Democracy		-0.985 (1.848)	0.081 (0.060)		-2.993 (2.653)
log(Oil Rents)		-0.188 (1.978)	0.015 (0.040)		0.594 (2.918)
Constant	93.258*** (3.744)	114.171*** (10.590)	12.386*** (0.322)	-55.626 (37.582)	-163.651 (118.068)
Observations	681	589	684	589	589
Countries	147	126	129	126	126
R <sup>2</sup>	0.745	0.761	0.981	0.690	0.619
F-Statistic				7.56	10.42

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality in terms of girls' primary enrollment rates. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Why does *FLM* promote gender gains in source countries' primary and secondary education but not in political representation, economic policy and higher level education? While not empirically tested, we suspect that remittances underpin these uneven advancements in gender equality. Female labor migrants can more easily channel money

earned from work abroad to lowering financial barriers to girls' education than to fund female candidates or lobby for more inclusive economic policies. Another reason may also be that women working abroad are more interested in their daughters' present and future well-being than potential improvements in the political environment that they are no longer a part of.

## 5 Conclusion

We find that, on average, FLM is a blessing for source country's gender equality. These blessings are concentrated in areas advancing women's human capital, like education. The blessings of FLM are less apparent in other policy domains. Our work thus sides with and buttresses more optimistic views of FLM as a force for source country gender equality (Ferrant et al. 2015; Levitt 2001; Lodigiani et al. 2020).

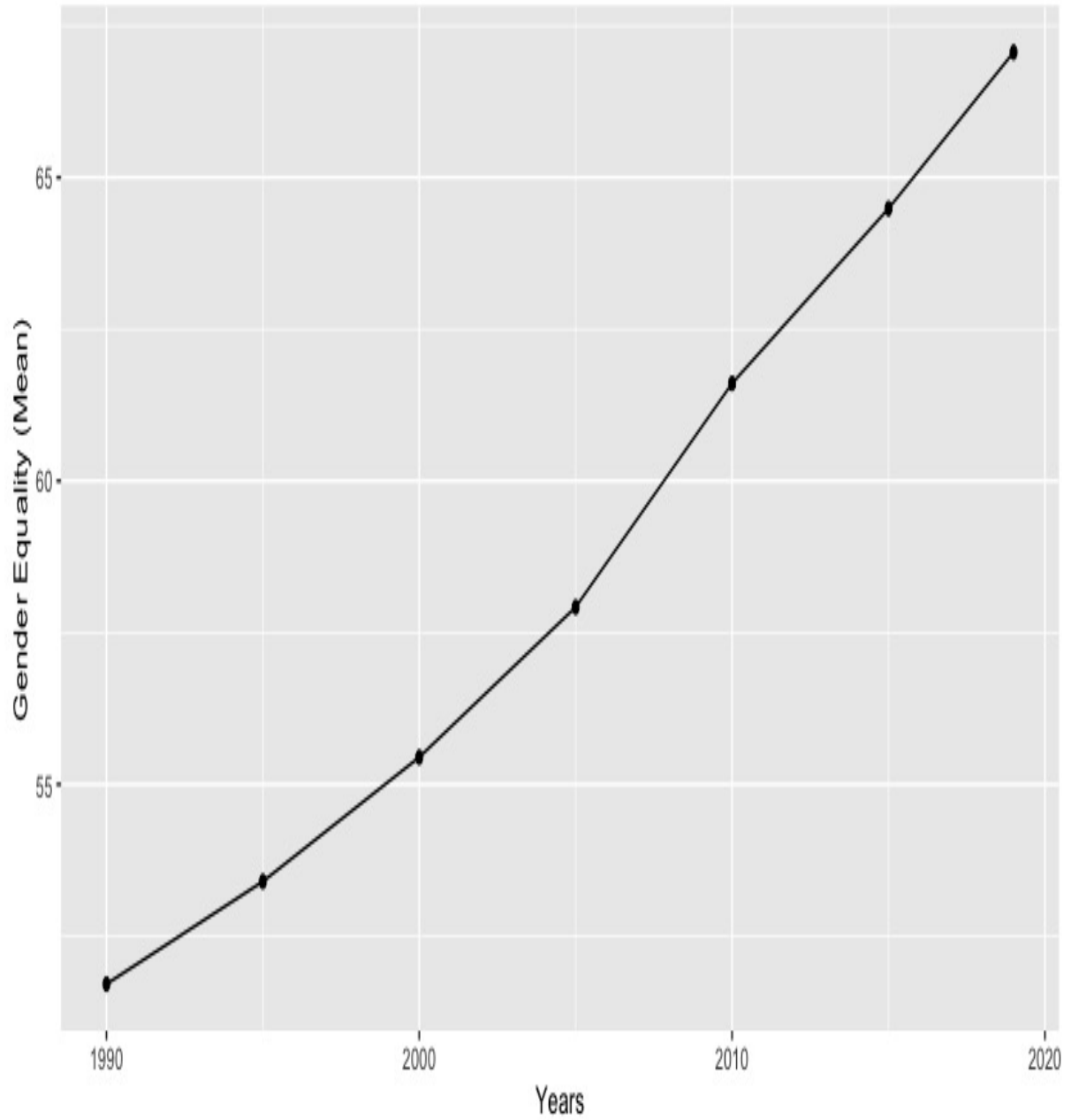
Our findings beckon many future avenues of research. One next step is to better clarify the mechanisms connecting FLM and gender equality. We suspect remittances shape these uneven gender equality gains. Norms may matter as well (Ferrant et al. 2015; Lodigiani et al. 2020; Tuccio et al. 2018). Incorporating host countries norms and remittance data into the analysis would help decipher these mechanisms. This data may be hard to find, especially cross-nationally. Future work may better investigate these dynamics sub-nationally.

