

Women's Empowerment and Social Household Spending in Fragile States: Evidence from Chad

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Abstract

State fragility in Chad has been narrowly associated with insecurity due to a long cycle of violent conflict and recurrent droughts, leading to low social development. In this paper, we have investigated the impact of women's empowerment on household social expenditures using data from the Chadian household consumption and informal sector survey carried out in 2011, and Propensity Score Matching as empirical model. The social expenditures used as outcome variables are education, health and food. We find that social expenditures are higher when a household is headed by a woman than when it is headed by a man with similar observed characteristics. In particular, differences between female-headed households and male-headed households are higher in food expenditures after controlling for observed characteristics (covariates). The results also show that there is a composition effect in household expenditure. While female-headed households spend their incomes in social sectors (health, food and education), those headed by men spend for temptation goods (alcohol and leisure). These results hold when we control both model specification and common support hypothesis. Our findings provide decision makers with economic policy tools to promote the social development focusing on women's empowerment.

Keywords: *Social expenditures, Household, Women's empowerment, Impact evaluation, Chad*

JEL Classification: *J16, H31 and C52*

1. Introduction

State fragility in Chad has been narrowly associated with insecurity due to a long cycle of violent conflict and recurrent droughts. Over the last 50 years, Chad has gone through several episodes of civil war. As a result, the country was ranked 8th out of 178 countries on the Fragile States Index (FSI) in 2017. This suggests that Chad is doing better than seven countries in high fragile situations.⁵ In this context, women are the most vulnerable group and they become victimized as rape, forced prostitution, forced marriage are rather common practices in Chad. Women in Chad represent 51.5% of the total population (INSEED, 2009). Despite this predominance, women face widespread discrimination and violence. Women in parliament comprised only 12.8% in 2012, and the value of the global gender gap index was 0.55 in 2011 (Chad ranked 134th out of 144 countries.). Only 18.8% of women have access to bank credit, 15.5% have a bank account and 26.0% are self-employed (INSEED, 2014). These facts combined pose serious challenges for women's empowerment.

Empowering women and reducing gender inequalities are two key objectives of development policy (Alkire et al., 2013). The fifth Sustainable Development Goal (SDG 5) explicitly aims to achieve gender equality and empower all women and girls. These not only are goals in themselves but have been shown to contribute to improving productivity and reducing poverty.

Empowering women is a multidimensional process with economic, socio-cultural, familial, legal, political and psychological dimensions (Malhotra et al., 2002; Mahmud et al., 2012). In development economics, women's empowerment is defined as the process through which women acquire the ability to make strategic life choices in a context where this ability was previously denied to them (Kabeer, 1999). In other words, women's empowerment is the process of having and using resources in an agentic manner to reach certain achievements (e.g. Kabeer, 1999; Malhotra et al., 2002 and Swain and Wallentin, 2009).

There are a few empirical studies assessing the different dimensions of women's empowerment on household spending. For instance, Garcia-Penalosa and Konte (2014) found that women's empowerment (decision-making power) is associated with high social expenditures (health, education, food, etc). In the same vein, Gakidou et al. (2010) examining women's empowerment found that women's education is correlated with children's education, nutrition and health.

Kishor (2000) and Williams (2005) conducted a study, respectively, in Egypt and Bangladesh on empowerment indicators and found that some of the indicators were comparatively better correlated than others with household spending. However, most of the studies did not clearly differentiate between the economic and other dimensions of women's empowerment to capture their effects on household spending. They also did not take into account women's empowerment in the context of fragility.

This study seeks to fill the gap observed in the literature and analyses the effect of women's empowerment on household spending. The main objective of this paper is therefore to highlight the effect of women's empowerment on social household spending in the context of fragility. Specifically, we explore the effect of women's empowerment on education, health and food household spending. Many motivations justify this study. First, Chad being an oil exporting country since 2003, has allocated large financial resources to social sectors (see Mabali and Mantobaye, 2017). However, social development indicators remain low, raising the issue of the efficiency of economic policies implemented and financed with oil revenue. Second, to the best of our knowledge, no similar study has been conducted before in Chad. Finally, a main advantage of using household-level data is a reduced need to control for confounding effects such as differences in institutional and macroeconomic conditions (Caselli and Michaels, 2009; James and Aadland, 2011).

