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**HOW GENDER BIASED ARE
FEMALE-HEADED HOUSEHOLD TRANSFERS IN EGYPT?**

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Abstract

In this paper, we claim that the policy of targeting female-headed households' (FHHs) may generate bias against women in male-headed households (MHHs) who may be more poverty-constrained. Targeting FHHs may have the merit of clear targeting, however, it doesn't address the feminization phenomenon of poverty; instead, it presents unequal opportunities for women in other families by less favoring them. We argue that proper targeting could be derived based on the number of women in families. The study applied a Gender-Based Poverty Detection Model to provide a good detection of household poverty and show that the vulnerable characteristics of females could be more influenced by the general household's poverty than females' headed households. Model results showed that not all FHHs are poor, and that some de jure MHHs include a large number of poor females. This means that targeting only de jure FHHs might result in resource leakage to the non-poor and under-coverage of poor de facto FHHs and poor females in MHHs. The analysis asserts that female headship is not always a correlate of poverty in Egypt. An important correlate, however, is the share of female members in the household. This raises questions about the effectiveness of social assistance and poverty alleviation programs in Egypt in targeting female poverty.

JEL Classification: J1; I3; D1

Keywords: Female-Headed Households; Gender-Based Poverty Detection; Poverty; Egypt

ملخص

في هذه الورقة، ندعي أن سياسة استهداف الأسر التي ترأسها نساء قد تولد تحيزا ضد النساء في الأسر التي يرأسها الذكور والتي قد تكون أكثر تقييدا للفقير. وقد يكون استهداف المؤسسات علامة مجتمعية صحية، إلا أنها لا تعالج ظاهرة الفقر لدى النساء. وبدلا من ذلك، فإنها تتيح فرصا غير متكافئة للمرأة في الأسر الأخرى عن طريق تفضيلها بدرجة أقل. ونجادل بأن الاستهداف السليم يمكن أن يستمد استنادا إلى عدد النساء في الأسر. وقد طبقت الدراسة نموذجا للكشف عن الفقر القائم على نوع الجنس لتوفير كشف جيد عن فقر الأسرة وتبين أن الخصائص الضعيفة للإناث يمكن أن تتأثر بدرجة أكبر بفقر الأسرة المعيشية العامة عن الأسر المعيشية التي ترأسها الإناث. وأظهرت النتائج النموذجية أن جميع الأسر المعيشية غير المنتمية إلى الأسر فقيرة، وأن بعض الأمهات الفقيرات في المستشفيات يشملن عددا كبيرا من الإناث الفقيرات. وهذا يعني أن استهداف الأسر الزراعية بحكم القانون فقط قد يؤدي إلى تسرب الموارد إلى غير الفقراء وتغطية أقل من الأسر التي ترأسها بحكم الأمر الواقع والإناث الفقيرات. ويؤكد التحليل أن رئاسة المرأة ليست دائما مرتبطة بالفقر في مصر. غير أن هناك صلة هامة بين نسبة النساء في الأسرة المعيشية. وهذا يؤثر تساؤلات حول فعالية برامج المساعدة الاجتماعية والتخفيف من وطأة الفقر في مصر في استهداف فقر الإناث.

1. Introduction

Poverty is considered one of the chronic economic and social problems Egypt has been facing throughout many decades. Therefore, successive governments devoted a lot of attention to designing different policies and programs to either support the poor or eliminate poverty.

Poverty is commonly known as a socio-economic phenomenon related to the lack of ability to generate an adequate household income. In this context, the term “adequate” refers to the sufficiency of this income to cover household expenses, at least for basic needs. Consequently, the composition of household income and its sustainability is the core of the poverty story.

In 1998, Datt and Jolliffe introduced the profile of poverty in Egypt. According to their results, Female-Headed Households (FHHs) were more likely to be poor and had higher measures of poverty depth and severity. The results showed that in urban areas, about 33 percent of FHHs suffered from poverty, while about 22 percent of Male-Headed Households (MHHs) suffered from poverty. However, in rural areas, about 36 percent of FHHs suffered from poverty, compared to about 28 percent of MHHs.

These findings grounded the policy of targeting FHHs. However, other results showed that poverty is more associated with the composition of the family rather than who is heading it. Assad and Krafft (2013) showed that the Labor Force Participation Rate (LFPR) is 23.1 percent for females, compared to 80.2 percent for males. Therefore, the risk factor could not only be summarized in FHHs; meaning that the number of females in the household is a risk factor because they are considered a weak point in regards to accessing and participating in income-generating activities.

This indicates that the core of poverty may be significantly related to individual characteristics, specifically gender, which could be aggravated by other factors, such as location. We claim that the policy of targeting FHHs’ may generate bias against women in MHHs who may be more poverty-constrained. In other words, targeting FHHs may have the merit of clear targeting, however, it doesn’t address the feminization phenomenon of poverty. It presents unequal opportunities for women in other families by less favoring them. We argue that proper targeting could be derived based on the number of women in families.

The current paper is structured into six sections. After the introduction, sections two and three review literature on gender poverty and transfers to FHHs. Section four highlights gender poverty and the targeting program in Egypt. In section five, we challenge the equality capacity of the female-headed family transfer program. Finally, section six concludes with policy implications.

2. Explaining the "Feminization of Poverty"

Reviewing the literature on gender inequality shows what could be referred to as the “feminization of poverty.” Some studies narrowly defined the term gender inequality as the inequality between men and women with regards to measures of well-being, or what has become to be known in inequality literature as the inequality of "outcomes," such as income levels. However, other studies defined the term in a broader sense, in terms of inequality of “opportunities.” Inequality of opportunity means that men and women do not have equal chances for development as a result of inequality in accessing basic opportunities, inequality under the law, inequality of voice and participation in the political process, and discrimination. Whether defined in terms of outcomes or opportunities, gender studies have consistently shown that women stand at a disadvantaged position compared to men. The universality of gender inequality has rendered promoting gender equality and empowerment of women to be one of the Millennium Development Goals agreed on by all the members of the United Nations.

As a group, women spend fewer years in paid employment, receive lower wages and live longer than men. All three differences increase women's risks of poverty relative to men (Fultz and

Francis, 2013). According to data provided by the 2014 UNDP Human Development Report, in almost all countries, regardless of their level of development, the labor force participation rate is lower for the females than for males. The ratio of female to male labor force participation rate in 2012 was estimated to be 0.711 in countries with low human development, and 0.758 in countries with very high human development. This implies that gender inequality is not an issue of poor development.

From a theoretical perspective, Human Capital Theories emphasize the role of gender gaps in human capital investment in explaining gender income gaps attributed to differences in productivity. Human capital models, such as Becker's model (1993), explain low investment in female human capital as a result of a *rational utility maximization decision* by the household regarding the allocation of responsibilities within family members. The present value of the lifetime earnings of the family could be maximized when the male family members invest in human capital for their professional life, whereas the female partners prioritize investment in family or domestic activities. If this is the case, then rational family decision making will act as a constraint to female human capital investment, labor productivity and labor force participation, and will deprive women from possible income opportunities.