Men are also missing from this analysis. Though the a priori consequences of men's labor migration (MLM) on source country gender equality are unclear, it is plausible that male migrants' remittances could also be channeled into improving their daughters' and female relatives' access to education. We would not expect, however, for MLM to influence women's political representation or labor laws except via absorbing the gender norms of their host country (Lodigiani et al. 2020; Tuccio et al. 2018).

The policy implications of our findings are clear. Open labor migration policies can promote source country gender equality. This recommendation counters existing work that warns of the consequences of female brain drain from a purely economic perspective (Dumont et al. 2007). Our more optimistic assessment proposes that women's employment abroad can improve some facets of gender equality at home.

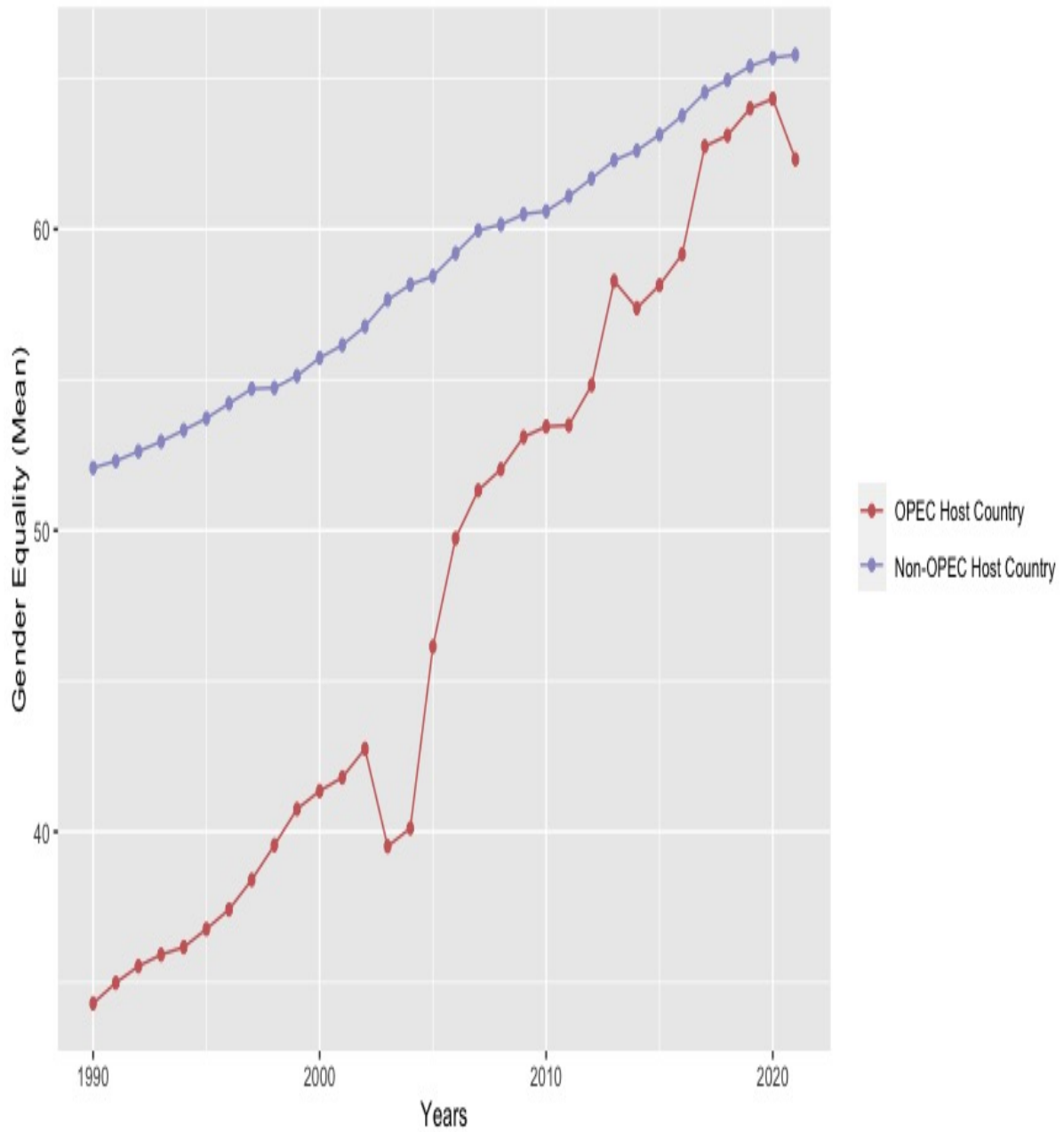
## 6 Appendix

Figure 4: Global Mean Gender Equality (1990 - 2019)



Source: World Bank, Global Inequality Index. Index has been reversed and multiplied by one hundred. Higher numbers signify greater gender equality.

Figure 5: Gender Equality in OPEC and Non-OPEC Countries