We use the Chadian household consumption and informal sector survey carried out in 2011 (ECOSIT 3) and Propensity Score Matching Model to assess the effect of women's empowerment on social household spending. We find that social expenditures (education, health and food) realized by female-headed households are higher than those realized by male-headed households after controlling for observed characteristics (covariates). Differences between the female-headed households and male-headed households are higher in food expenditures. For policy makers, these results raise the issue of women's empowerment because there is a strong connection between household social expenditures and social development indicators.

The poverty issue is a concern in Chad. The United Nations Development Programme (UNDP) ranks Chad 186th out of 188 countries, according to the 2016 Human Development Index. This result suggests that social development is relatively low in Chad compared with most countries in the world. Chad being an oil exporting country, this low level of social development raises the issue of the efficiency of economic policies implemented and financed with oil revenues since 2003. Indeed, measures taken ex-ante by the Chadian authorities to reduce poverty consisted in increasing funding to social sectors⁶. This suggests that alternative policies are needed to address poverty in Chad.

In this paper, we investigate the relationship between women's empowerment and social expenditures in Chad, which is also a fragile State. In other words, we investigate if female-headed households spend more or less than male-headed households.

Although the economic literature assumes a positive relationship between women's empowerment and household social expenditures, empirical works on this issue are limited. Given the multidimensional nature of women's empowerment, its measure is a major challenge for researchers. Our paper aims to contribute to the empirical literature on the link between women's empowerment and household social expenditures in a fragile State.

The rest of the paper is organized as follows. Section 2 provides a literature review on women's empowerment issue. Section 3 proposes a methodology for assessing women's empowerment effects on social household spending. Section 4 presents and discusses the results, and section 5 concludes with policy discussions.

2. Literature review

What is women's Empowerment?

The definition of women's empowerment has often varied based on the research objective and institution. According to the World Bank (2001), empowerment can be defined as the expansion of freedom of choice and actions, an increase of authority and control over the resources and decisions that affect one's life. Kabeer (2001) considers that empowerment has two dimensions, which are capability and achievements. Capability (Sen, 1993) can be defined as the ability for people to do something or take decisions independently. Achievements refer to outcomes (realization of capabilities).

Keller and Mbewe (1991) indicate that "women's empowerment can be defined as a process whereby women become able to organize themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources, which will assist in challenging and eliminating their own subordination". In other words, it is a process by which women gain rights to make choices and direct resources to help challenge and eliminate their subordination. Sen (1993) considers empowerment as "altering relations of power... which constrain women's options and autonomy and adversely affect health and well-being." Batliwala's (1994) definition is in terms of "how much influence people have over external actions that matter to their welfare." Kabeer (2001) defines it as "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them."

According to literature on gender and empowerment, it is difficult to understand women's empowerment without taking into account political, economic and socio-cultural spheres (Malhotra et al., 2002). In addition, Kabeer (1999) considers that it is not easy to be empowered in all dimensions at a time. Therefore, a disempowerment in one sphere might affect empowerment in other spheres, which makes the measurement increasingly difficult. Another challenge in the measurement process is the context of specific nature of women's empowerment (Malhotra et al., 2002). An indicator determining the level of empowerment in one cultural setting might be meaningless in another.

Empowerment is thought of as a process rather than a "condition or state of being" (Malhotra et al., 2002) and measuring a process is only possible through

proxies such as education (Ackerly, 1995) whereas the outcome of the process could be measured through direct indicators (Kishor, 2000). Malhotra et al. (2002) suggest a measuring process across multiple time periods. Yet, another challenge is measuring characteristics, which are subjective, context-specific and dynamic in nature, such as behaviour or norm. Due to the inherent complexities in concept of women's empowerment, it is difficult to measure women's empowerment, which is a multidimensional concept.

Using frameworks developed by various authors such as Beck and Stelcner (1997), Kishor (2000), Malhotra et al. (2002) synthesize the most commonly used dimensions (see Table A1 in the Appendix) and indicators of women's empowerment (see Table A2 in the Appendix). We adopt this approach in our study.

How does women empowerment influence social household spending?

