Essays on Women's Empowerment in Developing Countries

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List of Abbreviations

2SLS	Two-stage Least Squares
CAT	Convention against Torture and Other Cruel , Inhuman or Degrading Treatment or Punishment
CEDAW	Convention on the Elimination of Discrimination against Women
DHS	Demographic Health Survey
DV	Domestic Violence
FLFP	Female Labor Force Participation
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IDP	Internally Displaced People
IV	Instrumental Variable
LATE	Local Average Treatment Effect
LPM	Linear Probability Model
MDG	Millenium Development Goals
MENA	Middle East and North Africa
NGO	Non-Governmental Organization
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PPP	Purchasing Power Parities
UBOS	Ugandan Bureau of Statistics
PSU	Primary Sampling Unit
2SRI	Two-stage Residual Inclusion
UNHCR	United Nations High Commissioner for Refugees
WHO	World Health Organization
WVS	World Values Survey
WWII	World War II

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1 General Introduction

> "There is no tool for development more effective than the empowerment of women."
> — *Kofi Annan*

The idea of women's empowerment entered the mainstream development agenda in the late 1990s. Rooted in women's movements in the 1980s, the term initially symbolized a radical transformation of power relations in favor of women's rights, as well as structural change regarding equality between men and women (Kabeer, 1994; Sen, 1997). Feminist movements in developing countries challenged not only patriarchal values, but deeply rooted structures such as class or ethnicity, functioning as mediator for the subordination of women in developing societies. Evolving from discourses between various social movements, it followed a widespread adoption of the concept of women's empowerment and by the mid-1990s, it finally entered the development sector. For instance, it was part of the 1995 Beijing Platform of Action, adopted at the UN's Fourth World Conference on Women, and emphasized as one of three pillars in tackling poverty in the 2000 World Bank report (Calvès, 2009). Today, women's empowerment has become one of the core international development concerns (Batliwala, 2007; Cornwall & Eade, 2011).

Since then, much of the literature that has evolved around this subject focused on the instrumental gains: women's empowerment has been identified in various studies as a prerequisite for poverty reduction (United Nations (2005); World Bank (2012)). In addition to driving overall economic growth (Klasen and Lamanna, 2009), women's empowerment has been found to have beneficial effects on fertility rates, child health and education outcomes, as well as community development (e.g. Amzat, 2017; Prennushi, 2014).

This instrumental view has been criticized by various feminist thinkers, stressing that not enough effort is placed on intrinsic goals, sneaking gender issues as "Trojan horse" into mainstream development issues, based on efficiency arguments (Cornwall and Anyidoho, 2010; Cornwall and Brock, 2005; Batilwala, 2007). They claim that ignoring structural causes of women's inequality

in mainstream development limits progress in actual achievements in women's empowerment (Cornwall and Edwards, 2014).[1]

The importance of differentiating between instrumental and intrinsic values is also stressed by Sen's widely known capability approach. Put simply, investing in e.g. education is essential to what Sen refers to as "one's ability to do and be" and the necessity to consider development objectives from a broader "capability" perspective which places value on indicators for their intrinsic significance (Sen, 1997). [2]

In 2015, women's empowerment has been acknowledged as an important end in itself, by placing it on the development agenda as 'a stand-alone objective' in Goal 5 of the Sustainable Development Goals (SDGs).

This thesis follows the approach that values empowerment as an end in itself by looking at what drives or hinders progress in women's empowerment, but also focusing on its instrumental effects on other development ends. Within this framework, this thesis aims to explore various factors that foster women's empowerment, as well as linkages between different dimensions of women's empowerment.

Since the term empowerment lacks a unique conceptualization in research, we follow the definition of Kabeer (2001), (also taken up by the World Bank), throughout the three chapters. Henceforth, the term empowerment incorporates women's increased control over their own lives, bodies, and environments. Specifically emphasized are "women's decision-making roles, their economic self-reliance, and their legal rights to equal treatment, protection against all forms of discrimination, in addition to the elimination of barriers of access to resources such as education and information". Overall, the term empowerment reflects a multi-dimensional process that can be categorized into economic, socio-cultural, and political empowerment, among others (Kabeer, 2001).

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[1] For instance, putting too much emphasis on the synergy effects of women's empowerment does only lead to partial improvements instead of progress in structural transformation in society.

[2] In addition, Sen's capability provides a view to assess the general process of empowerment. According to his approach, the term describes the process of increasing "individual's well-being, freedom or set of valuable capabilities".

This thesis focuses on the social and economic dimensions. It consists of three essays, which will be summarized below in more detail. Each of these chapters addresses specific research questions in order to contribute to a better understanding of the processes underlying social and economic dimensions of women's empowerment at the micro and macro level. In particular, the first chapter starts by providing a broader perspective on the causes of women's empowerment at the macro level, by investigating the factors correlated with the closing of gender gaps in education across regions during the last 30 years. More specifically, we ask what economic, political or institutional changes are the drivers of progress in gender parity in education.

This explorative study paves the way for a more detailed analysis at the micro level. As the first chapter identifies conflict as one of the determinants impeding empowerment at the macro level, we explore in the second paper how women's economic empowerment reacts to refugee shocks triggered by conflict at the micro level. We do this by asking whether refugee shocks impact the host population in terms of women's labor force participation and social cohesion in Uganda.

The third chapter focuses on the instrumental view by asking whether economic empowerment itself can have instrumental effects on social dimensions of empowerment, namely domestic violence. Given that economic empowerment can be a powerful means to improve women's welfare by reducing domestic violence in the context of developed countries, we investigate if this link can be carried over to the developing country's context, where empirical findings show mixed results.

This thesis has two main contributions. First, by analyzing various driving factors of women's empowerment, this thesis contributes to the overall understanding of the factors that play a key role for women's empowerment. Second, the thesis shows that women's economic empowerment can have positive instrumental effects across other dimensions, such as freedom from domestic violence, even when measured by neoclassical approaches.

Each summary below introduces the general idea, estimation strategy and gives some policy recommendations based on the findings of the respective analysis.

1.1 Synopsis of Chapter 1: The Drivers of Gender Gaps in Education in Developing Countries

Some existing studies to date focus on the instrumental rationale for advocacy on gender equality, such as the impact of gender gaps in education on economic growth (Klasen & Lamanna 2009; Hakura et al. 2016; Knowles, 2002;). Yet, this study focuses on female empowerment via education considering both of them as intrinsic values.

The aim of this chapter is to investigate long-run trends such as economic prosperity, structural changes in the economy or changes in institutions, which may explain the achievement of gender parity in one dimension of gender equality, namely education. Within this overall framework, we target one factor specifically: international agreements on women's rights. The Convention against Discrimination against Women (CEDAW) enacted in 1979, was the first legal response to inequalities in women's status, including measures to improve female education directly. This chapter explores whether these international attempts to raise awareness for female education in the international arena and to put pressure on national governments was successful.

To this end, we implement various random effect models on 98 countries over the period 1980-2010. While doing so, we account for potential time trends by applying placebo tests and controlling for regional time trends, which are often neglected in studies on the effectiveness of human rights treaties (Simmons, 2011). Since many processes such as modernization processes and democracy transformations took place in the same period as the CEDAW ratification, we need to an apply instrumental variable approach to disentangle the effect of this international treaty from confounding factors. Thus, we instrument our main variable of interest, the ratification to the CEDAW, with three other human rights treaties to rule out potential threats through reverse causality or omitted variables bias.

We conclude that institutions are successful for primary educational attainment by using international agreements, pushing governments to implement certain policies to achieve equity in education. The results suggest that economic growth, the share of Protestants in a country, some social institutions and years of interstate conflict are correlated with changes in education gap outcomes. Yet, many factors we tested are found not to be associated with gender inequality in education, such as trade openness and structural transformation. Policy implications would, therefore, suggest that recent processes linked to globalization such as a higher integration into the world market and structural changes of the economy need to be supported and accompanied by gender strategies to effectively contribute to improvements in gender equality, at least in the dimension of education.

1.2 Synopsis of Chapter 2: The Impact of Congolese Refugees on Female Labor Market Outcomes and Social Cohesion

The past decade has experienced significant growth in the global population of forcibly displaced people. As of today, one out of every 110 people in the world is displaced, compared with one in 157 a decade ago, with much of this increase having occurred over the last five years. The large-scale numbers of refugees mostly, but not solely, escaping from intense civil-conflict situations has brought attention to the responsibility shouldered by hosting countries and communities, with most of them (84%) being developing regions.

While the impacts of voluntary labor migration have been widely explored- to a large extent focusing on developed countries-, the link between various aspects of forced migration on a host country's population remains poorly understood. This is despite a general increase in protracted refugee situations that can be expected to impact a country's population in various profound ways. Few studies though investigate the effects on labor market outcomes and we have not come across any study focusing on social effects, in response to large refugee increases in communities.

Gender issues in this context are particularly under-researched. Yet, this is of utmost importance since women often carry a double burden in terms of unpaid domestic and care work, such as child-rearing, while they belong to the most vulnerable individuals in the society (Manyire, 2013). The second chapter explores the effect of increased refugee inflows on women's labor market outcomes and social cohesion in Uganda. This research question is particularly interesting in the context of Uganda, since the government introduced a unique legal framework regarding the economic and social integration of refugees. Refugees are entitled to move around freely, work and build their own shelter, amongst others freedoms. This offers various ways of economic and social interaction between refugees and the Ugandan host population.

The empirical framework to answer this question is based on up to 5 waves from three different sources, covering the years 2000-2012. By using a difference-in-differences approach, we compare regions that experienced high refugee inflows to those exposed to fewer refugees, while taking into account the distance of the Ugandan communities to the refugee settlements.

We find that Ugandan women living closer to the settlements and thus exposed to higher refugee numbers benefit in terms of increased labor force participation rates, particularly in agricultural self-employment. In addition, we show that overall household welfare increases, as well as nutritional outcomes of children of the women under study. With respect to social cohesion,

greater refugee presence seems to enhance perceived equality within the host population, as well as increase the sense of belonging to the Ugandan nationality compared to other ethnic groups. Indicators of both institutional and interpersonal trust are not altered as result of increased refugee inflows.

Our results suggest a positive effect of the integrative Ugandan refugee policy on female labor market participation with subsequent improvements of the household's economic status. The 'social glue' among the host population is affected ambiguously by the refugee situation and needs to be considered carefully. Particularly, increases in adherence to the national identity over the ethnic identity can hint at an out-group discrimination against the refugee population. Overall, this study contributes to a better understanding of the relationship between refugee inflows and concerns about gender issues and forced displacement, by focusing on the host population's perspective.

1.3 Synopsis of Chapter 3: Does Female Labor Force Participation Reduces Domestic Violence? Evidence from Jordan

The incidence of violence against women is still a pandemic problem, given that one in three women (35%) worldwide have experienced violence in their lifetime (WHO report, 2017). Yet, this phenomenon is equally persistent in both developed as well as developing countries. Men experience higher levels of physical violence than women as, e.g., a result of war or disputes between gangs, while almost one third (30%) of violent acts women suffer (globally) come from either physical and/or sexual violence perpetrated by their intimate partner in their own home.[3]

The consequences of domestic violence on women's lives, as well as costs on the society and the economy, are well acknowledged in international reports (World Bank, 2016). In 2010, Fearon and Hoeffler calculated that the annual international costs of domestic violence amount to 4.3 trillion USD. However, effective strategies or at least promising concepts to reduce intimate partner violence, are still debated. The United Nations strongly advocate economic empowerment of women as a protective factor against domestic violence in its Beijing

[3] The emotional and economic dependence on the partner makes efforts on prevention even more complex.

declaration (United Nations, 2015), mainly based on studies from industrialized countries (Aizer, 2010; Anderberg et al., 2016).

Yet, empirical evidence from developing countries on the impact of labor force participation on domestic violence provides two conflicting views. One strand of literature finds that improved bargaining power due to economic empowerment can increase independence, decision-making power and outside options among women, leading to less spousal violence (Bowlus and Seitz, 2006; Kim et al. 2007). In contrast, another strand of literature finds that an increase in bargaining power through higher income can trigger domestic violence, for instance when traditional gender roles in the household are challenged. These "male backlash" studies find a positive impact between labor force and the prevalence of domestic violence as a reaction of the husband to regain power over his wife (Hjort and Villanger, 2011; Eswaran and Malhotra, 2011).

Given the mixed results, this chapter contributes to the literature by investigating the link between women's economic empowerment due to participation in the labor force and domestic violence in the context of Jordan. This is an interesting case to study, as labor force participation amongst women is very low in Jordan, and qualitative evidence hints at mainly traditional attitudes, prescribing women's main role as upholding the family and men as primary breadwinner of the family. Yet, recent studies report a shift towards more progressive attitudes towards gender roles, at least for the younger generation (Shteiwi, 2015).

In this analysis, we analyze DHS data from 2007, providing information on 10,867 ever-married women. The use of instrumental variable estimation helps us to address the problem of endogeneity issues entailed in estimating the effect of women's labor force participation on domestic violence. We find that women's participation in the labor force reduces the risk of sexual violence amongst Jordanian women, but does not significantly affect physical or psychological violence. The policy implications would, therefore, recommend strategies to get women into the labor force as a tool to protect women at least from spousal sexual violence.

With respect to the methodology, future research should address challenges inherent in the estimation of domestic violence, such as underreporting and measurement error. To overcome potential problems from underreporting, new research points to the solution of combining 'traditional' data, such as DHS including self-reported violence, with experiments providing better privacy to women (Aguero, 2017). Overall, this chapter contributes to a better understanding of the consequences of women's participation in the labor force on domestic violence in the context of a developing country where attitudes are shifting slowly from traditional views on women's role in society towards gender equality.

2 The Drivers of Gender Gaps in Education in Developing Countries

Abstract[4]

In recent decades, the gender gaps in education have rapidly closed in many regions of the world, while progress in other dimensions, such as political empowerment, health or domestic violence, has been much slower or even stagnated.

This paper investigates the potential drivers of these changes in gender equity in education by exploring the effects of economic growth, structural changes in the economy, social institutions, religion and political factors using a panel of 98 developing countries covering the period of 1981-2010. Given that there is little consensus on the impact of international agreements targeting gender equality in education, we specifically look at a country's commitment to the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW). We use exogenous variation in the duration of a country's ratification of the CEDAW generated by commitment to other UN Human Rights Treaties to identify a local average treatment effect (LATE). Our estimation results imply that education gaps, on average, improved when a country's government ratified the CEDAW and placebo tests confirm that these positive findings are not driven by an omission of time trends. However, after correcting for endogeneity through instrumental variable estimation, this effect only holds for primary education and becomes non-significant for secondary and higher education.

We also find that the reduction of the gender gaps in education is correlated with growth in GDP, religion, informal institutions such as the absence of land inheritance rights, and fewer years of civil conflict in a country.

[4] This is joint work with Amy Alexander, Stephan Klasen and Chris Welzel.

2.1 Introduction

All over the world, particularly in developing countries, women are exposed to extreme gender inequality. This is unacceptable from a human rights perspective, as gender equality constitutes a fundamental right in itself according to international and national bills (UN Women report, 2015). In addition, several studies indicate that such inequality hinders economic growth and exacerbates poverty as formal or informal institutions deny women access to own assets or income producing labor.[5] A central theme that emerges is the question of why gender inequality still exists in some dimensions but has already disappeared in others. Despite the convergence in female and male's educational status, remaining gaps in health, life expectancy, wages, employment or occupations seem to be persistent.

Yet, looking at gender gaps in education is of utmost importance, not only because there is a consensus that they are a barrier to economic growth (e.g., Licumba et al., 2015; Klasen & Lamanna, 2009), but also as they significantly affect other dimensions of gender gaps in female labor force participation or women's rights. This is supported by various empirical and theoretical studies on interrelations between education gender gaps and gender gaps in other dimensions (Seguino, 2000a, 2000b).

The aim of this paper is twofold. First, we elaborate potential factors that are correlated with improvements in female education and thereby may explain the substantial reduction of education gaps, over the last 30 years, in developing countries. Amongst these are economic factors (economic growth, structural transformation), political and institutional factors, conflict, development aid and women's political representation. We do not aim at establishing causal relationships here.

Second, we then provide a closer perspective by looking at the role of formal institutions and, specifically, international agreements in promoting female education and thereby potentially contributing to the closing of the education gap. In the last decades, several international human rights initiatives have called for collective action to push the basic right of women's education. Amongst them, the Millenium Development Goals, the Education for ALL (EFA) Dakar

[5] This phenomenon of women being disproportionally affected by poverty has been introduced as "feminization of poverty" (UN Women report, 2000).

Framework for Action and, in our focus, the Convention on the Elimination of Discrimination against Women (CEDAW) place equal educational attainment of women and men as the primary goal on their agenda. For instance, Article 10 of the CEDAW states that "States Parties shall take all appropriate measures to eliminate discrimination against women in order to ensure to them equal rights with men in the field of education…" Governments are asked to meet a set of requirements to ensure a comparable quality of education for girls and boys in "all types of schools, in rural, as well as in urban areas, in pre-school, general, technical, professional and higher technical education as well as in all types of vocational training".

Yet, such international agreements have been subject to controversial debate as critics claim that they have virtually no effect on practice and implementation due to, e.g., a lack of enforcement mechanisms (Kevane, 2003), or commitments to them are considered to be a rational to receive more development aid (Hathaway, 2007; Magesan, 2015)[6], or they serve as a vehicle for interests in international cooperation (Chayes & Chayes, 2009). Empirical evidence, however, finds that international agreements improve equality across several gender dimensions, such as economic and political rights (Cho, 2014). [7] Besides this debate, there is scarce empirical literature on the effectiveness of CEDAW on education. Recent literature has mainly focused on the impact of CEDAW on aggregated women's rights outcomes such as the Gender Empowerment Index (GEI) (Simmons, 2009) or the CIRI Index (Cho, 2014). Yet, to our knowledge, the link between a country's CEDAW ratification and improvements in gender equality in education (measured by female-male ratios in educational attainment) has not been investigated.

We contribute to the existing literature by conducting panel analyses across a large number of developing countries, and expanding the time-period under consideration from 1980 up to 2010. Prior cross-national research on gender differences in education has mostly been constrained by data limitations to one point in time, whereas studies of long-term trends in the differences in education between men and women tend to focus on the sub-national level (Buchmann & DiPrete, 2006; Charles & Bradley, 2002; Marks, 2008; Van Hek, Kraaykamp, & Wolbers, 2015).

[6] Or, alternatively, having a bad human rights reputation increases the fear of getting less development aid through aid sanctions (Hamilton Spence, 2004).

[7] CEDAW has been adopted and opened for signature, ratification and accession by the General Assembly resolution 34/180 of 18 December 1979 and entered into force 3 September, 1981.

We further contribute to the empirical discussion by devoting special emphasis to the omission of time trends and the potential endogeneity challenges in analyzing the causal effects of human rights treaties, such as the CEDAW, on human rights outcomes. More specifically, one concern is that countries signed this treaty at different times over a thirty-year period as equality in gender relations evolved for other reasons, e.g. democratization. Signing of the treaty might have followed these changes. This may result in a spurious correlation between ratification and education outcomes. We therefore exploit exogenous variation on the timing of CEDAW ratification. We find that commitments to three UN Human rights treaties are powerful instruments[8] in our context since they have a large significant impact on CEDAW ratification, and pass various tests of the necessary exclusion restriction.

Moreover, the literature on the impact of international agreements on human rights outcomes has largely neglected to control for long-running trends, which might cause a positive relationship between treaty ratification and human rights outcomes (Chilton, 2016). Thus, we include time dummies in our model and run 1,000 placebo tests where we randomly assign the duration of a country's ratification to show that our model does not suffer from the omission of time trends. We find that higher GDP per capita (above a threshold of 5720 US$), the absence of inheritance rights, and the number of years a country is involved in interstate conflicts are correlated with the change of the gender gap in education. We identify a positive average treatment effect for the countries whose CEDAW ratifications respond to UN treaty participation. However, this positive and statistically significant effect of signing the CEDAW disappears for higher levels of education (secondary and tertiary) and holds for only primary education after controlling for endogeneity issues.

The remainder of this paper is organized as follows. Section 2.2 provides a literature overview of factors that are related to gender inequality in education with specific emphasis on CEDAW ratification. Section 2.3 explains the data, and Section 2.4 discusses the regression specification and the empirical strategy to deal with endogeneity problems. Section 2.5 is devoted to the regression results. Section 2.6 and 2.7 discuss the study's robustness checks and limitations and Section 2.8 concludes.

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[8] The selected treaties are the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (Torture Convention, CAT 1984) and the Convention on the Prevention and Punishment of the Crime of Genocide (Genocide Convention, GPPCG 1948).

2.2 Literature Overview

The literature on female educational attainment has looked at various angles across time and regions, but few studies focus specifically on the education gap, i.e. changes in female education vs. male education over time. Therefore, we present an overview on various strands of the general literature on determinants of gender inequality, which draws attention to trends in economic development, formal and informal institutions, conflict, development aid, and religion. Second, we review literature on the impact of international agreements, such as CEDAW, on gender inequality.

2.2.1 Economic Factors

Economic Growth

Empirical evidence in recent years suggests that the link between economic growth and gender equality is rather weak and inconclusive. Yet, several micro-level studies hint at improvements in gender outcomes and reveal possible pathways (Duflo, 2012). Explanations based on family-decisions claim that economic growth improves access to resources for poor households, lowering vulnerability as in times of crisis, which leads to less discriminatory practices against girls (Duflo, 2012). Other market-oriented explanations, (e.g., Becker, 1975) argue that growth should induce competitive markets to increase the costs of discriminating against women, ultimately leading to equal opportunities between males and females. Yet, whether these channels can be fully effective depends on a country's growth patterns, i.e. the ability of economic growth to generate competitive markets and benefit poor households.

Very few studies exist with respect to education outcomes at the macro-level. For instance, Dollar & Gatti (1999) investigate the link between gender inequality in education and economic growth in a panel analysis covering 127 countries (1975-1990) and find a convex relationship between income and female secondary achievement. The impact of rising GDP per capita on female education kicks in only after a certain threshold. Other theoretical studies conclude that growth does not automatically translate to gender equality (Kabeer, 2016). The role of the state and its ability to allocate benefits from economic growth, as well as patriarchial structures, determine whether economic growth results in better outcomes for women.

Structural transformation

As countries develop, the sectoral composition of the economy moves away from agriculture and manufacturing toward services, a sector in which women have a clear advantage. Agriculture and manufacturing typically require more physical strength, while the service sector is less intense in the usage of "brawn skills". Following the well-established arguments in literature, women are better equipped with "brain skills", including interpersonal and communication

skills which are typically required qualifications in the service sector. Thus, the historical growth in the tertiary sector has created jobs for which women are appropriate and have a comparative advantage (Goldin, 1990, 2006; Galor and Weil, 1996; Rendall 2010; Weinberg, 2000; Ngai and Petrolongo, 2015). As a result, female labor productivity rises in the course of the tertiarization process in the economy and thereby may increase the demand for female education.

Globalization

Since the 1980s, most developing countries have adopted trade liberalization policies aimed at a better integration into the world economy (Aguayo-Téllez, 2011). Yet, empirical evidence is scarce and inconclusive on whether trade openness fosters gender parity in education and other dimensions (Grown et al., 2016). The impact of trade policies and foreign direct investments (FDI) varies depending on global and local context characteristics, such as resource endowments, political institutions, or socioeconomic background of the women, amongst others (Balliamoune-Lutz., 2009). Balliamoune-Lutz (2006) finds that higher integration into the world market exacerbates differences in youth and adult literacy rates between men and women in Sub-Saharan Africa; but not in other developing countries. Similarly, other studies suggest that higher trade openness exerts a negative impact on female education in developing countries when unskilled women are mainly engaged in labor-intensive sectors such as textiles, or other light manufacturing (e.g., Balliamoune-Lutz & Mc Gillvray 2009; Fontana and Wood 2000,).[9] In contrast, evidence from India and South Africa shows that whenever incentives for investments in schooling increase due to new job opportunities in export-oriented sectors and ICT-related jobs which require specific skills, enrollment rates of children increase. This effect is even more pronounced among young women, compared to men (Oster & Steinberg, 2013; Jensen, 2012; Levinson 2007). [10]

2.2.2 Social Institutions, and Culture

Additional explanations suggest that gender outcomes can also be affected by a wide range of social institutions, cultural norms, and values that have been changed over the last decades. There are different ways through which informal or social institutions may affect gender

[9] Hypothesized channels are that women drop out of school earlier to join the labor force and thus, inequality in education would increase compared to higher LFP rates.

[10] Another channel mentioned in literature relates to trade and the potential decrease the wage gap between men and women, as higher competition decreases discrimination against females. Thus, higher relative wages may give women access to educational opportunities (Aguayo-Téllez, 2011).

outcomes in education. Social norms may affect the costs and benefits of education as they are an important factor in shaping gender attitudes related to the division of work. They can even influence opportunity costs of women's education, for instance in the case of dowry payments (Hill & King, 1995; Lahiri & Self, 2007). Social institutions can affect the returns on education which are lower for females than for males, as women often face unequal access, payment and other barriers at the labor market (Pasqua, 2005; Song, Appleton, & Knight, 2006).

Overall, informal institutions that constrain women's autonomy and bargaining power are negatively related to women's education (Branisa et al., 2013). We measure different aspects of formal institutions, such as absence of inheritance rights, nuclear families and patrilocal vs. matrilocal societies. For instance, we test the impact of different family structures (Bertocchi & Bozzano, 2015; Alesina & Nunn, 2013). It is assumed that nuclear family living arrangements reflect a more liberal, rather than authoritarian, norms which should favor a more advantaged position for women within the household and society (Engels, 1902, Boserup, 1970, Barry, Bacon and Child, 1957). In the same line, absence of inheritance rights reflects a more egalitarian society as control over private property allowed men to have a more superior position over females and to introduce the concept of paternity over their children (Alesina & Nunn, 2013).

Religion

The impact of religion on gender roles has been explored by Algan & Cahuc (2006) among others. Using panel data, they show that conceptions of the "male breadwinner model" are more likely to persist in Catholic, Orthodox, and Muslim rather than Protestant and Atheist societies. With respect to inequality in education, Cooray & Potrafke (2011) compare the impact of political institutions versus culture and religion on girls-boys enrollment ratio for primary education using a cross-section analysis. They find that neither democratic nor autocratic regimes influence improvements in gender equality. Instead, Muslim dominated countries are impeding female education. Similarly, Norton & Tomal (2009) find that the proportion of Hindu and Muslim population in a country has a negative impact on female educational attainment. In contrast, evidence taking into account historical patterns finds that exposure to Protestant missionaries improves current literacy rates amongst females in India (Mantovanelli, 2014), while Gallego & Woodberry (2011) find a positive relationship between 20th century missionaries and current education levels across African countries.

Becker & Wössmann (2008) investigate the determinants of the education gap in 19th century Prussia. They find that a larger share of Protestants decreased the gender gap in education since girls and boys were equally urged to read religious texts, facilitating the promotion of girls' schooling.[11]

2.2.3 Political Factors

Development Aid

The topic of how development assistance affects gender inequality is relatively new in the broader framework of studies on aid effectiveness and development (Grown et al., 2016).

While empirical studies suggest that aid is allocated to countries according to the level of existing gender gaps in education and health (Dreher, 2015), there is only scarce literature at the macro- and micro-level on sectoral allocation of aid and its impact on gender equality outcomes. With respect to aid effectiveness in the educational sector in general, the effects are found to be rather small (Riddel, 2012). For instance, Michaelowa & Weber (2006; 2007) explore Official Development Assistance (ODA) directed to the education sector in low and low-middle income countries over the long-run (using five-year averages, 1975-2000) and in the short-term perspective (1993-2000). They conclude that ODA had positive effects on primary enrolment rates. Furthermore, Pickbourn & Ndikumana (2013) use OECD data to evaluate the impact of the sectoral allocation of aid and show that aid in education significantly diminishes the female–male gap in youth literacy. These findings are in line with other research on aid effectiveness in this sector (Riddell, 2012).

Conflict

Another strand of literature examines the role of conflict, crisis, and shocks. Existing gender inequalities may be exacerbated during violent conflict, but they may also be attenuated. In

[11] More recently, the results of Seguino (2011) using cross- section and OLS analysis, suggest that the negative positions against gender equality do not come specifically from one specific religion, but from the degree of religiosity of people.

times of conflict, traditional norms and cultural values can be challenged[12], but in many cases they increase early childhood marriages and early pregnancies, forcing girls out of school (Justino, 2011). Various single-country studies suggest that conflict has a direct, negative impact on gender disparities in schooling which can be attributed to safety concerns, migration and displacement and low returns to girl's education (Chamarbagwala & Moran, 2011; Shemyakaina , 2011; Justino, 2014). Girls are more vulnerable in times of conflict compared to boys, when their labor force is required at home, or when scarce resources mean that the money is reallocated in favor of male children in the household (Obura, 2003).

Further, in contexts where conflict simultaneously occurs with specific ideologies on gender roles, as in the case of Islamist extremist groups in Pakistan, negative effects on girls schooling outcomes can be observed (Khan and Seltzer, 2015). In other contexts, such as Nepal or Eritrea, conflict had positive impacts on girls' educational opportunities due to their involvement in military service, providing them e.g. with pedagogical skills (Manchanda, 2011; Hale, 2001). Yet, in the case of Eritrea, these educational improvements were not sustainable in post-conflict times, ultimately resulting in discouragement and frustration (Hale, 2001).

International policies: CEDAW

Another body of literature to which we pay specific attention describes the role of international instruments targeting the *de facto* status of women. Several international agreements have been signed in the last 30 years in order to improve the status of women, and a large body of literature tries to disentangle these effects on women's equality status from other factors. Since we focus on education, we specifically review the literature on the (CEDAW), which was adopted by the UN General Assembly in 1979. [13]

A growing body of studies finds that CEDAW exerts a positive impact on women's welfare status. For instance, various scholars show that CEDAW is associated with improved political, economic and social rights outcomes (Cole, 2013; Lupu, 2013; Simmons, 2009). Yet, only a few of them

[12] This has been mainly shown in other dimensions such as labor force participation. Here, opportunities for women in paid labor due to absence of men improved female labor force participation rates (Verwimp, 2010; Akbulut et al. 2011; Kreibaum and Klasen, 2015).

[13] Aside from addressing discrimination against girls and women in education, the convention aims at ending "all forms" of disadvantages women are exposed to. With ratification, states are obliged to implement a number of strategies to end discrimination. The monitoring process requires that states submit an annual report to the CEDAW committee in order to prove the progress.

incorporate the endogenous treaty ratification by instruments or other methods to tackle a potential spurious correlation (Cho, 2014; Simmons, 2009, 2010). For instance, Simmons (2009) finds that CEDAW exerts a positive influence on educational attainment, in addition to legal improvements, by using a selection equation as an instrument for treaty commitment. [14]Another conclusion that most of these studies are drawing, regardless of the methodology they use, is that the effect of CEDAW hinges on the domestic preconditions or level of democracy in a country. Again Simmons (2010) finds largest effects for democratic regimes in a transitional status. In contrast, in autocratic or stable democracies, the effect seems to be smallest. Similarly, Cho (2014) finds an impact of the CEDAW on political and economic rights only after a certain level of democratic degree.[15]

2.3 Data and Background

In this section we will present the data on which the analysis on educational gender gaps is drawn. We also focus our attention on the instrument that is employed to tackle the endogeneity problem when estimating the causal impact of CEDAW on our outcome measure.

We use an unbalanced panel of 98 countries covering the years 1981-2010, which leaves us with 6 times periods due to five-year intervals. In fact, gender gaps in education in the group of 'advanced economies' have already been almost completely closed (i.e. the gender ratios approximate the 100% benchmark for education gender parity) before our period of investigation. Therefore, we exclude them from the analysis.[16]

As our dependent variable, we use the Barro- Lee dataset (2013) that includes information on the average years of schooling of the population aged 25 and over, disaggregated by gender. A complete overview on the data sources that have been used for testing the various theories from the literature section above is provided in Appendix Table 2A.2.

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[14] First, the propensity that a government is ratifying *any* treaty on women's rights is modeled using exogenous factors. In a second stage, this probability is used as an instruments for CEDAW treaty ratification.

[15] We also take these findings into account when estimating our analysis by testing several interaction terms between CEDAW and the level of democracy or the civil liberty status in a country.

[16] We also excluded 5 outliers from the analysis, namely Nepal, Haiti, Yemen, Libya and Mali, since they are very unusual cases, e.g. having education ratio values exceeding 100.

Data for the ratification of the CEDAW and for country reservations are drawn from the United Nations Treaty Collection. However, the 'quality' of the data on the signing of the CEDAW is quite different for the complier countries (Simmons, 2004). In our case, though, no country has placed a reservation on Article 10 of CEDAW, which lays out obligations on equality in education. However, 35 countries have made reservations on other major provisions, such as article 2/16, that could affect the right to education as applied to women and girls (UNESCO report, 2017). In this regard, the majority of the predominantly Islamic countries ratified the treaty with major reservations.[17] One might be suspicious whether countries placing reservations on various articles are actually motivated to enforce strategies on educational equality. As this could impact our estimation outcomes, we account for these differences by coding our CEDAW variable with and without reservations in several robustness checks.