Human capital models, however, are not able to explain the gender gaps in income and labor force participation when the level of investment in human capital is controlled for. Gender gaps in income and labor force participation rates are observed between men and women with similar levels of educational attainment/achievement. For example, the MENA Development Report of 2013 argued that the MENA region exhibits a “gender inequality paradox.” Although most MENA countries have made great progress towards closing the gender gaps in education, huge investments in human development have not yet translated into proportionately higher rates of female labor force participation. Bruegel (1979) highlighted the role of *social institutions and traditional gender ideologies* in explaining female poverty and low labor force participation. It explained that when employers and/or male family members view the role of women as labor market participants to be only secondary to their role inside the family, the result is that less demanding, poorly paid, part-time or temporary jobs are socially constructed as more “appropriate” for female employees. In addition, when economies slow down and jobs are scarce, it is argued that priority should be given to men as they are perceived to be the bread winners, while women are primarily responsible for the domestic “caring” role (World Bank, 2012).

Iversen (2003), Pahl (1983) and Findlay and Wright (1996) highlighted another relevant social institution: the power relations within the household. Women tend to be less powerful or have less effective control regarding the allocation of family resources and are often more willing to sacrifice resources for the sake of their families or children. Social norms about the role of females within and outside of households and about the extent to which women are free and able to earn and control income and make decisions regarding the use of resources are referred to in recent literature as “women agency” (Moghadam, 2004; Offenhauer, 2005; Landes and Landes, 2001; World Bank, 2013).

In addition to social norms being biased against women's agency and labor force participation, countries' *discriminatory business environments* act as an additional obstacle to female well-being. Worldwide, women entrepreneurs are a minority (World Bank, 2013). There is a growing body of literature that investigates whether or not financial constraints typically faced by entrepreneurs differ by demographic characteristics, including gender (Muravyev et. al, 2009; Storey, 2004). Muravyev et. al (2009) examined whether financial institutions discriminate against entrepreneurs on the basis of gender by performing a cross-country Business Environment and Enterprise Performance Survey (BEEPS) covering 34 countries in Central and Eastern Europe, Western Europe, and Asia. This provided evidence that female-

managed firms, compared to their male-managed counterparts, are less likely to obtain a bank loan. In addition, female entrepreneurs are charged higher interest rates when loan applications are approved. These results hold after controlling for many important characteristics of firms that are related to their creditworthiness and performance and are robust to a number of specification checks. Evidence, however, suggested that gender-based discrimination is lower in countries with more developed financial markets. This is reflected in lower rejection rates and lower collateral requirements for female entrepreneurs in more financially developed economies. The MENA Development Report for 2013 argued that women in the MENA region not only face lower wages and less occupational choices than men, but also face limited self-employment opportunities through entrepreneurship. In some MENA countries, barriers to female entrepreneurs can be as obvious as legally requiring a male relative's approval for the woman's travel, while in other countries they are even gender-neutral barriers, such as having to go through the cumbersome procedures for starting a business, enough to discourage female entrepreneurship.

Inequality has traditionally been discussed in terms of income, consumption and wealth. However, inequality in opportunities for development has been gaining increasing importance. Rawls (1971) (as cited in Barros et. al, 2009) was the first to highlight the importance of fairness in the distribution of what he called “primary goods.” Following Rawls, Arneson (1989) (as cited in Barros et. al, 2009) spoke of the equality of “opportunity for welfare” rather than of welfare itself, as reflected by income or consumption levels. Equality of opportunity means “leveling the playing field,” thus giving all the same chance in achieving the outcomes of their selections. This is mainly done through (i) non-discrimination and (ii) guaranteeing that all individuals have access to a set of “basic opportunities,” such as basic education, basic healthcare and basic housing infrastructure (Barros et. al, 2009; Molinas et. al, 2010). In this sense, *public policy regarding the allocation of public infrastructure* can have adverse effects on female well-being if they do not take into consideration aspects of gender equality and female empowerment. For example, the World Bank (2011) showed how in low-density rural areas of some MENA countries, long distances from home to school and the lack of appropriate transport infrastructure and sanitation facilities are factors that impede girls' education.

3. Targeting Female-Headed Households

The above discussion shows that there is a multitude of reasons that explain the feminization of poverty; in other words, why poverty is more of a feminine problem. Logically, the same reasons suggest that poverty is much likely to be higher in a household with a large number of females and households with female heads.

The phenomenon of FHHs has become important worldwide (Barros et. al, 1997). Female heads of households are regarded as being worthy of special policy attention because, in addition to performing their traditional domestic role, they assume the absent male-breadwinner role while facing the several social and economic constraints discussed above.

Buvinic and Rao Gupta (1997) reviewed 61 studies examining the relationship between female household headship and poverty. Using a variety of poverty indicators, 38 out of the 61 studies found that FHHs are overrepresented among the poor. Another 15 found that poverty was associated with certain types of female heads, and only eight studies reported that there is no evidence for the hypothesis that FHHs suffer from greater poverty. Christofer et. al (2002) examined gender gaps in poverty in the United States and seven other Western nations and found that single-mother families have higher poverty rates than other families in all nations except Sweden, though the degree of their poverty varies. In another study, Kimenyi and Mbaku (1995) found that FHHs in the United States have the highest poverty rates of all “high poverty” groups.

According to Chant (2003), the poverty of FHHs has become a proxy for female poverty and for poverty in general. It is the concentration of poverty amongst FHHs that has led to the coining of the phrase “feminization of poverty” (Kimenyi and Mbaku, 1995). This has given rise to several arguments for targeting social assistance programs to FHHs in order to attack poverty. Reviewing the experience of Chile, which is one of the few countries that have targeted FHHs through government programs, Buvinic and Rao Gupta (1997) showed that targeting female headship can be an efficient way of reaching the poor.

An opposing argument has, however, suggested that female headship is not always correlated with poverty. In other words, not all households that have female heads are poor (Buvinic and Rao Gupta, 1997; Appleton, 1996; Barros et. al, 1997). The opposite is also true; some de facto FHHs are classified as MHHs because social and cultural prescriptions identify the man as the breadwinner and household authority (Handa, 1994; Buvinic and Rao Gupta, 1997). In addition, targeting only FHHs means that poor MHHs that might in fact include a large number of poor females are excluded from the program. In the latter case, the policy of supporting only FHHs would negatively affect female poverty reduction. Therefore, Handa (1994) suggested that treating female headed households as a homogenous group can be inappropriate. Buvinic and Rao Gupta (1997) alerted that female headship should not be used as the main criterion for targeting female poverty.

4. Female Poverty and Targeting in Egypt

4.1 Profile

Few studies have focused on analyzing the issue of female poverty in Egypt. El-Laithy (2001) studied the gender dimension of poverty and examined how women's poverty is linked to their education levels and their situation in the labor market. The author found that being a female increases the probability of being poor by 2.3 percentage points in urban areas and 4.79 percentage points in rural areas. Using both lower and upper poverty lines, the incidence of poverty among females was found to be slightly higher than that among males, and this was true in all regions. In addition, females are overrepresented among the poor, as their share of the poor exceeds their share of the population. The study showed that education is the strongest correlate of poverty as poor females are more represented in lower levels of education. In fact, the incidence of illiteracy among females was found to be significantly higher than that among males. Low levels of educational attainment is due to the tendency of poor households with limited resources to choose not to send their girls to schools. Another correlate of female poverty was their employment characteristics, as females are significantly less represented among the working category than males and a large proportion of poor working females have insecure jobs with no health and social insurance. Overall, the author argues that the disadvantages of poor women in Egypt are threefold; they suffer the hardship of poverty, they face social biases that limit their contribution to the development process, and, as household heads, they assume the breadwinner's role in addition to their primary household caring role.