According to the literature, women's empowerment can affect households spending through several mechanisms. First, stronger women empowerment (through greater gender equality) contributes to improvement in economic efficiency, economic growth and enhanced development outcomes. In many developing countries, women face discrimination in labour markets and societal institutions. Because they do not perform at their potential, competences (skills and talents) of women are not efficiently used to activities. In addition, they do not have access to productive inputs (land for instance), credits and earnings the same way as men. According to FAO (2011) Report, if women have access to same productive resources in farm activities, agricultural output will increase by between 2.5% and 4.0% in developing countries. The World Development Report-WDR (World Bank, 2012) concludes that eliminating all barriers preventing women from the job market will increase output per worker by 40%. By increasing their incomes and/or household incomes, economic empowerment gives women the capability to raise social investments or spending for the family. The WDR (World Bank, 2012) has shown that in several developing and emerging countries (Bangladesh, Brazil, Côte d'Ivoire, Mexico, South Africa), women's economic empowerment has increased social households' spending (such as children's health, education, and nutrition).

Second, another dimension of women's empowerment is education. According to several studies, educated women invest more in goods and services, which improves the well-being of their families. Indeed, because they are the main caregivers for children and family, it is easier for educated women to get jobs and high incomes and increase investments on education, health (see for instance Breierova and Duflo, 2004). Using data for 219 countries from 1970- 2009, Gakidou et al. (2010) have shown a reduction in infant mortality by 9.5% due to women education.

Finally, some authors consider that women have different preferences and ideas than men. They show that incomes in the hands of women of a household have a higher impact on intra-household allocation (child health, larger expenditure share of nutrients, health and housing) than income in the hands of men. In other words, women with high bargaining power invest more in social expenditures (Garcia-Penalosa and Konte, 2014).

Women empowerment in Chad

Gender inequality, conflict and fragility are key challenges to sustainable development. They are inextricably linked: unequal gender relations can drive conflict and violence, while women's active participation contributes to peace and resilience. At the same time, conflict and fragility place enormous burdens on women and girls, while peace-building and state building can provide unique opportunities to advance recognition of their rights. Strengthening gender equality in fragile situations is therefore critical for achieving global commitments to women's empowerment, sustainable peace, and the Sustainable Development Goals (OECD, 2017).

Women comprise 51.5% of the population in Chad. However, as in many African countries, women's empowerment in Chad is lacking immensely. Lack of freedom, child marriage, violence and female genital mutilation are a few of the issues women must face in Chad. This situation could be explained by lack of education, and cultural practices. The analysis, according to the area of residence, highlights big disparities. In urban areas, 60.3% of men are alphabetized in French or in Arabic against 38.3%, suggesting a parity sex of 0.64 whereas in rural areas this proportion represents 33.0% for men and 11.5% for women, suggesting a parity sex of 0.35.

In Chad, there is inequality between genders in reproductive health, empowerment, labour market participation and financial access. Reproductive health refers to maternal ration and adolescent birthright. Empowerment refers to the share of parliamentary seats held by women and the share of the population who are women, with at least some secondary education. According to the World Bank, the proportion of seats in Chad held by women in national parliaments was 14.9% in 2018 and was unchanged from the previous year.

Relating to women's labour market participation, ECOSIT 3 shows that around 26% of women have the possibility to decide for themselves to participate in the labour market and 24.3% to contract debt. Globally, at the national level, 42.5% of women regarding the whole population exercise a professional activity. Women house helps represent 59.1% of the total number of people working in this domain for a report of femininity of 144. In other professions, women are very rare or almost non-existent in some jobs such as semi-qualified employee/worker with a proportion estimated at 7.8%, representing a report of very low femininity (8.5%) either as employer (11.3%) women against 88.7% for a report of femininity estimated at 12.7%.

Women practice mainly in the business sectors of manufacturing of foodstuff, with a report of femininity of 1,047.3 followed by activities in the branch concerning food. Even if the proportion of women is very high in agriculture, the report of femininity is lower than 100, which denotes the ascendancy of men on women in this branch.

Around 18% of women in Chad who have been in a relationship, ranging from ages 15 to 49, have had a partner commit some type of physical or sexual violence against them at least once in their lifetime. Women in Chad are citizens with full voting rights but lack the knowledge about some rights, including their right to protection from gender-based violence. Many women are unaware that rape is a crime and see it as just an indecency. Without more knowledge about rights, women's empowerment in Chad is stifled.

3. Empirical strategy

We investigate the link between women's empowerment and social expenditures by using data at household level in Chad. Our identification strategy is based on the use of quasi-experimental method. The data set we use is a sub-set of the database from the Survey on Consumption and the Informal Sector in Chad (ECOSIT 3) conducted in 2011. It is composed of national households only. Having one observation point, the Propensity Score Matching (PSM) seems to be the most appropriate to address our research question. This model has the advantage of controlling for selection bias on observed characteristics (covariates). In fact, the PSM constructs a statistical comparison group by modelling the probability of participating in a group because of observed characteristics (Khandker et al., 2010; Rosenbaum and Rubin, 1983). In connection with our research issue, we need to identify the determinants of women's empowerment that must also be correlated with household social expenditures.