Source: World Bank, Global Inequality Index. Index has been reversed and multiplied by one hundred. Higher numbers signify greater gender equality.

Table 8: Female Labor Migration (FLM) and Female Legislative Representation in Source Countries

	(Fem Rep)	(Fem Rep)	(First Stage) (log(FLM))	(2SLS) (Fem Rep)	(2SLS) (Fem Rep)
<b>log(FLM)</b>				2.679 (4.973)	6.577 (4.831)
<b>Oil Price*</b>	-0.025*	-0.025	0.003***		
<b>OPEC Destination</b>	(0.014)	(0.015)	(0.0004)		
Oil Price	0.229*** (0.002)	0.255*** (0.012)	0.008*** (0.001)		
OPEC Destination	-5.913*** (2.148)	-5.812*** (2.198)	-0.444*** (0.078)		
log(GDPpc)		-1.468** (0.720)	0.002 (0.045)		-1.593*** (0.554)
Democracy		-0.265 (0.602)	0.081 (0.060)		-1.017 (0.812)
log(Oil Rents)		-0.823 (0.750)	0.015 (0.040)		-0.984 (0.783)
Constant	1.504 (2.932)	12.009** (5.721)	12.386*** (0.322)	-26.725 (63.549)	-63.281 (60.577)
Observations	722	672	684	672	672
Countries	137	128	129	128	128
R <sup>2</sup>	0.855	0.860	0.981	0.852	0.840
F-Statistic				4.69	8.49

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality in terms of female share of legislative representatives. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.