More recent studies also documented the existing gender gap. Al Azzawi (2010) and Al Azzawi and Said (2012) analyzed the degree of social mobility for females and found that between 1998 and 2006, females were stuck at the lower part of the distribution more often than males, both by income and job quality measures.

According to the United Nations Population Fund (UNFPA), despite substantial improvements in female literacy rates, enrollment rates and labor force participation in Egypt, there remains a gender gap in favor of males. Egypt ranks 130 out of 187 countries on the Gender Inequality Index as per the 2014 Human Development Report. The UNFPA suggested a number of reasons for the pronounced gender inequality in Egypt, such as the fact that illiteracy among women is almost twice as high as among men. Women's opportunities are also limited by lack of information and absence of assets for collateral to obtain credit. In addition, traditions tend

to deny women equal access to education, employment and healthcare, and many women lack awareness of their rights and have poor authority in the decision-making process.

Several labor market studies highlighted the existing gender pay gap. The gender pay gap is generally higher in the private sector than in the public sector and in the tradable sector than in the non-tradable sector (El-Hamidi and Said, 2014; Khairy, 2015). While female characteristics, such as high illiteracy, understandably play a role in explaining pay gaps, discrimination also adds up complications. Biltagy (2014) used data from the 2006 and 2012 Egypt Labor Market Panel Surveys (ELMPs) to explain wage differences between males and females using the Oaxaca-Blinder decomposition. The study found that the wage gap between males and females is 25% and 21% in 2006 and 2012 respectively, and the overall gap is largely attributed to discrimination against women. Al Azzawi (2013) also confirmed the impact of discrimination in explaining the high and increasing gender pay gap in the Egyptian manufacturing sector.

4.2 Female-headship and poverty

Headship is defined in terms of the power to make decisions and financially support the household. One way to objectively designate the household as an FHH is to calculate the share of the female income in the household's income, and if this share exceeds 50 percent, the household is female-headed. This is referred to as the de facto head designation. This is, however, quite difficult in the case of Egypt for two reasons; first, data on individual earnings of each household member is not provided by the HIECS, which is the only source of income data. Second, it is the common practice in Egypt to designate the oldest male member as the head of household, even if he is not the main breadwinner. Accordingly, FHHs are basically those households with no adult males. This is known as the de jure designation, meaning that data and studies on FHHs in Egypt may not provide the true picture of the FHHs' level of well-being.

The poverty status of FHHs is thus highly dependent on how headship is designated, in addition to how their poverty measures are calculated. Results of different studies show that comparing the poverty status of FHHs versus MHHs for the purposes of identifying eligible recipients for social assistance is problematic. While some studies concluded that FHHs are definitely poorer than MHHs and that female headship has a significant negative effect on household living standards (for example, Datt et. al, 1998; Datt and Jolliffe, 1999; AlAzzawi, 2015a; Al Azzawi, 2015b), other studies reached a completely different conclusion: that FHHs are less represented among the poor and actually tend to fare better than MHHs (World Bank, 2007).

Conflicting results arise from a number of errors in measurement. Social norms shaping how the household head is designated is one issue, and another issue is the presence of a large number of households where the male spouse is working abroad. In this case, it is not always clear how the head is designated. The female spouse might designate herself as the head in the absence of her husband. If this happens, the poverty among FHHs is underestimated due to the effect of remittances incorrectly recorded as part of the FHHs' income. The source of this measurement error should be taken into consideration in making generalizations about the well-being of FHHs, as income surveys show that remittances are indeed a major source of income for over 60 percent of FHHs. Another source of measurement error is that poverty measures based on consumption can be subject to gender bias. In FHHs, wives tend to report household expenditures more accurately than in MHHs; they are the ones responsible for purchases in FHHs, but in MHHs they might lack complete information on expenditures of all members, especially of the male head. This might incorrectly imply higher expenditures in FHHs. Finally, conducting a direct comparison between both types of households does not give a meaningful or accurate indication of poverty differentials between the two, as it neglects the differences in the characteristics of these households. A more meaningful comparison would require

controlling for the social, economic and demographic characteristics that matter for poverty and that are actually quite different between MHHs and FHHs. Again, comparing the poverty status after controlling for differences in characteristics by comparing both types of households with the same characteristics would give different results than comparing “typical” MHHs and FHHs; i.e. households with mean characteristics (World Bank, 2007; Al Azzawi, 2015a).

Using the Oaxaca-Blinder decomposition, Al Azzawi (2015b) found that most of the gender poverty gap, as measured by the difference between Foster-Greer-Thorbecke measures of poverty between “typical” FHHs and MHHs, is attributed to differences in “endowments,” where FHHs have less favorable characteristics than MHHs. This result holds true for the five rounds of Household, Income, Expenditure and Consumption Surveys from 1999/2000 till 2012/2013. This suggests that the computed poverty for FHHs would have been lower if the FHHs had the same mean values of exogenous variables as MHHs. The results also show that there has been an increasing role for differences in returns to endowments since 1999/2000, which implies a rising role for discrimination in explaining the poverty of FHHs relative to MHHs over time.

4.3 Female Cash Transfers

Whether or not FHHs are in fact poorer or better off than MHHs, many social assistance programs in Egypt consider FHHs worthy of targeting. In fact, FHHs are the largest recipient category of social assistance.

Egypt’s social assistance program, which was established by Law 112 of 1980, is administered by the Ministry of Social Solidarity and consists of both non-contributory pensions and Conditional Cash Transfers (CCTs), and is financed through taxes (Sieverding & Selwaness 2012).

Social assistance pensions were originally named Sadat pensions, later renamed Mubarak pensions, and are now officially called Social Solidarity/guarantee pensions. To be eligible, individuals must not be receiving another type of pension, and must be considered part of one of society’s most vulnerable groups, which include: divorced, widowed, and abandoned women, women with no male provider, orphans, the elderly, and households in which the male head is unable to work. In other words, the pensions are targeted toward households with no male provider capable of earning a labor income (Sabry, 2005; Sieverding & Selwaness, 2012).

An important implication of the aforementioned eligibility criteria is that receipts of social solidarity pensions become concentrated among FHHs, especially among households whose female head is over 60 years. This is expected because widowhood, which is more observed among females, is likely to increase with age (World Bank, 2007; Sieverding & Selwaness, 2012).

However, despite its bias towards FHHs, social assistance does not necessarily succeed in addressing female poverty for five main reasons. First, poor FHHs might not meet the eligibility criteria. Second, some poor FHHs who meet the eligibility criteria do not get the pension payments, either because female heads do not have identification cards or because the application procedures are long and cumbersome. Third, poor MHHs are often not eligible for transfers, and these might include a large number of females. Fourth, the value of transfers per recipient household is very low to be able to lift poor FHHs out of poverty. Finally, the importance of cash transfers was higher for better off FHHs; while all FHHs received 54 percent of Sadat and 44 percent of Social Guarantee pensions in 2006, the corresponding figures for poor FHHs were only eight and 12 percent (Sabry, 2005; World Bank, 2007).