Data sources

Data have been derived from ECOSIT 3 carried out in 2011. This Survey aimed to establish the poverty profile in Chad. These data have been used in the formulation of all the different National Poverty Reduction Strategies implemented by the Chadian Government subsequent to 2011. ECOSIT 3 database provides rich information about housing, education, health and durable goods used as well-being indicators. This survey has a national coverage.

ECOSIT 3 used a two-stage stratified sample. Enumeration Areas (EA) are randomly sampled at the first stage. These statistical units cover all inhabited areas of the country during the reference time, so that there are no gaps between EAs. They include a number of households based on population density and the distance between the towns of a region. ECOSIT 3 is made up of 10,080 households drawn from a whole population living in 20 regions out of the 23 regions of the country. There were 32,581 individuals surveyed with a response rate of 85%, corresponding to 9,259 households.

Given that ECOSIT 3 provides information on household characteristics, we use data at household level. Indeed, we consider in this study that women's empowerment is associated with decision-making in households. However, this role is insured by the head of the household. In addition, in connection with the research question,

household is a decision-making centre on resource allocation. Thus, data used are collapsed at household level. Our dataset is composed of 9,259 households with 2,294 female-headed households and 6,965 male-headed households. Female-headed households represent 24.78% of the total.

Identification strategy

Although the household head's gender is exogenous, the social expenditure level in a household may depend on observed characteristics. In such a context, another major challenge in a quasi-experimental evaluation method is to construct an appropriate counterfactual model. A potential source of bias is that these observed characteristics are both likely to be correlated with interest outcome and household head's gender. In these conditions, recent studies similarly use matching model given the structure of data used in this study. With this discussion in mind, we use a PSM to estimate women's empowerment effects on social household expenditures.

A PSM is a proposed method to reduce bias in the estimation of treatment effects with observational data sets. The goal of PSM is to correct for selection bias on observables using observational data. A PSM constructs a statistical comparison group by modelling the probability of participating in a programme based on observed characteristics (Khandker et al., 2010; Rosenbaum and Rubin, 1983). A counterfactual or control group is created by matching treated and control units using a summary measure, the so-called "the propensity score". The propensity score is the probability of participating in the programme. Rather than controlling for differences in observed characteristics between treatment and control groups by including these characteristics in a regression (conditioning), it matches each treatment unit with one or more control unit with similar observed characteristics. Finally, control units have the same observable characteristics as treatment units.

To implement a PSM, we needed to follow four key steps, namely: (i) identify the treatment and control units; (ii) "match" each treated unit to one or multiple control units on covariates or a propensity score; (iii) calculate the difference in means for each matched pair; and (iv) average over the treatment effects for each matched pair to obtain the treatment effect (Average Treatment on Treated - ATT). If the first step seems simple, the other three require to operate choices. In particular, the second step requires to include covariates in the participation equation. To model the assignment mechanism, we need to include all covariates that are correlated both with the treatment and the outcome of interest. In fact, to include the variables not associated with interest outcome will slightly increase the variance. However, omitting important variables can seriously increase bias in resulting estimates (Heckman et al., 1997; Dehejia and Wahba, 1999). According to Grilli and Rampichini (2011), the choice of covariates to include in the propensity score model should be based on: (i) theory and previous empirical findings (Sianesi, 2004; Smith and Todd, 2005) and (ii) formal (statistical) tests (Heckman et al., 1998, Heckman and Smith, 1999 and Black and Smith, 2004).

The last challenge is the choice of matching methods among ones that are proposed in the literature. The most widely used are: (i) Nearest-Neighbour Matching where each treatment unit is matched to the comparison unit with the “closest” observable characteristics; (ii) Kernel Matching; (iii) Radius Matching; and (iv) Stratification Matching (Abadie and Imbens, 2016). Based on recent empirical works, we use the two first algorithm procedures.

Finally, PSM requires two fundamental identification assumptions that ensure validity of results. There are conditional independence assumption (no selection on unobservables) and common support or overlap. The first assumption suggests that selection bias is conditional on the observed covariates in the baseline ($(Y(0); Y(1)) \perp W|X$). The second assumption ensures that individuals with the same X values have positive probability of being both participants and non-participants ($0 < p_i < 1$). There is no perfect predictability of d given X .