Table 9: Female Labor Migration (FLM) and Gender Equality Laws in Source Countries

	(WBL)	(WBL)	(First Stage) (log(FLM))	(2SLS) (WBL)	(2SLS) (WBL)
<b>log(FLM)</b>				11.527*** (2.680)	4.594** (2.022)
<b>Oil Price*</b>	-0.014	-0.009*	0.003***		
<b>OPEC Destination</b>	(0.012)	(0.005)	(0.0004)		
Oil Price	0.302***	0.259***	0.008***		
	(0.002)	(0.019)	(0.001)		
OPEC Destination	-2.611***	-3.426**	-0.444***		
	(0.986)	(1.393)	(0.078)		
log(GDPpc)		1.850	0.002		1.747
		(1.224)	(0.045)		(1.163)
Democracy		2.247***	0.081		1.778**
		(0.555)	(0.060)		(0.713)
log(Oil Rents)		1.295	0.015		1.197
		(1.668)	(0.040)		(1.457)
Constant	61.563***	47.754***	12.386***	-76.054**	-2.835
	(1.164)	(8.622)	(0.322)	(33.381)	(27.237)
Observations	788	673	684	673	673
Countries	150	127	129	127	127
R <sup>2</sup>	0.918	0.920	0.981	0.899	0.916
F-Statistic				4.60	8.32

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality with the Women, Business and the Law index. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 10: Female Labor Migration (FLM) and Female Primary Education in Source Countries

	(Fem Prime)	(Fem Prime)	(First Stage) (log(FLM))	(2SLS) (Fem Prime)	(2SLS) (Fem Prime)
<b>log(FLM)</b>				11.849*** (3.141)	22.047** (9.006)
<b>Oil Price*</b>	0.249*** (0.069)	0.269*** (0.069)	0.003*** (0.0004)		
<b>OPEC</b>					
<b>Destination</b>					
Oil Price	0.089*** (0.008)	0.130*** (0.026)	0.008*** (0.001)		
OPEC	-1.283 (3.770)	-1.893 (3.899)	-0.444*** (0.078)		
Destination					
log(GDPpc)		-2.941* (1.771)	0.002 (0.045)		-2.739 (2.127)
Democracy		-0.985 (1.848)	0.081 (0.060)		-2.993 (2.653)
log(Oil Rents)		-0.188 (1.978)	0.015 (0.040)		0.594 (2.918)
Constant	93.258*** (3.744)	114.171*** (10.590)	12.386*** (0.322)	-55.626 (37.582)	-163.651 (118.068)
Observations	681	589	684	589	589
Countries	147	126	129	126	126
R <sup>2</sup>	0.745	0.761	0.981	0.690	0.619
F-Statistic				7.56	10.42

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality in terms of girls' primary enrollment rates. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 11: Female Labor Migration (FLM) and the Gender Gap in Source Countries' Primary Education

	(Prime Gap)	(Prime Gap)	(First Stage) (log(FLM))	(2SLS) (Prime Gap)	(2SLS) (Prime Gap)
<b>log(FLM)</b>				-11.092*** (2.953)	-18.832*** (5.050)
<b>Oil Price*</b>	-0.141*** (0.035)	-0.153*** (0.035)	0.003*** (0.0004)		
<b>OPEC</b>					
<b>Destination</b>					
Oil Price	-0.036*** (0.004)	-0.051*** (0.011)	0.008*** (0.001)		
OPEC	4.964** (2.378)	5.376** (2.299)	-0.444*** (0.078)		
Destination					
log(GDPpc)		1.250* (0.746)	0.002 (0.045)		1.299 (1.142)
Democracy		0.328 (0.632)	0.081 (0.060)		2.532** (1.128)
log(Oil Rents)		0.860*** (0.281)	0.015 (0.040)		0.365 (1.135)
Constant	0.894 (0.598)	-8.637* (4.988)	12.386*** (0.322)	140.897*** (36.973)	227.695*** (59.165)
Observations	681	589	684	589	589
Countries	147	126	129	126	126
R <sup>2</sup>	0.719	0.729	0.981	0.521	0.270
F-Statistic				7.56	10.42

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1, 2, 4 and 5 measure gender equality in terms of the gender gap in boys' and girls' primary enrollment rates. A bigger gap indicates less gender equality. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 12: Female Labor Migration (FLM) and Female Secondary Education in Source Countries