2.3.1 Instruments- UN Human Rights Treaty Ratification

To tackle issues of endogeneity due to omitted variables, we implement commitments to human rights treaties at the UN as instruments, similar to Cho (2014).[18] The selected instruments are the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (Torture Convention, CAT 1984), the Convention on the Prevention and Punishment of the Crime of Genocide (Genocide Convention, GPPCG 1948), as well as the Convention against all Forms of Racism. The justification for this choice is that if a country signs one human rights treaty, it is very likely to commit to another. Regarding the exogeneity of the instruments, we assume that UN Convention signatures might be a signal of a country's interest in human rights in general rather than induced by women's lobbying in the country. Moreover, it is unlikely that the mandates of these two conventions are immediately related to gender inequality in education given the fact that the Torture Convention specifically focus on the problem of torture and the prevention of such crimes and the Genocide Convention war crimes against humanity. Further tests on the validity of the instruments are presented in Section 2.5, showing that our instruments meet well the requirements of the exclusion restriction and weak instruments tests.

[17] While article 2 and article 16 are fundamental for the convention, for example, the latter refers to domestic and marriage law.

[18] Cho (2014) used the UN Convention against Torture as well as the UN Convention against genocide as instruments for commitments to CEDAW.

We also tested several alternatives to these instruments, such as interaction terms between each of the three abovementioned UN Conventions and different components of Mosley and Uno's (2007) "basic collective" Labor Rights (LR) index. This indicator captures, e.g., the actual number of violations observed in the labor rights prescribed in the laws. The rationale behind this instrument is to measure actual enforcement of labor rights in a country. Thus, it captures countries that potentially ratify conventions without actually implementing the regulations.[19] This lack of enforcement in labor rights might overlap with countries that have not strictly implemented gender equality regulations yet and hence introduce greater heterogeneity into the set of countries in the instrument. However, none of these alternative interaction instruments between the UN treaties and different components of the LR Index turns out to be significant in the first stage. [20]

2.3.2 Descriptive Statistics - Trends in Female-Male Ratios in Education

We now turn to the evolution of female-male ratios in educational attainment over the last 40 years. We use the average number of years of total schooling, a widely used measure of a population's education level (Barro and Lee, 2013). This allows the aggregation of the average educational attainment across different education levels and therefore enables an analysis of a population's 'stock of human capital' at any given time. Figure 2.1 below shows the evolution of educational attainment for men vs. women across different world regions, over the last 40 years.

As we can see, there is generally a sharp upward trend in female-male schooling ratios towards parity across all regions. According to this graph, the Middle East and North African countries (MENA) clearly outperform all other regions by almost doubling their female-male ratios, whereas, Sub Saharan Africa, has a steady, continuous improvement at a slower pace.[21] However, the global average, which is of main interest for this analysis, clearly shows a rapid increase. Overall, women have registered a greater rate of growth than men, as women have increased their average years of schooling by 0.5 years more than men did during that period. Figure 2.2

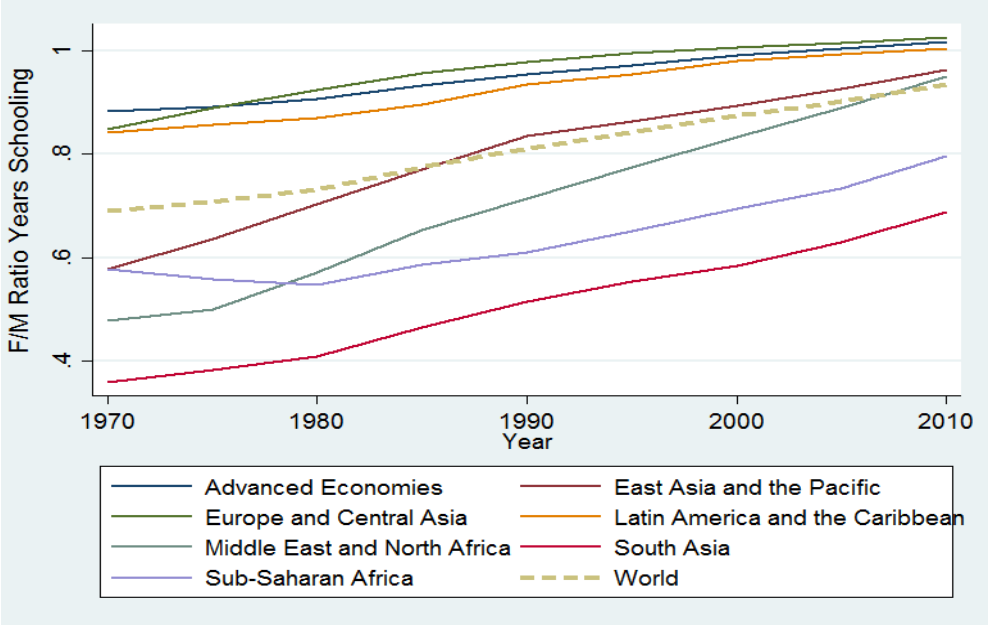
[19] This IV interaction term should be monotone increasing in the actual enforcement of labor's rights, i.e. better enforcement in labor's right should result in better CEDAW enforcement.

[20] We test the "practice component" which covers violations in labor rights in 37 different categories, as well as the law component if specific labor laws are in place in a country (Davis and Vadlamanati, 2013).

[21] Yet, one should notice that they start from very low levels of female-male ratios of schooling to begin with.

depicts that the world average of the female-male ratio in education was already on the rise before the CEDAW was put into place in 1979. We will further discuss these trends in the following sections.

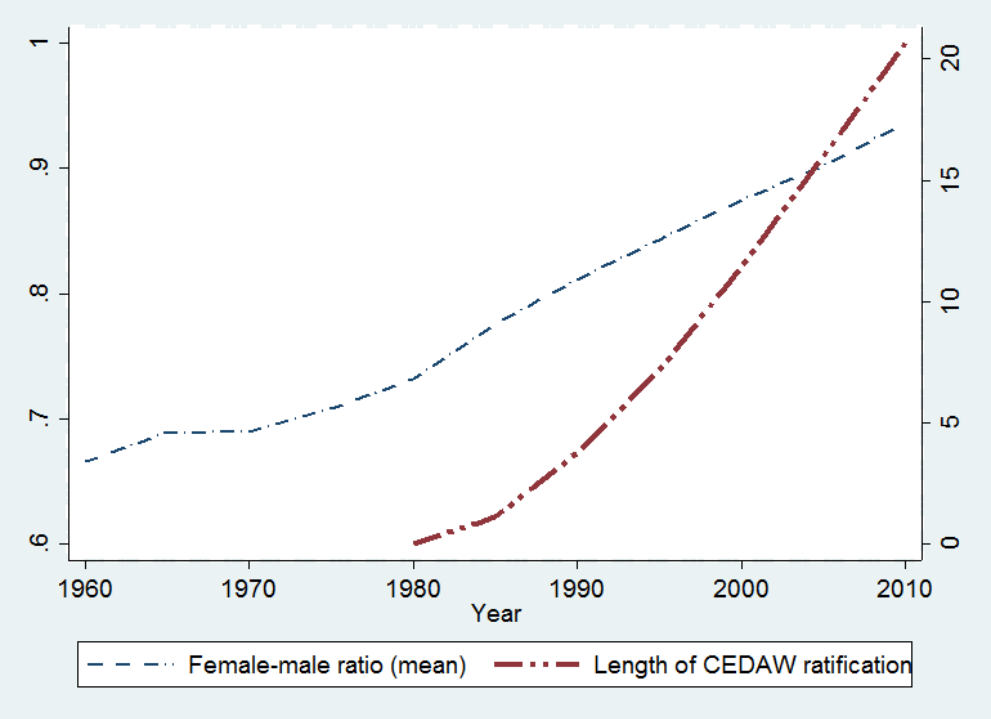
Figure 2.1 Trends in female-male ratios in average years of total schooling (by regions)



Source: Barro and Lee (2013), own calculations

Figure 2.2 Trends in CEDAW ratification and female-male ratios in average years of

total schooling, 1960-2010



Source: Barro and Lee (2013), own calculations

2.4 Methodology

In this section, we describe both the estimation specification and the strategy that deals with potential endogeneity problems.

2.4.1 Empirical Strategy

It turns out that the best panel specification to address our research question is to use a random effects model. We have run the regressions for fixed effects but specification tests (Hausman test) provide evidence in favor of the more efficient random effects estimator.[22] Moreover, pre-tests on panel unit roots (which are pertinent to apply before estimating random and fixed

[22] The Hausman test is applied to help in deciding between fixed and random effect estimators under the null hypothesis that the time-invariant part of the error terms are not correlated with the repressors. The p-value of 0.149 does not reject the null hypothesis and therefore, the more efficient random effects estimator has been chosen.

effects) suggest that the presence of unit roots in our panel can be rejected at a one percent significance level.[23] Thus, our baseline regression is estimated as follows[24]:

$$\Delta\, EducGap_{it} = \alpha_i + X'_{i(t-5)} + \Gamma'_{it} + \delta_t + \theta_R + \varepsilon_{it} \qquad (1)$$

Where $EducGap_{it}$ represents the "gap" in educational attainment, measured by the five years percent change in female-male ratios in the average years of schooling. [25]Our control variables are partly drawn from the existing growth literature (Knowles et al., 2002; Barro and Lee, 1991) and include the initial level of female-male ratios in education (in 1980) to reflect a country's stock of human capital and to test for a potential convergence effect. The latter is captured together with other time-invariant explanatory variables in the vector Γ'_{it}. Moreover, as an additional control variable, the change in years of schooling of males enters as a proxy for investments in human capital.[26] The intercept is measured by α_i, and ϵ_{it} are clustered standard errors at the country level.

The vector X'_i gradually introduces explanatory variables on the economic, political and formal/informal institution theories discussed above, which potentially explain our education gap, such as log(GDP), $\log(GDP)^2$, trade share, democracy, civil liberties, etc.

To mitigate concerns of endogeneity, we lag all of the time-varying explanatory variables by five years. Furthermore, regional dummies, Θ_R control for level differences and time- invariant, region-specific characteristics. δ_t is included in the model to capture macro shocks and absorb all time-specific variation that is common to all countries. Finally, to take into account region-specific time trends, $(t \times \Theta_R)$ represents a linear time trend for each region.[27]

[23] The Stata command xtunitroots fisher is chosen, as we have an unbalanced panel.

[24] As a further robustness check, we implement a Hausman-Taylor model which takes into account that some country-specific unobservable effects are potentially correlated with some explanatory variables (Green, 2012).

[25] This variable captures age cohorts 25-49.

[27] The following regions are included in the analysis: East Asia and the Pacific (EAP), South Asia (SA), Middle East and North Africa (MENA), Latin America and the Caribbean (LAC), Europe and Central Asia (ECA). The left out-category is Sub-Saharan Africa (SSA).

Turning to the second specification, we further introduce the CEDAW variable- our main variable of interest- for which we claim to establish a causal relationship:

$$\Delta\, EducGap_{it} = \alpha_i + \beta_0 Cedaw_{i(t-5)} + X'_{i(t-5)} + \Gamma'_{it} + \delta_t + \theta_R$$

$$+ \beta_1 (t \times \Theta_R) + \varepsilon_{it} \qquad (2)$$

The variable $CEDAW_{i\,(t-5)}$ indicates the duration of years since a country has ratified the CEDAW. This measure, the number of years after ratification, has been employed by other studies testing the impact on women's rights (Hafner-Burton & Tsutsui, 2005). Yet, possible drawbacks of this method are that we implicitly assume that ratification to the CEDAW increases linearly year by year, which may not be the case. Possibly, the effect comes into play several years after the ratification.[28] Therefore, we overcome this problem by lagging this variable by five years. This specification recognizes that there might be no immediate impact of signing the CEDAW on education outcomes, but, rather, the effect might happen with a certain delay due to bureaucratic, logistic or political procedures. In addition, the CEDAW variable is included with and without reservations to take into account variations on the quality of a country's ratification.[29] This is of specific concern in our case, since the majority of countries, especially in the MENA region (which shows rapid improvements in education), has placed reservations on their commitment to CEDAW.

2.4.2 Potential Sources of Endogeneity

We further assume that $Cov(CEDAW_{i(t-5)}, \epsilon_{it}) \neq 0$, which potentially results in an inconsistent estimator of β. There are various reasons for this assumption. For instance, it might be possible that high gender inequality in education induces women's movements to lobby or push for the CEDAW to be ratified in a country (Cov>0). Alternatively, countries with a higher level of women's education may be more likely to ratify the CEDAW convention because these countries can more easily meet the respective obligations (Cov<0). To measure an average causal treatment effect of CEDAW on our education gap, we exploit exogenous variation in CEDAW

[28] On the other hand, if the effect could be stronger right after ratification of the Convention due to increased public awareness.

[29] The CEDAW allows countries to place reservations on specific articles. An overview of countries which made reservations to article 2/16 (which include women's rights to education) can be found in the Appendix.

which is generated by commitment to three other human right treaties. This relationship is measured by estimating a linear regression of the endogenous regressor on the instrument:

$$CEDAW_{i\,(t-5)} = \pi_0 + \pi_1 Z_{i\,(t-5)} \quad (3)$$

The first stage in equation (3) includes CEDAW as the dependent variable, measured by duration (in years) since ratification of the CEDAW; Z reflects the instruments measured by the duration (in years) since ratification to the other three UN conventions. Then the outcome is regressed on the predicted value of our endogenous variable, CEDAW duration.

$$\Delta\, EducGap_{it} = \beta_0 + \beta_1 \widehat{Cedaw}_{i(t-5)} + X'_{i(t-5)} + \Gamma'_{i,t} + \delta_t + \theta_R + \beta_3(t \times \Theta_R) + \mu_{i,t} \quad (4)$$

A second source of endogeneity relates to the question of whether treaty ratification causes improvements in outcomes or whether the correlation between the CEDAW ratification and improved education outcomes is driven by a third omitted factor. For instance, omitted women's rights movements or advocacy groups in a country might push both, the CEDAW ratification and laws to improve female education outcomes at the same time.[30]

There might also be a concern about other omitted variables. For instance, in the course of a country's development, factors such as democratization, modernization and demographic changes could have affected gender equality outcomes and CEDAW commitment simultaneously. However, we try to capture these trends in our analysis by including a bunch of control variables, such as civil liberties or the democracy index of Freedom House (2014), to keep track of and adequately measure a country's democracy and modernization progress.

2.4.3 Monotonicity of the Instrument

Given heterogeneity across countries in the effect of CEDAW on education gaps, the identification of an average treatment effect requires monotonicity of the CEDAW variable with respect to the instrument (Angrist and Evans, 2004). However, it is very unlikely that countries who sign to UN treatments and would deny ratifying the CEDAW, as human rights issues are

[30] Finally, the endogeneity test after xtivreg rejects the null hypothesis that the CEDAW coefficient is exogenous with a p-value of 0.002 (Baum et al., 2003).

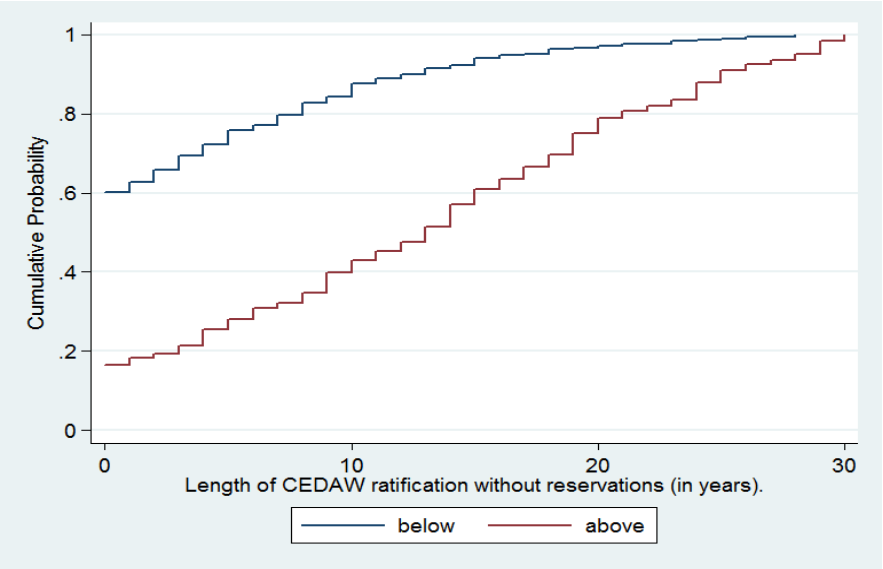
already on the agenda. More problematic are cases such as Saudi Arabia, a country which ratified the CEDAW under the condition of major reservations. However, given that it is difficult to imagine a considerable amount of *defiers* in our sample, we argue that our instrument satisfies the necessary monotonicity assumption.

To this end, we imply an informal test to show that our instrument is indeed monotone. According to Angrist and Imbens (1995), the cumulative density function (CDF) of the treatment when the instrument is "switched on" should lie below the CDF of the treatment if the instrument is "switched off". In other words, the CDF of the treatment if the instrument is switched on should first-order stochastically dominate the distribution of the treatment if the instrument is switched off.

As the ratification to the three UN treaties is not binary, we look at below and above the median of the duration in ratification to the UN commitments.

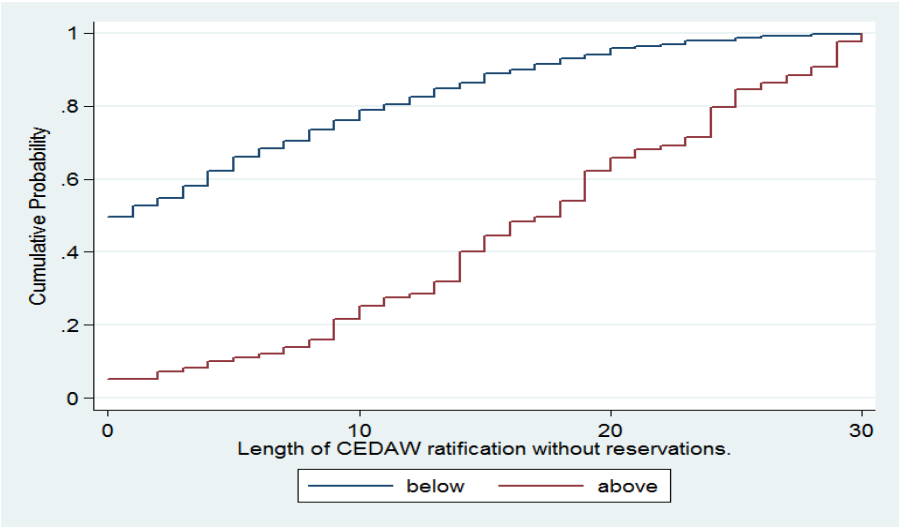
Both Figures in 2.3 and 2.4 suggest that the distribution of CEDAW ratification for countries which ratify UN treaties clearly dominates the CDF of those who did not ratify in our sample. Therefore, our instruments fulfill the required monotonicity assumption.

Figure 2.3 CDF's of CEDAW ratification for above and below median UN treaty ratification



Source: Author's calculation

Figure 2.4 CDF's of CEDAW ratification for top & bottom 25 Percent UN treaty ratification



Source: Author's calculation

2.5 Regression Results

2.5.1 Baseline Results

Before turning to the CEDAW variable, Table 2.1 presents our baseline results from the random effects model and demonstrates which factors are associated with the change in education outcomes.

We always control for a country's initial female-male ratio, the stock of human capital, civil liberties and fertility; at the same time we include gradually the factors of the various theories discussed earlier (in column 2-8) in order to test their influences on gender gaps in education outcomes. Hence, the last column (column 9) includes all variables from column (1)-(8).[31]

Economic Factors

Column (1) focuses on the hypothesis on economic development testing for non-linearities, and we can see that GDP per capita income enters convexly in the first column. The shape of this relationship basically indicates that, as income increases up to a level of about $5,671 per capita (PPP adjusted), there is no tendency of female education to increase faster than male education. After this threshold, however, there is a strong tendency to catch up. In other words, if a country moves from a lower-middle income economy to an upper-middle income economy (according to World Bank categories), we can see fast improvements in female-male ratios in education. This result differs from a study by Dollar and Gatti(1999) who estimated a lower threshold at around $2000. Yet, they used a different outcome measure- female with some secondary schooling attainment- which excludes people who achieved more than secondary education. There is a considerable number of developing countries in our sample with a growing share of males and females with more than secondary education. Thus, our measure is able to take into account these improvements which potentially results in a higher threshold.

Social Institutions

In column (4), we test the determinants of social institutions on our education gap, based on the hypothesis discussed above. Only the absence of inheritance rights seems to be positively associated with education outcomes. Recall that we take the proportion of a country's population with ancestors without inheritance rules for land and formal regulations. The absence of these discriminating juridical practices against women with regard to legal property and the distribution of land seems to be highly correlated with improvements in our education gap measure.

We test various other hypotheses on social institutions in Appendix Table 2A.5. For instance, the proportion of a country's ancestors with patrilocal post-marital in contrast to matrilocal residence rules as this might shape parents' decisions to invest in female education as outlined

[31] For the reader's convenience, we only show the coefficients of interest in Table 2.1. The full specifications are displayed in the Appendix starting from Table A 2.1.

above. However, the coefficient turns out to not be statistically significant. Also, family patterns do not seem to be correlated with our education outcome variables, as the coefficient of nuclear families vs. extended families is not statistically significant.

Turning to the control variables, the negative and statistically significant impact of the initial female-male ratio points to a convergence effect. Countries which start off at a lower level of their initial education gap tend to close their education gap faster than countries which have already higher gender equality in education at the very beginning. The proxy for investments in human capital, the change in male education, is negatively, but insignificantly correlated with our education gap measure in all specifications.

Surprisingly, other formal institutional variables added to the model as controls, such as the level of democracy and civil liberties, as well as fertility, are not significantly correlated with our outcome variable of interest.

Table 2.1 Baseline results (random effects model)

Dependent Variable: Female-male ratio in educational attainment

VARIABLES	**(1) Growth**	**(2) Structural Transformation**	**(3) Globalization**	**(4) Informal Institutions**
Lagged ln (GDP p.c)	-7.772**	-7.390*	-7.495*	-8.074**
	(3.318)	(4.010)	(3.995)	(3.847)
Lagged ln (GDP p.c)^2	0.441**	0.426**	0.436**	0.468**
	(0.190)	(0.215)	(0.215)	(0.208)
Lagged Agr. Sector value added (% of GDP)		-1.338	-1.432	-1.537
		(5.447)	(5.442)	(5.409)
Lagged Service sector value added (% of GDP)[1]		1.449	2.096	1.910
		(3.052)	(3.035)	(2.985)
Lagged Trade share (% of GDP)			-0.00687	-0.00557
			(0.00657)	(0.00633)
Absence of inheritance rights				1.927***
				(0.737)
Year FE, regional dummies included	Yes	Yes	Yes	Yes
Regional specific time trends included	Yes	Yes	Yes	Yes
Observations	536	536	536	536
Countries	98	98	98	98
R-squared	0.49	0.50	0.51	0.52

Table 2.1 continued: VARIABLES	(5) Conflict	(6) Religion	(7) Development Aid	(8) Women's Activism	(9) CEDAW
Protestant[2]		6.343**			
		(2.975)			
Hindu		0.517			
		(2.791)			
Muslim		-2.104			
		(1.745)			
Other Christian		-3.276			
		(2.650)			
Years of interstate conflict	-0.0763***				
	(0.0285)				
Lagged Net ODA share (% GDP)			0.00228		
			(0.0393)		
Women's CSO participation				-0.195	
				(0.481)	
Lagged CEDAW duration					0.223***
					(0.0644)
Year FE	Yes	Yes	Yes	Yes	Yes
Regional specific time trends included	Yes	Yes	Yes	Yes	Yes
Observations	536	536	466	508	536
Countries	98	98	89	93	98
R-squared	0.52	0.50	0.51	0.52	0.51

Dependent Variable: Female-male ratio in educational attainment. Clustered-robust standard errors at the country level in parentheses. ***p<0.01, ** p<0.05, * p<0.1. All time-varying independent variables are lagged by 5 years. [1]Base group: lagged industrial sector value added (% GDP). [2]Base-group religion: Catholics. Control variables included in all specifications: Absolute change in male education, lagged ln(fertility), initial female-male ratio in 1980, civil liberties, lagged ln(GDP p.c), lagged ln(GDP p.c)[2].

Column (6) adds variables on religious preferences and we find that only the coefficient of the share of Protestants in a country is positively associated with a faster closing of our female-male ratio.[32] In contrast, increases in years of interstate conflict are negatively correlated with improvements in our female-male ratio. Thus, the negative relationship found in several micro level studies reviewed above (Justino, 2011) is still visible at the aggregated level.

Moreover, our measures for development aid (column 7) and women's activism (column 8), i.e. the participation of women in civil society organizations, have no consistent relationship with the education outcome variable. This is actually surprising, given that various anecdotal and empirical micro level evidence points to improvements through women's activism and lobbyism (Weldon and Htun, 2013). Furthermore, years of civil conflict do not seem to be associated with the closing of the gap as well as political empowerment, measured by the share of females in parliament.

2.5.2 CEDAW Ratification

Finally, we turn to our main variable of interest in column (9), CEDAW, which depicts a strong positive association with the education gap with a five-year lag. A country's ratification is associated with a 0.202 percentage point increase in the change of the female-male ratio of total schooling, on average.

However, the positive effect of CEDAW vanishes for total schooling after we address the endogeneity concern, as discussed in depth in Section 2.3. After applying our instruments, the CAT Convention, the Convention against all Forms of Racism and the Convention against Genocide, the results in Table 2.3 show that the positive effect disappears for total schooling, as well secondary schooling in the second stage. Yet, the positive coefficient in the second column points to a weakly positive correlation (at a 10% significance level) between our education gap measure and cohorts with average years of primary schooling. By the fifth year, a CEDAW commitment accounts for a 0.18 percentage point increase in the female-male ratio. One potential explanation of this heterogeneity is that signing of CEDAW is more important for lower levels of education, since after passing a certain education threshold, other factors might become more important. For instance, the change in secondary and tertiary education might be dependent on labor market opportunities, family background or child care system in a country,

[32] Seguino (2003) suggests to control for degree of religiosity rather than the share in the population. However, the data he uses do not contain sufficient time periods to test for degree of religiosity.

which are not captured in our analysis. Similar to Cho (2014), we further test if the effect of commitments to CEDAW varies by other factors, such as the level of democracy. Yet, the interaction effects between democracy (or alternatively, the degree of civil liberties) and CEDAW commitment are not significant in our case (Appendix Table 2A.4). Anecdotal evidence also hints at other factors besides institutional quality, such as women's rights movements which are necessary preconditions to effectively push and advocate human rights norms in a specific country. However, we are constrained on testing the hypothesis on women's movements due to data availability in terms of sufficient time periods.

Regarding our instruments, we test for under-identification (weak instruments) using the Kleibergen and Paap (2006) test and over-identification (endogenous instruments) using Hansen's J-test (Hansen, 1982). The Kleibergen-Paap Wald F-statistic is in all cases >= 10, rejecting that our instruments are weak.[33] More specific, the F-statistic with 18.36 is above the Stock and Yogo critical value threshold of 13.91, meaning that the IV bias should be less than 5%. We also can't reject the null hypothesis that there is no over-identification for all three UN-treaties, indicating that our set of instruments is appropriate (Table 2.2).

Table 2.2 CEDAW ratification: Instrumental variable estimation-first stage

First Stage – Instruments	**(1) Total Schooling**	**(2) Primary Schooling**	**(3) Secondary Schooling**	**(4) Tertiary Schooling**
Lagged Torture Convention (CAT)	0.312*** (0.061)	0.278*** (0.0562)	0.313*** (0.0608)	0.307*** (0.0587)
Lagged Genocide Convention (GPPCG)	0.065*** (0.0132)	0.066*** (0.014)	0.065*** (0.012)	0.113*** (0.013)
Lagged Convention against all Forms of Racism	0.083*** (0.0245)	0.096*** (0.0244)	0.081*** (0.0231)	0.113*** (0.022)
Kleinbergen-Paap rk Wald F statistic (Weak instruments)	18.71	16.67	15.09	47.07
Sargan-Hansen J statistic, Overidentification test: p-value	0.657	0.128	0.254	0.535

[33] We use this test statistic since we implement robust clustered standard errors (Baum, Schaffer and Stillman ,2007).

Dep. Variable: lagged ratification of CEDAW (in years). Clustered robust standard errors at the country level in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All control variables and explanatory variables included as in Baseline, Table 10.

Table 2.3 CEDAW ratification: Instrumental variable estimation- second stage

VARIABLES	(1) **Total Education**	(2) **Primary Education**	(3) **Secondary Education**	(4) **Tertiary Education**
Lagged CEDAW duration	0.151	0.176*	0.0895	-0.260
	(0.110)	(0.106)	(0.211)	(0.341)
Lagged ln (GDP p.c.)	-7.649**	-7.755*	-2.526	9.074
	(3.739)	(4.326)	(8.098)	(11.00)
Lagged ln (GDP p.c.)^2	0.453**	0.457*	0.149	-0.422
	(0.207)	(0.241)	(0.441)	(0.645)
Lagged agr. sector value added (% of GDP)	-2.945	-0.663	7.112	0.305
	(4.465)	(4.816)	(8.643)	(9.576)
Lagged service sector value added (% of GDP)	1.248	3.366	-1.950	-5.757
	(3.178)	(3.783)	(5.817)	(8.186)
Years of interstate conflict	-0.0973***	-0.0720*	-0.0786	-0.236*
	(0.0333)	(0.0375)	(0.0698)	(0.131)
Protestant	5.587*	4.924	13.71**	19.03***
	(3.136)	(3.244)	(6.773)	(6.038)
Hindu	1.728	2.478	1.411	-10.30
	(3.130)	(2.285)	(6.551)	(7.392)
Muslim	-1.380	-1.103	0.340	-1.433
	(1.681)	(1.842)	(3.145)	(3.630)
Absence of inheritance rights	2.801***	3.071***	2.204	1.286
	(1.038)	(1.032)	(1.924)	(2.533)
Constant	40.51**	39.26**	17.64	-16.40
	(17.02)	(19.09)	(37.69)	(46.27)
Observations	536	536	536	536
Countries	98	98	98	98
R-squared	0.52	0.58	0.3	0.2

Dependent Variable: (1) Female-male ratio in educational attainment. : (2) Female-male ratio in primary educational attainment. (3) Female-male ratio in secondary educational attainment. Clustered-robust standard errors at the country level in parentheses. ***p<0.01, ** p<0.05, * p<0.1. All time-varying independent variables are lagged by 5 years. Base-group religion: Catholics. The following variables are included: Initial female-male ratio in 1980, lagged fertility, civil liberties, absolute change in male education, trade share.

We consider the estimated effects of CEDAW in the previous section as "local" in the sense that they are identifying the effect for a specific population of countries, i.e. those whose CEDAW ratification responds to UN treaties participation. More specific, the LATE measures a causal effect for the specific part of our sample whose treatment is shifted by the instrument, the *compliers* (according to Imbens and Angrist, 1994). In our context, this includes only countries whose CEDAW ratification changes with commitment to the three UN treaties discussed before.[34]

In the following, we systematically explore and rule out possible concerns which potentially violate a causal interpretation of our estimate β. These potential concerns can be categorized into three broad groups: 1) Omission of time trends 2) Endogenous timing of CEDAW ratification 3) Sample size and omitted variables. Each of these concerns will be addressed in the next subsections.

2.6 Robustness Check

2.6.1 Placebo Test: Omission of Time Trends?

We also address a concern raised by Chilton (2016) that improvements in human rights outcomes have simply coincided with the adoption of human rights treaties, rather than caused it. It has been criticized that past literature overlooked the long-running rends hat human rights had already improved long before the treaty regimes were put into place. They argue that the positive correlation that has been found in various studies between treaty ratification and human rights outcomes (e.g. Simmons, 2004, 2009) has actually little to do with the fact that a country ratified a given treaty. We thereby follow Chilton (2016), who shows via running several placebo tests that the positive effect of the CEDAW ratification on the Gender Equality Index

[34] In contrast, we might have countries who will sign to CEDAW regardless of their participation in UN treaties (*always takers*) and countries who will not sign to CEDAW regardless of their UN treaty participation (*never takers*). Thus, we cannot claim to draw any conclusions of the impact of CEDAW on education gaps for those countries.

(GEI) persists in the majority of simulations, despite the ratification years being randomly generated.[35]

We apply these placebo tests to our specification, by randomly assigning the duration of years since the CEDAW was ratified and repeated the regression specification 1,000 times.

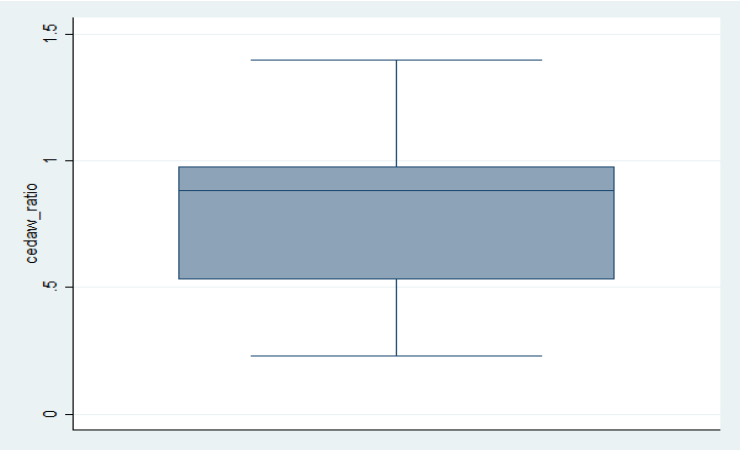
In contrast to the study of Chilton (2016) mentioned above, our coefficients are statistically different from zero in less than 5% of the simulations (see Appendix, Figure 2A.1). Thus, the results suggest that our model specification does not suffer from any biases due to the omission of time trends.