Variables and descriptive statistics

To analyze women’s empowerment effects on social household expenditures, we consider the sex of household head as our treatment variable. For this purpose, we use two types of variables: (i) pre-treatment variables or covariates and (ii) interest outcomes.

Regarding the covariates, several variables are used as predictors to construct the counterfactual for each female-headed household, which are likely to be correlated both with social expenditures and household’s sex. In connection with hypotheses of the PSM as presented above, the covariates included in the participation equation are: age of household head; household size; literacy; access to radio, home ownership; place of residence (rural/urban); and membership in an association of the household head. These variables cover the different dimensions of women’s empowerment as previously discussed in the literature review (Dahoun et al., 2013). The variables age, size of the household and place of residence describe the household characteristics having close links both with the level of social household spending and household’s sex.

Literacy is one of the dimensions of women’s empowerment and it is considered as one of its proxies (Ackerly, 1995 and Kishor, 2000a). Indeed, education allows us to evaluate the degree of women’s empowerment because women’s education is associated with expansion of freedoms by increasing their decision-making power. Access to radio is used as a predictor of women’s empowerment because it allows women to access information and change their behaviour. Radio programmes in promoting women’s rights are likely to affect women’s behaviour towards greater empowerment. For example, Schuler et al. (2010) show that access to radio has significantly improved women’s awareness of current events, social issues, and legal rights in Bangladesh. In Chad, especially in rural areas, access to information for women is often not free. To be the home owner is an indicator of standard of living. It covers the economic dimension of women’s empowerment. Finally, we assume

that women's association participation is an indicator of social empowerment. To do this, we use a dummy that equals 1 if household head is a member of any association, and 0 otherwise.

Regarding the outcome variables, we use disaggregated data on household expenditures. These household expenditures are related to education, health and food (see Table A3 in the Appendix for the definition of variables).

Table A4 in the Appendix presents the results of the balancing test and descriptive statistics of covariates. The results of the t-tests allow us to compare the mean values of each covariate between female-headed and male-headed households. The results show that there is statistically significant difference between female-headed and male-headed households, except home ownership, justifying the use of the PSM. Descriptive statistics of outcome variables are reported in Table A5 in the Appendix. We notice high inequalities within female-headed and male-headed households in terms of social expenditures.

A logit model was used to calculate the propensity scores⁷. Based on these propensity scores, each female-headed household is matched with several male-headed households (depending on the matching algorithm). We check for the balance of the propensity score between female-headed and male-headed households (i.e., the overlap or common support assumption) using both t-tests and histograms showing the density of propensity scores for each of the two groups. Results of t-tests after the matching are reported in Table A6 in the Appendix. We notice that matching has been successful because considering covariates, there is not a statistically significant difference between the two groups.

4. Results and interpretation

Table 1 presents PSM estimates of mean impacts using nearest neighbours matching (column 1) and Kernel-based matching (column 2) methods. For each outcome variable, we report the Average Treatment on Treated (ATT) and the standard errors (SE). These estimates were used to compare the differences between male-headed and female-headed households in terms of social expenditures. We consider three types of social expenditures as outcome variables, namely: health, education and food.

Focusing on the nearest neighbours matching and Kernel-based matching (one treated unit matched with 5 untreated units), it can be observed that social expenditures realized by female-headed households are higher than those realized by male-headed households. These differences are statistically significant at the 5% level for health and food expenditures and at the 1% level for education expenditures. This is consistent with our theoretical discussion showing that women are more likely to spend on social sectors (education, health and food) than men when they have the power.

Table 1: Women’s empowerment effects on social expenditure

Average impact	5 nearest neighbours matching		Kernel-based matching	
	ATT	S.E	ATT	S.E
Health expenditure	16,213	6,847.2**	13,687	6,536.1**
Food expenditure	155,244	61,805.4**	167 084	61,595.6***
Education expenditure	20,188	5,168.8***	20 126	4,947.5***
N				9 259

* significant at 10%, **significant at 5% and *** significant at 1%

Results also indicate that the differences between female-headed households and male-headed households are higher in food expenditures after controlling for observed characteristics (covariates). In particular, the results suggest that female-headed households spend, on average, CFAF 155,244 (column 1) of their income on food compared with male-headed households. One might imagine that, in a poverty context, a significant portion of a household revenue is mainly directed towards food. The magnitude of coefficient associated with health expenditures (CFAF 16,213) is 9.5 times higher than that of food expenditures. This could suggest that health expenditures are not necessarily associated with a better state of health as discussed

in the theoretical section. Finally, we investigate in the next section the possible explanations of these results.