	(Fem Secon)	(Fem Secon)	(First Stage) (log(FLM))	(2SLS) (Fem Secon)	(2SLS) (Fem Secon)
<b>log(FLM)</b>				38.218*** (5.808)	37.382*** (8.374)
<b>Oil Price*</b>	0.212*** (0.051)	0.197*** (0.046)	0.003***		
<b>OPEC</b>					
<b>Destination</b>					
Oil Price	0.254*** (0.013)	0.200*** (0.042)	0.008*** (0.001)		
OPEC	-12.524*** (2.102)	-12.661*** (2.304)	-0.444*** (0.078)		
Destination		3.363 (2.478)	0.002 (0.045)		0.608 (2.368)
log(GDPpc)		5.563*** (2.011)	0.081 (0.060)		0.444 (2.488)
Democracy		-0.981 (1.337)	0.015 (0.040)		1.460 (3.111)
log(Oil Rents)					
Constant	69.813*** (2.974)	43.933** (17.314)	12.386*** (0.322)	-410.941*** (74.073)	-406.163** (103.341)
Observations	575	498	684	498	498
Countries	140	122	129	122	122
R <sup>2</sup>	0.944	0.948	0.981	0.917	0.919
F-Statistic				7.67	7.82

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality in terms of girls' secondary enrollment rates. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 13: Female Labor Migration (FLM) and the Gender Gap in Source Countries' Secondary Education

	(Second Gap)	(Second Gap)	(First Stage) (log(FLM))	(2SLS) (Second Gap)	(2SLS) (Second Gap)
<b>log(FLM)</b>				-10.948*** (1.878)	-16.104* (8.650)
<b>Oil Price*</b>	-0.110*** (0.027)	-0.102*** (0.024)	0.003*** (0.0004)		
<b>OPEC</b>					
<b>Destination</b>					
Oil	-0.002 (0.004)	-0.021* (0.011)	0.008*** (0.001)		
Price					
OPEC	4.576 (3.450)	4.533 (3.420)	-0.444*** (0.078)		
Destination					
log(GDPpc)		1.229* (0.722)	0.002 (0.045)		2.316* (1.282)
Democracy		-1.805* (1.057)	0.081 (0.060)		0.336 (2.520)
log(Oil Rents)		0.822 (0.843)	0.015 (0.040)		-0.221 (1.194)
Constant	1.389 (1.468)	-6.176 (4.319)	12.386*** (0.322)	141.326*** (23.833)	190.152* (104.039)
Observations	575	498	684	498	498
Countries	140	122	129	122	122
R <sup>2</sup>	0.782	0.777	0.981	0.682	0.597
F-Statistic				7.67	7.82

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality in terms of the gender gap in boys' and girls' secondary enrollment rates. A bigger gap indicates less gender equality. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 14: Female Labor Migration (FLM) and Female Tertiary Education in Source Countries

	(Fem Third)	(Fem Third)	(First Stage) (log(FLM))	(2SLS) (Fem Third)	(2SLS) (Fem Third)
<b>log(FLM)</b>				-29.699*** (10.016)	-56.441*** (14.325)
<b>Oil Price*</b>	-0.192*** (0.052)	-0.193*** (0.047)	0.003*** (0.0004)		
<b>OPEC</b>					
<b>Destination</b>					
Oil	0.516*** (0.014)	0.478*** (0.042)	0.008*** (0.001)		
Price					
OPEC	2.506 (3.859)	2.723 (4.084)	-0.444*** (0.078)		
Destination					
log(GDPpc)		2.162 (2.334)	0.002 (0.045)		6.121*** (1.648)
Democracy		-0.456 (0.777)	0.081 (0.060)		4.231* (2.384)
log(Oil Rents)		2.308 (2.267)	0.015 (0.040)		2.977 (4.143)
Constant	16.036* (9.109)	1.126 (19.894)	12.386*** (0.322)	408.965*** (126.615)	700.380*** (178.511)
Observations	543	474	684	474	474
Country	139	121	129	121	121
R <sup>2</sup>	0.921	0.927	0.981	0.906	0.856
F-Statistic				4.24	5.55

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1, 2, 4 and 5 measure gender equality in terms of women's tertiary enrollment rates. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.