2.6.2 Is the timing of CEDAW ratification endogenous?

A further concern is the potential endogenous timing of the CEDAW ratification. We address the potential issue that governments' decisions to sign are a result of already improved female education outcomes rather than a consequence. Figure 2.5 shows that there is an almost equal proportion of countries with high and low female-male ratios in education in the year in which the country ratified the CEDAW. The female-male education ratio is less than 88% for half of the sample. This contradicts the argument of endogeneity of timing of the CEDAW ratification because not only countries who have already achieved high female-male ratios ratified the CEDAW.

Figure 2.5 Female-male ratios in education in the year of the CEDAW ratification

[35] For instance, if a country ratified the CEDAW in 1999, our test would suggest a positive, significant relationship regardless of the country being coded as having committed to CEDAW on 1981, 2005 or any other time.



2.6.3 Robustness to Sample Size and further Controls

We undertake several re-estimations of the baseline regression using different sample sizes and additional controls to mitigate concerns on omitted factors in random effect models.

First, regions which already started with a considerably high level of equality in education levels, such as the Latin American countries and Europe and Central Asia, are excluded from the analysis.[36] Second, we include additional control variables such as a government's expenditure on education, as well as oil rents. The latter should partly account for specific dynamics in the MENA region. Various studies have shown that in some cases, wealth generated by oil rents has weakened institutions which could in turn affect gender equality outcomes. The results in Appendix Table 2A.8, column (1) display that, interestingly, including a government's expenditure on education lowers the magnitude of our CEDAW variable. Possibly, governments who ratified the CEDAW show their commitment by spending a higher share of public financing on education which points to a potential channel. Overall, the results of the subsections above confirm that our findings are robust in terms of significance and direction of the effect against a variety of robustness checks.

[36] Regression results are available upon request.

2.7 Limitations of the Study

Before turning to the implications of the regression results, we will discuss several limitations of this analysis.

First, we acknowledge that we do not account for several possibly influential factors, such as national strategies and programs towards female education, since we are constrained by data availability. Various national policies such as cash transfer programs and other school programs are implemented on a large scale in many regions of the world to improve girls' schooling (Klasen, 2016). Second, we cannot draw any conclusions on the pathways through which CEDAW is improving primary educational attainment of women. This would be interesting work for future research. Other studies conducted on human rights outcomes mention possible channels such as increased public expenditures (governmental supply side), or increased awareness and change in the behavior of local communities; or increased pressure of the international community (Gray, Kittison, 2013). We expect that global pressures on governments may be one of the primary factors related to the magnitude and success of domestic efforts to reduce education inequalities.

Third, a further concern is that we look at education outcomes rather than improvements in access to education. For instance, a study by Simmons (2004) finds that enrollment rates improve after CEDAW ratification for primary education and tertiary education. Possibly, a high number of drop-out rates in schooling might explain that the significant increase in enrollment rates does not translate into higher years of secondary or tertiary education in our analysis. Lastly, an alternative explanation of our insignificant result is that we only pick up the effect of habitual convention signers due to the selection of our instrument.[37] Finally, we also cannot make any predictions if this positive trend in education will be persistent in the future, as one might expect a possible male backlash as for example in the US.

2.8 Conclusion

The goal of this paper is to provide empirical results on the recent closing of the gender gap in education, particularly for developing countries. Secondly, we specifically focus on the role of international policies targeting inequality in education, namely the CEDAW, where we attempt to establish a causal link with our education gap outcome variable. While doing so, we addressed

[37] However, we lack again sufficient data to test this hypothesis.

methodological issues, raised in recent literature on the effects of international human rights treaties.

Overall, the findings of this panel analysis suggest that economic growth, religion (the share of Protestants in a country), social institutions in terms of absence of inheritance rights, as well as fewer years of interstate conflict are associated with rapid improvements in female education outcomes over the last 30 years. With respect to economic growth, our results suggest that there is little tendency for countries to improve their education gap unless they move from low-income to middle-income economies, which is associated with a faster closing of the gap. Hence, policies that promote growth in per capita income will generally lead to higher gender equality in education (despite evidence in literature that growth alone is not sufficient to improve gender gaps in general (Bertocci, 2013; Duflo, 2012). Moreover, other factors that we tested, such as formal institutions in terms of civil liberties and degree of democracy, show no association with convergence in education outcomes between males and females.

Methodologically, the analysis confirms the importance of controlling for potential endogeneity due to omitted variable bias. The baseline results suggest that education gaps, on average, improved when a country's government ratified the CEDAW and a placebo test confirms that these positive findings are not driven by the omission of time trends. However, the statistically significant effect of the CEDAW does not hold for total schooling after correcting for endogeneity through IV-estimation. Yet, we do find that female-male ratios in primary education improve by 0.18 percentage points after five years of CEDAW ratification. This result suggests that an international legal commitment does motivate a government's efforts towards primary educational achievement for women.

2.9 Appendix

Table 2A.1 Descriptive statistics

Variables	Mean	Std. Dev.	Min.	Max.
CEDAW				
CEDAW duration	10.875	8.978	0	30
CEDAW duration (with reservations)	7.763	9.152	0	30
Instruments				
Genocide duration (years)	22.717	21.043	0	61
CAT duration (years)	5.962	7.189	0	24
Convention against Racism				
Dependent Variables:				
Change in female-male ratio in education: (total schooling)	6.205	7.832	-15.867	39.511
Primary education	5.291	7.937	-18.236	41.761
Secondary education	7.745	11.604	-23.886	83.523
Tertiary education	13.81	16.263	-16.696	98.38
Economic factors				
ln (GDP p.c.)	8.305	1.090	5.909	11.648
ln (GDP p.c.)^2	70.161	18.435	34.916	135.678
Agric. sector value added (% GDP)	0.171	0.136	0.0004	0.7002
Industrial sector value added (% GDP)	0.316	0.118	0.081	0.785
Service sector value added	0.513	0.115	0.101	0.811
Trade share (% GDP)	79.711	46.745	12.678	372.099
Initial female-male ratio	0.688	0.275	0.168	1.426
Change in male education	0.497	0.447	-.942	2.264
ln (fertility)	1.202	0.497	0.073	2.114
Oil rents (% GDP)	10.635	20.831	0	78.931
Total education expenditures (%GDP)	4.261	1.849	1.004	14.79
Political factors				
Civil liberties	3.905	1.589	1	7
Democracy index	5.603	3.031	0	10
Social institutions				
Absence of inheritance rights	0.168	0.293	0	0.999
Nuclear families	0.293	0.343	0	1
Patrilocal society	0.744	0.348	0	1

Plow	0.479	0.458	0	1
Religion				
Protestant	0.080	0.104	0	0.493
Hindu	0.019	0.089	0	0.771
Muslim	0.258	0.351	0	0.991
Catholic	0.290	0.334	0	0.943
Other Christian	0.100	0.133	0	0.634
Conflict				
Years of civil conflict	8.576	16.187	0	105
Years of interstate conflict	3.496	5.914	0	35
Development Aid				
Net ODA share (% GDP)	6.703	10.612	-0.186	127.280
Net ODA share (% Government expenditure)	28.499	56.636	-0.973	522.703
Women's activism				
Women's CSO participation	0.928	0.931	-2.079	2.79
Share of women in parliament	13.18	8.800	0	56.3
N	498			

Table 2A.2 Data Sources and Description

Variable	Explanation	Source
CEDAW duration in years	Duration of CEDAW ratification in years	United Nations Treaty Collection http://treaties.un.org//
Genocide duration (years)	Duration of Genocide ratification in years	United Nations Treaty Collection http://treaties.un.org//
CAT duration (years)	Duration of CAT ratification in years	United Nations Treaty Collection http://treaties.un.org//
Convention against all Forms of Racism	Duration of ratification to the Convention against all Forms of Racism(in years)	United Nations Treaty Collection http://treaties.un.org//
CEDAW duration (with reservations)	Commitments to the CEDAW: time after ratification in years, signed with reservations	United Nations Treaty Collection http://treaties.un.org//
Change in female-male ratio in education	Percent change in a country's female-male ratio *100	Barro and Lee(2013)
Ln (GDP p.c)	Log of per capita GDP in constant prices (US$, PPP, base year:2005)	Penn World Tables(2017, Version 8.1)
Ln (GDP p.c)^2	Log of per capita GDP in constant prices (US$, PPP, base year:2005) squared	Penn World Tables(2017, Version 8.1)
Agric. sector value added (% GDP)	Agric. sector valued added divided by total value added (% GDP)	United Nation Statistics Database(2017)
Industrial sector value added (% GDP)	Industrial Sector valued added divided by total value added (% GDP)	United Nation Statistics Database(2017)
Service sector value added (% GDP)	Service sector valued added divided by total value added (% GDP)	United Nation Statistics Database(2017)
Trade openness (% GDP)	% of the sum of exports and imports in GDP	World Development Indicators(2007)

Initial female-male ratio	Initial level of a country's female-male ratio in 1980	Barro and Lee(2013)
Change in male education	Percent change in male education of cohorts 25-49 years	Barro and Lee(2013)
Ln (fertility)	Log of total fertility rate (births per woman)	World Development Indicators(2007)
Civil liberties	Civil liberties. Scored: 1=most free and 7=least free	Freedom House(2015)
Democracy index	Combined democracy measure. Scored: 1=least free and 10=most free	Freedom House(2015)
Absence of inheritance rights	Share of country's population with ancestral absence of inheritance rights of real property (land).	Alesina et al.(2013)
Nuclear family structure	Share of a country's population with ancestral nuclear family structure	Alesina et al.(2013)
Extended family structure	Share of a country's population with ancestral extended family structure	Alesina et al.(2013)
Patrilocal societies	Share of a country's population with ancestral patrilocal societal structures. Equals 1 if patrilocal society.	Alesina et al.(2013)
Matrilocal societies	Share of a country's population with ancestral matrilocal societal structures. Equals 1 if matrilocal society.	Alesina et al.(2013)
Plow	Share of a country's population with ancestors that practiced plow agriculture.	Alesina et al.(2013)
Religious share in 1980:		
Protestant	% of share of Protestants in total population	La Porta et al.(1999)
Hindu	% of share of Hindu in total population	La Porta et al.(1999)
Muslim	% of share of Muslim in total population	La Porta et al.(1999)
Catholic	% of share of Hindu in total population	La Porta et al.(1999)
Other Christian	% of share of other Christians in total population	La Porta et al.(1999)
Years of civil conflict	Number of years a country was involved in civil conflict. Original source: Correlates of War Database Version 4	Correlates of War database
Years of interstate conflict	Number of years a country was involved in interstate conflict. Original source: Correlates of War Database version 4.	Correlates of War database
Net ODA share (% GDP)	Net ODA received by country (% of GNI)	World Development Indicators(2007)
Net ODA share (% Government expenditure)	Net ODA received as % of central government expense	World Development Indicators(2007)

Share of women in parliament	Proportion of seats held by women in national parliaments (%)	World Development Indicators(2007)
Women's CSO participation	Question: Are women prevented from participating in civil society organizations (CSOs)? Ranked as: 0: Almost always 1: Frequently. 2: About half the time. 3: Rarely. 4: Almost never.	Variety of democracy(2015)
Collective Labor rights , law elements	Standardized values of collective labor rights. Higher values (0-7), more violations.	Collective Labor Rights dataset

Table 2A.3 Full-sample - Baseline results of the random effects model investigating female-male ratios in educational attainment (1980-2010)

VARIABLES	(1) Growth	(2) Structural Transformation	(3) Globalization	(4) Informal Institutions
Lagged ln (GDP p.c)	-7.772**	-7.390*	-7.495*	-8.074**
	(3.318)	(4.010)	(3.995)	(3.847)
Lagged ln (GDP p.c)^2	0.441**	0.426**	0.436**	0.468**
	(0.190)	(0.215)	(0.215)	(0.208)
Lagged agr. sector value added (% of GDP)		-1.338	-1.432	-1.537
		(5.447)	(5.442)	(5.409)
Lagged service sector value added (% of GDP)		1.449	2.096	1.910
		(3.052)	(3.035)	(2.985)
Lagged trade share (% of GDP)			-0.00687	-0.00557
			(0.00657)	(0.00633)
Absence of inheritance rights				1.927***
				(0.737)
Initial female-male ratio 1980	-13.50***	-13.47***	-13.28***	-13.79***
	(2.029)	(2.073)	(2.075)	(2.162)
Absolute change in male education	-1.158	-1.118	-1.100	-1.047
	(0.811)	(0.848)	(0.835)	(0.837)
Civil Liberties (Freedom House)	0.299	0.238	0.249	0.192
	(0.208)	(0.217)	(0.218)	(0.223)
Lagged ln (fertility)	1.592	1.462	1.492	1.208
	(1.415)	(1.428)	(1.445)	(1.394)
Year FE	Yes	Yes	Yes	Yes
Regional specific time trends included	Yes	Yes	Yes	Yes
Observations	536	536	536	536
Countries	98	98	98	98
R-squared	0.49	0.50	0.51	0.52

Table A 2.3. continued:	(5)	(6)	(7)	(8)
VARIABLES	Conflict	Religion	Development Aid	Women`s Activism
Lagged ln (GDP p.c)	-8.427**	-5.909	-10.92**	-9.541**
	(4.024)	(3.837)	(4.907)	(4.798)
Lagged ln (GDP p.c)^2	0.506**	0.340*	0.660**	0.568**
	(0.214)	(0.206)	(0.275)	(0.271)
Protestant		6.343**	6.390*	6.143**
		(2.975)	(3.539)	(3.080)
Hindu		0.517	-0.875	0.109
		(2.791)	(2.693)	(2.923)
Muslim		-2.104	-2.537	-2.181
		(1.745)	(1.806)	(1.824)
Other Christian		-3.276	-5.912	-3.425
		(2.650)	(3.847)	(2.622)
Initial female-male ratio	-13.52***	-13.91***	-13.67***	-13.42***
	(1.838)	(2.193)	(2.178)	(2.036)
Civil Liberties	0.313	0.377*	0.260	0.369*
	(0.217)	(0.225)	(0.258)	(0.208)
Years of interstate conflict	-0.0763***		-0.0815*	-0.0531*
	(0.0285)		(0.0421)	(0.0290)
Lagged Net ODA share (% GDP)			0.00228	
			(0.0393)	
Women‘s CSO participation				-0.195
				(0.481)
Constant	40.89**	34.56*	64.94***	49.13**
	(19.80)	(19.92)	(19.92)	(19.92)
Year FE	Yes	Yes	Yes	Yes
Regional specific time trends	Yes	Yes	Yes	Yes
Observations	536	536	466	508
Countries	98	98	89	93
R-squared	0.52	0.50	0.51	0.52

Dependent Variable: Female-male ratio in educational attainment. Clustered-robust standard errors at the country level in parentheses. ***p<0.01, ** p<0.05, * p<0.1. All time-varying independent variables are lagged by 5 years. Base-group religion: Catholics. Controls included: Absolute Change in male education, lagged ln(fertility), lagged agric. sector value added (% of GDP), lagged service sector, sector value added (% of GDP), lagged ind. sector value added (% of GDP).

Table 2A.4 CEDAW specifications, random effects model /with reservations /second stage

VARIABLES	(9) Full Sample CEDAW	(10) CEDAW with Reservations	(11) Second Stage Primary Education
Lagged CEDAW duration	0.223***	0.103*	0.168*
	(0.0644)	(0.0560)	(0.101)
Ln (GDP p.c.)	-8.258**	-6.563*	-7.620
	(3.796)	(3.900)	(4.756)
Ln (GDP p.c.)^2	0.495**	0.383*	0.448*
	(0.207)	(0.210)	(0.263)
Lagged agr. sector value added (% of GDP)	-3.088	-3.140	-0.512
	(4.473)	(4.758)	(5.047)
Lagged service sector value added (% of GDP)	1.285	-0.259	3.428
	(3.133)	(3.240)	(3.714)
Initial female-male ratio	-14.85***	-14.88***	-14.79***
	(2.207)	(2.345)	(2.267)
Trade share	-0.00538	-0.00803	-.0028
	(0.00627)	(0.00679)	(0.0066)
Civil liberties	0.326	0.211	0.407
	(0.217)	(0.235)	(0.231)
Lagged log(fertility)	2.218	1.006	2.180
	(1.487)	(1.464)	(1.574)
Male change in education	-0.841	-0.0270	-0.432
	(0.813)	(0.833)	(0.767)
Years of interstate conflict	-0.110***	-0.0708**	-0.0389*
	(0.0314)	(0.0302)	(0. 028)
Protestant	5.224	7.512**	4.430
	(3.223)	(3.656)	(3.170)
Hindu	2.527	0.363	2.007
	(2.954)	(3.005)	(2.082)
Muslim	-1.125	-1.129	-0.930
	(1.679)	(1.881)	(1.980)
Other Christian	-0.0401	-4.290	-1.320
	(2.731)	(4.037)	(2.723)
Absence of inheritance rights	2.968***	2.918***	3.019***
	(1.028)	(1.076)	(0.9629)
Constant	41.81**	31.25**	37.66*
	(17.63)	(15.39)	(20.67)
Year FE included	Yes	Yes	Yes
Regional specific time trends included	Yes	Yes	Yes
Observations	536	536	536
Number of id	98	98	98
Adj. R-squared	0.52	0.52	0.52

Dependent Variable: Female-male ratio in educational attainment. Clustered-robust standard errors at the country level in parentheses. ***p<0.01, ** p<0.05, * p<0.1. All time varying independent variables are lagged by 5 years. [1]Base group: lagged industrial sector value added (% GDP). [2]Base-group religion: Catholics. Control variables included in all specifications: Absolute change in male education, lagged ln(fertility), initial female-male ratio in 1980, civil liberties.

Table 2A.5 Testing alternative indicators on the informal institution and conflict hypothesis, 1980-2010

VARIABLES	(1) Informal Institutions	(2) Informal Institutions	(3) Informal Institutions	(4) Conflict
Patrilocal societies	-0.102			
	(0.726)			
Nuclear family		-0.889		
		(0.904)		
Plow			-1.405	
			(1.240)	
Years of civil conflict				-0.00137
				(0.0108)
Lagged ln (GDP p.c)	-7.415*	-7.221*	-7.394**	-7.465*
	(3.816)	(3.906)	(3.749)	(3.914)
Lagged ln (GDP p.c)2	0.425**	0.412**	0.419**	0.427**
	(0.205)	(0.210)	(0.200)	(0.211)
East Asia and the Pacific	0.277	0.700	1.085	0.313
	(1.308)	(1.346)	(1.474)	(1.283)
Europe and Central Asia	0.777	0.926	1.487	0.772
	(1.576)	(1.580)	(1.741)	(1.592)
Latin America and the Caribbean	-0.452	-0.0211	-0.623	-0.410
	(0.920)	(0.997)	(0.920)	(0.914)
Middle East and North Africa	2.565**	3.041**	3.630**	2.570**
	(1.301)	(1.433)	(1.599)	(1.297)
Sub-Saharan Africa	0.629	0.961	1.697	0.628
	(2.142)	(2.198)	(2.332)	(2.151)
Constant	43.51**	42.69**	44.16**	43.78**
	(18.00)	(18.40)	(17.86)	(18.37)
Year FE included	YES	YES	YES	YES
Regional specific time trends included	YES	YES	YES	YES
Observations	536	536	536	536
Number of id	98	98	98	98
R-squared	0.49	0.49	0.50	0.51

Robust clustered standard errors in parentheses ***. p<0.01, ** p<0.05, * p<0.1. The following control variables are included: Initial female-male ratio in 1980, lagged fertility, civil liberties, absolute change in male education, lagged agricultural/industry/service sector value added (% GDP).

Table 2A.5 Continued: Alternative factors tested, 1980-2010

VARIABLES	(5) Development Aid	(6) CEDAW with Reservations	(7) Women's political empowerment
Net ODA share (government expenditures)	0.00744		
	(0.0111)		
CEDAW duration with reservations		0.100***	
		(0.0364)	
Women's share in parliament			0.0233
			(0.0293)
Lagged ln (GDP p.c.)	14.43	-8.143**	-12.31***
	(9.817)	(3.939)	(3.573)
Lagged ln (GDP p.c.)^2	-0.882	0.469**	0.707***
	(0.607)	(0.212)	(0.203)
East Asia and the Pacific	-0.893	0.277	-0.381
	(1.264)	(1.243)	(1.265)
Europe and Central Asia	-2.785*	0.249	-1.127
	(1.448)	(1.498)	(1.487)
Latin America and the Caribbean	-1.200	-0.658	-0.550
	(0.876)	(0.912)	(1.201)
Middle East and North Africa	1.293	2.889**	2.058
	(1.670)	(1.330)	(1.488)
Sub-Saharan Africa	-2.387*	1.016	0.151
	(1.316)	(2.192)	(1.748)
Constant	-44.23	45.78**	62.15***
	(38.31)	(18.38)	(15.31)
Year FE included	YES	YES	YES
Regional specific time trends included	YES	YES	YES
Observations	191	536	330
Number of id	76	98	97
Adj. R-squared	0.47	0.50	0.53

Robust clustered standard errors in parentheses ***. p<0.01, ** p<0.05, * p<0.1. The following control variables are included: Initial female-male ratio in 1980, lagged fertility, civil liberties, absolute change in male education, lagged agricultural/industry/service sector value added (% GDP).

Table 2A.6 Instrumental variable approach (2SLS) -Interaction effects between the Democracy Index (Civil liberties) and CEDAW ratification, 1980-2010

	(1)	(2)	(3)	(4)	(5)
		Civil liberties		Democracy Index	
VARIABLES	Total education	Primary education	Secondary Education	Total education	Primary education
Civil liberties*CEDAW	0.0919	0.0504	0.115		
	(0.0936)	(0.0876)	(0.190)		
Democracy Index*CEDAW				-0.0210	-0.0133
				(0.0531)	(0.0512)
CEDAW duration (years)	-0.109	0.0219	-0.0742	0.260	0.210
	(0.339)	(0.306)	(0.665)	(0.364)	(0.358)
Civil liberties	-0.453	-0.00714	-0.953		
	(0.809)	(0.790)	(1.489)		
Democracy Index	-0.112	-0.166			
	(0.299)	(0.301)			
Ln (GDP p.c.)	-13.49***	-12.58***	-13.20	-11.80***	-10.89**
	(4.239)	(4.531)	(8.646)	(4.213)	(4.955)
Ln (GDP p.c.)^2	0.783***	0.717***	0.771	0.645***	0.583**
	(0.244)	(0.257)	(0.512)	(0.238)	(0.280)
Constant	68.06***	62.76***	64.99*	66.30***	61.42***
	(18.63)	(20.12)	(36.66)	(18.80)	(22.40)
Year FE included	Yes	Yes	Yes	Yes	Yes
Regional specific time trends included	Yes	Yes	Yes	Yes	Yes
Observations	536	536	536	511	511
Countries	98	98	98	94	94
R-squared	0.52	0.56	0.53	0.29	0.28

The following control variables are included: Initial female-male ratio, absolute change in male education, years of interstate conflict, plow, absence of inheritance rights, agricultural/industrial/service sector/value added (% GDP), robust clustered standard errors at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Figure 2A.1 Robustness checks for testing CEDAW: Time trend

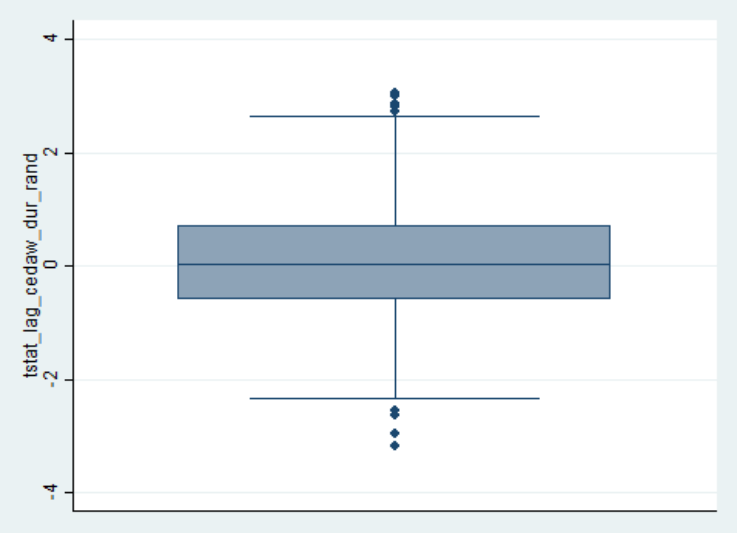


Table 2A.7 Further controls added, oil rents and public expenditures on education

VARIABLES	(1) **Second Stage** Primary Education	(2) **Second Stage** Primary Education
Lagged CEDAW duration	0.164*	0.182*
	(0.0943)	(0.0945)
Total government expend. on education (% GDP)	-0.0984	
	(0.106)	
Oil rents (% GDP)		0.119***
		(0.0339)
Ln (GDP p.c.)	-11.62**	-10.37**
	(5.119)	(4.837)
Ln (GDP p.c.)^2	0.614**	0.543**
	(0.282)	(0.266)
Initial female-male ratio	-14.58***	-14.76***
	(2.316)	(1.842)
Years of interstate conflict	-0.0463	-0.0520*
	(0.0288)	(0.0281)
Constant	66.25***	53.91**
	(22.62)	(21.80)
Year FE included	Yes	Yes
Regional specific time trends included	Yes	Yes
Observations	528	534
Countries	95	98
R-squared	0.58	0.59

Dependent Variable: Female-male ratio in primary educational attainment. Clustered-robust standard errors at the country level in parentheses. ***p<0.01, ** p<0.05, * p<0.1. All time-varying independent variables are lagged by 5 years. [1]Base group: lagged industrial sector value added (% GDP).[2] Base-group religion: Catholics. Control variables included.in all specifications: Absolute change in male education, lagged ln(fertility), initial female-male ratio in 1980, civil liberties. All explanatory variables from baseline, Table C4 (9) included.

Table 2A.8 Countries under study

East Asia and the Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Cambodia	Albania	Argentina	Cyprus	Bangladesh	Benin
China	Armenia	Bolivia	Egypt	India	Botswana
Indonesia	Bulgaria	Brazil	Iran	Nepal	Burundi
Laos	Croatia	Chile	Iraq	Pakistan	Cameroon
Malaysia	Czech Republic	Colombia	Israel	Sri Lanka	Central African Republic
Mongolia	Estonia	Costa Rica	Jordan		Congo
Philippines	Hungary	Dominican Republic	Morocco		Gambia
South Korea	Kazakhstan	Ecuador	Qatar		Ghana
Thailand	Kyrgyzstan	El Salvador	Saudi Arabia		Ivory Coast
Vietnam	Latvia	Guatemala	Syria		Kenya
	Lithuania	Honduras	Tunisia		Lesotho
	Moldova	Jamaica			Liberia
	Poland	Mexico			Malawi
	Russia	Panama			Mauritania
	Slovakia	Paraguay			Mozambique
	Slovakia	Peru			Namibia
	Slovenia	Trinidad and Tobago			Niger
	Tajikistan	Uruguay			Rwanda
	Ukraine	Venezuela			Senegal
					Sierra Leone
					South Africa
					Sudan
					Swaziland
					Tanzania
					Togo
					Uganda
					Zambia
					Zimbabwe

Table 2A.9 United Nations human rights treaties used as instrumental variables

United Nations human rights treaty	Date opened
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (Torture Convention, CAT 1984)	10/12/1984
Convention on the Prevention and Punishment of the Crime of Genocide (Genocide Convention, GPPCG 1948).	9/12/1948
Convention against all Forms of Racism	7/03/1966

Table 2A.10 Countries with reservations to article 2 and/or 16 (including women's rights to education)

Algeria	Egypt	Jamaica	Malta
Bahrain	India	Jordan	Mauritania
Bangladesh	Iraq	Kuwait	Morocco
South Korea	Israel	Malaysia	Niger
Syria	Tunisia	Maldives	Qatar
		United Arab Emirates	Singapore

3 The Impact of Refugees on Female Labor Market Outcomes and Welfare among the Host Population in Uganda

Abstract[38]

This study explores the effect of refugee intensity based on refugee inflows on local female employment outcomes and subsequent effects on the host populations' welfare and social cohesion in Uganda. We exploit a natural experiment of three sudden Congolese refugee inflows and use a difference-in-difference estimation to investigate the causal impact of sudden refugee inflows on different types of female employment among the host population and on the host population's social fabric.

Using a repeated cross-section (pre- and post-treatment) of DHS data covering the years 2001-2011, we find that higher exposure to the treatment variable (greater refugee inflows) increases the probability that Ugandan women are working by 0.02 percentage points. The results differ by type of employment. A higher refugee intensity results in a higher likelihood of women being engaged in agricultural self-employment and a lower probability of being engaged in agricultural work for the family. We also find that higher refugee intensity has a positive impact on household wealth and a beneficial effect on undernutrition indicators of children below the age of five.

We interpret these findings as improved labor market opportunities for Ugandan women created by the sudden refugee inflows, which translates into positive average welfare effects for the host population. Using three different dimensions of social cohesion and Afrobarometer data covering the years 2000-2012, we find that higher refugee intensity is associated with an increased perception of equality among the host population and slightly higher levels of adherence to the Ugandan nationality. We neither find an effect on institutional nor on interpersonal trust levels.

3.1 Introduction

The number of people forced to leave their home has reached an unprecedented height of almost 70 million people worldwide (UNHCR, 2018a). Those that had to cross borders were mostly received by neighboring low and middle-income countries that themselves face scarce resources and development challenges (UNHCR, 2018b). As the number of protracted refugee situations- those that last longer than five years- increases over the past decades, this puts an additional

[38] This is joint work with Jana Kuhnt and Ramona Rischke.

strain on host countries. Often host populations' support reduces over time, leading to social conflict and potential violence (e.g., International Crisis Group, 2018; Sarzin, 2017).

While Ugandans themselves have sought refuge in neighboring states during the country's recent history of civil war, Uganda has also been receiving displaced populations over several decades from around 13 countries, including the Democratic Republic of Congo (DRC), Somalia, South Sudan, Rwanda and Burundi (World Bank, 2016). Building upon the so-called self-reliance strategy from 1999, the Refugee Act from 2006-09 gave the refugees relative freedom of movement, equal access to primary education, healthcare, and other basic social services, and the right to work and own a business. In spite of their freedom to settle outside of designated areas, the majority of refugees choose to stay in refugee settlements in order to receive UNHCR assistance. In these settlements (rather than camps), until recently[39], they were allocated pieces of agricultural land and materials to put up shelters and grow food. The aim of this strategy was to promote self-reliance and overcome their dependence on humanitarian aid (World Bank report, 2016). Uganda has been praised by the international community for its progressive refugee policy (UNHCR, 2018; Meyer, 2006). The settlements are neither socially nor economically isolated areas. There is intensive and frequent interaction between different refugee groups as well as with the host population, who are often neighbors and use the same public services, such as hospitals and schools (e.g. Betts, Bloom, J. Kaplan, et al., 2014).

The focus of this study is a refugee influx from the DRC starting in the aftermath of the Second Congo War, one of Africa's deadliest conflicts in recent history (UN, 2015). Unexpected by the local and international institutions, more than 100,000 refugees from DRC arrived in Uganda in the years following the official peace agreement in summer 2003 (Kreibaum, 2016). They were mainly sent to three camps located in the Southwest of Uganda that were mostly vacant before. While the Congolese refugees were initially received openly by the Ugandan population, the protraction of their situation led to increasing reluctance among the hosts. They were perceived as a burden on public services and as competition in the labor market (Kreibaum, 2016).

The purpose of this study is to contribute to a better understanding of the impact of refugees on local communities in terms of employment and social cohesion. As the host and refugee population regularly interact, the refugee presence is expected to have an economic and social

[39] Due to scarcity of land, refugees arriving after 2011 received smaller or no plots of land for agricultural purposes in some camps (personal interviews, 2018; UNHCR, 2018c; The EastAfrican, 2017).

impact on the Ugandan society. While there is a growing interest in estimating the economic impacts of hosting refugees (Balkan & Tumen, 2016; Del Carpio & Wagner, 2015; Ruiz & Vargas-Silva, 2015, 2016; among others), we still know little about the consequences of refugee influxes on labor market outcome, particularly in developing countries. This limits our understanding of the potential consequences of hosting refugees (UNHCR, 2015). Female labor force participation is of particular interest in Uganda, as women, and female-headed households are often found to be poorer than male-headed households, and men *within* the household have main control over the productive resources. This is despite the fact that female control over household resources has been linked to better livelihoods in terms of household and children food consumption and health, for instance (Duflo, 2003; Klasen, 2004). To analyze the impact on female labor force participation and subsequently household welfare, we use a repeated cross-section of Demographic Health Surveys (DHS) and yearly UNHCR data on the number of refugees allocated to three different settlements in Uganda. We exploit the sudden and unexpected inflow of Congolese refugees as a natural experiment, controlling for initial differences using a difference-in-difference framework. We find that a greater exposure to refugees positively influences women's labor force participation. This effect is mainly driven by women working in the agricultural sector.