Robustness tests

We perform several robustness tests to check whether our results are sensitive to model specification and choice of outcome variables. First, we drop observations with propensity scores outside of the common support, and the regression is run on the restricted sample. Indeed, Heckman et al. (1997) encourage dropping treatment observations with a weak common support. The histogram of propensity scores by female-headed households highlight overlap problems (see Figure A1 in the Appendix). To avoid the problem of controls with extremely low propensity scores, we limit units with $0.015 < \pi < 0.64$. We then use the inverse of the propensity score to reweight female-headed and male-headed households (Hirano et al., 2003). The idea is units that are underrepresented in the treatment or control group are up-weighted and units that are over-represented in one of the groups are down-weighted. Finally, we change the outcome variables using alcohol and leisure expenditures. The results of all estimates are reported in Table 2. In column (1), the estimate is carried out on reduced sample. Column (2) contains the estimate results where propensity score are inversed. In column (3) we use the alcohol and leisure expenditures as outcome variables.

Table 2: Robustness tests

	Reduced sample		-		Total sample	
	(1)	(2)	(3)			
	ATT	S.E.	ATT	S.E.	ATT	S.E.
Health expenditures	6,707	6,224.1*	27,888	15,402.1**		
Food expenditures	164,650	64,515.7**	288,804	79,392.3***		
Education expenditures	18,904	4,081.3***	15,623	6,058.9***		
Alcohol expenditures					-36,568	7,283.4***
Leisure expenditures					-7,606	3,862.4***
N		6,189				9,259

* significant at 10%, **significant at 5% and *** significant at 1%

The results remain broadly unchanged. In particular, when limiting sample on common support, we find that social expenditures (health, education and food) by female-headed households are higher than those realized by male-headed households after controlling for observed characteristics (covariates). However, we notice that this method improves the effectiveness of the PSM because standard errors associated with three estimates are decreased. We note that significance associated with health expenditure coefficient decreases from 5% to 10%. Regarding the use of the inversed

propensity score, we notice that coefficients associated with different household social expenditures remain positive and statistically significant, while they experienced an increase.

Column (3) shows that male-headed households spend more on alcohol and leisure than female-headed households. This suggests a composition effect of household expenditure. In particular, male-headed households spend less on social sectors than female-headed households with the same observed characteristics.

These results highlight the fact that our main estimates are not sensitive to model specification. They also show that there is a composition effect of household expenditures.

5. Conclusion and policy recommendations

In this paper, we have investigated the impact of women's empowerment on household social expenditures using data from the Chadian household consumption and informal sector survey carried out in 2011, and Propensity Score Matching as empirical model. Based on economic literature, we have hypothesized that female-headed households are more likely to spend on social sectors than men when they have the power. The use of the PSM allowed us to match each female-headed household with one or more male-headed households with similar observed characteristics. The social expenditures used as outcome variables are education, health and food.

Thus, our findings support the hypothesis that social expenditures are higher when household is headed by a woman than when it headed by a man with similar observed characteristics. In particular, differences between the female-headed households and male-headed households are higher in food expenditures after controlling for observed characteristics (covariates). Results also show that there is a composition effect in household expenditures. While female-headed households spend their incomes in social sectors (health, food and education), those headed by men spend for temptation goods (alcohol and leisure). These results hold when we control both model specification and common support hypothesis.

As a fragile State and oil exporter country, Chad implemented economic policies based on the large increase in financing for the social sectors to address the poverty issue. Despite this, the level of social development is low in Chad, raising the issue of efficiency of economic policies. Our findings provide decision makers with economic policy tools to promote social development focusing on women's empowerment.

Notes

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5. These seven countries are South Sudan, Somalia, Central African Republic, Yemen, Sudan, Syria and Democratic Republic of Congo.
6. See Mabali and Mantobaye (2017) for the effects of this allocation mechanism of oil revenues on poverty indicators.
7. Results of participation equation are available from the authors upon request.