The errors in targeting social assistance suggest that the method of categorical targeting used to allocate social assistance pensions should be combined with targeting based on proxy-means

testing (PMT), if better targeting of the poor in general and poor females in particular is to be achieved.

Another type of social assistance programs has recently been piloted in Egypt, drawing on a growing international experience. **Conditional Cash Transfers (CCTs)** have become a popular method of providing assistance to the poor and, additionally, breaking the intergenerational cycle of poverty. The first CCT program was a joint initiative between the Ministry of Social Solidarity and the Social Research Center at the American University in Cairo. The program was launched in 2009 targeting 160 families in a slum in Cairo called Ain El-Sira, and was expanded in 2010 to 65 Upper Egypt villages in Assiut and Sohag¹. However, activities ceased with the January 2011 revolution. Families received cash from the government based on minimum school attendance, regular visits to health clinics, child nutrition, and attendance of awareness sessions on finance and family health (Anon, 2011).

The CCT program had an explicitly feminist design. The program worked with mothers and FHHs with school-aged children. The mothers and FHHs received the cash transfer and were responsible for the fulfillment of the program's requirements. In addition, girls received more cash to stay in school than their male counterparts in order to combat the gender school enrollment gaps (Anon, 2011).

The government has recently concluded an agreement with the World Bank for a project aimed at strengthening the social safety nets worth 400 million USD. The project, which started in 2015 and was launched in a number of upper Egypt governorates, consists of two funds; Takaful (solidarity) and Karama (dignity)². Under the Takaful program, poor households receive monthly income support based on an incentive system related to school attendance and utilizing maternal and child healthcare services. Takaful has the same feminist design of the previous CCT program as the transfers are received and administered by mothers and FHHs. Karama, however is an unconditional income support, with no gender bias, and it aims at protecting poor elderly people over the age of 65 and those with severe disabilities. Both rely on the use of a PMT formula developed by the Ministry of Finance to identify poverty without recourse to questions on income or expenditure³. PMT achieves efficient targeting under the condition that appropriate proxies for poverty are used.

Additionally, there are two other Social Care and Social Development Programs managed by the Ministry of Social Solidarity. The first is known as the **Productive Families and Vocational Formation project** and aims to turn families into productive units. To achieve this, families are provided with monetary and in-kind loans, technical assistance, vocational training and marketing assistance. With the project focusing on the production of handicrafts, FHHs and housewives are given priority among eligible categories for participation in the project⁴. The second type is known as **Women Development projects**, and is intended to provide women in rural communities with training to develop their skills and assistance to start small economic projects⁵.

¹ Egypt Network for Integrated Development. Conditional Cash Transfers: Conditioning for Empowerment. Available at http://enid.org.eg/Uploads/PDF/PB7_cash_transfers.pdf. Accessed on 26 January 2016.

² Ministry of International Cooperation (2016). Available at <http://moic.gov.eg/Front/Projects/ProjectDet.aspx?ProjID=538>. Accessed on 25 January 2016.

³ Sholkamy, H. (2015). About Karama and Takaful. Available at <http://english.ahram.org.eg/NewsContent/4/0/151899/Opinion/0/-About-Karama-and-Takaful.aspx>. Accessed on 28 January 2016.

⁴ Ministry of Social Solidarity (2016). Available at: http://www.moss.gov.eg/misa/ar-eg/%D8%A7%D9%84%D8%AE%D8%AF%D9%85%D8%A7%D8%AA/%D8%A7%D9%84%D8%AA%D9%86%D9%85%D9%8A%D8%A9%D8%A7%D9%84%D8%A7%D8%AC%D8%AA%D9%85%D8%A7%D8%B9%D9%8A%D8%A9.aspx?udt_473_param_detail=10. Accessed on 28 January 2016.

⁵ Ministry of Social Solidarity (2016). Available at: <http://www.moss.gov.eg/misa/ar-eg/%D8%A7%D9%84%D8%AE%D8%AF%D9%85%D8%A7%D8%AA/%D8%A7%D9%84%D8%B1%D8%B9%D8%A7%D9%8A%D8%A9%D8%A7%D9%84%D8%A7%D8%AC%D8%AA%D9%85%D8%A7%D8%B9%D9%8A%D8%A9/>

Apart from financing and assistance, the Ministry of Social Solidarity administers other programs that focus on the empowerment of women through the establishment of centers to host and direct women facing violence, centers that provide services to reduce the burden on working women and help them meet their home responsibilities, and equal opportunity units to receive complaints regarding discrimination.

Moreover, the Social Fund for Development (SFD) has succeeded in increasing the number of women who have access to micro and small loans, and FHHs are explicitly identified as a target group along with the new graduates, unemployed youth and displaced public enterprise workers (Assaad & Rouchdy, 1999). The total number of micro and small projects owned by female entrepreneurs and financed by the SFD between 1992 and 2015 reached 1,065,717 projects, comprising 56 percent of the total number of projects financed by the SFD over the period.

The loans focus on financing projects in which female workers excel, such as textiles, ready-made garments and food processing⁶. The SFD usually provides financing to women indirectly through intermediaries such as the Productive Families Project and different NGOs (Abou-Ali et al, 2009). In addition to financing, the fund attempts to create forward linkages between the established micro and small projects and the medium and large industries to increase the marketability of the former's products, thus increasing the probability of their success. The SFD also provides training to female entrepreneurs to develop their skills in the areas of small project management and preparing feasibility studies.

5. Empirical Work

This section uses evidence to try to prove that the feminization of poverty could not be narrowed down to only FHHs. Therefore, through adapting a Gender-Based Poverty Detection Model, the empirical section employed to prove that this model could provide a very good detection of household poverty, and that the vulnerable characteristics of females could be more influenced by the general household's poverty than females' headed households. Accordingly, through the model results and the followed discussion section, the authors tried to emphasize that the government policies that concluded the feminization of poverty to only FHHs are biased and unfair, and that the optimal solution is to discover more female characteristics that could cause the vulnerability or poverty situations.

5.1 Methodology

5.1.1 Clusterwise logistic regression model

In regard to the analysis of real data, there are situations in which multi-statistical techniques must be used. In such cases, mathematical programming could be introduced as an alternative approach to integrate more than one statistical technique in one model. One of these models is the Clusterwise Regression Model, which is used to perform cluster analysis within a regression framework. In 1999 Lau et al, they generalized all earlier attempts in what they called the "Generalized Clusterwise Regression Model," which incorporates the parameter heterogeneity in traditional regression using a mathematical programming model. In 2009 Hamed et al, they applied the clusterwise approach on the logistic regression model under what they called the "Generalized Clusterwise Logistic Model." In this model, they used a non-linear goal programming with an objective linear function and non-linear constraints to composite a model that includes a logistic regression model and a cluster analysis model.

[%D8%AE%D8%AF%D9%85%D8%A7%D8%AA%D8%A7%D9%84%D9%85%D8%B1%D8%A3%D8%A9.aspx?udt_486_param_detail=15](#). Accessed on 28 January 2016.