While several qualitative studies suggest substantial social effects of hosting refugees, there is very little empirical insight (e.g., Agblorti, 2011; Kuhnt et al., 2017). Using a repeated cross-section of the Ugandan Afrobarometer data, we study potential effects of hosting refugees on measures of social cohesion). Here, we find that greater refugee presence is related to larger perceived equality within the host population as well as slightly stronger feelings for the Ugandan identity in comparison to the respective ethnic group. More intense refugee presence does neither significantly influence measures institutional nor interpersonal trust.

We contribute to the literature in several ways: First, we argue that we can establish causality when analyzing the effects of refugee inflows on the host population by applying a difference-in-difference methodology. Second, we complement the analysis of female labor market outcomes by looking at different indicators for multi-dimensional household welfare. Third, to the best of our knowledge, we perform the first quantitative study that focuses on social cohesion and gender labor outcomes in Uganda.

3.2 Literature Overview

3.2.1 Female Employment

There is a paucity of studies on the effects of refugee inflows on native female employment in developing countries, therefore, we discuss in the following general effects of refugees on labor

markets among the host population. Empirical evidence on the impact of migration on host countries and communities have traditionally focused on voluntary migration flows (e.g., Borjas, 1995, 2003; Glitz, 2012; Ottaviano & Peri, 2008). Their findings illustrate potential mechanisms that might also apply to forced migration, yet, it is important to note critical differences: Studies on voluntary migration largely focus on high-income countries, while low-income countries host the vast majority of refugees (e.g., Borjas, 1995, 2003; Glitz, 2012; Ottaviano & Peri, 2008). Further, the multidimensional motivations behind migration choices are expected to differ across migrant groups. Voluntary migrants are often assumed to seek better economic opportunities while forced migrants are assumed to primarily be fleeing from oppression, war or conflict without any particular economic motivation (Cassidy, 2004). While there is some evidence on the effects of refugee protection crises on forcefully relocated populations themselves, the literature trying to quantify the impact of forced migration on the host economy and population is increasing only recently. Possible effects are complex, ranging from price increases for goods and services over competition for jobs and natural resources to economic opportunities and beneficial social spillovers (e.g. Balkan & Tumen, 2016b; Ruiz & Vargas-Silva, 2016; Taylor et al., 2016; Tumen, 2016).

It has been acknowledged that the presence of refugees can be both economically harmful and beneficial to the host population and depends, for instance, on labor market policies[40]. According to theoretical considerations as well as previous literature (though traditionally mostly studying voluntary migration towards high income countries), the arrival of significant numbers of migrants often presents an initial burden on the local environment and resources as well as increasing competition in low-income segments of the labor market (e.g. Borjas, 2003; Braun & Omar Mahmoud, 2014; Foged & Peri, 2015). However, host populations can simultaneously benefit from the provision of cheap labor to local producers and from increased demand for goods and services, which can change the mix of goods and services demanded and the technologies used to produce or provide them (Dustmann et al., 2009). Generally, these dynamics have the potential to create new job opportunities and markets. There are a number of descriptive studies that demonstrate the economic interaction between refugee and host population in several African countries (e.g. Werker, 2007; Alloush et al., 2017).

[40] Here, an important factor is the length of the refugee presence under study. Studies have shown that short-term effects differ from the medium- to long-term impact (e.g., Kreibaum, 2016; Ruiz & Vargas-Silva, 2015).

Betts, Bloom, Josiah Kaplan, et al. (2014), describe diverse "refugee economies" in Ugandan refugee settlements, where intense economic interactions take place among refugee populations as well as between Ugandans and refugees. Their qualitative evidence suggests that refugees coming to Uganda from DRC are mainly working in agriculture, either on their own plot of land that they received upon arrival or as agricultural wage laborers.

Anecdotal evidence from western Tanzania shows that there are changing opportunities of a refugee influx over time: After an initial burden on infrastructure and local markets, the local host population is able to benefit from the business interaction and increased demand for agricultural products (Whitaker, 1999). In other words, over time, supply-side effects were able to catch up with demand-side effects. Recently, some researchers have started to investigate the causal economic effects of hosting refugees for populations in developing countries. Evidence from Kenya shows that in the long run, the presence of forced migrants increases economic activities (approximated by nightlight data) in refugee hosting areas (Alix-Garcia et al., 2018). The authors find that proximity to a large refugee camp is leading to increased consumption, as well as more low-skilled jobs and wage labor for the host population. Also, their results suggest that increased agricultural and livestock production are incentivized through increased demand by refugees. This is supported by Taylor et al. (2016), who are using a simulation approach and data on Congolese refugees in Rwanda and find that refugee presence increases host populations real income through market interactions. Using the same Ugandan setting as our study, Kreibaum (2016) finds that the sudden influx of Congolese refugees into Uganda increases real consumption of the host population at the district-level. Further, she documents that Ugandans living close to refugee settlements benefit from increased public service provision within refugee camps. Using the influx of Burundian and Rwandan refugees into Tanzania as a natural experiment, Maystadt & Duranton (2014) find a positive long-term impact of refugee influx on the local population's real per capita consumption even after the return to their country of origin. As a main driver for the observed persistent change in welfare, they refer to reduced transportation costs through road investments. Relying on similar data, Maystadt & Verwimp (2014) find differential effects of the large refugee presence on the Tanzanian host population: While overall consumption increases, this effect is less pronounced for paid laborers while most pronounced for agricultural self-employed households (i.e. those selling their surplus on the market). They explain this by increased competition among agricultural workers while the self-employed agricultural households benefit from the provision of cheap labor.

Investigating the effect of variations in refugee population in Tanzania, Alix-Garcia & Saah (2009) find that prices for agricultural goods increased for areas located closer to refugee camps. They discuss that this benefits the rural population, that is, people active in agricultural

production, for whom they find positive welfare effects versus negative wealth effects for those living in urban areas. In their setting, food aid as a supply side effect seems to affect prices only in the short-run.

In this regard, results of previous empirical research have been mixed. Ruiz & Vargas-Silva (2016) investigate the effect of Rwandan and Burundian refugee presence on the Tanzanian host population labor market. They find that an increased presence of refugees positively impacted the incomes of farmers (owning land) engaged in agriculture or livestock production. Their results further suggest that particularly agricultural employees (not owning land) were negatively affected through the increase of cheap low-skilled labor. They did not find evidence for a general increase in the likelihood of self-employment, though they find that those previously employed as temporary workers show a tendency for increased self-employment after the refugee influx. In general, natives have an advantage in establishing new businesses due to their local knowledge and access to networks.

There is some research investigating the effects of internal displacement on host communities. These studies might help to further understand labor market effects of population movements that are more similar to each other and, hence, are closer substitutes in the job market. Investigating a population shock to local labor markets through internal displacement in Colombia, Calderón & Ibáñez (2009) find a negative effect on wages, particularly for the low skilled informal workers. It is important to note, here, that internal displacement in Colombia is characterized by people scattered throughout the country, while in our study refugees are largely localized within the respective refugee settlement. Further, similarity of internally displaced people with the receiving population is expected to ease the substitutability of laborers. In the same country, Bozzoli, Brück & Wald (2013) find that internal displacement leads to increased self-employment. Following Calderón & Ibáñez (2009), Morales (2018) investigates the effect of internal displacement in Colombia on local labor markets. He finds that in the short-run, the host communities are negatively impacted by depressed wages. However, in the longer-run these effects are dispersed, though, a small negative effect persists for low-skilled, female workers.

Overall, results from studies focusing on voluntary migration suggest that an increase of migrants may force the local population to redistribute across occupations, and its effect largely depends on the substitutability of the existing and newly arriving workers. This finding is supported by several studies on internal displacement (e.g., Calderón & Ibáñez, 2009), where those displaced share more commonalities with host populations compares to incoming refugees from other countries. Results from rigorous evaluations are inconclusive regarding the

multitude of effects of voluntary and forced migration on the host community and depend on characteristics of the local economy (e.g. Borjas, 1995, 2003; Card, 2001; Ottaviano & Peri, 2008; Glitz, 2012; Clemens, 2013; Braun & Omar Mahmoud, 2014). While effects of internal displacement point towards a more negative direction for the hosting areas, the impact of hosting refugees in lower-middle income countries seems to be positive in terms of general economic activities, and particularly beneficial to households that are self-employed in agricultural or livestock production and, hence, can react to increased demand. However, it can harm agricultural workers who seem to some degree compete with refugees in the labor market.

Women in low-income, rural settings are usually involved in agricultural activities. At the same time, their formal access to land owing rights and their role for handling cash crops (such as coffee, high-value fresh fruits and vegetables) is often restricted and in the hands of male household heads. Studies on gender-specific impact of voluntary or forced migration are very limited and mostly focused on high-income countries (Furtado, 2015; Cortés & Tessada, 2011). Fransen, Ruiz & Vargas-Silva (2017) find that the presence of refugees in Tanzania had a differential impact on task and time allocation for male and female members of host communities. Depending on women's skill levels, they find that higher skilled women experience an increase in outside employment due to a higher supply of unskilled refugee workers taking over household chores. In contrast, less skilled women suffer from increased competition over natural resources, leading to the need to dedicate more time in daily household tasks (such as firewood collection), which causes a reduction in outside employment.

Building on these insights, we expect the hosting of refugees in Uganda with its liberal refugee policies in terms of access to productive assets and labor markets[41] to have a positive economic effect in the medium to longer-run, particularly for Ugandans who are engaged in agricultural self-employment.

3.2.2 Social Cohesion

Apart from an economic impact of hosting refugees, it is likely that the arrival of new people affects the local community's social fabric. This is relevant since it frames interactions between different groups of society and might influence the beneficial and peaceful functioning of

[41] These have recently been subject to changes due to scarcity of gazetted governmental land (personal interviews, 2018; The EastAfrican, 2017).

communities (e.g., Kuhnt et al., 2017). We are particularly concerned about the impact on social cohesion among the Ugandan host communities. While there is no uniform, clear-cut definition of social cohesion, it is often described as the 'glue' that holds them together and can be proxied by a set of different variables, including trust levels, civic engagement, or memberships in associations (see Section 3.4.3 for our operationalization of social cohesion) (ibid).

The majority of forced migrants seeks refuge in neighboring countries, which are often developing economies where governments are struggling to comply with their state obligations, including the provision of sufficient public services, economic opportunities or safety (UNHCR, 2018c). If not adequately supported, for instance by the international community, the arriving refugees can represent an additional strain, both economically and socially, that can lead to secondary conflicts and violence among the local population. A popular recent example is the arrival of more than 3.5 million Syrian refugees followed by almost 0.5 million asylum seekers from mostly Iraq and Afghanistan in Turkey over the past six years. While the refugees were welcomed at the beginning, hostility towards the newcomers and intercommunal violence between host communities and refugees is rising in recent years (International Crisis Group, 2018).

Refugees are perceived as low-wage competition in the labor market and as culturally different. Particularly in the larger cities, there has been a rise in socio-economic inequality and urban violence. Host communities that themselves feel marginalized perceive the refugees as a threat and believe that they are provided with better public services and assistance than themselves (International Crisis Group, 2018). This was also reported by (Landau, 2002) in Tanzania, where the local population mobilized politically against the perceived unfair treatment with respect to access to public services. Also, respondents stated increased fear for safety since refugees were regarded as violent. Similar evidence comes from Ghana, where in reaction to large refugee inflows from neighboring countries a rise of social conflicts between host and refugee population was reported (Agblorti, 2011). Using descriptive data from a social media survey in Jordan, Kuhnt et al. (2017) show that the recent inflow of Syrian refugees was associated with a moderate deterioration on overall levels of social cohesion within Jordanian communities.

Generally, there is still very little empirical evidence on the impact of refugees on social cohesion, particularly in developing countries. Potential impact channels are multifaceted. Large refugee inflows are likely to influence the socioeconomic structure – directly through the increased presence of people in need of humanitarian assistance, and indirectly, by their influence on e.g. the local labor market and product prices influencing households' disposable incomes. A low socio-economic status can hinder a person's capability to be an active member of

society, and can decrease trust levels (Vergolini, 2011). Generally, poverty and inequality have been shown to negatively influence levels of social cohesion (e.g. Kawachi & Kennedy, 1997; Alesina & La Ferrara, 2000; Costa & Kahn, 2003). Fleeing from conflict, many forcibly displaced populations have experienced psychological hardship and discrimination. Alesina & La Ferrara (2002) find that these experiences decrease level of generalized trust. Simpson (2018) argues that it is of utmost importance to overcome trauma triggered through the experience of violence as it is an important psychological barrier to contribute positively to social cohesion. Using cross-sectional data from Mali, Calvo et al. (2018) show that the experience of conflict decreases trust between groups and increases the tendency to gather within kinship groups. On the other hand, there are several studies that mostly use lab-in-the-field experiments to investigate the effect of civil wars or conflict on population's levels of social cohesion in developing countries. They generally find that the personal experience of violence increases the level of pro-social behavior within communities (e.g. Gilligan et al., 2014; Voors et al., 2012; Blattman, 2009; Stage & Uwera, 2018).

Newly arriving people from foreign countries often increase the diversity within the host community. They are likely to speak different languages, and follow other beliefs or cultural norms. A variety of studies has investigated effects of diversity on a society, whereas results are ambivalent. While diversity is often associated with diverse and sometimes conflicting preferences that can lead to unrest and exclusion, it also leads to an increased variety of abilities. This again can lead to more creativity and innovation, which benefits the economic development of a country (e.g. Alesina et al., 2005; van Staveren et al., 2017; Kanbur et al., 2011). Overall, new people affect existing group boundaries, and different waves of displacement can lead to shifting group memberships. Landau (2002) reports that the host population in Tanzania felt closer adherence to their national virtue and identity in reaction to the arrival of refugees, while it simultaneously did not strengthen the citizen's relationship or trust towards their nation state. Particularly, if people feel threatened (e.g. by low-wage competition in the labor market or by other belief or value systems) in-group (people sharing a similar belief system or salient characteristics) solidarity might increase, which is often simultaneously associated with out-group distrust or hostility (*intergroup threat theory*) (Stephan et al., 2009; Hargreaves et al., 2009). On the other hand, according to the contact theory, increasing the number of people from other groups fosters the possibility of interaction between members of different groups, which again can decrease prejudices (Wagner et al., 2006; Schlueter et al., 2010). Studies that have empirically investigated the relationship between social cohesion (or social capital) and diversity, find ambiguous results. Some report that levels of generalized trust as well as civic engagement, and organizational membership are lower in more diverse societies (Alesina et al.,

2002, 2000; Putnam, 2007; Stolle et al., 2008; Delhey et al., 2005; Costa et al., 2003; Glaeser et al., 2000).

Summing up, there is a multitude of channels potentially triggered by forced displacement that are likely to impact levels of social cohesion in the receiving society. Changing socioeconomic status of households is likely to influence the social fabric. A potentially perceived threat to the dominant belief and value system could negatively influence the level of social cohesion. The effect of diversity as such is contested with regard to its impact on social cohesion. It is likely that it is rather social exclusion and a lack of social interaction (e.g. complicated through language barriers) that drives lower levels of social cohesion.

In our setting, the impact is unclear and ambiguous. The freedom of movement of refugees within the country and the de facto integrative settlements where refugee and host population live as neighbors and use the same public institutions (such as schools and health centers) provide extensive possibilities to interact (*contact theory*). This may decrease prejudices and also offers possibilities to interact on an economic and social level. Simultaneously, this increases the active presence of refugees within the host communities, compared to a 'closed camp' approach (e.g. as practiced in Kenya) (Alix-Garcia et al., 2017). This might trigger people to strengthen ties with their own kinship or increase adherence to the nation state to differentiate themselves from other nationalities as a reaction to a perceived threat to the dominant group (here, Ugandan). Language barriers are likely to limit social integration, and perceived unfairness with regard to public service provision (better schools and health care within settlements) as well as conflicts over land fuel violence between host and refugee populations and increase the perception of threats (e.g., Sebba, 2006). Further, the protracted nature of the refugee crisis in Uganda may, on the one hand and after an initial welcoming of refugees lead to growing resentments over time (Harrell-Bond, 1986; 2002). On the other hand, if successfully managed, an economic and social integration of the refugees becomes more feasible as the barriers to social interaction fade with time (e.g. language learnt by second generation). This is also reported by Whitaker (1991) in Tanzania, where Rwandan and Burundi refugees were initially perceived as a burden by the host population, which changed following improvements in the provision of services and the establishment in structures to absorb the newly arriving people.

3.3 Background on Refugee Inflows and Settlements in Uganda

Uganda is situated in Eastern Africa and shares borders with conflict-torn countries, like South Sudan and DRC. The Northern part of Uganda has itself a recent history of civil war leading to large waves of displacement within and across borders. Uganda has a long history as a host

country for refugees and currently provides refuge to almost 1.4 million forcibly displaced people, primarily from South Sudan, DRC, and Burundi (UNHCR, 2018). Uganda is known and often praised by international agencies for its open door policy to people seeking refuge from neighboring countries, and its favorable refugee protection environment characterized by its settlement approach (UNHCR, 2018; Meyer, 2006)[42].

Upon arrival and registration at the transition camps at the Ugandan border, refugees receive emergency aid for up to two weeks. They are subsequently allocated to settlements according to capacity of the respective camp and potential family bonds (personal interviews, 2018). Here, they receive a plot of land for farming activities and material assistance in the form of shelter, food rations and facilitated access to public services, like schools and health clinics. The Ugandan government follows a self-reliance strategy aiming at the empowerment of the refugees (Meyer, 2006). By the allocation of agricultural land and basic farming tools, they enable the refugees to become independent from food aid and non-food items by generating a surplus that can be traded for other goods (Sebba, 2006)[43]. The main economic activities are farming and livestock production by both refugee and host population, and over 80% of the rural Ugandan population is employed in the agricultural sector (Sebba, 2006; CAP, 2006). Food assistance is phased out after five years after arrival as the refugee should have become self-reliant (Dryden-Peterson & Hovil, 2004). Further, the government tries to build integrated public services that are accessed by Ugandans as well as by the refugee population (Meyer, 2006; Kreibaum, 2016). In the Refugee Act from 2006-09 the Ugandan government officially established freedom of movement of all refugees and it allowed them to choose between living in one of the settlements (where they receive all the organized assistance) or to move independently to urban centers, like Kampala (where they forego this assistance) to self-settle there.

The number of protracted displacement situations, where at least 25,000 refugees from the same country have been displaced for at least five years in a given country of asylum, have increased in the past decades. In 2015, there were 32 such incidences, up from 27 in 1993, and

[42] It is important to note that particularly in recent years, several actors have started to criticize this self-reliance model employed in Uganda as being driven by the interest of donor and host institutions not necessarily benefitting the vulnerable refugee population (e.g. Meyer, 2006).

[43] Since 2011/12 the Ugandan government has had difficulties in providing agricultural land to all newly arriving refugees due to the lack of sufficient gazetted governmental owned farm land. The scarcity has also given rise to land conflicts between host and refugee population (e.g. Refugee Law Project, 2003).

their average length increased to 27 from formerly nine years. Overall, 41% of all refugees worldwide fall into this category (Sarzin, 2017). Though, initially welcoming the forcibly displaced, with the protraction of their stay, the Ugandan society increasingly perceived the refugees as a burden and competition in the labor market (Kreibaum, 2016). The Second Congo War starting after a coup in 1998, initiated one of those protracted displacement crises. This was one of the deadliest conflicts in Africa forcing millions of people to leave their homes, particularly, in the east of DRC. A peace agreement in 2003 officially ended this war. But particularly in the Eastern Congolese provinces, Kivu and Ituri, an independent conflict among militia continued and escalated in the following years, resulting in large waves of displacement across and within the DRC borders. In this paper, we focus on these displacement waves of Congolese fleeing to Uganda: As can be seen in Figure 3.2, the first major wave of DRC refugees came in 2005, which were mainly sent to the refugee settlement *Kyaka II*, followed by two additional waves in 2008 and 2009, where refugees were sent to the settlements *Nakivale* and *Kyangwali*. *Nakivale* is the largest settlement with more than 100,000 refugees, followed by *Kyangwali* with more than 40,000 and *Kyaka II* with almost 30,000 inhabitants. In all settlements, Congolese refugees represent the majority (UNHCR, 2015).

All three settlements are located in the South-West of Uganda in relative remoteness and rural places in proximity to the DRC border (see Figure 3.1). They were established in the early 1960s for Burundi and Rwandese refugees, of whom most resettled into their country of origin in the 90s (Refugee Law Project, 2002; UNHCR, 1995). This left the settlements largely vacant until the crisis in DRC flared up. The unanticipated, sudden and localized nature of this event provides a tool to isolate the effect of the refugee inflows from other factors. As argued in Kreibaum (2016), both the Ugandan government as well as aid agencies were unprepared for the sudden influx of thousands of refugees.

Irrespective of their freedom to move out of the settlements, 88% of the Congolese refugees in Uganda choose to live in settlements and only 12% live in Kampala (UNHCR, 2014). Betts et al. (2014) document the intense economic interaction between host and refugee population. In spite of the remote locations of the refugee settlements, they are closely integrated in the local economies. Through trading in particular, the settlements are integrated into the wider economic system, and refugee and host populations are connected and continuously cross national, religious or ethnic lines (Betts et al., 2014). Congolese refugees are mainly active in agriculture, cultivating their own land or as agricultural workers, and only a minority own small businesses (Betts et al., 2013; UNHCR, 2014).

Figure 3.1 UNHCR presence in Uganda as of July 2016 (Note: Rwamwanja Settlement was opened in 2012. Source: UNHCR website, accessed February 2nd, 2018).

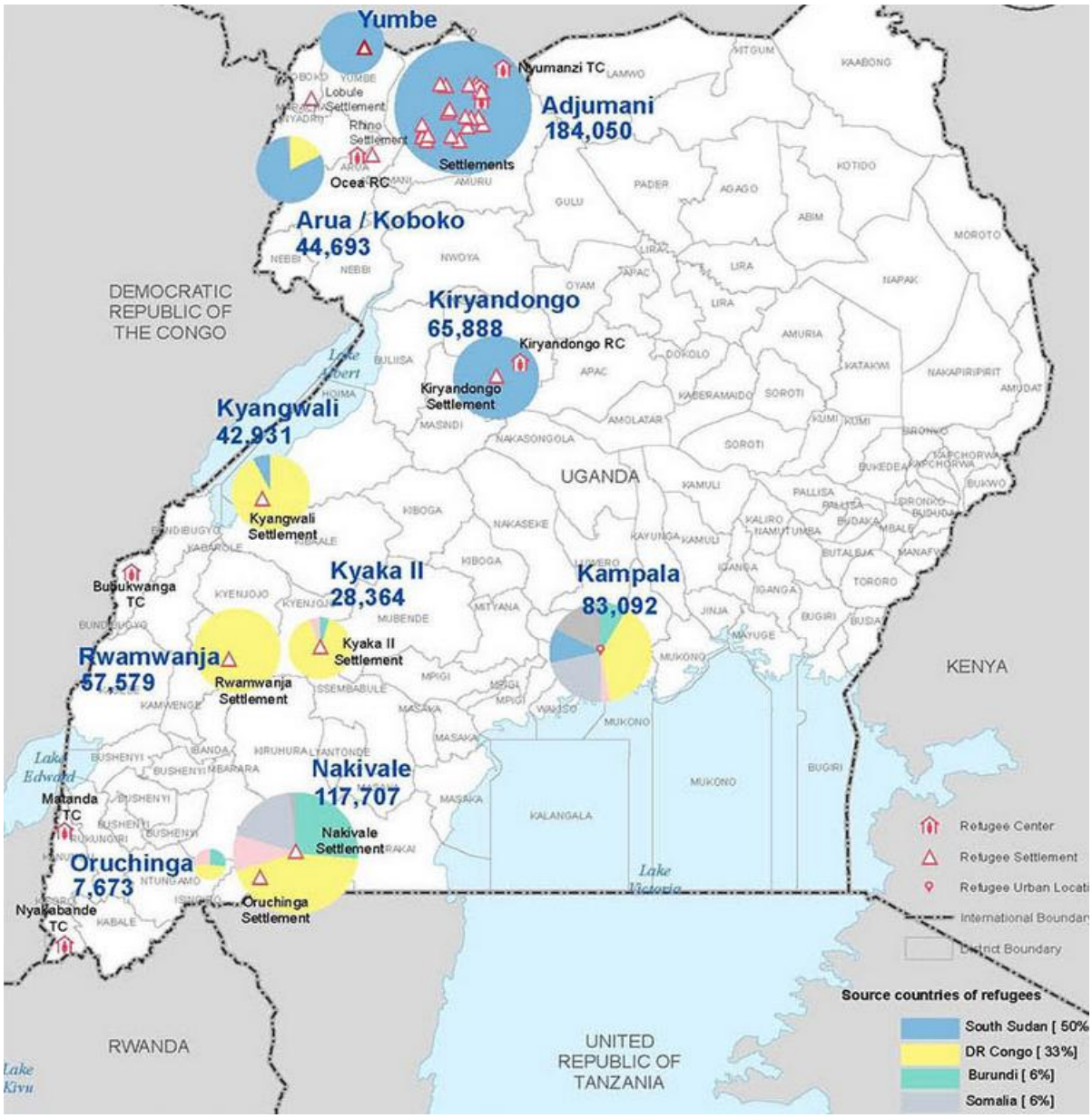
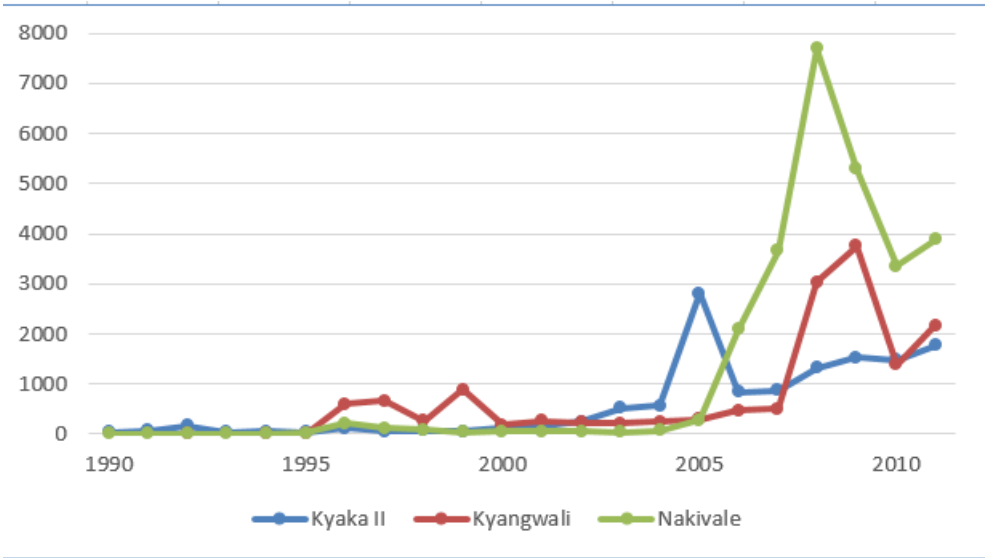


Figure 3.2 Influx of Congolese refugees to three settlements



3.4 Data and Management

3.4.1 Refugee Stock and Inflow

We use UNHCR data collected and provided by Kreibaum (2016) that includes information on the yearly stock and arrival of refugee groups in the Ugandan settlements. Following our identification strategy (refer to Section 3.5) we focus on the inflow of refugees in three settlements (*Nakivale, Kyangwali* and *Kyaka II*) that experienced a sudden increase of refugees from DRC starting in 2005 up to the year 2009. Previous to this influx the settlements were mostly vacant. We have GPS coordinates of each refugee settlement, which we use to calculate distances between the households located in the PSUs of the respective dataset and the three settlements.

3.4.2 Female Employment

We use three survey waves of the Ugandan Demographic Health Survey (UDHS) (years 2000/2001, 2006, 2011), collected by the Uganda Bureau of Statistics in collaboration with the Ministry of Health. The UDHS is a nationally representative survey of households, including women in the age range of 15-49, and children born to these women. It provides information on female employment as well as a variety of health and household indicators of well-being. The

data is collected as repeated cross-sectional data. Our sample includes both married and single women, which leaves us with a sample of 18,682 individuals.

Five districts in the North of Uganda were heavily affected by violent conflicts of the Lord's Resistance Army (LRA) until 2006. As a consequence, economic activities in this area were undermined by violence, as well as characterized by the inability of people to freely interact in the market (Refugee Law Project, 2014). They also became dependent on food aid and were not self-sustainable due to the inability to engage in farming or participate in economic activities. Instead of fleeing to other districts in Uganda, the government began in 1996 to force people to move to so called "protected villages", mainly located in the sub-region Lango and Acholi in Northern Uganda (Bozzoli et al., 2012). In short, as the economic development of these Northern areas is presumably very different from other regions in Uganda, we exclude these conflict-affected districts from our analysis. In a similar line, we drop the capital district Kampala, as the majority of refugees are not registered officially and hence cannot be accounted for (Kreibaum, 2016). Furthermore, there are a lot of economic opportunities in large urban centers, thus crowding out effects may not be so string as to affect livelihood of the majority of the population. In any case, the research question of this paper aims at exploring how large numbers of refugee inflows affect economic activities and welfare of the host population in less densely populated areas (Macchiavello, UNHCR report, 2015).

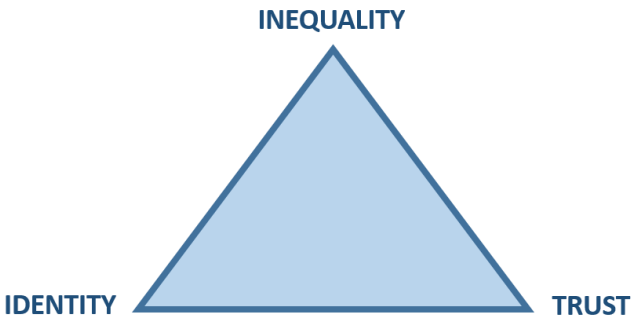
Overall, we are left with 46 districts and 701 primary sampling units (PSUs) in our sample and refugee settlements are located in three of them. We will refer to PSUs as 'clusters' in the subsequent sections of this paper.

3.4.3 Social Cohesion

Social cohesion is a multi-dimensional concept that lacks a clear-cut definition and established practice regarding its measurement. Researchers have developed and applied different measures and created multi-dimensional indices proxying different aspects of social cohesion. This makes a comparison across empirical studies difficult. Measures often overlap in the variables used, which commonly include personal and institutional trust, civic or political engagement, and memberships in associations. The data used for these measurements mainly comes from secondary multi-purpose surveys, such as the Afro- and Arab-barometer, the European and World Value Survey or the Gallup World Poll. We follow the Social Cohesion Index (SCI) developed by Langer et al. (2016). It considers three relationships commonly hypothesized to determining the degree of social cohesion within a society: *bonding* (relationships within groups of a society), *bridging* (relationships across groups within a society), and *linking* (relationship between individuals and state institutions). The SCI is operationalized by

considering individual perceptions in three dimensions: inequality, trust, and group identities. These components are not independent but mutually related (see Figure 3.3).

Figure 3.3 Social Cohesion Index developed by Langer et al. (2016)



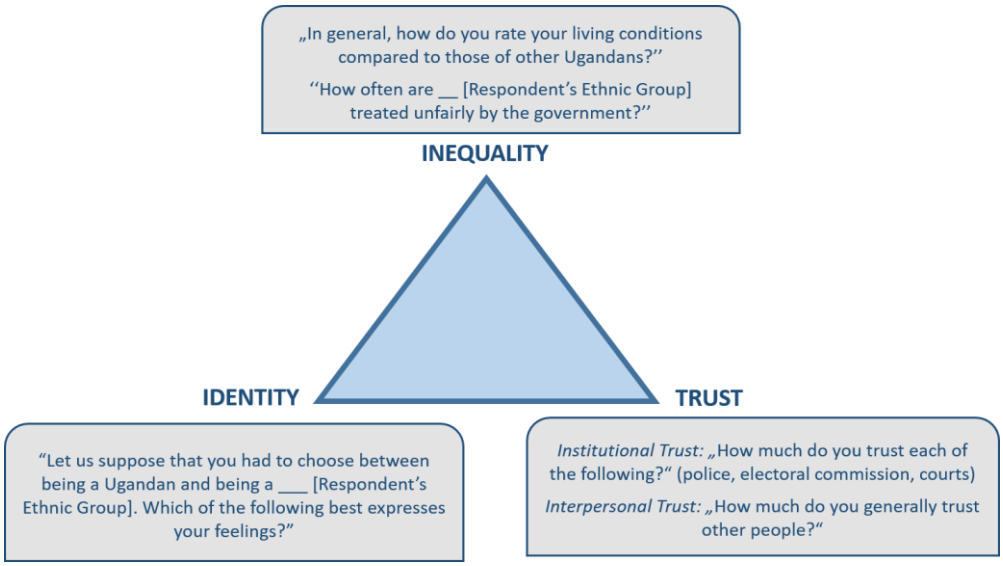
The first component, perceived inequalities, refers to both horizontal (to other members of the same social group) and vertical (between groups) inequalities experienced. Particularly in multiethnic societies such as Uganda, inequalities between ethnic groups (or e.g., across religious lines) can lead to violence and conflict (Langer et al., 2016). According to the authors, relevant inequalities include those of political, cultural, social or economic nature. Highly unequal societies are hypothesized to be less socially cohesive. The second component describes the extent of trust in institutions as well as among people in general terms. Several studies have used trust as an important measure for the 'glue' within the society (e.g. Knack et al., 1997; Zak et al., 2001). Low levels of trust and social cohesion in societies are associates with a larger likelihood of conflict and, following a two-way relationship, conflicts also destroy trust (Langer et al., 2016).