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Appendix

Table A1: Commonly used dimensions of empowerment and potential operationalization

Dimension	Household	Community	Broader Arenas
Economic	Women's control over income; relative contribution to family support; access to and control of family resources	Women's access to employment; ownership of assets and land; access to credit; involvement and/or representation in local trade associations; access to markets	Women's representation in high paying jobs; women CEO's; representation of women's economic interests in macroeconomic policies, state and federal budgets
Socio-cultural	Women's freedom of movement; lack of discrimination against daughters; commitment to educating daughters	Women's visibility in and access to social spaces; access to modern transportation; participation in extra-familial groups and social networks; shift in patriarchal norms (such as on preference); symbolic representation of the female in myth and ritual	Women's literacy and access to a broad range of educational options; Positive media images of women, their roles and contributions
Familial/ Interpersonal	Participation in domestic decision-making; control over sexual relations; ability to make child-bearing decisions, use contraception, access abortion; control over spouse selection and marriage timing; freedom from domestic violence	Shifts in marriage and kinship systems indicating greater value and autonomy for women (e.g. later marriages, self-selection of spouses, reduction in the practice of dowry; acceptability of divorce); local campaigns against domestic violence	Regional/national trends in timing of marriage, options for divorce; political, legal, religious support for (or lack of active opposition to) such shifts; systems providing easy access to contraception, safe abortion, reproductive health services
Legal	Knowledge of legal rights; domestic support for exercising rights	Community mobilization for rights; campaigns for rights awareness; effective local enforcement of legal rights	Laws supporting women's rights, access to resources and options; advocacy for rights and legislation; use of judicial system to redress rights violations

continued next page

Table A1 Continued

Dimension	Household	Community	Broader Arenas
Political	Knowledge of political system and means of access to it; domestic support for political engagement; exercising the right to vote	Women's involvement or mobilization in the local political system/campaigns; support for specific candidates or legislation; representation in local bodies of government	Women's representation in regional and national bodies of government; strength as a voting bloc; representation of women's interests in effective lobbies and interest groups
Psychological	Self-esteem; self- efficacy; psychological well-being	Collective awareness of injustice, potential of mobilization	Women's sense of inclusion and entitlement; systemic acceptance of women's entitlement and inclusion

Source: Malhotra et al. (2002)

Table A2: Individual and aggregate indicators on women's empowerment

Individual/households level indicators	
Domestic decision- making	• Finances, resource allocation, spending, expenditures
	• Social and domestic matters (e.g. cooking)
	• Child-related issues (e.g. well-being, schooling, health)
Access to or control over resources	Access to, control of cash, household income, assets, unearned income, welfare receipts, household budget, participation in paid employment
Mobility/freedom of movement	Mobility/freedom of movement
Aggregate level indicators	
Labour market	Female labour force participation (or female share, or female/male ratios), occupational sex segregation, gender wage differentials, child-care options, labour laws, percent of wives/women in modern work, ratio of female/male administrators and managers, ratio of female/male professionals and technical workers, women's share of earned income
Education	Female literacy (or female share, female/male ratio), female enrolment in secondary school, maternal education
Marriage/kinship system	Singulate mean age at marriage, mean spousal age difference, proportion unmarried females aged 15-19, area of rice cultivation, relative rates of female to male migration, geographic region
Social norms and practices health/survival	Wives'/women's physical mobility, relative child survival/sex ratios of mortality
Political and legal	Ratio of seats in parliament held by women, women's legal rights, questions, complains, requests from women at village council

Source: Malhotra et al. (2002)

Table A3: List of variables

Variables	Description
Sex	A dummy variable equals 0 if the household head is a male, 0 otherwise
Health expenditure	There are health and hygiene expenditures of the household during the last four months of the year. They contain hospital costs, drug costs, consulting fees (health care personnel and traditional healer), transportation costs for visiting health centres. These expenditures have been annualized
Education expenditure	These expenditures contain schooling fees, costs of school uniforms, school materials, and costs of transport to school. They relate to the 2010-2011 school year
Food expenditure	Food expenditures are an aggregation of all the spending related to purchase of food, including the assessment of self-consumption
Treat	Treat is our treatment variable that equals 1 if female-headed household, 0 otherwise
Alcohol expenditures	This spending concerns those that are for alcoholic beverages and tobacco
Leisure expenditures	Leisure expenditures relate to spending on cultural and artistic activities, and sport
Age	This variable captures the age of household head
Size	Size is the number of people in a household
Association	Association is a variable that captures the women's association participation. This is a dummy variable that equals 1 if household head is member of any association, 0 Otherwise
Urban	Urban is a dummy variable that equals 1 if the household lives in urban area, 0 otherwise
Home ownership	Home ownership is a dummy variable that equals 1 if household owns a home, 0 otherwise
Literacy	This is a dummy variable that equals 1 if household head knows to read and write, 0 otherwise
Access to radio	Access to radio is used as predictor of women's empowerment. This is dummy variable equals 1 if household owns a radio, 0 otherwise.