⁶ Social Fund for Development. Available at <http://www.sfdegypt.org/web/sfd/women-and-small-enterprises>. Accessed on 24 January 2016

Hamed et al (2009a) introduced a non-linear goal programming model that estimates the logistic regression model. Understanding this model is a prerequisite to understanding the Generalized Clusterwise Logistic Model. The core concept of their model was focused on the role of logistic regression as a part of regression analysis and discrimination analysis models. Therefore, the model was constructed to limit the deviations between the expected and predicted values for the response variable to equal zero. On the other hand, the logistic regression model is used as a discrimination model. Therefore, the logistic model must achieve a significant level of the subjects' correct classification; i.e. maximize the probability of correctly classified subjects.

Hamed et al (2009b) introduced the Generalized Clusterwise Logistic Model, which is based on a predetermined and unrestricted number of clusters (e.g. K clusters) and number of explanatory variables (e.g. J explanatory variables). In this case, the desired objectives become more complicated. It is of interest to minimize the sum of residuals between the observed and the predicted response variable, and the sum of deviations from the separation interval in every cluster. Thus, the clustering criteria will be these two types of errors, meaning the subject will have the highest probability of belonging to a specific cluster if it achieves a minimum deviation from the fitted line in that cluster as compared to other clusters, and it is out of the separation interval or needs a slight push to be out of it in that cluster.

5.1.2 Wealth Index Construction

Although poverty measures that rely on household consumption can be considered a more reliable and accurate measure of the poverty situation, there is too much evidence in the literature that states the advantages of using the socio-economic indices, such as the wealth index, as an appropriate measure of relative poverty. Hancioglu (2002) reported a comprehensive appraisal of the alternative methodologies and measures that have been used to identify the household economic status in absence of consumption expenditure and/or income data. The assessed methods included the methodology introduced by Filmer and Pritchett (2001), which aggregated various household indicators for asset ownership to build the wealth index.

The constructed wealth index is the main source of the response variable in the proposed model. The wealth index is constructed using a minimal number of variables, which characterize the poor in order to enable the targeting equation to utilize the rest of variables. This is done without losing the efficiency of the estimated wealth index. In the constructed wealth index, 36 variables are used, consisting of household members per room, connectivity to water source, private kitchen, private toilet, type of floor material, type of ceiling material, main source of cooking fuel, main source of lighting power, main source of garbage disposal, as well as 27 durable assets.

In order to estimate the weights of the wealth index variables, Filmer and Pritchett (2001) and El Khoury and Panizza (2001) suggested weighing the indicator variables composing the index by means of weights derived from the Principal Components Factor Analysis (PCFA). This has been done through extracting a linear combination of the single indicator that captures most of the information in the input variables. The literature in this field assumes that the first principle component, which is the largest, is considered the desired wealth index. Consequently, the first principle component that has been obtained from the PCFA is considered as a proxy for the theoretical wealth index.

5.1.3 Gender-Based Poverty Detection Model (GBPDM)

The GBPDM exercise depends on two main factors; the first of which is the efficiency of the selected exogenous variables in distinguishing between poor and non-poor households, as well as the efficiency of the introduced exogenous variables in producing two stories of poverty, meaning two poverty clusters. The second is the efficiency of the predetermined poverty

measure, which is the wealth index in our case. According to the poverty literature carried out by El-Laithy (2001 and 2003), Datt et al (1998), Roushdy and Assad (2006), and Moursi and ElMossallamy (2006), a wide set of poverty determinants can be recognized. This set includes 17 variables assembled in four main groups:

1. Household Head Characteristics: dummy variable that presents FHHs, and dummy variable that presents the household-head with the higher education degree.
2. Household Females' Characteristics: percent of females with higher education to the total household members, percent of young and adult females (15 years and older) to the total young and adult household members (15 years and older), percent of unemployed females to the household members, percent of female out-of-labor force to the total household members, percent of female out-of-human force to the total household members, percent of casual female workers and females working in the private sector to the total household members, maximum type of work among the female household members, percent of female household members under the cover of social security to the total household members, and percent of female household members under the cover of medical insurance to the total household members.
3. Housing Characteristics: dummy variable that presents rural resident, dummy variable that presents vulnerable houses, and dummy variable that presents owning the household's houses.
4. Other Characteristics: natural logarithm of the household size, dummy variable that presents households that own a ration card, and the natural logarithm of percent of household expenditure on health to the total household income.

Through several sets, the authors attempted to refine the mentioned endogenous characteristics. The refinement process was based on four measures: correct classification, sensitivity, specificity and membership parameters' optimality. Thus, the GBPDM using the Clusterwise Logistic Model is written as follows:

$$\text{minimize } F = \sum_{i=1}^{250} ({}_1C_i \times {}_1d_i + {}_2C_i \times {}_2d_i) + s^+ + s^- \quad (1)$$

Subject to

$$\frac{\exp({}_1\beta'x_i)}{1 + \exp({}_1\beta'x_i)} + {}_1d_i \geq 0.5 + \varepsilon \quad \forall Y_i = 1 \quad i=1.2....250 \quad (2)$$

$$\frac{\exp({}_1\beta'x_i)}{1 + \exp({}_1\beta'x_i)} - {}_1d_i \leq 0.5 - \varepsilon \quad \forall Y_i = 0 \quad i=1.2....250 \quad (3)$$

$$\frac{\exp({}_2\beta'x_i)}{1 + \exp({}_2\beta'x_i)} + {}_2d_i \geq 0.5 + \varepsilon \quad \forall Y_i = 1 \quad i=1.2....250 \quad (4)$$

$$\frac{\exp({}_2\beta'x_i)}{1 + \exp({}_2\beta'x_i)} - {}_2d_i \leq 0.5 - \varepsilon \quad \forall Y_i = 0 \quad i=1.2....250 \quad (5)$$

$$\sum_{i=1}^{250} \left({}_1C_i \left[Y_i - \frac{\exp({}_1\beta'x_i)}{1 + \exp({}_1\beta'x_i)} \right] + {}_2C_i \left[Y_i - \frac{\exp({}_2\beta'x_i)}{1 + \exp({}_2\beta'x_i)} \right] \right) - s^+ + s^- = 0 \quad (6)$$

$${}_1C_i + {}_2C_i = 1 \quad i=1.2....250 \quad (7)$$

$$\sum_{i=1}^{250} {}_1C_i \geq 1 \quad (8)$$

$$\sum_{i=1}^{250} {}_2C_i \geq 1 \quad (9)$$

$${}_1C_i \cdot {}_2C_i \cdot {}_1d_i \cdot {}_2d_i \geq 0 \quad i=1,2,\dots,250 \quad (10)$$

$$s^+, s^- \geq 0 \quad (11)$$

Where:

Y: is the binary response variable; 1 means the lowest wealth index (= Q_1), 0 means higher socio-economic levels ($> Q_1$).

\mathbf{x}_i : the i-th vector of the 17 endogenous variables and the intercept.

${}_k\boldsymbol{\beta}$: the (j+1) vector of endogenous variables coefficients and intercept in the k-th cluster.

${}_kC_i$: the membership of the i-th observation to the k-th cluster.

${}_kd_i$: the deviation of the i-th observation from the separation interval in the k-th cluster.

s^+, s^- : the corresponding negative and positive deviations.