The third component of this index is the strength of people's adherence to their national in relation to their group (here ethnic) identity. In particular, in settings with diverse ethnicities and artificially created national boundaries, this indicator is important. The authors argue that closer adherence to a group identity can trigger conflict between groups while also national identities can be used to differentiate oneself from other nationalities, e.g., from a refugee population. The relationship between a sense of national belonging and social cohesion *between* refugees and the host population is thus a bit unclear. While the feeling of belonging to one's nation is considered a characteristic of cohesive societies, increasing the sense of belonging to the in-group could also reflect the perception of intrusion by the out-group. Langer et al. (2016) have applied the SCI to several African countries using repeated cross-sectional data from the Afrobarometer.

Following their example, we use five Ugandan Afrobarometer waves (years 2000, 2002, 2005, 2008, 2012). This public attitude survey is a nationally representative repeated cross-sectional dataset, which has geo-referenced primary sampling units (PSU) and includes detailed information on different dimensions of social cohesion. Each wave approximately contains 2,400 interviews, leaving us with a pooled sample of 11,902 observations and 1,199 unique PSUs where each PSU typically contains eight households. After excluding the five Northern conflict affected districts and Kampala region (as conflict and densely populated areas are likely to affect social interactions and communities' perceptions as well as to establish comparability to the UDHS dataset), we are left with 57 districts in four regions of Uganda.

Using the Afrobarometer dataset, we then follow Langer et al. (2016) in their specific measures of the three components of the SCI.

Figure 3.4 SCI components proxied by Afrobarometer Data



All components are perception-based. Inequality is proxied using two variables aiming to capture perceived equality among Ugandan hosts. The first measures economic equality and is set equal to one if the own living conditions are perceived to be the same compared to other Ugandans. The second component aims at measuring equal treatment of important subgroups, here the ethnic group, within the larger population. This variable equals one if the respondent stated that his or her ethnic group was never treated unfairly by the government. Both components of the combined inequality variable are available for all five Afrobarometer waves. Identity is measured by a variable capturing the degree the respondent feels closer to the national compared to their ethnic identity. It equals one if the respondent feels more or only Ugandan as compared to his or her ethnic group. This variable is available starting from 2002.

The third SCI component is composed out of two different sets of variables: The first measures trust towards different state institutions. Here, we focus on trust towards the police, courts, and the electoral commission. All these variables are available in all five Afrobarometer rounds. In a robustness check we investigate trust levels towards alternative state institutions. All variables equal one if trust levels are high ("trusts a lot"). Further, we investigate interpersonal trust by using a variable measuring generalized trust levels towards other people. This variable is set to one if the respondent stated that most people can be trusted. We have information on this variable for the years 2000, 2005, and 2012.

3.5 Identification Strategy and Methodology

3.5.1 Treatment Exposure: Refugee Intensity Index

By using the information on the yearly inflow data per settlement in combination with the georeferenced distances to the respective households, we are able to construct a refugee intensity index that has been previously implemented in other studies (Baez 2011; Maystadt & Duranton, 2014; Maystadt & Verwimp 2014). This refugee index measures the scope of the inflows as experienced by each respondent in a given cluster *c* (georeferenced PSU), by creating a distance variable to each refugee settlement that is weighted by the newly arrived refugee population in the respective settlement. Here, the location of the clusters throughout Uganda enables us to exploit a large heterogeneity in our sample in terms of the distance of respondents to the refugee settlements. More specifically, we calculate the refugee index as follows:

$$Refugee\ index_{i(c),t} = log\left(\sum_{s=1}^{3} \frac{P_s}{D_{s,c}^{\alpha}} + 1\right) \qquad (2)$$

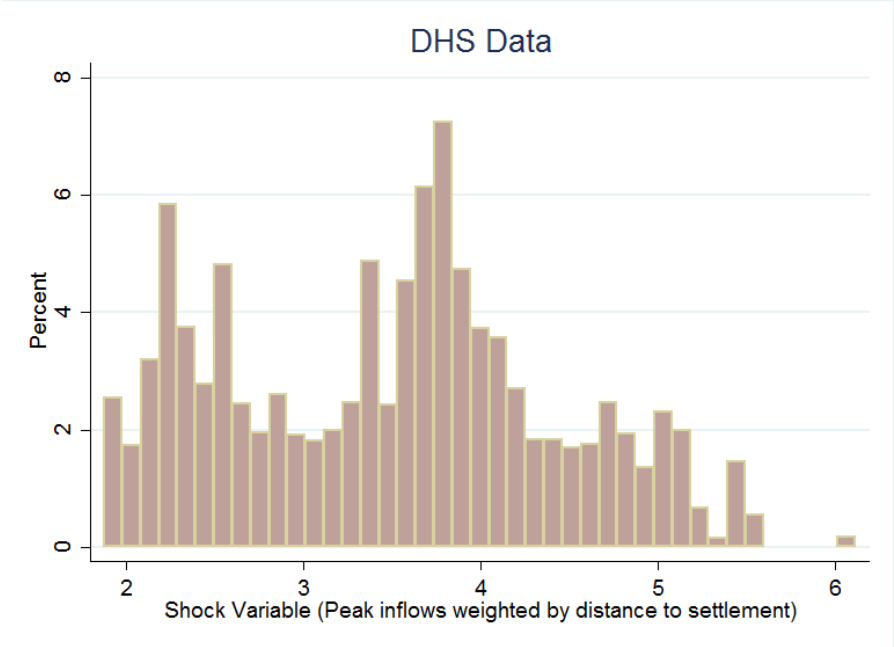
where *s* takes the values of 1 to 3 for the different refugee settlements. P refers to the peak refugee *inflows* into each settlement in the years 2005 (*Kyaka II* settlement), 2008 (*Nakivale* settlement) and 2009 (*Kyangwali* settlement). D refers to the distance between a given cluster *c* and each settlement. Following Maystadt & Duranton (2014), α is set to 1 and the resulting ratio is transformed into logarithm (and 1 is added to deal with 0 values in pre-shock periods) to reduce the importance of some highly refugee-exposed villages.[44]

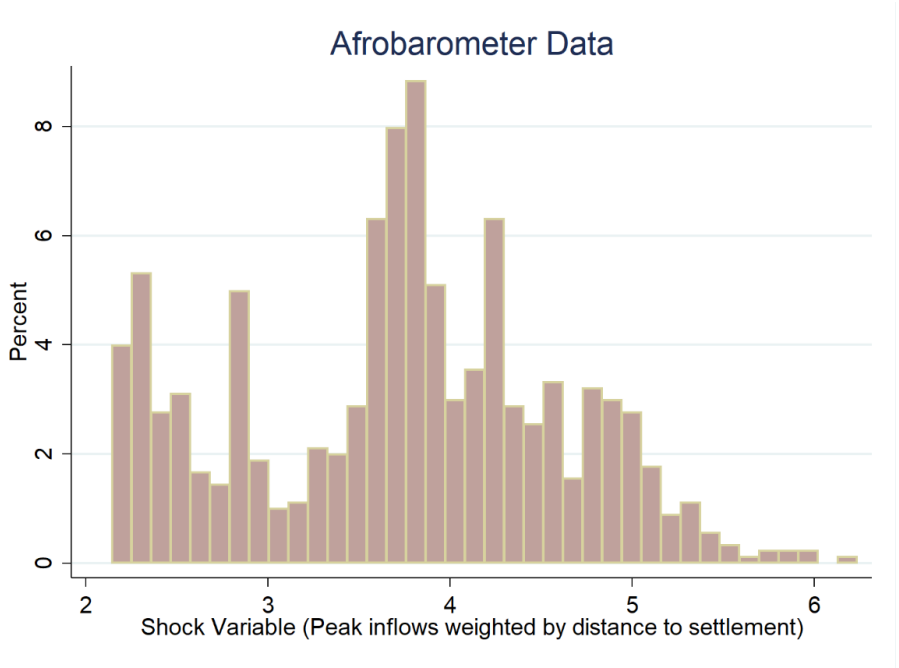
[44] This refugee index is similar to a continuous treatment effect in a difference-in-difference estimation (Wooldridge, 2002, 132).

The resulting Refugee Index $RI_{c,,t}$ is continuous, takes the value zero in pre-shock years, and is constructed for different treatment periods to adequately capture different timings of the inflows into the settlements as shown in Figure 3.1. This specification assigns higher values to households living closer to the refugee settlements and lower values to those living farther away. At the same time, it increases with the number of refugees arriving in a given location. We use different functional forms of this index in the robustness section (see Section 3.7).

As shown in Figure 3.5, there is a substantial range in our refugee index. Similarly, Figure B 3.2 (Appendix) displays substantial variation in distance from the cluster location to the refugee settlements. Some clusters are situated closer to the refugee settlements while others are farther away.

Figure 3.5 Range of values for the refugee shock variable for DHS and Afrobarometer Data





Source: Authors' calculations

Rather than focusing on a binary treatment variable, this approach exploits variation in the treatment *intensity* of different locations and thus allows us to analyze the difference between "high refugee intensity" and "low refugee intensity" areas.

3.5.2 Exploiting a Natural Experiment

Our identification strategy relies upon the unexpected size and nature of the refugee influxes from DRC into Ugandan settlements. While considerations related to economic potentials may have played a role when establishing these settlements in the 1960s, as documented by various sources (e.g., UNHCR report, 2016), the initial set-up of the location of the settlements in the 1960s was mainly based on the decision to find large rural areas not invaded by tsetse flies, a carrier of the so-called sleeping sickness. Hence, all three settlements had already been set up decades before this study's influx period with requisite provision of basic infrastructure and public services as well as an adaptation of neighboring communities.

We argue that the location of settlements is (sufficiently) exogenous to the economic activities and social structures at the time of the Congolese refugee inflows. When the official peace agreement was signed in 2003, local and international institutions did not expect another spike of violence and subsequent displacements of Congolese populations. As described by Kreibaum (2016), particularly, the large number of people arriving within such short period of time was unexpected. Another concern is that despite being forcibly displaced, refugee's decision to locate in a certain area might be associated with the economic opportunities available at the

destination. However, the Congolese refugees themselves chose to seek refuge in Uganda in reaction to violent acts within their own country irrespective of economic or social indicators of Ugandan areas, which is supported by literature showing that forced migration from armed conflicts is not primarily driven by economic considerations (Gracia et al., 2010; Czaika & Kis-Katos, 2009). Additionally, the allocation of refugees across settlements is randomly decided by the Ugandan authorities upon their arrival in transition camps at the border according to the settlements' capacities (personal interviews, 2018). Hence, the refugees themselves did not have the option to choose their long-term settlement. We further argue that the concern on refugees locating themselves in more dynamic and economically active regions after their initial settlement is negligible in the context of Uganda (Bonfiglio, 2010; Dryden-Peterson & Hovil, 2004).

Overall, these conditions underline this setting as a suitable natural experiment, where the intensity of refugee presence is unrelated to potential determinants of our dependent variables (Gerber & Green, 2011).

3.5.3 Difference-in-Difference Methodology

Our datasets are uniquely suited to assess the causal impact of three series of refugee inflows between the years of 2005-2009 on the Ugandan host population. This is because, first, both datasets comprising our dependent variables (DHS and Afrobarometer) contain waves that were carried out before the unexpected and large inflows of Congolese refugees took place in 2005 (see Section 3.3). These can be considered as baseline surveys. Therefore, the data allow us to distinguish the impact of the refugee influx from initial differences between households or districts (assuming – as we do here – that there were no substantial changes to *structural differences* across locations between our baseline waves and the first treatment years).

Further, we make use of an earlier DHS survey wave (1995) to analyze the plausibility of the common trend assumptions, i.e. that districts with higher and lower refugee intensity would have followed similar trajectories in terms of our labor outcome variable (female employment) in the absence of the refugee inflow.

Two assumptions that need to be valid in order for the identification strategy to hold are the common trend assumption as well as the conditional comparability of high refugee intense areas

vs. low refugee intense areas.[45] According to the first assumption, it is assumed that in the absence of the refugee shock, "high refugee intense" vs. "low refugee intense" areas would have developed in similar paths in terms of the outcome variable (e.g. women's employment). While this assumption –by definition- cannot formally be tested (since we cannot observe a counter-factual), we examine the plausibility of this assumption using the following strategy: we split our sample into "high" and "low refugee intensity" districts. High refugee intensity districts are defined as districts with a "high treatment" intensity, i.e. roughly all PSUs that are ranked at least in the 75th percentile (or higher) of the refugee index. We then use the earliest available round of the DHS data of Uganda in 1995, prior to the Congolese refugee inflow, to test if districts located closer to the refugee settlements differed from those farther away from the settlements. As can be seen in Table 3B.3 (Appendix), the two groups appear to be statistically different in terms of individual and district characteristics. This underscores the necessity to control for differences in pre-conditions of the treatment and control group, as usually done in the difference-in-difference (DID) framework. Regarding conditional comparability, we are left with the assumption that our treatment and control groups are not systematically different in terms of unobserved characteristics affecting labor market or welfare outcomes.[46]

In order to check the credibility of the common trend assumption, we add a second survey wave that pre-dated the high refugee inflow, namely data from the year 2000. We then run a placebo model using a binary indicator for whether the district will have a high treatment intensity in the future and regress this indicator and all control variables on our outcome variable of interest, women's employment. In this placebo test, a significant coefficient of this binary indicator would suggest that households highly exposed to the refugee inflows (the treatment group) in the future were following a different trend, even *before* the refugees arrived in Uganda. In other words, Table 3B.4 (Appendix) presents the results of the placebo test that investigates whether differences in employment could be explained by refugee inflows, even when refugees were not yet present. However, we do not find that the future status of a high refugee intense district significantly affects any of the female employment outcomes Table 3B.4. Hence, the results first support the assumption of common trends in the absence of refugees and, second, our refugee

[45] Since we do not aim at establishing causal relationships between the social cohesion measure and refugee inflows, we formally analyze the plausibility of the common trend only for the DHS data.

[46] Not all variables included in the baseline specification can be tested here (e.g. distance to border, etc., since they appear for the first time in the 2000 round when GPS data became available.

index seems to yield the causal effect of the refugee inflows. Additionally, Figure 3B.1 in the Appendix provides visual evidence that the trend of both treatment (high refugee intensity districts) and control group (low refugee intensity districts) develops in a parallel way before the arrival of refugees in 2005.

3.5.4 Baseline Model

Our main outcome variables relate to female employment, household welfare, and measures of social cohesion. We estimate, for instance, the impact of refugee inflows on woman's working status controlling for socio-demographic characteristics and other factors. In particular, we exploit both time and distance variations to refugee camps to show how women and the households they are living in have been affected by refugee inflows originating from DRC between 2005- 2009.

The "refugee index" (see Section 3.5.1) is our treatment variable and we perform a difference-in-difference analysis on pre- and post-shock data along the following lines (here exemplified using the DHS dataset):

$$W_{i\,(c),\,t} = \beta_0 + \beta_1\ refugee\ index_{c,\,t} + \gamma\, \boldsymbol{X}'_{i,\,t} + \beta_2\, m_{c,\,t} + \delta_d + \delta_t + \epsilon_{c,\,t} \qquad (1)$$

Where $W_{i(c),\,t}$ measures various female employment outcomes. For instance, $W_{i(c),\,t}$ represents a dummy indicating that woman *i,* living in cluster *c,* is working or engaged in either agricultural self-employed work or agricultural work for the family or others in time period *t*. An alternative categorical outcome variable, type of occupation, is used to further differentiate between different sectors in which the female respondent has been engaged (professional/ sales and services/agricultural sector).

With respect to the regressions focusing on social cohesion, $W_{i(c),\,t}$ measures, for instance, the perceived feeling of equality within the host community or alternatively levels of institutional or interpersonal trust. The main coefficient of interest (our treatment variable) is β_1, a measure of the refugee index, which estimates the intensity of the refugee inflow experienced in each cluster *c*.

The adjusted employment regressions control for characteristics of both women and their husbands, such as age, age^2 and years of education, respectively, which are included in **X**'. Other household controls include the number of household members, whether the household head is female, married and an asset index provided by DHS, which is used as a proxy for household wealth. We further add a dummy indicating if the household is located in an urban or rural

region, cluster characteristics such as the distance to the DRC border, the distance to the next water source and lagged per capita night-time light as a proxy for regional economic activities at the district level. Recent research has implemented night-time light data as a proxy for economic activity (see for example Kreibaum, 2016; Henderson et al. 2012). Since it can be argued that rainfall data are a better proxy for agricultural performance and productivity (Bundervoet et al., 2015), we use this (lagged) indicator as an alternative to night-time light in a further robustness check. In order to capture seasonal effects, which are particularly important for agricultural work, $m_{c,\,t}$ month of interview dummies are included at the cluster level (Ruiz & Vargas-Silva, 2017). We refrain from regressions adjusted for further control variables when analyzing measures of social cohesion. Here, the literature has not yet developed an accepted set of control variables and any choice would be arbitrary.

The coefficient $\delta_{d,}$ represents district dummies to control for unobserved heterogeneity, and δ_t is a time dummy indicating the post-shock treatment periods and likely to capture time-varying effects, common to all clusters. The social cohesion estimations are run with region dummies as well as year dummies. In all models, we use cluster-robust standard errors at the treatment level, which is the cluster (PSU) level in our case, following other studies (Kreibaum, 2016; etc.).[47]

In line with much of the recent literature (e.g. Ruiz & Vargas-Silva, 2017; Kreibaum, 2016), we opt for a linear probability model instead of logit or probit models, due to advantages such as the ease of implementation and interpretability of the results. We do provide evidence in the robustness section that our results are robust to the application of non-linear models for our binary employment variable (Appendix, Table 3B.1). A full description of the construction of all variables included in the regression analysis is provided in the Appendix.

Descriptive statistics of the DHS and UNHCR are provided in Table 3.1 below[48], separated by values above the median of the refugee index vs. below the median of the refugee index.

[47] We use the default robust standard errors (SE) in the baseline results since our error terms show a normal distribution. However, applying clustered SE at the treatment level (cluster level) does not alter our results at all.

[48] Similar descriptive statistics for the Afrobarometer data can be found in the Appendix.

The unconditional comparison depicts that individuals and households are quite similar in terms of female age, gender of the household head, household wealth and proximity to the water source. However, differences occur in our main variables of interest, i.e. female employment, working in sales and services or being self-employed, as well as distance to the border of the DRC, which is slightly higher for high refugee intense districts.[49] This is in line with the argumentation above, as refugee-hosting settlements are closer to the DRC border and mostly located in urban areas. Moreover, all these indicators are included in the regression analysis as controls. In addition, it can be observed that numbers of female employment, working in the agricultural sector and being agricultural self-employed, are slightly higher in districts with high refugee intensity. This correlation is later confirmed in our regression analysis.

Table 3.1 Descriptive statistics DHS and UNHCR 2000-2011, comparing characteristics in districts above vs. below the median of the refugee index

	(1)	(2)	(3)	(4)
	Full sample	**Above median of refugee index**	**Below median of the refugee index**	**T-statistic**
$Log(RI_{c,t}+1)$	2.37	2.85***	2.20***	-21.71
	(1.805)	(2.095)	(1.664)	
Individual and hh characteristics				
Women's employment	0.75	0.77***	0.74***	-3.83
	(0.432)	(0.420)	(0.436)	
Type of occupation				
Not working	0.20	0.19	0.20	1.04
	(0.399)	(0.395)	(0.400)	
Professional	0.05	0.06	0.05	-1.04
	(0.224)	(0.230)	(0.222)	
Sales and Service	0.14	0.11***	0.15***	7.10
	(0.344)	(0.309)	(0.355)	
Agricultural Work	0.61	0.64***	0.60***	-5.38
	(0.488)	(0.479)	(0.490)	
Agricultural Work				
Agric. self-employed	0.49	0.55***	0.47***	-8.54
	(0.500)	(0.498)	(0.499)	
Agric. work for family	0.22	0.20***	0.22***	3.59
	(0.412)	(0.397)	(0.417)	
Agric. work for others	0.05	0.05	0.05	1.05
	(0.224)	(0.217)	(0.226)	
Female education (years)	4.91	5.09***	4.85***	-3.59

[49] It should be noted though that we excluded the capital Kampala from our analysis.

	(3.876)	(3.714)	(3.927)	
Female age (years)	28.03	27.94	28.06	0.73
	(9.399)	(9.285)	(9.437)	
Female age^2 (years)	873.82	866.83	876.18	0.97
	(574.4)	(566.8)	(577.0)	
Married	0.65	0.63***	0.66***	3.53
	(0.478)	(0.484)	(0.475)	
Household size	6.36	6.16***	6.42***	5.02
	(3.067)	(2.883)	(3.124)	
Female household head	0.30	0.30	0.30	-0.34
	(0.459)	(0.460)	(0.459)	
Wealth poorest	0.19	0.09***	0.23***	20.28
	(0.396)	(0.292)	(0.420)	
Wealth poor	0.18	0.15***	0.19***	6.19
	(0.385)	(0.358)	(0.393)	
Wealth middle	0.19	0.26***	0.16***	-14.81
	(0.391)	(0.439)	(0.370)	
Wealth rich	0.20	0.25***	0.19***	-9.54
	(0.402)	(0.434)	(0.390)	
Wealth richest	0.23	0.24	0.23	-1.75
	(0.423)	(0.429)	(0.421)	
Husband's age	37.22	36.77***	37.37***	2.40
	(11.88)	(11.28)	(12.07)	
Husband's education	1.48	1.53***	1.47***	-2.15
	(1.429)	(1.561)	(1.381)	
District/cluster level characteristics				
Rainfall (mean at district level)	0.41	0.40***	0.42***	4.69
Lagged (Night-time light)	-19.36	-18.90***	-19.51***	-5.10
	(7.052)	(6.252)	(7.296)	
Distance to water source	44360.41	44890.79	44181.99	-1.12
	(37658.9)	(22318.1)	(41564.9)	
Distance to DRC border(km)	184.66	110.33***	209.67***	54.38
	(116.7)	(62.32)	(120.1)	
Urban	0.19	0.15***	0.20***	8.82
	(0.391)	(0.352)	(0.403)	
N	18723	4713	14010	

Mean coefficients; (standard deviations in parentheses). * p < 0.05, ** p < 0.01, *** p < 0.001.

3.6 The Impact of Hosting Congolese Refugees

3.6.1 Baseline Results- Female Employment

We now examine the potential links between the refugee index and women's employment outcomes by conducting linear probability models.

Table 3.2 reports the baseline results on the effect of the refugee index on women's employment outcomes over the period 2001-2011. Overall, a higher refugee index, that is, a higher intensity of refugee inflows seems to increase the likelihood of female employment. In column (3), which

includes all control variables, we can observe that greater exposure to the inflow of refugees leads to a higher probability of women employed. However, the effect of the coefficient on the refugee index (which can be interpreted as an elasticity) is rather small, around 0.058, but significant. Economically, an increase by 100 refugees per settlement corresponds to a 0.02 percentage point (2.6%) increase in the probability of women being employed. Accordingly, an increase by 1000 refugees per settlement is associated with a 0.07 percentage point (9.3%) increase in the likelihood that the woman is working.

Taking into account the difficulty of transportation due to poor road networks and infrastructure in the region (Betts et al., 2014), we expect that our effects of the refugee settlements are somewhat localized.[50] Looking at the spatial distribution of the refugee effect, women living in clusters with an average distance to all three settlements between 85- 100km, are 0.09 percentage points more likely to be engaged in employment (compared to the mean value of women's employment). However, the minimum average distance to all three settlements is 85 km, which is already a long distance, especially if the infrastructure is poor. If women live within an average distance between 100- 120 km away from all three settlements, they experience an increase in the probability to work by 0.04 percentage points (again compared to the mean). Possible scenarios are that the inflow of refugees leads to greater economic activities, which might generate new working opportunities for women or, alternatively, they substitute males who switch to better-paid jobs.

Turning to the control variables, higher education increases the likelihood of female employment, as expected, and according to recent literature (e.g. Baah-Boateng, 2013). Interestingly, the binary variable measuring if the household head is female is positively affects the likelihood of female employment, consistent with a financial necessity to participate in the labor force. Women living in richer households are less likely to work, which corresponds to DHS reports (DHS, 2012). A possible reason is mentioned by Bbaale et al. (2014), in the context of Uganda, arguing that richer women have a tendency of searching longer for more decent jobs, and hence remain unemployed for longer periods compared to poorer women. Other factors decreasing the likelihood of employment include longer distances to a water source and living in urban regions. The latter finding may indicate that labor market opportunities for women are

[50] Since our GPS coordinates measure the distance starting from the centroid of the refugee settlement, we can assume that the distance from cluster to settlements are quite close to the borders of the settlements, given that the settlements have a considerable size of e.g. 185km^2 for Nakivale.

particularly pronounced in the agricultural sector. With respect to distance to water sources, a study by Ruiz & Vargas-Silva (2017), found similar results as women who need to invest more time to daily housework tasks, such as fetching water or collecting firewood, can dedicate less time to outside employment. Lagged night-time light data, our indicator of regional economic activity is not significant, and neither is distance to the DRC border. Yet, the latter is correlated to the refugee index as can be seen in Table 3.1.

Table 3.2 The effect of refugees on women's employment, linear probability models, 2001-2011

VARIABLES	(1) No controls	(2) Individual level controls	(3) Full Sample
Log($RI_{c,t}$+1)	0.0610***	0.0611***	0.0580***
	(0.0115)	(0.0110)	(0.0112)
Individual level			
Female educ.(years)		0.00184*	0.00206**
		(0.000944)	(0.000944)
Female age		0.0479***	0.0481***
		(0.00227)	(0.00227)
Female age^2		-0.000618***	-0.000622***
		(3.55e-05)	(3.55e-05)
Married		0.0360***	0.0346***
		(0.00804)	(0.00805)
HH size		-0.00709***	-0.00785***
		(0.00104)	(0.00104)
Female HH head		0.0273***	0.0289***
		(0.00751)	(0.00751)
Wealth poor		-0.0150	-0.0124
		(0.00979)	(0.00978)
Wealth middle		-0.0267***	-0.0215**
		(0.0102)	(0.0102)
Wealth richer		-0.0530***	-0.0416***
		(0.0107)	(0.0108)
Wealth richest		-0.0995***	-0.0668***
		(0.0121)	(0.0132)
		(0.00293)	(0.00298)
Cluster/district level			
Lagged (Night-time light)			-0.000163
			(0.000812)
Distance to next water source (km)			-3.24e-07*
			(1.80e-07)
Km to DRC boarder			-0.000102
			(0.000173)
Urban			-0.0611***
			(0.0108)
Year=2006	0.210***	0.224***	0.216***
	(0.0509)	(0.0491)	(0.0496)
Year=2011	0.242***	0.234***	0.226***
	(0.0197)	(0.0190)	(0.0205)
Constant	0.545***	-0.246***	-0.197***

3.6.2 Different Types of Occupation

Since agriculture is the primary source of employment in Uganda, we want to shed light on how the impact of refugee inflows differs by type of occupation. Hence, we further distinguish between three different sectors, i.e. professional (e.g. teachers); sales and services; agricultural sector. The results of the multi-nominal logit regression in Table 3.3 reveal that our positive overall effects presented in the baseline results are primarily driven by women working in the agricultural sector. The marginal effect implies that, on average, a 1% increase in the refugee index is associated with a 10.2 percentage points higher probability of women working in the agricultural sector. Other employment categories, i.e. sales and services, and professional work, which require higher levels of education or may be characterized by higher entry barriers compared to the agricultural sector, do not seem to be affected by the refugee inflows.

Highly educated women are less likely to engage in agriculture for work as shown by the negative coefficient of female education in column (3), while it is surprising that women's education has no impact on being employed in the sales and services sector (column (2)).

Since narratives from the settlements in *Nakivale* and *Kyaka II* hint to an increase in self-reliance and self-employment activities among refugees and between refugees and host communities (Betts at al. 2014, personal interviews, 2018), we test this hypothesis by looking at women working in agricultural self-employment, working in agriculture for the family, and working in agriculture for others. The results in Table 3.4 suggest that women are less likely to be (exclusively) engaged in agriculture. This could actually point to an improvement in women's situations, as e.g. women who previously exclusively worked for their family have now some extra food to sell in self-employment. Lastly, as can be seen in column (3), the probability of women working for others is not affected by the sudden inflow of refugees, probably because only a small share of women (5 %) are represented in this category and because refugees themselves are a valuable source of agricultural labor if labor demand increases, e.g. in harvesting seasons.

The magnitude of the effect is not negligible, since women exposed to the refugee inflow are 3 percentage points more likely to be self-employed in the agricultural sector, compared to the base category (not working and working in agriculture for the family or for others). In other words, if we compare the 90th percentile (clusters very closely located to the settlements) to the 50th percentile of the refugee shock variable, women are 2.5 percentage points more likely to work while keeping all other variables constant. The number of household members is positively associated with the probability of being engaged in agricultural family work and changes the sign for the probability of being self-employed or working for others. As women fill the role of primary caretakers of their family' members in Uganda, and an increase in household members puts constraints on women's time, they can dedicate less time to work outside or engage in self-employment activities.

Table 3.3 Type of women's occupation, multinomial (polytomous) logistic regression, 2001-2011.

VARIABLES	(1) **Professional/ technical/managerial**	(2) **Sales and Services**	(3) **Agricultural Sector**
Log($RI_{c,t}$+1)	0.173	0.108	0.677***
	(0.220)	(0.188)	(0.161)
Individual level			
Female educ.(years)	0.300***	0.00225	-0.0569***
	(0.0156)	(0.00982)	(0.00874)
Female age	0.500***	0.406***	0.245***
	(0.0374)	(0.0235)	(0.0177)
Female age2	-0.00650***	-0.00547***	-0.00299***
	(0.000589)	(0.000375)	(0.000285)
Married	0.306***	0.0455	0.234***
	(0.107)	(0.0825)	(0.0644)
HH size	-0.0986***	-0.0859***	-0.0271***
	(0.0156)	(0.0116)	(0.00881)
Female HH head	0.540***	0.464***	0.0811
	(0.102)	(0.0720)	(0.0587)
Wealth poor	0.537**	0.206	0.0660
	(0.223)	(0.128)	(0.0961)
Wealth middle	0.416*	0.370***	-0.128
	(0.242)	(0.134)	(0.103)
Wealth richer	0.610**	0.572***	-0.315***
	(0.242)	(0.146)	(0.111)
Wealth richest	0.553**	0.864***	-0.823***
	(0.238)	(0.156)	(0.123)
Cluster/district level			
Lagged log (Night- time light)	-0.0297	0.0187	-0.00218
	(0.0185)	(0.0160)	(0.0162)
Distance to next water source (km)	2.54e-06	-1.81e-06	-1.40e-06
	(3.63e-06)	(2.99e-06)	(2.74e-06)
Km to DRC boarder	0.00413	-0.00175	-0.000375
	(0.00360)	(0.00293)	(0.00265)
Urban	-0.207	0.439***	-0.814***

	(0.146)	(0.117)	(0.131)
Year=2006	1.577	-0.0120	3.020***
	(0.959)	(0.805)	(0.714)
Year=2011	2.591***	0.115	2.333***
	(0.447)	(0.365)	(0.334)
Constant	-15.31***	-5.941***	-5.091***
	(1.377)	(1.146)	(0.979)
Observations	18,695	18,695	18,695
Pseudo R-squared	0.2494	0.2494	0.2494
Marginal effects:			
$Log(RI_{c,t}+1)$	-0.00753	-0.0031	0.102***
(z-value)	(0.00707)	(.01489)	(0.0207)

Base category (0): Not working. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. District, year and month of interview dummies included.