Table 15: Female Labor Migration (FLM) and the Gender Gap in Source Countries' Tertiary Education

	(Tert Gap)	(Tert Gap)	(First Stage) (log(FLM))	(2SLS) (Tert Gap)	(2SLS) (Tert Gap)
<b>log(FLM)</b>				18.959*** (6.149)	31.471*** (6.224)
<b>Oil Price*</b>	0.110***	0.108***	0.003***		
<b>OPEC</b>	(0.037)	(0.032)	(0.0004)		
<b>Destination</b>					
Oil Price	-0.173*** (0.007)	-0.165*** (0.017)	0.008*** (0.001)		
OPEC	-1.901 (2.315)	-2.190 (2.294)	-0.444*** (0.078)		
Destination					
log(GDPpc)		-0.561 (0.952)	0.002 (0.045)		-2.772*** (1.063)
Democracy		0.586 (1.077)	0.081 (0.060)		-2.041 (1.303)
log(Oil Rents)		-0.866 (1.385)	0.015 (0.040)		-1.239 (2.491)
Constant	-3.890 (3.504)	0.115 (9.074)	12.386*** (0.322)	-250.161*** (77.337)	-387.255*** (81.369)
Observations	543	474	684	474	474
Countries	139	121	129	121	121
R <sup>2</sup>	0.890	0.892	0.981	0.816	0.708
F-Statistic				4.24	5.55

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 2, 4 and 5 measure gender equality in terms of the gender gap in men's and women's tertiary enrollment rates. A bigger gap indicates less gender equality. All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 16: Oil Prices, OPEC Destination Share of Female Labor Migration (FLM) and Gender Equality in Source Countries

	<i>DV: Gender Equality (GE)</i>			
	(GE)	(GE)	(WOPOL)	(WECON)
	(1)	(2)	(3)	(4)
<b>Oil Price*</b>	0.017	0.025**	0.002***	-0.005
<b>OPEC Share of FLM</b>	(0.011)	(0.010)	(0.0003)	(0.006)
Oil Price	0.202***	0.187***	0.013***	0.002
	(0.001)	(0.005)	(0.001)	(0.002)
OPEC Share of FLM	-6.914***	-7.178***	-0.426	0.266
	(2.645)	(2.698)	(0.388)	(0.202)
log(GDPpc)		0.607	-0.166**	0.138
		(0.386)	(0.071)	(0.090)
Democracy		-0.611**	0.018	0.043
		(0.266)	(0.044)	(0.088)
log(Oil Rents)		-0.213	-0.051**	0.025
		(0.941)	(0.025)	(0.095)
Constant	62.064***	58.929***	2.569***	-0.171
	(1.795)	(2.164)	(0.456)	(0.536)
Observations	799	684	424	421
Countries	129	129	125	125
R <sup>2</sup>	0.979	0.984	0.706	0.760

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 and 2 measure gender equality with the Gender Equality index. Model 3 measures gender political equality (WOPOL) and Model 4 measures gender economic equality (WECON). All variables except the dependent variables are lagged. Standard errors are clustered at the year level.

Table 17: Brent Oil Prices, OPEC Destination and Gender Equality in Source Countries

	<i>DV: Gender Equality (GE)</i>			
	(GE)	(GE)	(WOPOL)	(WECON)
	(1)	(2)	(3)	(4)
<b>Brent Oil Price*</b>	0.011*	0.016**	0.002**	-0.004
<b>OPEC Destination</b>	(0.007)	(0.008)	(0.001)	(0.005)
Brent Oil	0.185***	0.171***	0.014***	0.002
Price	(0.001)	(0.005)	(0.002)	(0.002)
OPEC Destination	-3.472*	-3.742*	-0.262	0.127
	(1.964)	(2.040)	(0.310)	(0.133)
log(GDPpc)		0.634*	-0.165**	0.137
		(0.379)	(0.073)	(0.089)
Democracy		-0.631**	0.016	0.046
		(0.274)	(0.046)	(0.088)
log(Oil_rents_lag + 1)		-0.211	-0.050*	0.024
		(0.936)	(0.026)	(0.094)
Constant	62.588***	59.223***	2.555***	-0.165
	(1.788)	(2.102)	(0.468)	(0.524)
Observations	799	684	424	421
Countries	152	129	125	125
R <sup>2</sup>	0.979	0.983	0.705	0.760

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 and 2 measure gender equality with the Gender Equality index. Model 3 measures gender political equality (WOPOL) and Model 4 measures gender economic equality (WECON). All variables except the dependent variables are lagged. Standard errors are clustered at the year level.