The implementation of the GBPDM tried to benefit from the mathematical programming approach by employing the small sample sizes. Therefore, the testing phases of the mentioned model showed reliable results at a sample of 250 households. This led the authors to determine the presentation of the GBPDM for each of the four regions separately. Consequently, the proposed GBPDM will be compiled into four models, each for every region.

5.2 Results

This section is devoted to presenting the results of the GBPDM that was developed in the methodology section (tables 3, 4 and 5). The analysis of the GBPDM was based on two pillars; the first is to analyze the results that were achieved from the sampled households, while the second is devoted to the refresh sample used to test the model results in case of being applied over any set of households who did not participate in the model building process.

In the methodology part, there was an explicit mention that the GBPDM is applied for each region separately to afford the sufficient sample size that can adequately describe the discrepancies within the region, as the mathematical programming technique that was employed to solve this model produces excellent results with small sample sizes. In fact, the national official statistics for the employed variables in the model, either at the level of gender differentiation or the overall level, show a clear and significant variation across regions. For instance, based on the 2015 Labor Force Survey, the unemployment rate of urban governorates is the highest, which recorded 15.8 percent, followed by lower governorates that recorded 12.7 percent, while upper and frontier governorates showed a very low level at 11.5 percent and 11.7 percent respectively. Employment rate is also another example on the variation across the regions, where it is the highest among the females in lower governorates, which recorded 20.4 percent, followed by frontier governorates that recorded 17.2 percent, and close levels for urban and upper governorates at 14.9 percent and 14.1 percent respectively. Therefore, the authors preferred to give each region the flexibility to reshape its GBPDM to become as consistent and suitable as possible to the poverty story within the region.

Starting with the urban governorates, the GBPDM showed that a sensitivity rate (true positive rate) hit 98 percent, and a 100-specificity rate (false positive rate) hit 30 percent. The analysis of this result tells us that the gender and housing characteristics employed in the GBPDM are able to correctly detect 98 percent of the actual poor households, and wrongly classified 30

percent of the non-poor households as poor households. The profile of those incorrectly included households within the poverty set showed that they are too close to the poverty situation, which means that they are the extension of the vulnerability set. Those vulnerable households, even if they are not currently poor, are too sensitive to any signal that can easily reduce their socio-economic situation. Therefore, any price surge or the lack of a major or even partial source of income will transfer this type of household from vulnerable to poorer. Accordingly, even the wrong classification of these households as poor households, with an almost inclusion of all poor households, means extending the umbrella of poverty detection to the vulnerability detection.

The analysis of the two types of poverty that were introduced by the model (the two clusters) shows that the first poverty cluster is related to households with relatively large sizes, large percent of casual female workers and females working in the private sector to the total household members, small percent of female household members under the cover of social insurance and to the total household members, as well as small percent of female household members under the cover of medical insurance and to the total household members. On the other hand, the second poverty cluster was biased towards households that reside in vulnerable houses, households headed by females, a small percent of females out-of-labor force to the total household members, large percent of females out-of-human force to the total household member, unskillful females' type of work, as well as those households who are not likely to have ration cards. Moreover, both clusters showed sensitivity to households whose heads have lower or non-education degrees.

Applying the GBPDM on lower governorates showed a different story. Firstly, the sensitivity rate is typically 100 percent, and the 100-specificity is 46 percent. It is clearly shown that the increase of the vulnerability situation resulted in the increase of the 100-specificity rate, because the model tends to include those vulnerable households to the set of poorly classified households. However, as we described in the methodology section, this type of probit model produces the probability of household poverty, and by using the cut-off-point we can judgmentally control the inclusion process. In the practical model that is used in this paper, the 0.5 is used as a cut-off point, but this does not prevent the modification of the cut-off point according to the government policy or the budget constraint.

In lower governorates, the first poverty cluster is biased toward households in rural areas, households residing in vulnerable houses, households who do not own their houses, large percent of casual female workers and females working in the private sector to the total household members, large percent of female household members under the cover of social security to the total household members, as well as small percent of household expenditure on health to the total household income. The second poverty cluster is biased towards a large percent of females out-of-labor force to the total household members, small percent of females out-of-human force to the total household members, as well as households that own ration cards. Moreover, there are four other characteristics that work jointly to distinguish the two poverty clusters from the non-poor cluster, which are: HHH with higher education degrees, small percent of females with higher education degrees to the total household members, unskillful females' type of work, and small percent of female household members under the cover of medical insurance to the total household members.

The story of poverty in upper governorates also showed a different story compared to urban and lower governorates. The sensitivity rate in this region hit 98 percent, and the 100-specificity rate hit 26 percent. The lower specificity rate in this region showed how poverty is crystal-clear in the region. In this region, the first cluster is biased towards households residing in rural areas and vulnerable households, those whose heads are females, unskillful females' type of work, as well as small percent of female household members under the cover of medical insurance to

the total household members. The second poverty cluster is biased towards HHH with lower or non-education degrees, small percent of number of females aged 15+ to the total household members aged 15+, large percent of casual female workers and females working in the private sector to the total household members, and small percent of female household members under the cover of social security to the total household members. In addition to the above characteristics for each poverty cluster, there are five other characteristics that jointly distinguish the two poverty clusters from non-poor clusters: small percent of females with higher education degrees to the total household members, small percent of females out-of-labor force to the total household members, large percent of females out-of-human force to the total household members, and households that are more likely to have ration cards.

The last region is the frontier governorates, where the sensitivity rate hit 88.9%, and the 100-specificity rate hit 18.9%. Of course, this is the model with the least sensitivity among the studied four regions, which could be related to the common tradition and customs that are related to gender and may not be varied enough between different socio-economic classes, which means less classification power than the other regions. In this region, the first poverty cluster is biased towards rural areas, Households residing in vulnerable houses, relatively small household sizes, and HHH with higher education degrees. The second poverty cluster is biased towards households that do not own their houses, small percent of females with higher education degrees to the total household members, small percent of number of females aged 15+ to the total household members aged 15+, small percent of females out-of-human force to the total household members, unskillful females' type of work, small percent of female household members under the cover of medical insurance to the total household members. Moreover, no common characteristics were detected that can jointly distinguish between poor clusters and non-poor clusters.

Through the previous paragraphs, the four regions were separately analyzed; therefore, the produced characteristics that could tell the story of gender poverty in Egypt will be presented. The 17 used characteristics could be categorized to some specific groups that can crystalize how much the incidence of a specific characteristic is correlated to the poverty situation in Egypt. The first group is the common poverty characteristics, where these characteristics participated in one of the two poverty clusters or both of them in the four regions. In this group, we noticed six variables, two related to household residence and housing condition (rural areas and vulnerable houses), one related to household head regardless the type of gender (HHH with lower education degrees dummy variable), and three female-related characteristics (percent of females out-of-human force to the total household members, maximum type of work among the female household members and percent of female household members under the cover of medical insurance to the total household members). The other view for this group could conclude that education and employment are jointly anatomizing the poverty due to gender decomposition of households in Egypt. In other words, economic inclusion of females and type of their work, as well as education characteristics, are more likely to determine the poverty situation of the household.