Table 3.4 Women working in agriculture: Self-employed /work for the family/others, linear probability model, 2001- 2011

	(1)	(2)	(3)
VARIABLES	**Agri. Self -employed**	**Agri. Family**	**Agric. Others**
$Log(RI_{c,t}+1)$	0.136***	-0.127***	-0.0125
	(0.0154)	(0.0146)	(0.00856)
Individual level			
Female educ.(years)	0.00122	0.00315**	-0.00414***
	(0.00150)	(0.00142)	(0.000941)
Female age	0.0457***	-0.0499***	0.00466**
	(0.00318)	(0.00301)	(0.00187)
Female age^2	-0.000568***	0.000648***	-8.25e-05***
	(4.99e-05)	(4.69e-05)	(2.90e-05)
Married	0.204***	-0.125***	-0.0713***
	(0.0116)	(0.0107)	(0.00714)
HH size	-0.00870***	0.0123***	-0.00303***
	(0.00151)	(0.00144)	(0.000893)
Female HH head	0.0533***	-0.0473***	-0.00344
	(0.0104)	(0.00993)	(0.00610)
Wealth poor	-0.0145	0.0206	-0.00642
	(0.0135)	(0.0127)	(0.00722)
Wealth middle	-0.00922	0.0326**	-0.0219***
	(0.0141)	(0.0134)	(0.00738)
Wealth richer	0.00692	0.0146	-0.0207***
	(0.0148)	(0.0141)	(0.00799)
Wealth richest	-0.0506***	0.00602	0.0268**
	(0.0188)	(0.0178)	(0.0118)
Cluster/district level			
Lagged log (Night-time light)	-0.00573***	0.00641***	-0.00196***
	(0.00122)	(0.00117)	(0.000654)
Distance to next water source (km)	5.22e-08	2.49e-07	-1.41e-07
	(2.45e-07)	(2.35e-07)	(1.28e-07)
Km to DRC boarder	-0.000210	1.87e-05	0.000120
	(0.000228)	(0.000214)	(0.000126)
Urban	-0.0527***	-0.0962***	0.132***

	(0.0176)	(0.0153)	(0.0146)
Year=2006	0.554***	-0.471***	-0.0992***
	(0.0689)	(0.0653)	(0.0385)
Year=2011	0.266***	-0.197***	-0.0755***
	(0.0293)	(0.0277)	(0.0165)
Constant	-1.070***	1.901***	0.108*
	(0.101)	(0.0954)	(0.0586)
Observations	11,478	11,480	11,474
R-squared	0.20	0.19	0.11

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. District and month of interview dummies included. Base group column (1): not working, work for family/others; base group column (2): not working, self-employed, working for others; (3) base group: self-employed, not working, work for family.

3.6.3 Effects on Household Wealth and Children's Health

In order to establish that changes in employment for women in fact contribute to welfare effects for households (and to refute the possibility that a woman's decision to work is purely driven by poverty and may be needed to counter-act labor market deteriorations for other adult household members), we test if the inflow of refugees affects the overall welfare status of the household. To do so, we regress a binary variable, which assigns the value one to the poor households of the asset index (and 0 if they belong to >=middle categories) on the refugee inflow and similar control variables used in Table 3.1.[51] We do find positive welfare effects specifically for households in the poorest/poor wealth quintiles, as a negative coefficient in Table 3.5 suggests that households affected by the refugee inflow are less likely to become poor. This result also holds if we take the subsample of currently married women as often done in labor market studies (column 2).

As a further attempt to shed light on the overall welfare effect experienced by households, we investigate changes in the nutritional status of children below the age of five, born to the women in our sample. We aim at substantiating the idea that children's health improves as a consequence of women's increased engagement in employment, which is expected to work through the channel of greater bargaining power within the household. Thus, in Table 3.6 using subsamples of children below the age of five we investigate children's anthropometrics in terms of wasting, stunting, and underweight. In line with the positive effects on women's employment found in the previous regressions, our results indicate that households who are more exposed to the refugee inflow are better off in terms of children's nutritional status. This matches with studies indicating that an increase in household income allows a more diverse intake of food

[51] The asset index is divided into five wealth categories: poorest, poor, middle, richer, richest.

(Doan, 2014), especially if the income is put into the hands of women. For instance, Ornaheim (2016) finds that greater income from mothers' employment translates to higher consumption of market-purchased inputs such as food, which in turn improves nutritional outcomes. Overall, these results support the notion that a temporary refugee inflow induces a positive impact on both the welfare status of the households and children's health outcomes. Yet, they do not tell us anything about potential underlying mechanisms, which we discuss in the subsequent Section 3.9.

Table 3.5 Binary outcome – Households of low/lowest wealth quintiles (poor/poorest==1), 2001-2011

	(1)	(2)
VARIABLES	**Poor/Poorest HH (Full sample)**	**Poor/Poorest HH (Sample: Currently married)**
Log($RI_{c,t}$+1)	-0.0909***	-0.100***
	(0.0117)	(0.0146)
Female age	0.000818	-0.0131***
	(0.00240)	(0.00339)
Female age^2	-6.32e-05	0.000132***
	(3.85e-05)	(5.12e-05)
Female educ.(years)	-0.0355***	-0.0344***
	(0.000814)	(0.00105)
Husband's age		-0.00186***
		(0.000460)
Husband's education		-0.0249***
		(0.00333)
Log (Night-time light)	-0.00210*	-0.00163
	(0.00117)	(0.00142)
Distance to next water source (km)	-1.23e-07	-6.86e-08
	(1.83e-07)	(2.24e-07)
Km to DRC boarder	0.000275	0.000132
	(0.000181)	(0.000216)
Year=2006	-0.432***	-0.483***
	(0.0507)	(0.0638)
Year=2011	-0.155***	-0.172***
	(0.0199)	(0.0253)
Married	0.0502***	
	(0.00740)	

Constant	1.297***	1.723***
	(0.0800)	(0.102)
Observations	18,682	12,079
R-squared	0.318	0.318

Base category (0): Middle, Richer, Richest. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. District and month of interview dummies included in all specifications.

Table 3.6 Health undernutrition outcomes of children below the age of 5 years, 2001-2011

	(1)	(2)	(3)
VARIABLES	**Stunted**	**Wasted**	**Underweight**
$Log(RI_{c,t}+1)$	-0.0412*	-0.0249**	-0.0511**
	(0.0249)	(0.0112)	(0.0201)
Female education(years)	-0.0144***	-0.00231**	-0.00928***
	(0.00185)	(0.000944)	(0.00166)
Female age	-0.0102	-0.00167	-0.00515
	(0.00707)	(0.00391)	(0.00644)
Female age^2	0.000150	2.73e-05	0.000100
	(0.000116)	(6.45e-05)	(0.000107)
Log (Night-time light)	0.00600***	-0.000504	0.00238
	(0.00225)	(0.00155)	(0.00226)
Distance to next water source (km)	-1.80e-08	2.02e-07	-9.76e-08
	(4.28e-07)	(2.11e-07)	(3.91e-07)
Km to DRC boarder	0.000354	0.000218	-1.94e-05
	(0.000412)	(0.000198)	(0.000375)
Urban	-0.0701***	-0.0115	-0.0892***
	(0.0194)	(0.0104)	(0.0162)
Year=2006	-0.124	-0.0959*	-0.172**
	(0.107)	(0.0492)	(0.0870)
Year=2011	-0.00103	-0.0520**	-0.0248
	(0.0420)	(0.0223)	(0.0362)
Constant	0.884***	0.161	0.716***
	(0.184)	(0.103)	(0.166)
Observations	4,958	4,962	4,958
R-squared	0.058	0.027	0.052

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. District and month of interview dummies included in all specifications.

3.6.4 Social Cohesion Among the Host Population

Using the same treatment indicator as applied in Section 3.6.1, we find that an increase in the refugee index is associated with higher levels of the equality index, i.e. with higher levels of perceived equality between refugee's own ethnic group and fellow Ugandans. As described in Section 3.5.1, the index is composed of two variables, one indicating perceptions regarding equal treatment of the ethnic group by the government and the second variable measuring economic equality of the household in comparison to other Ugandans. Households with more exposure to refugees have slightly higher levels of adherence to their national identity over their ethnic group. This variable is positive and significant at the 10% level. Differentiating between trust towards state institutions and generalized interpersonal trust, we do not find significant results for any indicator. While the variables included in the institutional trust index are generally positively related with greater exposure with refugee settlements[52], this is not the case for the interpersonal trust variable. Here, our results are not significant at conventional levels. All regressions include regional and year fixed effects. We used various different treatment indicators[53] as robustness check, which give similar results to the ones reported here. In order to keep the interpretation simple and be able to differentiate across the different social cohesion components, we refrain from constructing an aggregated SCI index, which is done by Langer et al. (2016).

Table 3.7 Social Cohesion Indicators measured at the individual level

Langer et al. dimension	**Inequality**	**Identity**	**Trust**	
	Perceived equality	Adherence to national identity	Institutional trust	Interpersonal trust
$Log(RI_{c,t}+1)$	0.0616***	0.0452*	0.0034	-0.0246
p-value	(0.00000)	(0.06190)	(0.76959)	(0.13601)
N	10,776	9,398	10,593	6,987
Regional FE	yes	yes	yes	yes

[52] See Table 3B.2 (Appendix) for the results of the individual variables included in the aggregated measures.

[53] This included peak population data vs. peak inflows as well as constant treatment indicators focussing on the distance to refugee settlements.

Year FE	yes	yes	yes	yes

*** p<0.01, ** p<0.05, * p<0.1. P-values in parentheses, robust standard errors clustered at PSU level.

The reference frame for interpreting social cohesion indicators is mostly not adequately defined. Oftentimes it is measured at the individual level, yet social cohesion generally is a group phenomenon. To account for this, we also collapse the data to the next higher level, the PSU. Results at this 'neighborhood' level are very similar to the individual level results (refer to Table 3.8).

For the period of 2005 to 2012, Langer et al. (2016) have shown that social cohesion in Uganda seems to have decreased after 2005 and slightly increased from 2012 onwards without reaching the initial levels. Our results differ from those reported by Langer et al. (2016). We find that an increase in the refugee index seems to foster the perception of economic equality among the host population. While Langer et al. (2016) argued that the negative change in social cohesion was in line with an increased ethnicization of politics, it is possible that relative equality is associated with aid money following the inflows of refugees. To the extent that international donors follow area- rather than group-specific targeting and to the extent that respondents do not differentiate between services provided by the government and international donors, our refugee index may plausibly be associated with increased perceptions of equality among the host population. Also increasing economic opportunities for all households in closer proximity to refugee settlements might have supported equality. As described in Section 3.3, refugee camps have been set up in rural and less advanced areas of Uganda. Hence, economic possibilities might have been less pronounced, feeling communities left behind. Refugee presence and well documented increases in economic activities (e.g., Betts et al., 2014) might have led to welfare gains within these communities, resulting in a feeling of greater equality. Presence of different nationalities within the communities might have also deflected attention away from ethnic groups. The increased perceived equality in ethnic group treatment as well as the increase of adherence to the national (Ugandan) identity points towards this direction. On a positive note, identification with the nation state is a positive characteristic of a coherent society, which in the case of Uganda has often been challenged by ethnic conflicts. On the other hand, this result might hint at the fact that the host population aims at differentiating themselves from the 'newly arrived others', which would generally be interpreted as a lower level of social cohesion. Hence, besides strengthening ties among the host population, this finding might simultaneously point towards discrimination against other nationalities. Neither trust in institutions nor in people is significantly associated with the refugee index.

Table 3.8 Social cohesion indicators collapsed to the PSU level

	Inequality	Identity	Trust	
			Institutional	Interpersonal
Log($RI_{c,t}$ +1)	0.0622**	0.0316	0.0079	-0.0332
p-value	(0.01232)	(0.43334)	(0.58577)	(0.14527)
N	1,396	1,104	1,389	840
Regional FE	Yes	yes	yes	yes
Year FE	Yes	yes	yes	yes

*** p<0.01, ** p<0.05, * p<0.1. P-values in parentheses, robust standard errors clustered at district level.

3.7 Robustness of Results and Study's Limitations

3.7.1 Robustness Checks

The above regression results are based on several identifying assumptions and specification choices. Therefore, we examine their robustness regarding a number of possible threats to our identification strategy, such as (1) DHS sampling design and seasonality effects; (2) a potential endogenous refugee index and alternative calculations of the index related to stock vs. inflow numbers; (3) different samples.

3.7.2 DHS Sampling Design and Seasonality effects?

One concern in our analysis is related to the sampling design of the DHS data, which may potentially lead to spurious seasonality effects in our results. While DHS interviews are conducted during different times throughout the year, seasonality patterns differ throughout Uganda. Thus, monthly interview dummies might not sufficiently capture differences in seasonality. If the DHS data sampling procedure in those years with high refugee inflows happened to occur when the South-Western region was in planting or harvesting season while the remaining districts were sampled in lean season, we would find a highly significant spurious effect on female work in agricultural households, particularly those that are subsistence oriented. Yet, this scenario is very unlikely as the DHS intended to implement a random

sampling of the clusters.[54] We nevertheless implement different strategies to prove that our results are not biased by sampling procedures and seasonality patterns of the data. First, Figure 3B.3 provides evidence that the average distance from clusters to settlements is comparable for all three DHS rounds. Only the first wave (2000) includes more clusters located closer to the settlements, which would mean that our impacts may actually be underestimated (lower bound estimates).[55] Moreover, there is no huge variation across regions in Uganda regarding crop-growing times except for the fact that the Northern part (which is largely excluded) has only one growing season. As the lean period (months characterized by little or no harvest) lasts from April to June for all regions, the majority of the DHS interviews were conducted during harvesting seasons from August to February (FAO GIEWS, 2018). We further test the assumption that our coefficients are not biased by seasonality patterns by including a proxy for droughts, which is the length of the growing season. If farmers experience a prolonged drought period, growing times will be substantially reduced (Kansiime et al., 2016). Table 3B.5 depicts that our employment outcomes are robust to both the length of the harvesting season in a district, as well as the inclusion of seasonal/occasional work at the regional level. A further test of restricting the sample to the Western and Central region supports our central findings, as shown in Appendix Table 3B.8, column (3).

3.7.3 Alternatives to the Refugee Index and Potential Endogeneity

A further concern relates to the potential endogeneity of the refugee inflows used in the construction of our refugee index. It could be the case that despite strict governmental rules regarding the allocation to settlements, refugees systematically self-selected into certain settlements due to e.g., higher expectations of job opportunities. This would lead in turn to spurious estimates. We therefore substitute our refugee inflow figures with one for all three settlements in the treatment period, as already briefly described in Section 3.5. This alternative calculation reduces de facto our treatment variable to the distance to settlements. Table 3B.7 (Appendix), column (1) shows that there are no significant changes to our results, suggesting

[54] If there is no systematic bias in selecting DHS clusters within districts, i.e. if the selection of clusters is random, there should not be any problem about seasonality issues.

[55] If we assume that sampled clusters are overall located closer to settlements in the pre-shock period, this would lead to a higher refugee index for the post-shock waves. This in turn might narrow down the gap between (treatment and control) pre-and post-shock period, which suggests a downward bias (underestimation) of the reported effects.

that our estimates do not suffer from any endogeneity bias and simultaneously indicating that it is proximity to new economic opportunities rather than the relative size of the "shock" that matters most in our case.

Next, we compute several alternatives to the treatment variable to prove the robustness of our main coefficient of interest. First, we include the refugee inflow/distance component of all three camps separately into the regression, to reject the risk that one specific refugee settlement is driving our results. Table 3B.7 (row 4) confirms that all three settlements have an almost equal effect on our outcome variable, women's employment, with *Nakivale* (which experienced the largest refugee inflow) having the largest impact.

Following Baez (2011) and Maystadt & Verwimp (2014), we test if our treatment variable, Refugee shock $\sum_{s=1}^{3} \frac{P_s}{D_{s,c}^{\alpha}}$, remains robust to the use of different spatial weights in the treatment refugee index variable, with α equal to 0.5, 1, 2, 3. Put simply, if we change α from 1 to 2, i.e. if we place a higher weight on the distance, the effect of refugee numbers is diluted by distance.[56] As expected, the regression coefficients of our treatment variable are larger for smaller weights (e.g. 0.5), and smaller for larger weights (e.g. 2) (again at the median value of the refugee shock).

In the baseline regression, we model the inflows of refugee settlements as linear effects and assume that women's exposure to the refugee inflows is a function of both proximity to the settlements and the number of inflows. However, other studies (Maystadt & Verwimp, 2014, etc.) find a non-monotonic relationship between refugee inflows and their outcome variable, consumption. To contribute to that discussion, we introduce the squared term of the RI index to our regression in Table 3B.7. Indeed, the significant coefficient of the squared RI hints to a nonlinear relationship and diminishing returns between refugee inflows and female employment. We do expect the women living very close to the settlements to be the ones most positively affected by the inflow and the economic opportunities created by an increased demand for agricultural products and other services, while the benefits vanish with an increasing distance to the settlements.

[56] For instance, for 100km distance and α=2, the effect of the same number of refugees is weighted by 100^2=10,000km, which means that refugee inflows are diluted more by distance. If we take alpha=0.5, the effect of the same number of refugees does not dilute that fast, since we have $100^{0.5}$=10km.

We also implement alternative versions of our treatment variable by substituting the inflow refugee values with a level of the settlement population variable (by adding up the different inflow years from 1995 onwards), measuring the stock of the refugee population, rather than inflow figures.[57] Again, we obtain similar coefficients compared to our baseline results.

We also provide evidence that the effect of the Congolese refugees on our outcome variables is not altered significantly by adding the stock of refugees in the three settlements originating from other countries (such as Burundi, Rwanda or Sudan) to the specification. This would rather reflect the long-term effects of refugee presence (also see Kreibaum, 2016). In the main specification (column 1) of Table 3B.1, the coefficient is statistically significant, but the size of the effect is extremely small. However, one would expect business opportunities to continuously exist, and last over time. This means that in our case, the effect is driven by large numbers of the refugee inflow, i.e. new economic opportunities rather than established ones.

3.7.4 Robustness to Geography and Different Sample Size

We now explore the robustness of our estimation results to changes in the sample. First, we exclude all remaining Northern districts from the sample (eight in total), which have been occasionally affected by the conflicts of the LRA during 2008-2011 (UNHCR, 2018).[58] Second, we further restrict the sample to the Central and Western regions only, in order to see if our results change remarkably after removing all households in districts with large distance to our settlements. However, we do not observe any qualitative changes in our results after adjusting the sample in Table 3B.8 accordingly. We do find a slight increase of the coefficient when reducing the sample to the Central/Western regions, which is as expected since the included clusters are in closer proximity to the settlements.

3.8 Limitations

The variety of robustness checks above document that our results hold in terms of different samples and alternative specifications of our treatment variable. Further, we successfully tackled potential endogeneity issues. However, some limitations of our analysis remain.

[57] We recognize that this is a rather weak measure since we lack data on outflows of the settlements.

[58] Five Northern districts (Moyo, Adjumani, Kitgum, Pader and Gulu) were heavily affected by conflicts and are therefore dropped from the entire sample (see Section 5.4).

One main concern is that we cannot test if our estimates are confounded by internal migration, since we lack data whether women have moved away from their initial location/place of residence. However, we came across neither empirical nor anecdotal evidence for substantial migratory movements of this kind. This is also supported by Kreibaum (2016), who also does not find an indication for large scale migration between districts in Uganda. Our consistent results across a variety of robustness checks provide an example for the beneficial impact of refugee settlements on economic and selected welfare indicators of the host population. Yet, it is worth mentioning that our observed results are only average effects, which could potentially mask interesting heterogeneity in welfare changes. Therefore, we test for various interaction effects in Appendix Table 3B.9, which provide evidence that our effects do not significantly vary by women's education or by the wealth status of households. Also, we cannot find evidence that female headed households are differently affected by the refugee numbers, as the respective coefficients in column 5 are not significant.[59]

Our study sheds light upon potential impacts of refugee inflows within a setting characterized by relative strong interaction between refugee and host population. Hence, we fully acknowledge that our results are context-specific and might not apply to more isolated refugee situations. As Ugandan settlements are marked by an intensive interaction between locals and refugees in various economic and social activities, this allows for a more direct impact on local markets and societies. We expect, however, that previous exposure to high refugee numbers has contributed to this interaction between the host population and new arrivals. Due to data constraints, we also recognize that our estimates are not able to shed light on the effects on the male population in terms of labor market outcomes. Further, due to data constraints we are limited to the perspective of the host population, and we therefore cannot draw any conclusions about the welfare status of the refugees themselves.

3.9 Discussion

Using insights from qualitative interviews that we conducted in the *Nakivale* settlement in 2018[60] (supported by other reports), we hypothesize some possible channels through which the inflow of Congolese refugees may have positively influenced female employment, particularly in the self-employed agricultural sector. The first potential channel relates to increased access to

[59] Regression results are shown in Appendix Table 3B.9, column 3-5.

[60] See Appendix for qualitative data (personal interviews) that was collected.

agricultural markets in proximity to the settlements and changes in the sales structures. Previous to the refugee inflows, there existed no systematic structure for small scale producers to sell their surpluses generated by agricultural activities. Travelling themselves to markets within and outside the settlements was often assessed to be prohibitively expensive, particularly for those situated in remote places. However, increased refugee inflows lead to an increasing population within the camp and to more people producing small surpluses across the settlements. As a result, a middle-men trading structure was established over time, such that so-called "middlemen" buy produce from small farmers and then sell them at larger markets within and outside the settlements otherwise too far to be easily reached by the farmers themselves.[61] This offered new opportunities to sell surplus from agricultural products for people living in rural areas both within and around the settlements. In other contexts, such as Kenia, Alix-Garcia et al. (2017) describe that market structures for trading of services and goods are better developed within the camp than in neighboring towns. Similar mechanisms are reported in Tanzania, where the arrival of refugees triggered remote villages to become integrated into a trading regime and improved transportation network (Landau, 2002). Maystadt & Duranton (2014) suggest increased road construction and herewith reduced transportation costs among the effects of the refugee influx.

Second, population growth triggered by the inflow of refugees generates increased economic potential in general. Given that the refugee population is approx. 1/5 of the overall district population (100,000/500,000), it creates more demand for agricultural products. While this could potentially overburden local economies in the short-run, and while we cannot disentangle temporal dynamics involved, we see beneficial net effects for the period under consideration. An additional avenue for beneficial welfare effects among host populations is related to increased labor supply as refugees work as cheap laborers on the farms of Ugandans. Particularly, in a situation of high demand for agricultural produce, this enables the host population to increase the potential of their agricultural land to the extent that previously human resources might have

[61] Nakivale and Kyangwali refugee settlements are both located in Uganda's rural countryside, separated by long distances and poor roads from their nearest urban commercial centers of Mbarara and Hoima, respectively (Betts et al, 2014). For instance, the market in Mbarara is around 42 km away from the Nakivale settlement, which takes approx. 1.5 hours by car.

been a limiting factor and crowding out effects of local populations are limited in size.[62] Further anecdotal evidence from *Nakivale* and *Kyangwali* settlements report that aid organizations such as UNHCR, OPM, etc. provide specific trainings for women deliberately including both host population and refugees. These trainings generate knowledge to improve farming, skills training on crops and livestock production, as well as enabling participants to start farming activities while fostering inter-group relations (UNHCR, 2013; personal interviews 2018). Hence, host community women might now be more skilled to generate and sell agricultural surpluses.

A further possible scenario is that host community males in particular are switching to better-paid jobs in the formal sector offered by nongovernmental organizations or public services, which were created due to the increased presence of refugees (UNHCR report 2017), while women might substitute males' labor force in the agricultural sector. This is related to an insider's advantage that allows them to 'climb the ladder' in the local labor force.

Unfortunately, our dataset does not allow us to investigate these mechanisms quantitatively and disentangle the driving mechanism of the observed improvement in our estimation results.

3.10 Conclusion

While the public debate is currently dominated by the economic and social costs of hosting refugees, our study draws a more nuanced picture. Uganda has been praised as a country that offers refugees the opportunity to participate economically and socially by allowing them to e.g., work and own businesses and to further foster interaction between host and refugee population by establishing joint public services. We find that women living in households that experienced a higher refugee intensity in terms of living in close proximity to refugee settlements and in terms of increased inflow of refugees show higher employment rates particularly in agricultural self-employment compared to women living farther away. Moreover, we observe beneficial effects on household welfare and nutritional outcomes of children proxied by reduced wasting, stunting

[62] Another potential mechanism relates to price stability and increased demand. In Uganda, each arriving household has received a plot of land and a starting kit for agricultural production. In the short-run, an exogenous rise in demand by refugees is expected to increase prices in local markets (though this can be reduced by food aid providing in the short-run). In the medium-term and longer-run, providing refugees with these assets serves to stabilize agricultural prices surrounding the camp due to the refugees` potential to trade their surplus for other goods and also creates demand for non-agricultural products (Alix-Garcia et al., 2017).

and underweight. A battery of robustness checks confirms that the results are persistent for different specifications, samples, and after addressing potential endogeneity issues. Hence, more intense refugee presence is related to positive economic outcomes for females, their children and households more generally.

Besides an economic impact, we also study the effect on individuals' and communities' indicators of social cohesion – the 'glue' that holds a society together. The results are ambiguous and not straightforward to interpret. While we find no effect on different aspects of trust, we do find our refugee index to be associated with an increased perception of equality among the host population. This might be related to greater economic opportunities and herewith, labor force participation. Further, we see an increased adherence to the Ugandan nationality. While this can be positively interpreted as a support for the nation state over ethnic identities, this might also hint at the fact that the host population uses this to differentiate themselves from the refugee population. This could potentially lead to or reflect discrimination and should be regarded carefully.

We acknowledge that due to data constraints we cannot exactly verify the channels through which the improvement of female employment and household welfare took place. Nevertheless, we present several potential mechanisms based on qualitative interviews that we conducted in Nakivale, the largest of the three refugee settlements in our study, and further qualitative reports. Factors that might explain the results include greater demand induced by refugees, improved trading-structures established in reaction to more agricultural small-scale production within the settlements, and increased skills and knowledge acquired through trainings in farming activities. Our results are in line with the recently raised narrative of 'refugee economies' – describing refugees as economic actors and herewith changing the obsolete picture of the reducing refugees to being dependent human being (Betts et al., 2014). Important policy implications resulting from these narratives and our results are that international organizations and governments should further support the ability of the host population to exploit the increased demand and business potentials provoked by refugees and to lift labor market restrictions. Fostering economic activities between refugees and host populations is expected to ensure and may further increase economic benefits induced by the inflow and presence of refugees. At the same time, the social impact of large numbers of newly arriving populations on hosting communities has to be carefully observed to safeguard social cohesion.

Overall, this study shows economic benefits to local population when the host country facilitates labor market access and self-sufficiency of refugees. The progressive refugee laws in Uganda further supported interactions between refugees and the host population by various strategies

e.g., providing joint trainings in agricultural skills to strengthen the socioeconomic status of both the refugees and local population. Yet, the Ugandan refugee policy has been recently criticized, as an essential part of the Refugee Law, the land plots allocated to refugees, have shrunken substantially over the last years due to land scarcity. Further, changing rainfall patterns due to climate change have deteriorated harvest outcomes. These factors endanger the self-reliance approach of the Ugandan government, which implies that new strategies need to be developed and rolled-out to facilitate the economic participation of refugees and to avoid secondary conflicts.

3.11 Appendix

Table 3B.1 Non-linear (logit) models for binary outcomes

	(1)	(2)	(3)	(4)
VARIABLES	**Women's employment**	**Agri. Self - employed**	**Agri. Family**	**Agric. others**
Log($RI_{c,t}$+1)	0.236***	0.704***	-0.541***	-0.118
	(0.0803)	(0.0831)	(0.0999)	(0.179)
Stock of refugees	2.20e-05***	1.19e-05**	-1.73e-05**	7.32e-06
	(5.81e-06)	(4.95e-06)	(7.49e-06)	(8.81e-06)
Female education(years)	0.00657	-0.0731***	-0.0234***	-0.115***
	(0.00600)	(0.00591)	(0.00745)	(0.0132)
Female age	0.262***	0.125***	-0.284***	-0.00214
	(0.0150)	(0.0150)	(0.0170)	(0.0287)
Female age^2	-0.00329***	-0.00142***	0.00372***	-0.000238
	(0.000244)	(0.000236)	(0.000273)	(0.000465)
Married	0.168***	0.788***	-0.556***	-1.035***
	(0.0502)	(0.0514)	(0.0584)	(0.0981)
Female HH head	0.170***	0.0215	-0.334***	-0.200**
	(0.0480)	(0.0476)	(0.0593)	(0.100)
HH size	-0.0430***	-0.00625	0.0726***	-0.0223
	(0.00627)	(0.00673)	(0.00763)	(0.0155)
Wealth poor	-0.0886	-0.130**	0.109	-0.176
	(0.0726)	(0.0639)	(0.0708)	(0.129)
Wealth middle	-0.152**	-0.174***	0.111	-0.484***

	(0.0738)	(0.0668)	(0.0754)	(0.141)
Wealth richer	-0.283***	-0.265***	-0.0623	-0.530***
	(0.0740)	(0.0692)	(0.0811)	(0.148)
Wealth richest	-0.412***	-0.956***	-0.376***	-0.290*
	(0.0846)	(0.0859)	(0.105)	(0.171)
Lagged log (Night-time light)	0.00206	-0.0107	-0.0229***	0.0190
	(0.00727)	(0.00746)	(0.00845)	(0.0182)
Distance to next water source(km)	-2.17e-06*	7.00e-07	1.16e-06	-1.12e-06
	(1.29e-06)	(1.17e-06)	(1.55e-06)	(2.54e-06)
Km to DRC border	-0.00114	-0.00177	0.00119	0.00282
	(0.00122)	(0.00111)	(0.00134)	(0.00231)
Urban	-0.291***	-0.858***	-1.079***	0.735***
	(0.0606)	(0.0704)	(0.103)	(0.136)
Constant	-3.468***	-5.927***	4.885***	-0.577
	(0.539)	(0.539)	(0.625)	(1.168)
Observations	18,682	15,023	15,025	15,019
Pseudo R-squared	0.16	0.18	0.18	0.12

Table 3B.2 Separate indicators of the Social Cohesion Index measured at the individual level

	Inequality		**Institutional Trust**		
	=1 if own econ condition is same compared to others	=1 if own ethnicity was never treated unfairly by government	=1 if trusts police a lot	=1 if trusts courts a lot	=1 if trusts electoral commission a lot
$Log(RI_{c,t}+1)$	0.0399***	0.0838***	0.0204	0.0185	-0.0265*
p-value	(0.00850)	(0.00000)	(0.20037)	(0.17933)	(0.05595)
N	11,425	11,198	11,867	11,891	11,248
Regional FE	yes	yes	yes	yes	
Year FE	yes	yes	yes	yes	

*** p<0.01, ** p<0.05, * p<0.1. P-values in parentheses, robust standard errors clustered at PSU level.

Table 3B.3 Two-group mean comparison test in 1995, low refugee intensity districts (control) vs. high refugee intensity districts (treatment)

	Differences in means [mean(control)– mean(treatment)]	**T-statistic**
Women's employment	-0.0664***	(-4.80)
Sector occupation	-0.354***	(-6.71)

Agri. Self -employed	-0.133***	(-7.69)
Agri. Work for family	0.0194	(1.46)
Agri. Work for others	-0.00328	(-0.67)
Female educ in years	0.401***	(3.76)
Female age in years	-0.801**	(-3.17)
Female age in years^2	-48.46**	(-3.18)
Currently married	0.0548***	(4.12)
Number of hh members	0.405***	(4.13)
Female hh head	-0.0446***	(-3.53)
HH Wealth	0.108*	(2.53)
Urban	0.132***	(9.71)
Observations	6227	

T-statistics in parentheses,* p<0.05, ** p<0.01, *** p<0.001.