Table 18: Oil Prices, OPEC Destination and Gender Equality in Low and Middle-Income Source Countries

	<i>DV: Gender Equality (GE)</i>			
	(GE)	(GE)	(WOPOL)	(WECON)
	(1)	(2)	(3)	(4)
<b>Oil Price*</b>	0.007	0.011*	0.001**	0.003
<b>OPEC Destination</b>	(0.006)	(0.006)	(0.0005)	(0.005)
Oil	0.217***	0.211***	0.014***	-0.005***
Price	(0.001)	(0.007)	(0.002)	(0.002)
OPEC	-3.317*	-3.371*	-0.248	-0.097
Destination	(1.702)	(1.734)	(0.303)	(0.203)
log(GDPpc)		-0.039	-0.179**	0.173***
		(0.326)	(0.083)	(0.051)
Democracy		-0.919*	0.015	0.107
		(0.508)	(0.054)	(0.117)
log(Oil Rents)		-0.467	-0.049***	0.087
		(1.041)	(0.018)	(0.080)
Constant	60.543***	62.312***	2.645***	-0.155
	(1.822)	(3.111)	(0.537)	(0.329)
Observations	520	488	310	307
Countries	107	102	96	96
R <sup>2</sup>	0.961	0.968	0.598	0.653

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 1 and 2 measure gender equality with the Gender Equality index. Model 3 measures gender political equality (WOPOL) and Model 4 measures gender economic equality (WECON). All variables except the dependent variables are lagged. Standard errors are clustered at the year level.

Table 19: IV: Oil Prices, OPEC Destination Share of Female Labor Migration (FLM) and Gender Equality in Source Countries

	(First Stage) (log(FLM))	(2SLS) (GE)	(2SLS) (GE)	(2SLS) (WOPOL)	(2SLS) (WECON)
<b>log(FLM)</b>		5.964*** (1.199)	11.400*** (3.550)	0.802** (0.321)	-0.490 (0.457)
<b>Oil Price*</b>	0.004*** (0.001)				
<b>OPEC Share of FLM</b>					
Oil Price	0.008*** (0.001)				
OPEC Share of FLM	-0.564*** (0.098)				
log(GDPpc)	0.001 (0.045)		0.592 (0.589)	-0.137 (0.108)	0.131 (0.091)
Democracy	0.083 (0.060)		-1.599 (1.074)	-0.045 (0.061)	0.081 (0.081)
log(Oil Rents1)	0.014 (0.041)		-0.380 (0.826)	-0.108** (0.055)	0.071 (0.094)
Constant	12.392*** (0.319)	-8.177 (14.533)	-79.949* (42.591)	-7.385 (4.697)	6.088 (6.046)
Observations	684	684	684	424	421
Countries	129	129	129	125	125
R <sup>2</sup>	0.981	0.978	0.967	0.582	0.746
F-Statistic		4.27	7.84	3.81	3.83

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 2 and 3 measure gender equality with the Gender Equality index. Model 4 measures gender political equality (WOPOL) and Model 5 measures gender economic equality (WECON). All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 20: IV: Brent Oil Prices, OPEC Destination and Gender Equality in Source Countries