The second group, which is close to be generic poverty determinants because it showed existence in three regions, could be separated into two sub-groups. The first of which is the sub-group that includes only the percent of females with higher education degrees to the total household members appeared in GBPDM for all regions except urban governorates. The second sub-group includes four characteristics: percent of females out-of-labor force to the total household members, percent of casual female workers and females working in private sector to the total household members, percent of female household members under the cover of social security to the total household members, and the owning of ration cards appeared in the GBPDM for all regions except frontier governorates. This could lead to the conclusion that as clear as the gender characteristics could tell the story of poverty in urban, lower and upper

governorates, they fail to tell us the story of poverty in frontier governorates, which could be related to the general norms and restrictions that could not show a significant sensor to these variables from the different socio-economic classes. On the other hand, the last category showed the importance of the rest of variables but for two regions or less.

Jumping from the sample to the non-sample households the results showed interesting results. The sensitivity rate ranged from 73.4 percent in upper governorates to 84.6 percent in urban governorates. The 100-specificity rate ranged from 34.3 percent in urban governorates to 61.3 percent in lower governorates. These results emphasize that poverty in urban governorates could be easily detected, and vulnerability in lower governorates is widely common against sharp poverty, while upper governorates showed the opposite to the lower governorates.

The more interesting results were found in the analysis of the GBPDM variables across the three regions. An exact eleven variables showed a clear response to one of the poverty clusters or to the both of them. These variables included residency, housing conditions, females' education and their inclusion in economic activities, the type of females' work, females under the cover of social and medical insurance, as well as the household expenditure on health as a percent of household income. Moreover, there are three variables that characterize a dimension or more of poverty at urban and lower governorates only, which are: household size, percent of unemployed females to the total household members, and percent of females out-of-human force to the total household members. On the other hand, there are two variables that characterize one or more dimensions of poverty in urban and upper governorates only, which are: FHHs, and percent of casual female workers and females working in private sector to the total household members.

6. Discussion

Feminization of poverty is the phenomenon that women represent disproportionate percentages of the world's poor (Datt et al, 1998). This means that poverty incidence is exaggerated because of females' vulnerability. This paper tried to investigate two questions and test one of the common national policies. The first research question regards the feminization of poverty. Surely, feminization of poverty is proven worldwide, but there is no evidence on what this phenomenon extends in the Egyptian context. The second question seeks to identify the major characteristics that can formulate the relationship between poverty and gender-based subject. In this regard, one of the common national policies will be tested respectively, which is the policy of supporting FHHs. In fact, this is the only captured policy that supports females in Egypt, which is carried through different ways; for instance, through supporting divorced females, or by allowing unmarried females to benefit from their parents' pension, or even the direct program that targets FHHs.

Starting with the main research question that seeks to answer how much this phenomenon is pronounced in the story of poverty in Egypt, the methodology tried to employ a set of gender-based characteristics, in addition to some residence and housing conditions in the context of a targeting model using the clusterwise technique, where this model is defined as the GBPDM. The results that have been discussed in the empirical results section showed how much this model is able to identify or detect the poor, where the probability of correctly classifying households in the lowest socio-economic quintile was almost close to the optimum (100 percent) at the four regions. Moreover, the misclassified households, which are wrongly classified as the poor set, were mostly in the close quintile(s), which means that they present the vulnerable set of households (figures 4, 5, 6 and 7). Therefore, it is clearly shown that most of the classified households were truly poor, and that there were a lot of vulnerable households and few misclassified households, because of the semi-similarity of their characteristics to the characteristics of poor households. As shown in table 6, and discussed in the analysis section,

it is clearly proven that the GBPDM is considered a significant powerful model that can identify the poor characteristics, even if it is not the most efficient.

The second research question regarding whether the current set of national policies that target FHHs is an equitable policy or works on extending the gaps of inequality, as clarified earlier, will be introduced in two parts. The first part works on identifying how much FHHs act as a suitable characteristic to understand the feminization of poverty in Egypt. Targeting FHHs is indeed an easy way to target a set that is mostly truly poor, but, unfortunately, it is not the appropriate way in Egypt. The results of the GBPDM showed that FHHs appeared in only two regions: urban and upper Egypt, as an indicator of household poverty. Moreover, FHHs appeared in the mentioned regions in only one poverty cluster, which means that there is another poverty cluster in the mentioned regions, whereas FHHs did not distinguish well between the poor and the non-poor.

Furthermore, the share of young and adult females (aged 15+) to the households' young and adult members (aged 15+) was one of the poverty indications in one of the poverty clusters at upper and frontier governorates. This could imply that the presence of females in the household in these regions is directly proportional to the incidence of poverty. In fact, the appearance of the two mentioned characteristics means that not only are FHHs a determinant of the poverty situation, but also that there are many households that showed a sensitivity to the share of young and adult females to their size. Therefore, this result is the first evidence that the feminization of poverty in Egypt could not be simplified in FHHs only. Conversely, targeting FHHs means judgmentally dropping the type of households that also have the same umbrella of gender-based poverty. Nevertheless, they showed another indication for this phenomenon.

The second part of the second research question regards the better gender-based characteristics that could produce more identification power. Three gender-based characteristics⁷ showed either clear distinction between poor and non-poor, or bias towards one of the poverty clusters. Moreover, there are four other gender-based characteristics that were a part of unfolding the poverty story in all regions except for frontier governorates, and one characteristic that unfolded the poverty story in all regions except for urban governorates. The mentioned seven characteristics were an interaction between gender as the first side, as well as some other characteristics, which are: economic inclusion, demographic dependency, females' access to higher education, employment sector and type of work, as well as two of the most important decent jobs' characteristics. In other words, there is another piece of evidence, which is the strongest, that concluded the importance of intersection between gender and some functional characteristics in the detection of poor households.

The previous discussion told a story of feminization of poverty that is not taken into consideration from the applied policies in Egypt. These policies treat the feminization of poverty in Egypt by only targeting FHHs, with no mentioned attention to the incidence of females in the household size and/or their characteristics. On the contrary side, the GBPDM results show that FHHs and even the share of females to the household size are less likely able to tell the story of feminization of poverty, or poverty in general, in comparison to some economic and social characteristics of the young and adult females in the household. The highlighted characteristics participate in the poverty story in each region and share the story in different ways and different clusters. This is, indeed, another important result. Some of these characteristics did not show only one pattern in the poverty clusters. For instance, in some clusters, the maximum type of females' work referred to advanced levels of work, which participate with other characteristics to identify the story of well-educated or skilled females

⁷ X11: percent of females out-of-human force to the total household members

X13: maximum type of work among the females' household members

X15: percent of females' household members under the cover of medical insurance to the total household members

who found a good job, but whose families still suffer from poverty for other reasons, or because they don't have the decent jobs that can give them the appropriate conditions; thus, they were not fully empowered to push their families to break the poverty cycle.