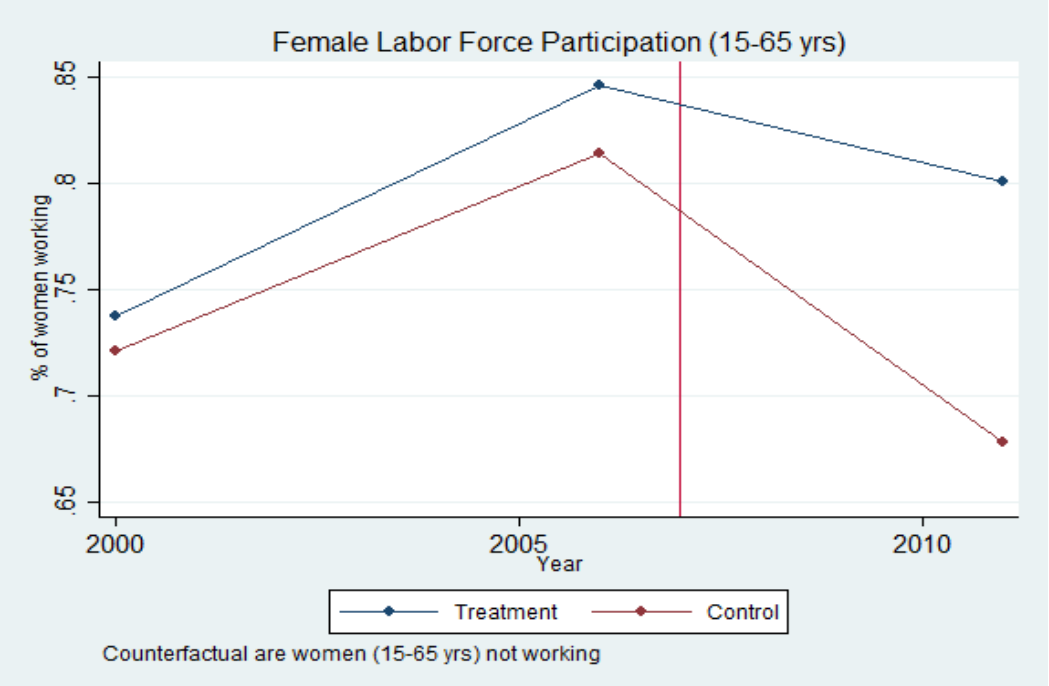
Table 3B.4 Placebo Model, 1995/2000- Treatment if the district will have a "high refugee intensity" in the future

	(1)	(2)	(3)	(4)
VARIABLES	**Women's employment**	**Agric. Self-employed**	**Agric. work for family**	**Agric. Work others**
Treatment if district will have a "high refugee intensity" in the future	0.0010 (0.98159)	-0.0237 (0.64107)	0.0354 (0.46382)	0.0007 (0.93885)
Female educ.(years)	0.0058***	-0.0136***	-0.0027*	-0.0038***
	(0.00678)	(0.00000)	(0.05855)	(0.00341)
HH size	-0.0080***	-0.0108***	0.0120***	0.0006
	(0.00297)	(0.00418)	(0.00003)	(0.59314)
Female age in years	0.0112***	0.0080***	-0.0062***	-0.0014***
	(0.00000)	(0.00000)	(0.00000)	(0.00069)
Female hh head	0.0545***	-0.0600***	-0.0208	0.0179***
	(0.00098)	(0.00023)	(0.20361)	(0.00502)
Wealth poor	0.0641*	0.0101	-0.0193	0.0002
	(0.06223)	(0.62654)	(0.31141)	(0.98147)
Wealth middle	0.0474	0.0114	-0.0298*	0.0070
	(0.15811)	(0.61668)	(0.09817)	(0.36725)
Wealth richer	0.0063	0.0124	-0.0907***	0.0059

	(0.87336)	(0.67961)	(0.00031)	(0.52027)
Wealth richest	-0.0394	-0.1156***	-0.1604***	0.0306
	(0.31312)	(0.00480)	(0.00000)	(0.15800)
Urban	-0.0991***	-0.2791***	-0.0727***	0.0171
	(0.00040)	(0.00000)	(0.00062)	(0.13376)
Constant	0.4050***	0.4998***	0.4092***	0.0666***
	(0.00000)	(0.00000)	(0.00000)	(0.00134)
Observations	12,622	8,717	8,746	8,722
R-squared	0.076	0.185	0.085	0.013

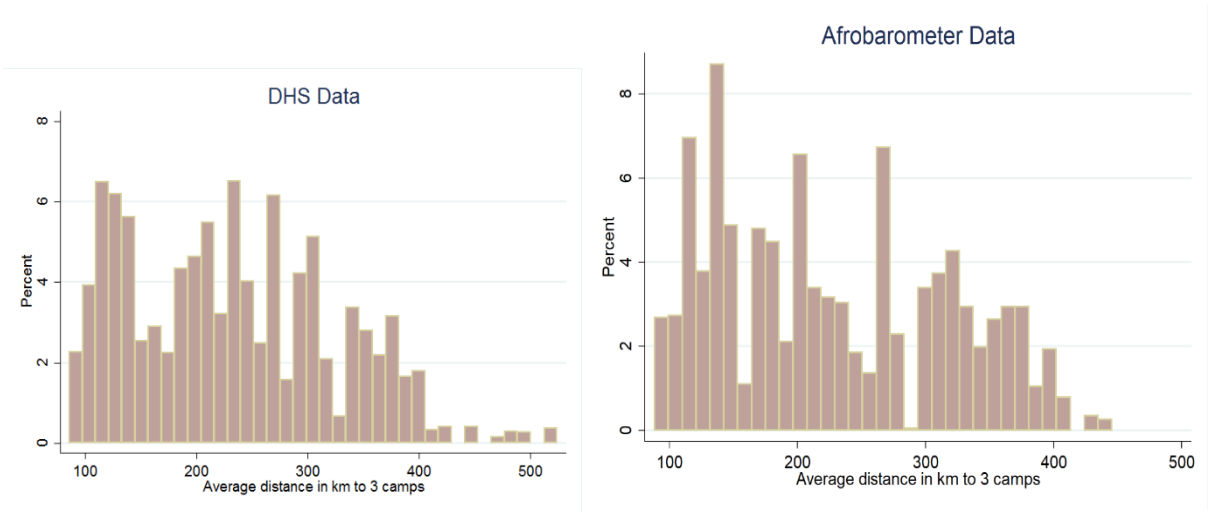
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10. Standard errors are clustered at the district level.

Figure 3B.1 Linear trend of female labor force participation rates (mean) in "high intense" refugee districts vs. "low intense" refugee districts before and after the treatment period



Source: Authors' calculations.

Figure 3B.2 Average distance from clusters to refugee settlements (km) for DHS and Afrobarometer Data



Source: Authors' calculations.

Figure 3B.3 Kernel density estimates of cluster to settlements average distance for all three waves

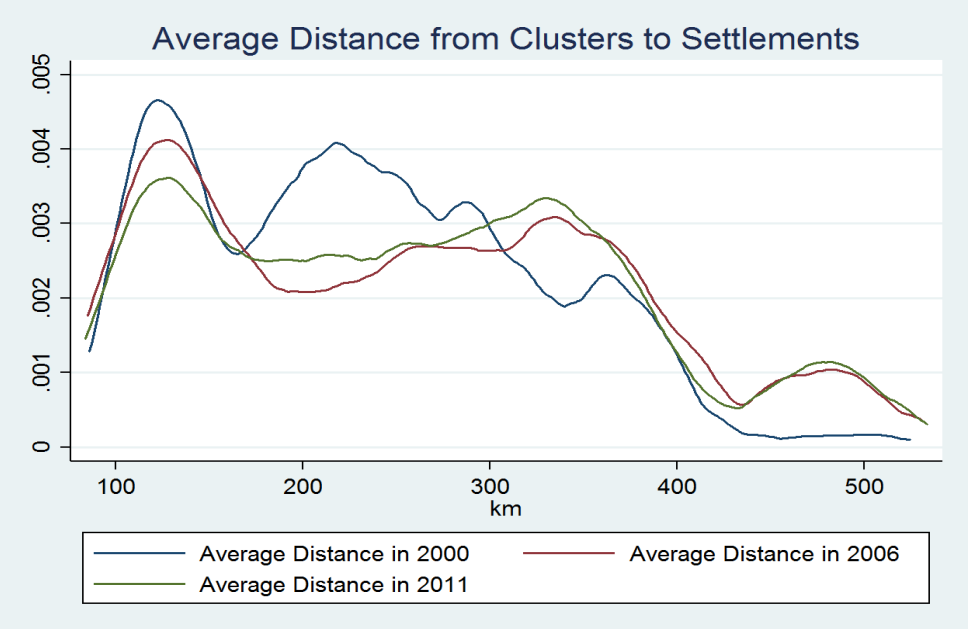


Table 3B.5 Controlling length of the growing season and seasonal work per district

	(1)	(2)	(3)	(4)
VARIABLES	Women's Employment Status	Women's Employment Status	Agricultural self-employed	Agricultural self-employed
$Log(RI_{c,t}+1)$	0.08***	0.06***	0.16***	0.17***
	(0.014)	(0.015)	(0.019)	(0.021)
District level				
Length of Growing Season	0.06***		-0.02	
	(0.019)		(0.024)	
Seasonal/Occasional Work		-0.28***		0.11
		(0.089)		(0.111)
Observations	12,079	12,079	10,352	10,352
R-squared	0.12	0.12	0.19	0.19

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.10. District and month of interview dummies included in all specifications.

Table 3B.6 Descriptive statistics: Afrobarometer Data

	(1)	(2)	(3)	(4)	(5)
	Full sample	**Above median of the refugee index**	**Below median of the refugee index**	**Difference (3)-(2)**	**T-statistic**
$Log(RI_{c,t}+1)$	2.27	3.14	2.10	-1.05	-22.04
SCI inequality component	0.25	0.25	0.25	-0.01	-0.74
"=1 if own economic condition is the same compared to others"	0.25	0.23	0.25	0.02	1.50
"=1 if own ethnicity was never treated unfairly by government"	0.25	0.28	0.25	-0.03	-3.06
SCI identity component	0.37	0.29	0.39	0.10	7.84

SCI institutional trust component	0.21	0.23	0.20	-0.03	-3.33
"=1 if trusts electoral commission a lot"	0.21	0.23	0.21	-0.02	-2.34
"=1 if trusts police a lot"	0.17	0.19	0.16	-0.02	-2.36
"=1 if trusts courts a lot"	0.24	0.28	0.24	-0.04	-3.88
"=1 if thinks most people can be trusted"	0.16	0.15	0.16	0.01	0.92
N	11902	1924	9978		

Table 3B.7 Robustness to alternatives to the refugee index (summary), 2001-2011

	(1)	(2)
VARIABLES	**Women's Employment**	**Women agricultural self-employed**
Constant refugee inflow (**=1**) for each camp		
$\log\left(\sum_{s=1}^{3} \frac{\mathbf{1}}{D_{s,c}^{\alpha}} + 1\right)$	2.596***	
	(0.493)	
Refugee Settlements separately included:		
Kyaka II settlement $\left(\frac{\mathbf{P}_{\text{Kyaka II}}}{\mathbf{D}_{\text{Kyaka II,c}}^{\boldsymbol{\alpha}}}\right)$	0.0240*	
	(0.0122)	
Nakivale settlement $\left(\frac{\mathbf{P}_{\text{Nakivale}}}{\mathbf{D}_{\text{Nakivale,c}}^{\boldsymbol{\alpha}}}\right)$	0.0498***	
	(0.0113)	
Kyangwali settlement $\left(\frac{\mathbf{P}_{\text{Kyangwali}}}{\mathbf{D}_{\text{Kyangwali,c}}^{\boldsymbol{\alpha}}}\right)$	0.0395***	
	(0.0124)	
Spatial weights:		
A. RI with α=0.5	0.0002***	0.0003***
	(0.000)	(0.000)
B. RI with α=2	0.0165***	0.0234***
	(0.003)	(0.004)

C. RI with α=3	0.2120***	0.3235***
	(0.072)	(0.076)
D. RI with α=1 and without log	0.0009***	0.0015***
	(0.000)	(0.000)
U-shaped relationship:		
E. Log($RI_{c,t}$+1)	-0.2117***	-0.1016***
	(0.033)	(0.043)
F. Log($RI_{c,,t}$)^2	0.0341***	0.0324***
	(0.004)	(0.005)
G. Level of settlement population $\log(\sum_{s=1}^{3} \frac{\text{Level of refugees}}{D_{s,c}^{\alpha}} + 1)$	0.106*** (0.0150)	0.181*** (0.0231)
District, year dummies	Yes	Yes
Month of interview dummies	Yes	Yes

Note: Only the coefficient for the Refugee Index ($RI_{c,t}$) is reported. All control variables are included. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.10.

Table 3B.8 Alternative samples– Married sample; Northern and Western regions excluded, 2001-2011

VARIABLES	(1) Married Sample	(2) Northern Districts excluded	(3) Central and Eastern District
Log($RI_{c,t}$ +1)	0.0792***	0.0582***	0.0795***
	(0.0229)	(0.0130)	(0.0184)
Stock of refugees	-2.92e-07	1.91e-06**	
	(1.19e-06)	(7.62e-07)	
Female education(years)	0.00765***	0.00245**	0.00366***
	(0.00113)	(0.00102)	(0.00129)
Female age	0.0281***	0.0577***	0.0591***
	(0.00335)	(0.00235)	(0.00296)
Female age^2	-0.000319***	-0.000752***	-0.000760***
	(4.94e-05)	(3.75e-05)	(4.74e-05)
Household size	-0.00491***	-0.00882***	-0.00765***
	(0.00148)	(0.00115)	(0.00138)
Female household head	0.0171*	0.0206***	0.0302***
	(0.00926)	(0.00741)	(0.00962)
Wealth poor	-0.00669	0.00526	0.0111
	(0.0123)	(0.0115)	(0.0155)
Wealth middle	-0.00859	-0.00803	0.0100
	(0.0124)	(0.0116)	(0.0160)
Wealth richer	-0.0362**	-0.0272**	-0.00953
	(0.0144)	(0.0121)	(0.0158)
Wealth richest	-0.0602***	-0.0522***	-0.0231

	(0.0168)	(0.0145)	(0.0184)
Husband's age	-0.00102**		
	(0.000478)		
Husband's education	0.00117		
	(0.00314)		
Lagged Log (Night-time light)		-0.00383***	-0.00355**
		(0.00141)	(0.00153)
Distance to next water source (km)	-3.98e-07	-2.24e-07	-1.28e-07
	(3.05e-07)	(2.46e-07)	(3.30e-07)
Km to DRC boarder	0.000303	0.000191	0.000211
	(0.000316)	(0.000197)	(0.000271)
Urban	-0.0901***	-0.0558***	-0.0302**
	(0.0177)	(0.0121)	(0.0147)
Year=2006	0.293***	0.178***	0.230***
	(0.0980)	(0.0580)	(0.0776)
Year=2011	0.258***	0.250***	0.304***
	(0.0388)	(0.0218)	(0.0295)
Constant	0.0493	-0.593***	-0.793***
	(0.124)	(0.0932)	(0.128)
Observations	12,079	14,713	9,771
R-squared	0.12	0.18	0.183

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. District and month of interview dummies included in all specifications. Dependent variable: women's employment.

Table 3B.9 Controlling for unobserved district effects and testing interactions between the refugee index and female education/ HH wealth

VARIABLES	(1) Women's Employment Status	(2) Women's Employment Status	(3) Women's Employment Status	(4) Women's Employment Status	(5) Women's Employment Status
$Log(RI_{c,t}+1)$	0.0736**	0.0677**	0.0500**	0.0566**	0.0520**
	(0.0333)	(0.0334)	(0.0209)	(0.0219)	(0.0210)
Female educ. (years)		0.00188*	-0.00428**		0.0524***
		(0.00105)	(0.00187)		(0.00236)
		(0.00881)			-0.000685***
HH head		0.0278***	0.0124*	0.0135*	(3.58e-05)
		(0.00787)	(0.00719)	(0.00725)	-0.00806***
HH wealth poor		0.000606		0.00133	(0.00117)
		(0.0105)		(0.0201)	-0.0146
HH wealth middle		-0.00476		-0.0203	(0.0125)
		(0.0110)		(0.0198)	-0.0251**
HH wealth richer		-0.0238*		-0.0614***	(0.0123)
		(0.0124)		(0.0212)	-0.0517***
HH wealth richest		-0.0459***		-0.117***	(0.0137)
		(0.0147)		(0.0249)	-0.0976***
$Log(RI_{c,t}+1)$* Female educ.(years)			0.000876		(0.0157)
			(0.000584)		
HH wealth poor*$Log(RI_{c,t}+1)$				-0.00570	
				(0.00674)	
HH wealth middle* $Log(RI_{c,t}+1)$				-0.00145	
				(0.00679)	
HH wealth richer* $Log(RI_{c,t}+1)$				0.00476	
				(0.00720)	
HH wealth richest* $Log(RI_{c,t}+1)$				0.0107	
				(0.00773)	

Selected Personal Interviews:

Nakivale Camp, Uganda conducted by Jana Kuhnt from 19.-27.04.2018

Interview with William, from DRC. Arrived in 2006, Refugee Welfare Council (RWC) Leader

- When Congolese refugees arrive at the border they go to registration center located at the border
- Within mostly 2 weeks they are then distributed to a camp (priority is given to camps where family members are already living), refugees themselves are not able to select a camp
- After registration in camps, thy receive basic items (towels, blankets etc.) and poles to build a house, also seeds for land to produce agricultural products
- The starting point was farming for economic activities, as well as income generation
- They mostly produce beans and maize (corn), similar to DRC agricultural production (in DRC additionally produced rice)
- Select their agricultural production according to possibilities of land (what is possible to cultivate on this land)
- There is little competition with the host population
- Sells his surplus to middle men (which can be refugees and Ugandans) who then sell it at the larger markets in e.g. Mbarara
- No price differences across host or refugee population, same prices in whole camp
- Agricultural production as food security
- First wave of refugees in 1990s and then 2006/2008 and since then no possibility to return due to continued conflict in DRC
- Children attend school at camp (joint attendance with host population)
- Children learn English and sometimes local Ugandan language (Anchovi)
- English as common language and all live together in one community, children go to same

school, use same health center...no open conflicts apart from re-occurring land conflicts

Interview with Thomas, Team Leader UNHCR Nakivale Camp

- Distribution of refugees at the border (from registration points): according to free capacity in camps – good to concentrate on camps with large influx (other small influx might be due to family members already present in camp)

Interviews at Market in Nakivale Camp (New Congo)

- Rwandese refugee women with shops for potatoes
- Buys potatoes outside of camp from Ugandan farmers and sells it within camp
- Rwandese refugee family (woman: Ivonne, man: al nur) have small shop for vegetables
- Vegetables are mostly bought at middlemen who get their products from Ugandans and refugee farmers
- Opened shop in 2002, stable income flows but then 3-4 years ago less agricultural products available as land that is located close to Nakivale lake has been captured by Ugandans and agricultural production was disabled.
- Uganda women that opened shop within camp at market to gain from new business opportunities
- Wholesaler for beans
- Buys from host and refugee farmers
- Prices are generated by supply
- Congolese business women, wholesaler for beans
- Buys from Anchovi (Ugandans) beans and then sells it at market
- Did not receive any land when arrived in 2011, so had to find alternative business opportunities
- Overall a lot of business in market areas with large economic activity, communication in Kiswahili among refugees

Interview with Wholesaler, Active Since 2015

- Buys sorghum, maize, beans from farmers
- Host and refugee get same price from him
- Started with small shop but then is now more middlemen as he then sells the products to Ugandans outside of camp
- Several Ugandans employ refugees outside camp for farm work
- Agricultural production very dependent upon land availability – decreased in the last years due to the fact that a smaller plot of land was distributed to newly arriving refugees

4 Does Women's Labor Force Participation Reduce Domestic Violence? Evidence from Jordan

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Abstract

Enhancing women's labor force participation is seen as a way to promote their empowerment and improve their well-being and the well-being of their children. The empirical literature on the relationship between women's employment status and domestic violence is less clear-cut. Using quantitative data from Jordan in 2007, this study explores the effect of women's employment, as measured by their participation in paid work outside the home, on reported domestic violence, controlling for the potential endogeneity of women's employment, which might bias the relationship between employment and domestic violence. Without taking endogeneity into account, the regression results suggest that a woman's participation in paid work enhances violence by her husband. After controlling for endogeneity, these results turn out to be insignificant, which suggests that women's work status has no causal influence on marital violence. Differentiating between various types of domestic violence provides weak evidence that women's employment lowers sexual violence.

4.1 Introduction

In the Middle East, women are about 28 percent of the working population while in comparable middle-income countries the proportion is about 43 percent. In 2005, women's labor force participation in Jordan was 14.9 percent, far below regional rates and other lower middle-income countries (Economic and Social Council 2008; World Bank 2004, Gaddis & Klasen, 2014).

Women's employment is desirable on intrinsic and instrumental grounds. Following Sen's capability approach, work constitutes an important element of women's well-being and empowerment (Sen, 1999). Empirical studies indicate that women who have access to economic resources invest in their children's education and nutrition and preventative healthcare, and have lower fertility rates (for example, Vyas & Watts, 2009). In fact, women's employment has been found to be a robust factor reducing fertility, child mortality, and gender bias in mortality (for example, Murthi, Guio & Dreze, 1995; Klasen & Wink, 2003). Reducing gender gaps in employment has also been seen as a determinant of economic growth using cross-national and cross-regional studies (Esteve-Volart 2004; Klasen & Lamanna, 2009).

However, there may also be negative impacts of women's employment on their well-being due to an increased risk of domestic violence. Moreover, the link between domestic violence and a woman's involvement in paid work is unclear. Some studies find a "protective" effect since earned income promotes empowerment, which leads to a better household bargaining position.[63] Other studies indicate that women's employment increases spousal violence, since husbands see their role as breadwinners undermined.

A key concern is the potential endogeneity of women's working status and violence, due to reverse causality or omitted variable bias. It may be the case that domestic violence leads women to seek employment, or that unobserved factors drive women's decision in favor of work and their husbands' violence. For instance, in the former case, a recent study in the Indian context by Bhattacharya 2015 finds that women who experienced spousal violence are more likely to be employed than women who are not exposed to violence. To address these issues, several linear probability models and probit regressions using instrumental variables are

[63] Incidentally, this is also the implicit position taking by the summary document of the Committee on the Status of Women that sees women's economic empowerment as a critical means to reduce domestic violence (United Nations 2013).

implemented. While our regular results without controlling for endogeneity indeed show that employment outside of the home increases domestic violence, we find a statistically and economically insignificant effect of employment on domestic violence in the IV specification, suggesting that endogeneity bias is indeed a problem and leads to spurious positive relationship between employment and domestic violence. When we disaggregate by different forms of domestic violence, these results are replicated for emotional and physical violence. In the case of sexual violence, we actually find a weak protective effect of women's employment.

4.2 Theoretical Background: Theories of Domestic Violence

4.2.1 Bargaining Model

Non-cooperative bargaining models of domestic violence, such as Farmer & Tiefenthaler's (1996), forecast that an increase in women's economic empowerment through earned income or financial support from outside the marriage will lower the level of spousal violence within households. Improvements in women's financial status will increase their probability of leaving an abusive relationship, which may lead either to the end of the partnership or a decrease in violence. Tauchen, Witte & Long (1991) developed a Nash-bargaining model of domestic violence to represent the effect of changes in income on domestic violence. In their model, every spouse has a specific level of the threat-point which should provide the minimum level of welfare to both spouses within the relationship. The woman's threat-point indicates the level of violence she is willing to accept without leaving the marriage given a specific amount of financial transfers from her husband. The model predicts that an increase in the man's income enables him to "buy" more violence by increasing the financial transfers to his wife. On the other hand, an increase in the woman's income constrains him to reduce violent behavior. Similarly, in resource theory, women's income leads to a higher household income. This resource effect decreases household economic stress and thereby reduces spousal violence (Gelles, 1997). All of these models predict a protective effect for women's employment.

4.2.2 Male-backlash models

Sociological "male-backlash" models predict the opposite. As women's wages increase, violence against them will be triggered as well, since men consider their traditional gender role to be threatened. According to a study of Macmillan & Gartner (1999), marital relationships are dominated by socially and culturally prescribed gender roles. To the extent that women's independence changes these roles, women experience more violence since men try to compensate for lost authority.

As argued by Aizer (2007), male-backlash theories do not consider women's rationality constraint and ignore the possibility that women can choose to end the relationship (Aizer, 2007). In Jordan, women do not have attractive outside options. The divorce rate is quite low, around 1.96 percent. The legal system, based on *Sharia*, impedes divorce since separating from one's husband is accompanied by significant social stigma and economic distress. In this context, the threat of ending the marriage may not be credible and a bargaining model may not be appropriate (Bhattacharya, Bedi, & Chhachhi, 2011). The most frequent divorce procedure is the *talaq* ("arbitrary" divorce), the right to divorce without providing any legal reasons which is exclusively reserved for the husband. The law prescribes the wife's right to financial compensation after an arbitrary divorce, and she gets compensated for at least one year and a maximum of three years. However, if the wife is seeking a divorce in Jordan, she gives up all her financial marital rights and may face an insecure economic situation after divorce (El Azhary, 2003).

4.2.3 Previous Empirical Findings

The recent empirical evidence on the effects of women's economic empowerment is not clear-cut. Macmillan & Gartner (1999) investigate the link between women's employment and domestic spousal abuse in Canada. Their findings suggest that the effect of women's employment on marital violence depends on men's working status. If the husband is unemployed, the risk of violence increases if the woman works, whereas it decreases for working women when the husband is employed. Bhattacharya et al. (2011) explore the link between women's work status and property ownership and domestic violence in India. Taking into account the potential endogeneity of this relationship, they instrument women's employment status by the membership in a specific caste.[64]

The estimation results show that women's participation in paid work is associated with a sharp reduction in spousal violence. A further qualitative study by Vyas, Mbwambo & Heise (2015) explores the link between women's paid work and intimate partner violence in the context of Tanzania. Focusing on semi-conductive interviews on women engaged in informal-sector trading activities, they find no association between women's independent income and partner

[64] It is unclear whether this instrument satisfies the exclusion restriction as there might be caste-related norms that affect domestic violence directly.

violence. Yet, the results suggest that women were able to spend their earned income according to their needs, which in turn reduced conflict due to negotiations over money.

Atkinson, Greenstein & Lang (2005) support the male-backlash theory. They analyze the incidence of violence under consideration of cultural variables and traditional gender roles. Using an index of traditionalism, the effect of the relative income on the incidence of violence is tested. The estimation results indicate that the share of women's income is only positively correlated with spousal violence if the husband has a traditional ideology. Bloch & Rao (2002) use survey data from three villages in India, finding that the risk of spousal violence is higher for women from rich households. The regression results suggest that dissatisfied men inflict violence to extract more money from their wives' families.

Not many studies are available from Middle Eastern countries. Kishor & Johnson (2004) find a positive relationship between women's paid work and the incidence of violence in Iran, and a negative significant effect in Egypt. Yount (2005) investigates the relationship between woman's socioeconomic dependence and physical abuse among married women in Egypt. Multivariate findings suggest that greater differences between a woman and her husband's socioeconomic status are associated with a higher probability of physical abuse.

With the exception of the study by Bhattacharya et al. (2011), none of these studies controls explicitly for the endogeneity of women's employment, which may bias the results.

4.3 Data

The analysis in this paper is based on the household- and women-only questionnaire of the 2007 Jordan Population and Family Health Survey (JPFHS). The data were collected by Measure DHS initiated by the US Agency for International Development (USAID) to provide data for demography, health, and nutrition for children and women in developing countries. A nationally representative sample of 14,564 households in Jordan were interviewed, including 10,867 ever-married women in ages 15–49. The nonresponse rate is less than 1 percent. All twelve governorates of Jordan are included as well as urban and rural areas and the Badia desert region in the south.

The women-only questionnaire includes a special section regarding domestic violence and women's empowerment. In order to identify if the woman experienced *emotional violence*, the following questions were asked: Does/did your husband ever: say something to humiliate you in front of others/ threaten to hurt or harm you or someone close to you?

To reveal the extent of *physical violence*, they asked: Does/did your husband ever: push you, shake you, or throw something at you/ slap you or twist your arm/punch you with his fist or with something that could hurt you/ kick you, drag you or beat you up/ try to choke you or burn you on purpose/threaten you with a knife, gun, or any other weapon/ attack you with a knife, gun, or any other weapon?

To identify if the women experienced any *sexual violence*, they asked: Does/did your husband ever physically force you to have sexual intercourse with him even when you did not want to?

These three different kinds of violence, emotional, physical, and sexual, were summarized to an index of spousal violence that represents the dependent variable in our regression analysis. If any of the three questions are answered with a yes, the variable is one. In a robustness check, we also use the three indicators separately. The dependent variable, domestic violence, is a binary variable that can only take the values zero or one. A linear probability model is implemented to estimate the probability of a woman experiencing domestic violence. As a great proportion of predicted probabilities falls between zero and one, the estimates are expected to be unbiased and consistent (Horrace & Oaxaca, 2006).[65]

4.4 Empirical Specification

The linear probability model includes socioeconomic characteristics, household data, and regional components. The presence of domestic violence is modeled as,

$$DV = \beta_0 + \beta_1\, woman's\ working\ status + \beta_2\, Characteristics\ Husband/Wife + \beta_3\, HH\text{-}\ Characteristics + \beta_4\, Region + \epsilon_i \quad (1)$$

The dependent variable domestic violence captures the incidence of emotional, physical, and sexual violence in the household. The key independent variable, woman's working status, indicates whether the woman is involved in paid work outside the home. We also add a range of

[65] It turns out that the predicted probabilities of domestic violence from the main specification all lie in the interval (0.017, 0.609) and thus, a linear probability model is expected to yield consistent estimates. Moreover, we also estimate a probit model to check for the robustness of the results and found them to be virtually identical. Results are available on request.

control variables, including characteristics of husband and wife, such as education, husband's employment status, age difference between the spouses, and household characteristics, including the number of household members as well as economic status.

Other control variables include the number of co-wives and, given the prevalence of kinship marriages in Jordan, the degree of kinship between spouses. Since there are vast differences in the economic and social structure of the different governorates of Jordan, they are captured by regional dummy variables. ϵ_i represents other unobservable factors that are captured by an independent and identically distributed (i.i.d.) error term.

4.5 Endogeneity Issues

A key concern in this regression is the potential endogeneity between women's working status and domestic violence. Endogeneity can have several sources, two of which may be present in this model, namely simultaneous causality and omitted variables. The presence of violence may lead a woman to increase or decrease her willingness to work. Most studies suggest that violence reduces women's employment due to mental and physical health consequences (Staggs & Riger, 2005; Tolman & Wang, 2005), increasing tardiness and absenteeism (Lloyd, 1997; Riger, Ahrens & Blickenstaff, 2000). On the other hand, women who are suffering from abuse might be more likely than non-abused women to seek paid work (Narayan et al., 2000). Studies from developing countries find mixed results as regards the probability that an abused woman works outside the home, since abused women are both more likely and less likely to work (Morrison & Orlando, 1999). In this case, causality would run both ways, leading to a biased coefficient on women's employment.

Work status and domestic violence are driven by a third unobserved factor, traditionalism. These two possibilities of endogeneity suggest that in equation (1) the observed relationship between women's working status and domestic violence may be biased or even spurious. However, the direction of bias can be ambiguous. Although employment status and traditionalism is likely to be negatively correlated, the effect of traditionalism on violence could be positive or negative. Under the assumption that the incidence of violence is positively correlated with the degree of traditionalism (assuming that a more traditionally socialized spouse does not allow his wife to work), we may have a downward bias, finding a spurious negative correlation. Of course, if traditional husbands beat their wives less (and ensure that

they work less), there could be a spurious positive correlation, leading to an overestimate of the coefficient on the employment status.[66] In this case, the coefficient of women's employment status is underestimated. With respect to reverse causality, the bias is hard to quantify. If violence causes women to work less, it may lead to a downward bias of the coefficient (an underestimation); if it causes women to work more, it would lead to an upward bias. Existing literature suggests that estimates of the effect of women's employment are more likely to be underestimated (Farmer & Tiefenthaler, 2004; Johnson, 1995).

To tackle the issue of endogeneity through omitted variables and reverse causality, a two-stage linear probability model is implemented. Specifically, the first stage is defined by

$$Working\ status = \Pi_0 + \Pi_1 z_1 + \Pi_2 z_2 + \upsilon_i \quad (2)$$

where working status is predicted by the exogenous instruments z_1 and the control variables z_2 (which overlap with the variables in (1)). The error term $\boldsymbol{\upsilon_i}$ captures the remaining variance of *working status*, which is not explained by the covariates (including the instrument) in equation (2). In the second stage, the outcome, domestic violence, is regressed on the predicted value of the endogenous variable, working status, from the first stage along with other exogenous variables. Several studies have shown that estimating a linear probability model via "two-stage least squares" provides a good estimate of the average effect, making the magnitude of the coefficients easier to obtain (Miguel et al., 2004; Wooldridge, 2002; Angrist & Pischke, 2009).[67] As there are questions regarding the consistency of these IV estimation techniques when there is a limited dependent variable in both stages, we also estimate the model using the two-stage residual inclusion method (2SRI) as a further robustness check.[68] As *wife's working status* is a binary endogenous regressor, this method delivers consistent estimates in nonlinear models (Wooldridge, 2002). In the first stage, the auxiliary equation (2) is estimated as a probit model.

[66] For example, one may argue that in these traditional families, gender roles are clearly delineated with each "knowing their place," leading to less conflict and violence. This absence of violence would not mean that there is no inequality, but could be a result of both partners accepting the unequal family situation.

[67] Angrist and Pischke (2009) show that linear probability models (LPM) are a good option for different kinds of limited dependent variables.

[68] This method was first suggested by Jerry Hausman (1987). Consistent 2SRI methods for nonlinear models have been developed by Richard W. Blundell and Richard J. Smith (1989) or Whitney K. Newey (1987).

In the second stage regression, the endogenous variable *wife's working status* is not replaced. Instead, the residual term (υ_i) of equation (2) is included as an additional regressor in equation (1), which is estimated by a probit model as follows:

$$DV = \beta_0 + \beta_1 \text{ woman's working status} + \beta_2 \text{ Characteristics Husband/Wife} + \beta_3 \text{ HH- Characteristics} + \beta_4 \text{ Region} + \gamma\ \hat{\upsilon}_1 + \epsilon_i \quad (3)$$

Testing the coefficient γ of $\hat{\upsilon}_1$ in equation (3) evaluates whether working status is indeed endogenous.[69] A key issue in this estimation is the validity of the instruments. A valid instrument should fulfill two conditions: First, it should be strongly correlated with the endogenous variable. Second, it should be exogenous in the basic model. In the current case, there are a few potentially strong candidates that could serve as good instruments, for instance type and size of the family or currently pregnant. These variables are already used in other studies to instrument women's work status (Bhattacharya et al. 2011; Chin, 2007). However, the results of appropriate tests indicate that in this case only the variable *cluster average of working status* constitutes a valid instrument. The variable is constructed in such a way that we always use the cluster average excluding the woman being considered in each observation to avoid an in-built correlation. The cluster average of working status has a strong impact on women's own employment status, but should not be directly correlated with husband's violent behavior, other than through its impact on women's own employment. Hence, the conditions necessary to be a valid instrument should be fulfilled in this case.

In the empirical analysis several specifications are estimated and the validity and strength of the instruments are tested.

[69] The coefficient of $\upsilon\hat{}_1$ is significant at the 5 percent level and thus, the null hypothesis of exogeneity of working status in equation (1) can be rejected. Therefore, using standard LPM regression models is not appropriate.