Table A4: Balancing test before matching

Covariates	Female	Male	Difference (p)
Age	42.59	41.75	-0.84**
			(0.017)
Size	4.46	5.71	1.25***
			(0.000)
Home ownership (%)	68.13	68.17	0.04
			(0.975)
Urban (%)	70.71	66.36	-4.35***
			(0.000)
Association (%)	31.82	30.96	-0.86***
			(0.000)
Radio (%)	36.71	57.09	20.38***
			(0.000)
Literacy (%)	16.61	42.47	25.86***
			(0.000)
Number obs.	2,294	6,965	

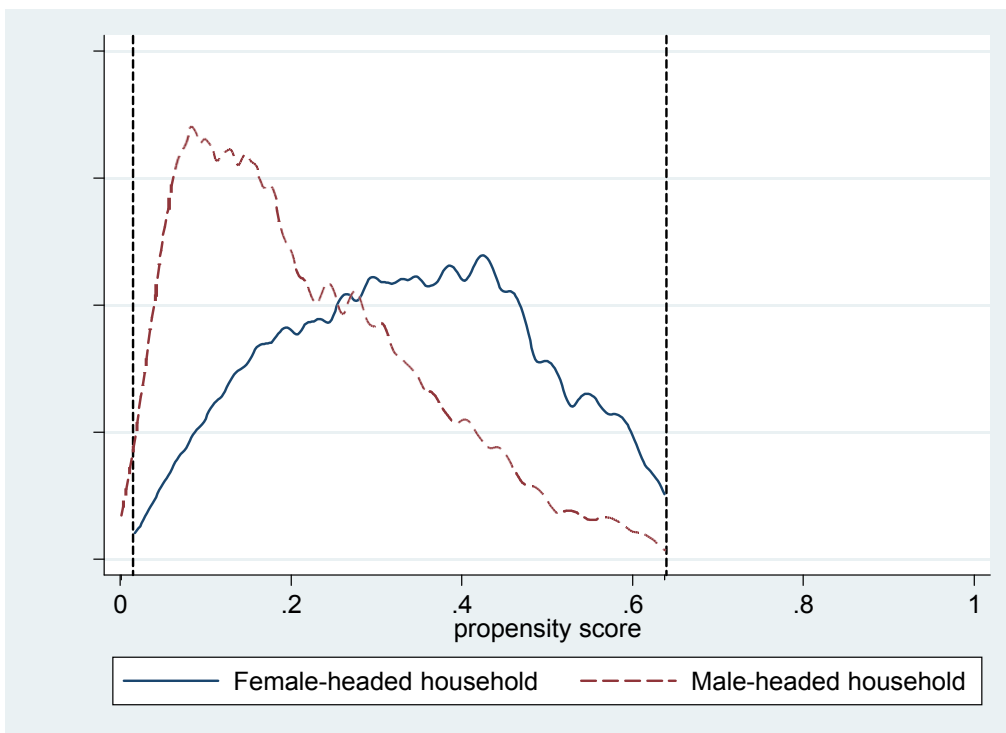
Table A5: Descriptive statistics of outcome variables

	Female				Male			
	Mean	Min	Max	Std. Dev	Mean	Min	Max	Std. Dev
Food expenditures (per capita)	305,462	16,876	4,426,586	289,086	277,944	21,000	9,697,321	306.742
Education expenditures	40,735	0	3,086,233	132,118	37,640	0	2,581,244	111,923
Health expenditures	54,990	0	2,316,083	161,238	69,547	0	3,616,800	180,820
Number obs.			2,294				6,965	

Table A6: Balancing test after matching

	Female	Male	Difference
Age	39.56	40.38	0.83
			(0.283)
Size	5.64	5.93	0.29
			(0.133)
Home ownership	67.16	72.67	5.50
			(0.556)
Association (%)	31.60	33.26	1.66
			(0.208)
Urban (%)	46.77	41.27	-5.49
			(0.154)
Radio (%)	50.75	54.01	0.033
			(0.402)
Alpha (%)	4.48	4.72	0.24
			0.883

Figure A1: Support common hypothesis





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