	(First Stage) (log(FLM))	(2SLS) (GE)	(2SLS) (GE)	(2SLS) (WOPOL)	(2SLS) (WECON)
<b>log(FLM)</b>		3.752*** (1.152)	7.716** (3.114)	0.626 (0.400)	-0.331 (0.356)
<b>Brent Oil Price*</b>	0.003*** (0.0004)				
<b>OPEC Destination</b>	0.007*** (0.001)				
<b>OPEC Destination</b>	-0.433*** (0.080)				
<b>log(GDPpc)</b>	0.002 (0.045)		0.607 (0.469)	-0.144 (0.102)	0.136 (0.086)
<b>Democracy</b>	0.081 (0.060)		-1.284 (0.855)	-0.033 (0.066)	0.069 (0.086)
<b>log(Oil Rents)</b>	0.014 (0.040)		-0.327 (0.824)	-0.095** (0.048)	0.059 (0.082)
<b>Constant</b>	12.414*** (0.324)	19.778 (13.983)	-33.697 (37.510)	-5.133 (5.684)	4.058 (4.897)
<b>Observations</b>	684	684	684	424	421
<b>Countries</b>	129	129	129	125	125
<b>R<sup>2</sup></b>	0.981	0.981	0.975	0.624	0.753
<b>F-Statistic</b>		4.69	8.52	4.27	4.30

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 2 and 3 measure gender equality with the Gender Equality index. Model 4 measures gender political equality (WOPOL) and Model 5 measures gender economic equality (WECON). All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

Table 21: IV: Oil Prices, OPEC Destination and Gender Equality in Low and Middle-Income Source Countries

	(First Stage) (log(FLM))	(2SLS) (GE)	(2SLS) (GE)	(2SLS) (WOPOL)	(2SLS) (WECON)
<b>log(FLM)</b>		2.903 (1.866)	9.586** (3.751)	0.731 (0.470)	0.144 (0.288)
<b>Oil Price*</b>	0.001** (0.001)				
<b>OPEC Destination</b>	0.012*** (0.001)				
<b>Oil Price</b>	-0.353*** (0.069)				
<b>OPEC Destination</b>	-0.086 (0.068)		0.784 (0.703)	-0.158 (0.123)	0.168*** (0.033)
<b>log(GDPpc)</b>	0.055 (0.046)		-1.449 (0.888)	-0.016 (0.062)	0.099 (0.085)
<b>Democracy</b>	0.009 (0.048)		-0.556 (0.873)	-0.092** (0.043)	0.067 (0.059)
<b>log(Oil Rents)</b>	12.831*** (0.464)	29.951 (22.846)	-58.285 (45.237)	-6.320 (6.628)	-2.062 (3.767)
<b>Constant</b>					
Observations	488	488	488	310	307
Countries	102	102	102	96	96
R <sup>2</sup>	0.981	0.963	0.940	0.420	0.656
F-Statistic		2.90	4.00	2.49	2.48

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Source country-year is the unit of analysis. All models include country and year fixed effects. Models 2 and 3 measure gender equality with the Gender Equality index. Model 4 measures gender political equality (WOPOL) and Model 5 measures gender economic equality (WECON). All variables except the gender equality variables are lagged. Standard errors are clustered at the year level.

## 6.1 The Global Inequality Index (GII)

The UN's Gender Inequality Index is a composite index that measures gender inequality across three domains: health, empowerment, and labor market (UN Development Report 2023).

The health dimension primarily measures the reproductive health of women and girls through maternal mortality ratios and adolescent fertility rates. Maternal mortality captures the level of importance society places on women during childbirth which, in turn, reflects women's status within society (WHO 2023). On the other hand, adolescent pregnancies reflect women's potential capabilities within society. As adolescent pregnancies often hinder girls from attaining higher levels of education and limit opportunities available to them, a greater prevalence of pregnancies among youth indicates greater dis-

advantage faced by women relative to men (Oxford Poverty and Human Development Initiative, [n.d.](#)).

The empowerment dimension is derived from two primary indicators: the share of parliamentary seats held by women and the share of women with secondary and higher levels of education relative to men (WHO [2023](#)). Women's share of parliamentary seats captures the level of visibility within the political arena, the level of representation they receive in government, and the general capabilities possessed by women which are needed to attain higher office. Similarly, education attainment captures individuals' access to information and capabilities to make lead changes to their individual circumstances and broader society (Oxford Poverty and Human Development Initiative, [n.d.](#)).

Finally, the labor market dimension compares female and male labor force participation rates (WHO [2023](#)). Labor force participation reflects each gender's willingness to work in each society, perception of work opportunities available to them, as well as gender roles within the household and border society.



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