4.6 Descriptive Statistics and Variables

4.6.1 Descriptive Statistics

According to the Jordan Population and Family Health Survey 2007, one in five ever-married Jordanian women reported that they suffered from physical violence at the hands of their husband during their lifetime. Around 12 percent of women documented that this abuse took place within the year before the survey. With respect to the type of violence, eight percent of ever-married women experienced sexual violence by their husband. Emotional violence is prevalent as well, as one in five women suffered from emotional abuse by their husband. Overall, 28.1 percent of ever-married women reported ever having experienced emotional, physical or sexual violence by their husbands. These are large shares of women, particularly if one allows for the possibility of underestimation of domestic violence in such a survey setting. [70]

Table 4.1 Incidence of domestic violence in Jordan (%)

	Type of violence			
Wife's age	Emotional	Physical	Sexual	Domestic violence
15–29	14.91	16.98	7.31	25.14
30–39	19.05	19.63	8.49	28.86
40–49	20.07	18.54	8.35	30.55
Overall	17.79	18.49	8.07	28.11

Note: Sample Size N= 2,283

Table 4.2 Incidence of domestic violence by wife's working status in Jordan (%)

Type of Violence	**Not working (wife's working status=0)**	**Working (wife's working status=1)**

[70] These shares are close to the rates reported by the World Bank (2014) for the Middle East as a whole of 40 percent.

Emotional violence	18.16	16.81
Physical violence	18.41	19.00
Sexual violence	8.14	7.64
Domestic violence	28.14	27.95

Note: Sample Size N= 2,283

Women with lower levels of education and those living in poorer households are more likely to report domestic violence than women with more education or those living in wealthier households. Table 4.2 shows that reports of physical/sexual/emotional violence also vary by wife's working status, however the differences are rather small. Around 19 percent of the women who were working reported being a victim of physical violence compared to 18 percent of women who were not working Domestic violence is also more common in situations where the husband is better educated than the wife and in households where the wife is significantly older or younger than her husband. Table 4.3 further reports lower rates of domestic violence for women who are living in a kinship marriage compared to those who are not married to a relative. These correlations are interesting, but of course do not necessarily imply a direction of causality.

Table 4.3 Incidence of domestic violence in Jordan by background characteristics (%)

	Type of Violence			
Variables	Emotional	Physical	Sexual	Domestic violence
Wife's education				
0 years of schooling	26.74	25.63	13.37	37.33
1–6 years of schooling	19.36	21.63	8.48	31.31
6–12 years of schooling	17.10	14.72	6.93	24.46
12–18 years of schooling	12.97	12.76	6.02	21.47
Husband's education				
0 years of schooling	19.44	20.37	9.26	26.85
1–6 years of schooling	22.32	21.87	11.39	33.49
6–12 years of schooling	18.55	20.05	8.50	29.79
12–20 years of schooling	14.02	12.66	5.09	21.34

Spousal age difference				
Wife older	16.83	19.80	9.90	28.71
Wife is same age	13.20	17.26	5.08	24.37
Wife's 1–4 years younger	17.68	18.16	7.34	27.73
Wife's 5–9 years younger	17.46	17.14	8.49	27.08
Wife's 10 + years younger	21.41	21.73	8.82	31.86
Wealth quintile				
Lowest	20.89	22.49	9.25	31.96
Second	16.84	18.96	8.01	28.15
Middle	16.18	18.24	10.00	27.21
Fourth	17.38	14.58	5.42	25.23
Highest	17.78	13.70	5.54	24.49
Kinship marriage				
Kinship marriage = 0	19.66	20.56	8.35	29.82
Kinship marriage = 1	17.39	18.28	8.66	27.84
Spousal education difference				
Husband better educated	20.14	20.59	9.94	31.15
Wife better educated	17.71	18.96	8.23	29.02
Both equally educated	15.40	14.78	5.22	22.36

Note: Own Calculations, Sample Size N= 2,283

4.6.2 Independent Variables

Wife's working status is a binary variable taking the value of one if the woman is engaged in paid work outside the home. If the variable takes the value zero, the woman is unemployed or works inside her home. Similarly, the variable for husband's employment takes the value one if he worked during the last twelve months. Since education might have a nonlinear effect on violence, the squared term is included in the model as well. Since age of men and women shows a high correlation, the variable age difference between the two spouses is included in the

model,[71] also to indicate differences in bargaining power.[72] Generated with the principal components analysis, the wealth index places individual households on a continuous scale of relative wealth. No further variables concerning the economic status of the household are available in the dataset. Household size reports the number of persons living in the household. The variable kinship marriage indicates if the wife is related to her current husband. The variable takes the value one if a woman is married to her first cousin, second cousin, or other relative. Moreover, *number of co-wives* represents a polygamous union and measures the number of other wives up to three as a continuous variable.

Location effects are measured by the variable urban and the capital city Amman. The latter is included in the regression in order to control for unobserved heterogeneity between urban and rural areas. Similarly, the Badia region is included separately as it involves different forms of cultural life and traditions than the rest of Jordan. Descriptive statistics on these variables are shown in Appendix Table C4.1.

4.6.3 Instrument

As the main instrument, we include cluster average of women's working status in the regression model. The Demographic Health Surveys (DHS) are divided into geographical units, so called "cluster" which are usually census enumeration areas or villages in rural areas (DHS, 2010). By using the cluster average of working status, we capture the effects of the average employment rate in the vicinity of the woman on her own employment performance. This may proxy for employment opportunities for women in the area, unmeasured values and attitudes affecting women's employment, and network efforts enabling women to find employment.[73]

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[71] The variable age difference is modeled by subtracting wife's age from husband's age. We also included wife's age as an additional control variable to the regression model, but the coefficient has no effect and is not statistically significant.

[72] The variance inflation factor (VIF) significantly decreases from 3.42 (husband's age) and 3.23 (wife's age) to 1.21 (age difference) demonstrating that age difference indeed reduces the problem of collinearity.

[73] In a robustness check, we also add the presence of children under 3 as an additional instrument which has been found in the literature to affect women's employment (Martin Browning 1992; Raquel Carrasco 2001).

4.7 Estimation Results

4.7.1 Linear Probability Model Estimation

Table 4.4 presents the estimation results of equation (1), measuring the probability of a woman experiencing some kind of violence from her husband. Following the narrative provided in the earlier sections, the discussion focuses on the role of women's work status influencing the probability of experiencing violence. Most of the other variables have already been tested before in other studies on domestic violence (for example, Flake, 2005; Rao, 1997; Jejeebhoy, 1998; Panda & Agarwal, 2005).

Table 4.4 reports in the first column the results of a linear probability model (LPM) of the aggregated domestic violence measure that does not consider the endogeneity of women's work status. It shows that women's labor force participation has a small, but significant positive effect on the probability of spousal violence. If a woman is involved in paid work, the probability of spousal violence increases by 0.076 ($p<0.01$), holding everything else constant. This result would seem to support the *Male-backlash theory* (Bhattacharya, Bedi & Chhachhi, 2011).[74]

An increase in husband's education has a nonlinear effect on domestic violence. At low levels of education, the incidence of violence increases, while at high levels, it decreases with the turning point being at about eight years of education. [75]

Husband's employment status has a significant negative impact on violent behavior suggesting that regular employment decreases stress and frustration. The age difference between the spouses is positively linked to violence, but the effect is not statistically significant. Household size also displays a positive effect on violence, statistically significant at the 1 percent significance level. Consistent with expectations, wealth, reflecting the economic status of the household, reduces violence, as poor households are more prone to violence since the lack of financial resources might cause economic stress.

[74] We also added wife's age as a control variable to the regression model in order to test if the effects vary over different stages of a woman's life, but none of the regression results changed significantly.

[75] According to the DHS report, ten years of education correspond to incomplete secondary education, and twelve years of education correspond to complete secondary education.

In order to shed light on whether the coefficients differ significantly for different types of the dependent variable, *domestic violence*, we further report in Table 4.4 column (2-4) the probability of a woman experiencing emotional, physical, and sexual violence. The estimated regressions deliver similar results regarding the sign and magnitude of the main covariates in column (1). However, the coefficient of working status is not statistically significant for sexual violence; thus the overall results appear to be driven by the correlation between work status and the likelihood of experiencing physical and emotional violence. Moreover, husband's education, up to eight years, appears to have an enhancing effect on the incidence of all three types of violence and a protective effect beyond eight years; yet, again, this is not significant for the incidence of sexual violence. The coefficients of husband's employment status and age difference show signs similar to the main specification in column (1), however, none of them are statistically significant. All of these results have not considered the potential endogeneity of women's work.

The overall fit of the main regression model in column (1) has a likelihood ratio of 57.44 and a p-value of 0.00, both indicating, that the model is significant as a whole, compared to a model that includes only the constant. The R^2 of 0.03 is quite low, however, R^2 is generally not considered as an accurate measure of overall fit in the case of a linear probability model (Studenmund, 2011). A further test diagnostic, the "percent correctly predicted" of the model, reports an overall correct prediction rate of 75.5 percent, R^2 suggesting that we are able to account for the key drivers of reported domestic violence reasonably well. But as the regression results might be inconsistent in the presence of endogeneity bias, we focus in the next section on the IV estimates in Table 4.5 for a more detailed interpretation of the coefficients.

Table 4.4 LPM of experiencing domestic violence

	(1)	(2)	(3)	(4)

	Domestic violence	Emotional violence	Physical violence	Sexual violence
Intercept	0.249***	0.221***	0.116**	0.0710**
	(0.0548)	(0.0474)	(0.0488)	(0.0359)
Working status	0.0755***	0.0384*	0.0751***	0.0167
	(0.0245)	(0.0211)	(0.0213)	(0.0157)
Husband's education	0.0220***	0.0122*	0.0148**	0.00550
	(0.00832)	(0.00720)	(0.00735)	(0.00580)
Husband'seducation^2	-0.00143***	-0.000804**	-0.000898**	-0.000380
	(0.000416)	(0.000355)	(0.000364)	(0.000278)
Husband employed	-0.0401*	-0.0264	-0.00273	-0.0164
	(0.0222)	(0.0190)	(0.0191)	(0.0145)
Wife's education	0.00244	-0.00166	0.00448	-0.00556
	(0.00738)	(0.00651)	(0.00659)	(0.00527)
Wife's education^2	-0.000632	-0.000387	-0.000656*	0.000186
	(0.000402)	(0.000350)	(0.000348)	(0.000276)
Age difference	0.00112	0.000710	0.000527	0.000311
	(0.00151)	(0.00133)	(0.00135)	(0.00101)
Household size	0.00915***	0.00133	0.00963***	0.00625***
	(0.00334)	(0.00279)	(0.00294)	(0.00225)
Wealth	-1.11e-07	4.01e-08	-3.09e-07***	-8.63e-08
	(1.08e-07)	(9.46e-08)	(9.08e-08)	(5.67e-08)
Urban	-0.0326*	-0.0150	-0.0297*	-0.0132
	(0.0180)	(0.0152)	(0.0154)	(0.0108)
Badia region	-0.0109	-0.0149	-0.00120	0.0152
	(0.0251)	(0.0214)	(0.0221)	(0.0160)
Amman	0.0738***	0.0853***	0.0549**	0.0123
	(0.0257)	(0.0234)	(0.0226)	(0.0153)
Number of co-wives	0.133***	0.145***	0.124***	0.0691**
	(0.0383)	(0.0363)	(0.0366)	(0.0287)
Kinship marriage	-0.0264*	-0.0261*	-0.0279**	0.00414
	(0.0159)	(0.0135)	(0.0136)	(0.00972)
R2	0.033	0.030	0.033	0.017
Number of observations	3,283	3,283	3,283	3,283

Notes: Robust standard errors in parentheses. ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.
Source: DHS 2007. LPM coefficients are shown in column (1-4). However, probit regression models yield similar results.

Table 4.5 2SLS- Probability of experiencing violence and working instrumental variable: second stage estimates

	(1)	(2)	(3)	(4)
	Domestic Violence	Emotional Violence	Physical Violence	Sexual Violence
Intercept	0.278***	0.235***	0.106	0.146**
	(0.0951)	(0.0811)	(0.0817)	(0.0637)
Working status	-0.0808	-0.0391	0.132	-0.388
	(0.423)	(0.360)	(0.363)	(0.283)
Husband's education	0.0208**	0.0116	0.0152**	0.00244
	(0.00876)	(0.00747)	(0.00753)	(0.00587)
Husband's education^2	-0.00137***	-0.000775**	-0.000920**	-0.000225
	(0.000448)	(0.000382)	(0.000385)	(0.000300)
Husband employed	-0.0466*	-0.0297	-0.000343	-0.0334*
	(0.0278)	(0.0237)	(0.0239)	(0.0186)
Wife's education	-0.00553	-0.00561	0.00739	-0.0262*
	(0.0226)	(0.0193)	(0.0195)	(0.0152)
Wife's education^2	7.39e-05	-3.65e-05	-0.000914	0.00202
	(0.00195)	(0.00166)	(0.00167)	(0.00130)
Age difference	0.000576	0.000440	0.000725	-0.00110
	(0.00208)	(0.00178)	(0.00179)	(0.00140)
Household size	0.00901***	0.00127	0.00968***	0.00590***
	(0.00331)	(0.00282)	(0.00285)	(0.00222)
Wealth	-7.14e-08	5.96e-08	-3.23e-07**	1.54e-08
	(1.52e-07)	(1.29e-07)	(1.30e-07)	(1.02e-07)
Urban	-0.0297	-0.0135	-0.0308*	-0.00564
	(0.0201)	(0.0171)	(0.0172)	(0.0134)
Badia region	-0.00896	-0.0139	-0.00191	0.0203
	(0.0255)	(0.0218)	(0.0219)	(0.0171)
Amman	0.0670**	0.0819***	0.0574**	-0.00537
	(0.0310)	(0.0264)	(0.0266)	(0.0207)
Number of co-wives	0.141***	0.149***	0.121***	0.0902***
	(0.0414)	(0.0353)	(0.0356)	(0.0277)
Kinship marriage	-0.0265*	-0.0262*	-0.0279**	0.00383
	(0.0160)	(0.0137)	(0.0138)	(0.0107)
R2	0.022	0.026	0.031	0.028
Number of observ.	3,283	3,283	3,283	3,283
F-test of joint significance	11.58	11.58	11.58	11.58

First-stage results-instrument				
Cluster average working status	0.140*** (0.0413)	0.140*** (0.0413)	0.140*** (0.0413)	0.140*** (0.0413)

Notes: Robust standard errors in parentheses. ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively. The coefficients of cluster average working status don't change in the first-stage, as the sample size remains the same for all regressions. The first stage additionally includes all covariates included in the second stage. Full first-stage results are available on request.
Source: DHS 2007.

4.7.2 Instrumental Variable Estimation

As discussed in the previous parts, the variable women's working status is instrumented with the variable cluster average of women's working status in the baseline-IV regression model in Table 4.5.

The instrument *cluster average of working status* is expected to have a significant impact on women's employment status but is independent of husband's violent behavior as it largely reflects local labor market conditions for women and attitudes toward women's employment that are unlikely to directly affect male violence. Thus, we consider the cluster average as a suitable instrument for women's working status.

The first stage of the IV estimation at the bottom of Table 4.5 indicates that, as expected, the cluster average of working status increases the probability that the woman works. This effect is statistically significant at the 1 percent level. A one-unit increase in the variable cluster average increases the probability of the women working by 0.14, holding everything else constant. In the second stage of the IV estimation, shown in Table 4.5 column (1), the coefficient of work status now turns out to have a negative but highly insignificant effect on violence, with the point estimate being relatively close to zero. Thus, the variable work status appears to have no causal effect on violence, in contrast to the basic model that did not consider endogeneity. This result suggests that the positive relationship between violence and woman's employment in the basic

model is likely to be driven by omitted variables or reverse causality, rather than by male backlash.[76]

This result is confirmed in column (1) of Table 4.6 where we report the results of the two-stage residual inclusion model. The marginal effects in the second stage show that work status is not significantly associated with the probability of domestic violence; this statistical insignificance is mostly due to a very small coefficient, which is close to 0 (rather than due to a particularly large standard error) suggesting that there really is no relationship between the two variables.[77]

Similarly, wife's education level is not related to the incidence of violence in the second stage of the IV estimation reported in Table 4.5. Similar to the linear probability model in Table 4.4 husband's education exerts a nonlinear effect on the prevalence of domestic violence, statistically significant at the 5 percent significance level. The measure of differences in empowerment between the spouses, *age difference*, shows the expected positive direction of the effect, but is again not statistically significant. A higher number of household members increases the incidence of violence, statistically significant at the 1 percent significance level. This estimation result is consistent with the idea that more people in the household cause more social stress, as is found in several other studies (Jewkes et al., 2002; Salam et al., 2006).

The economic status of the household, proxied by the wealth index, displays the expected sign but is again not significantly associated with husband's violent behavior.

Both indicators for urban regions, *Urban* and *Amman,* show opposite signs regarding the incidence of violence. Yet, the coefficient of urban turns out to be insignificant as compared to the baseline regression in Table 4.1 column (1). The variable Amman has a positive sign, going against the empirical literature that suggests a negative link between urban areas and domestic violence. This result may be driven by the fact that flight from the countryside leads to a higher population share of traditional and rural families in the capital. Urban living conditions are especially stressful for migrants, and leaving their rural environment might have put pressure

[76] When we include children under age 3 as an additional instrument, the results are the same. With the two instruments, we are able to perform an over identification restriction test, which is passed. Results are available on request.

[77] The coefficient of the first stage-residual added to the second stage is significant at the 5 percent significance level, indicating that working status is indeed endogenous.

on already poor coping mechanism (Al-Nsour et al., 2009). Furthermore, Amman represents a modern urban area at first glance, yet, at the micro level traditional and informal structures become more visible (Abu-Dayyeh, 2004). Therefore, increased violence could also point to tensions and clashes of values and attitudes associated with urban living, often in cramped living quarters. The negative, but insignificant, sign of Badia region might reflect the social system in rural areas which is largely based on tribalism, leading to higher social control and sanctions against spousal violence (Rowland, 2009).

The coefficient of *number of co-wives* has a positive sign suggesting that women experience more violence if they live in polygynous marriages. This is consistent with some other theoretical and empirical models. For example, Hassouneh-Phillips (2001) finds that women of polygynous marriages experience higher levels of emotional, physical, and sexual abuse relative to women of monogamous marriages. Violent behavior is often used by a husband as a source of controlling wives within the marriage. The addition of wives causes significant stress as it constitutes a change in family and economic structure (Hassouneh-Phillips, 2001; Al-Krenawi, 1999). The first wife is forced to share existing resources with the new families of the husband and competition becomes strongest in terms of a husband's investment in health, education, and other expenditures for their children (Bledsoe, 1993; Al-Krenawi, 1999). Further empirical support is given by a cross-sectional study in South Africa, finding that polygyny is correlated with higher levels of domestic physical and sexual abuse (Jewkes et al., 2002).

Consanguinity marriages could be a relevant factor as they are relatively common in Jordan, with 43 percent of marriages taking place between relatives (mostly first or second cousins, DHS Report, 2010). The coefficient of kinship marriages appears to have a negative and significant effect on violence. According to the Gendered Resource Theory of Atkinson, Greenstein & Lang (2003), a more traditional ideology is accompanied with a higher probability of violence. The negative relation of violence and traditionalism in this model might, however, reflects higher family control and sanctions facing the husband in case of violence towards his wife (Counts, Brown, & Campbell, 1999; Erchak, 1984). Empirical evidence is given by Stieglitz et al. (2011) who found a negative impact of kinship marriage on marital violence due to the principle of deterrence and control of the family.

We now turn to the IV regression results separated by each type of domestic violence. Few studies examine the risk factors for different types of domestic violence independently. One problem in analyzing domestic violence is the lack of a unique definition in research, specifically with respect to sexual and emotional violence. The majority of studies limits the term intimate partner violence to the inclusion of physical violence, neglecting other forms of violence (Jewkes,

2001). However, a small strand of literature investigates specifically the incidence of sexual violence irrespective of physical violence (Naeemah et al., 2004; Jewkes, 2001).

Consistent with results of the baseline IV regression in column (1), none of the coefficients of *working status* is significant at conventional significance levels. One should note, however, that the impact of working status on sexual violence is negative, empirically sizable, and approaches statistical significance at conventional levels.

Husband's education has a nonlinear and significant impact on physical violence while the coefficients for emotional and sexual violence are not significant at conventional significance levels. One possible explanation for the difference in effects is given in Heise's conceptual framework (1998). Important factors at the societal or community level are cultural norms and attitudes prescribing how more educated men should behave in a more controlled way in public, and may influence such men against physically and emotionally abusing their wives. However, entitlement over his wife's body remains a privilege to the husband (Go et al., 2003), the only sphere where they have complete control over their wife. This might be a likely explanation of finding educational attainment to be independent of sexual violence.

Surprisingly, wife's education decreases the incidence of sexual violence while not being associated with the prevalence of emotional and physical violence.[78] Other studies find a protective effect on sexual violence as well, specifically in patrilinear societies (Abrahams, 2001; Kinsaha, 1998). Yet, according to a WHO recent study it is not known, whether the U-shape relationship as found between education and physical violence is also the case for sexual violence (WHO Report, 2010).

Moreover, the negative impact of wealth, the economic status of the household in Table 4.5 is primarily related to physical violence, as none of the coefficients for emotional and sexual violence are significant. The variable capturing the differences in bargaining power between the spouses, *age difference*, is not significant for any type of violence, as is the case for the aggregated domestic violence results in column (1).

[78] The F -test of joint significance of both the linear and the squared term fails to reject the null hypothesis that both coefficients are significantly different from 0. Thus, we expect the effect of wife's education to be linear.

The prevalence of emotional and physical violence appears to be higher amongst households with more co-wives. Various studies on co-wife relationships in polygynous families find the relationships to be emotionally unsatisfactory for the majority of family members. This often results in increased stress levels, triggering emotional and physical violence by the husband (Al-Krenawi, 1999; Al-Krenawi & Graham, 1999; Chisholm & Burbank, 1991).

The negative relationship between violence and traditionalism in this model, as reported by the negative coefficient of *kinship marriage*, might reflect higher family control and sanctions facing the husband in cases of violence towards his wife in the case of emotional and physical violence (Counts, Brown & Campbell, 1999; Erchak, 1984). However, as entitlement over a women's body is the primary domain of the husband, social control through family might not take effect in the case of sexual violence (Chibber, Krupp, Padian & Madhivana, 2012).

Overall, further research is required to examine the overlap in different types of domestic violence and disentangle the differences in risk factors. In this study, the co-occurance is quite low, as only 10.6 percent reported to experience both sexual and physical violence at the same time, which further emphasizes the need for more in-depth research in terms of differences in risk factors.

To support these estimation results, formal tests are implemented to analyze the validity and strength of the instrument. The predictive power or relevance of the instruments is tested via the F- statistics for joint significance of the instruments in the first stage regressions. The F-statistic records a value of 11.58, which indicates a strong correlation of the instrument with women's work status. According to Stock, Wright & Yogo (2002) the F- statistic should be higher than 10 for the instruments to be truly valid. Moreover, the strength of the instrument is tested by the weak instrument robust test of Finlay & Magnusson (2009). The confidence intervals of the weak-instrument robust test are significantly smaller than the confidence intervals of the Wald Test, indicating that the instrument is strongly correlated with the endogenous regressor. Based on these tests and the theoretical justification, cluster average of working status appears to be a valid instrument.

In order to test the robustness of the results to possible estimation problems of using linear probability models in our IV estimation, we also estimate the IV regressions using a two-stage residual-inclusion estimation. The results, shown in Table 4.6, confirm our findings from the

two-stage least squares linear probability estimations. If endogeneity is not considered, the working status of the wife appears to increase domestic violence.[79] In the IV model, cluster average of working status appears as a valid instrument and the work status of the wife is no longer significant. Moreover, the coefficients of the first-stage residuals, which capture the remaining variance in working status not explained by the instruments considered, are positive and statistically significant in all specifications on domestic violence. Thus, the null hypothesis of exogeneity of working status in equation (1) can be rejected in all cases, implying that a standard LPM is not consistent.

But note that we find that working status now has a statistically significant negative impact on sexual violence when using the residual inclusion method, while no such effect is found for physical and emotional violence. We interpret this as weak evidence suggesting that working status generates a protective effect reducing sexual violence.

We also experimented with various interaction terms to see whether the impact of paid work depends on women's education, men's education, men's employment, or kinship marriage (as suggested in some of the literature discussed above); yet, none turned out to be significant, so that we do not find an effect of women's paid work on domestic violence that is conditioned by other factors.

[79] In the specification of sexual violence, the coefficient of work status is not significant.

Table 4.6 2SRI- Domestic violence separated by each type of violence (emotional/physical/sexual)

	Probit			
	(1)	(2)	(3)	(4)
	Domestic violence	**Emotional violence**	**Physical violence**	**Sexual violence**
Wife's working status	0.0110	0.00814	0.0733	-0.253**
	(0.199)	(0.172)	(0.172)	(0.120)
Husband's education	0.0216***	0.0116*	0.0155**	0.00350
	(0.00836)	(0.00700)	(0.00725)	(0.00509)
Husband's education^2	-0.00144***	-0.000792**	-0.000964**	-0.000302
	(0.000432)	(0.000362)	(0.000380)	(0.000267)
Husband employed	-0.0402*	-0.0247	-0.00151	-0.0253*
	(0.0224)	(0.0189)	(0.0193)	(0.0132)
Wife's education	0.00134	-0.00104	0.00648	-0.0141**
	(0.0108)	(0.00912)	(0.00914)	(0.00632)
Wife's education^2	-0.000479	-0.000377	-0.000786	0.00109**
	(0.000859)	(0.000734)	(0.000730)	(0.000511)
Age difference	0.000835	0.000514	0.000543	-0.000658
	(0.00160)	(0.00134)	(0.00138)	(0.000974)
Household size	0.00880***	0.00112	0.00931***	0.00515***
	(0.00321)	(0.00273)	(0.00271)	(0.00187)
Wealth	-9.32e-08	5.09e-08	-3.22e-07***	-3.06e-08
	(1.20e-07)	(1.02e-07)	(1.06e-07)	(6.77e-08)
Urban	-0.0319*	-0.0153	-0.0304*	-0.00902
	(0.0186)	(0.0159)	(0.0159)	(0.0111)
Badia region	-0.00904	-0.0131	-0.00128	0.0161
	(0.0246)	(0.0209)	(0.0207)	(0.0139)
Amman	0.0682***	0.0762***	0.0531**	0.00101
	(0.0255)	(0.0209)	(0.0222)	(0.0155)
Number of co-wives	0.121***	0.117***	0.0999***	0.0657***
	(0.0350)	(0.0284)	(0.0294)	(0.0197)
Kinship marriage	-0.0271*	-0.0266*	-0.0291**	0.00259
	(0.0159)	(0.0137)	(0.0137)	(0.00956)
Residual	0.0339*	0.0416*	0.258**	0.737**
	(0.0116)	(0.0278)	(0.107)	(0.325)
N	3,283	3,283	3,283	3,283
Pseudo R2	0.028	0.029	0.036	0.031
First-stage results-instrument				
Cluster average working status	0.112***	0.112***	0.112***	0.112***
	(0.0373)	(0.0373)	(0.0373)	(0.0373)

Notes: Marginal effects reported. Bootstrapped standard errors in parentheses. ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively. The coefficients of cluster average working status do not change in the first stage, as the sample size remains the same for all regressions. The first stage additionally includes all covariates included in the second stage. Full first-stage results are available on request.
Source: DHS 2007.

4.8 Conclusion

Using a representative national household survey, we explore the link between women's paid work and spousal violence in Jordan. Once we control for endogeneity, there is no significant impact of wife's employment status on domestic violence. When we disaggregate domestic violence into different types of violence, these results hold for emotional and physical violence. Moreover, we find a weak protective effect of women's employment status on sexual violence in some specifications. Thus, the hypothesis of Vyas & Watts (2003), stating that women entering the labor market in regions where traditional attitudes prescribe women to the domestic sphere are more prone to violence due to their "pioneer role," cannot be confirmed.

The weak protective effect of employment on sexual violence gives support for theories that predict an increase in women's bargaining power through their engagement in paid work. The results have further consequences, suggesting that policies addressing job opportunities in the labor market for women in order to reduce violence as advocated recently (UN 2013) may be successful in Jordan at least for sexual violence. As discussed in World Bank (2014), supportive policies (including education and training programs and policies promoting safety and security) are needed to ensure that women's employment reduces domestic violence. The main protective factors against domestic violence in Jordan are husband's education and employment status. These findings demonstrate that the World Bank policies mentioned above should also promote men's education in Jordan.

This study showed that it is important to control for unobserved factors and reverse causality. Estimates which do not account for the possibility of both reverse causality and omitted variables are more likely to draw the conclusion that women's work status is indeed associated with an increased incidence of violence.

These results are surely not the last word on this important and difficult subject. Data concerning domestic violence suffer from underreporting and may cause measurement errors. The insignificant effect of employment might arise due to the difficulty of encompassing the phenomenon of violence as well as the different levels at which factors might operate. Data restrictions do not allow us to include factors at the community level, such as weak community sanctions against domestic violence or social norms that restrict women's public participation (Heise & Moreno, 2002). Possibilities for further research include tackling the remaining methodological issues and distinguishing between different forms of domestic violence.

4.9 Appendix

Table 4C.1 Summary statistics

	Mean	Std. Dev.	Min.	Max.
Domestic violence (Domestic violence=1)	0.28	0.45	0	1
Wife's working status (Wife working=1)	0.14	0.35	0	1
Wife's education (in years)	10.57	4.04	0	18
Wife's age	34.11	7.77	16	49
Husband employed (Husband employed=1)	0.82	0.39	0	1
Husband's education (in years)	10.35	3.84	0	20
Husband's age	39.85	9.57	15	91
Age difference	5.95	5.53	-31	49
Household size	6.16	2.54	1	26
Number of children < 3 years	0.56	0.67	0	4
Wealth	7820.70	88499.36	-345913	467690
Number of co-wives	0.071	0.29	0	3
Kinship marriage (Kinship marriage=1)	0.422	0.48	0	1
Urban (Urban=1, Rural=0)	0.307	0.46	0	1
Badia region (Badia region=1)	0.14	0.35	0	1
Amman (Amman=1)	0.119	0.324	0	1
Cluster average of working status	0.14	0.13	0	1

Source: DHS 2007, own calculations. Sample Size N= 3,283.

Table 4C.2 Frequency distribution of selected background characteristics (%)

	Percentage	Frequency
Household size		
1	0.03	1
2-5	42.48	1,393
6-8	40.59	1,331
9-14	16.50	541
15+	0.40	13
Number of children < 3 years		
0	52.03	1,706
1	38.12	1,250
2	9.55	313
3	0.27	9
4	0.03	1
Spousal age difference		
Wife older	6.16	202
Wife is same age	5.98	196
Wife's 1-4 years younger	31.53	1,034
Wife's 5-9 years younger	37.72	1,237
Wife's 10 + years younger	18.60	610
Wealth quintile		
Lowest	26.68	875
Second	25.86	848
Middle	20.74	680
Fourth	16.29	534
Highest	10.43	342
Number of co-wives		
0	93.90	3,079
1	5.34	175
2	0.55	18
3	0.21	7
Kinship marriage		
Kinship Marriage = 1	42.09	1,380
Kinship Marriage = 0	57.91	1,899

Source: DHS 2007, own calculations. Sample Size N= 3,283.

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Eidesstattliche Erklärung

Versicherung gemäß §14 Prüfungs- und Studienordnung für den Promotionsstudiengang Wirtschaftswissenschaften

1. Die Gelegenheit zum vorliegenden Promotionsvorhaben ist mir nicht kommerziell vermittelt worden. Insbesondere habe ich keine Organisation eingeschaltet, die gegen Entgelt Betreuerinnen und Betreuer für die Anfertigung von Dissertationen sucht oder die mir obliegenden Pflichten hinsichtlich der Prüfungsleistungen für mich ganz oder teilweise erledigt.

2. Ich versichere, dass ich die eingereichte Dissertation "Essays on Women's Empowerment in Developing Countries" selbstständig und ohne unerlaubte Hilfsmittel verfasst habe; fremde Hilfe habe ich dazu weder unentgeltlich noch entgeltlich entgegengenommen und werde dies auch zukünftig so halten. Anderer als der von mir angegebenen Hilfsmittel und Schriften habe ich mich nicht bedient. Alle wörtlich oder sinngemäß den Schriften anderer Autoren entnommenen Stellen habe ich kenntlich gemacht.

3. Die Richtlinien zur Sicherung der guten wissenschaftlichen Praxis an der Universität Göttingen werden von mir beachtet.

4. Eine entsprechende Promotion wurde an keiner anderen Hochschule im In- oder Ausland beantragt; die eingereichte Dissertation oder Teile von ihr wurden nicht für ein anderes Promotionsvorhaben verwendet.

5. Des Weiteren ist mir bekannt, dass Unwahrhaftigkeiten hinsichtlich der vorstehenden Erklärung die Zulassung zur Promotion ausschließen bzw. später zum Verfahrensabbruch oder zur Rücknahme des erlangten Titels berechtigen.

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Date and Signature