7. Conclusion and Policy Implications

Building on the above results and discussion, it becomes very clear that the Egyptian government should revisit its gender-based targeting policies and the common targeting policies to reshape the set of targeting characteristics, which can truly identify the poor households and be efficiently equitable. The government should not apply any social benefits policies before being sure that these policies offer an efficiently equitable condition to the targeted population. Theoretically, there are several problems with using female headship as a proxy for poverty, resulting in the occurrence of targeting errors; these have been identified in section four and begin from the practical difficulty involved in identifying headship. Empirically, the results in section five show that female poverty cannot be restricted to a condition resulting from household headship. There are, however, several gender-based characteristics that explain female poverty. This raises the question of how many households were left out from the targeting system in Egypt because they did not introduce their households as female-headed. Moreover, the condition of FHHs is purely subjective, even if there is an investigation to prove it. Conversely, the introduced characteristics are typically objective, which the government could revise from the official registration; for instance, the educational level of the females or the registration in social insurance, even for those working in public or private sector, which is easily verified. In this regard, it is essentially important to highlight that linking and integrating national databases will smoothly facilitate the reach to the appropriate targeting system. Moreover, we conclude from this paper that females' characteristics should be introduced to the national targeting models to enhance these models and to achieve the sufficient equity regarding the utilization of gender-based targeting policies.

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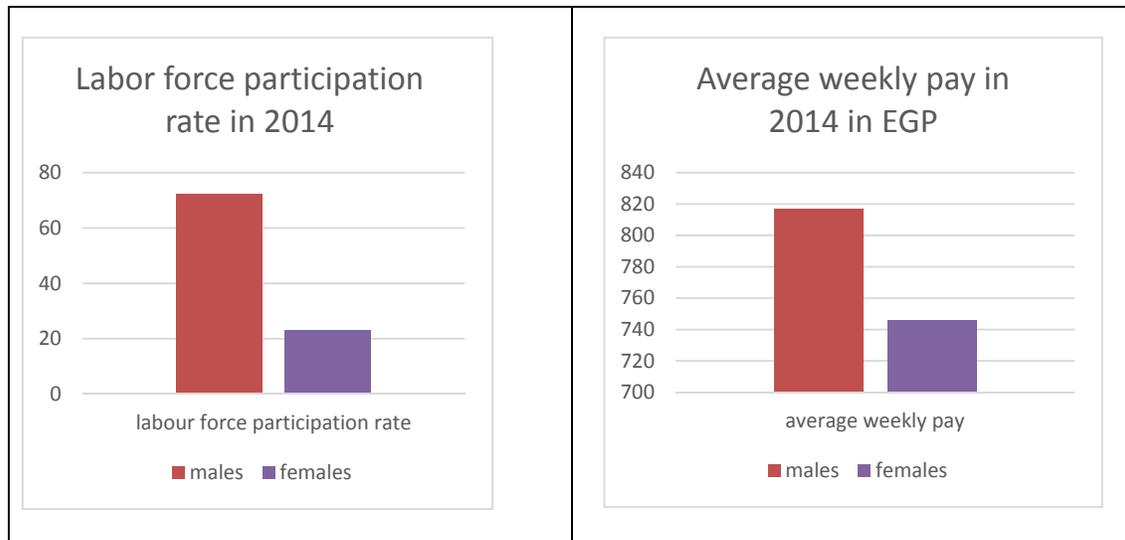
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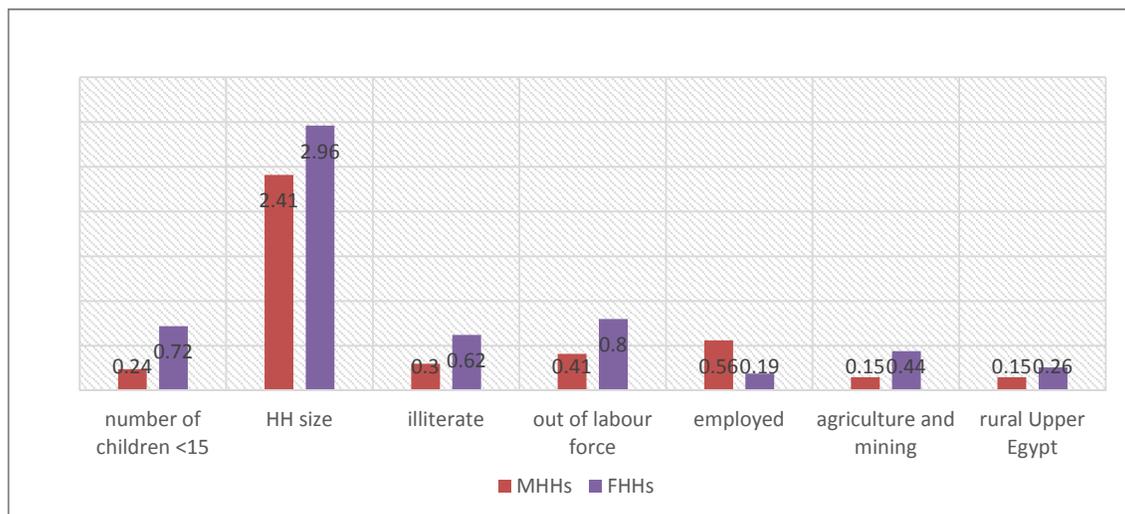
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Figure 1: Labor Market Indicators by: Gender



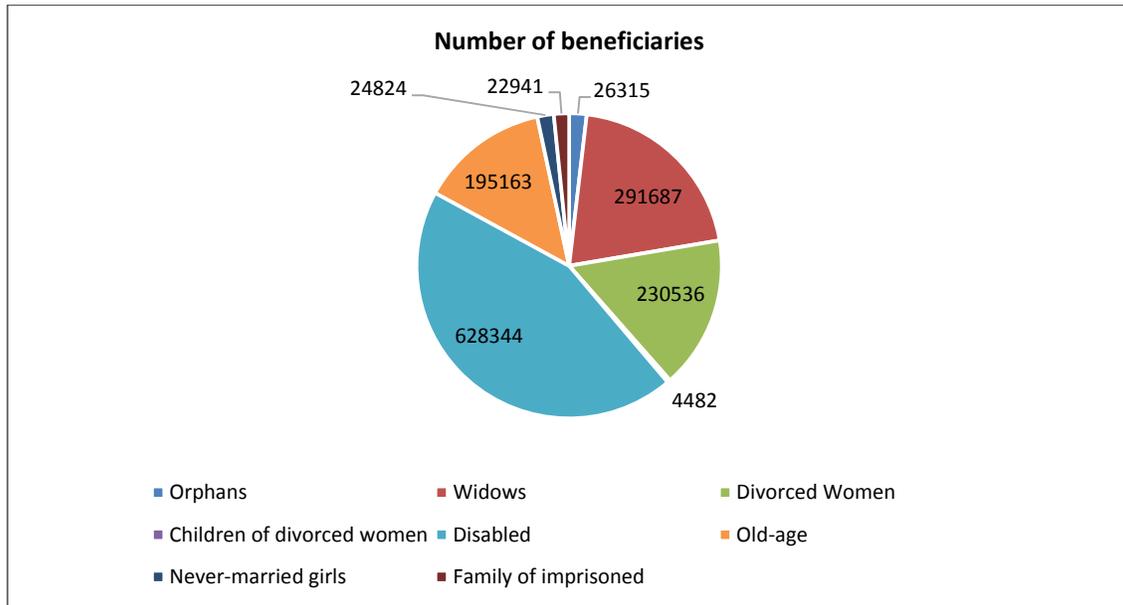
Source: Based on data from CAPMAS

Figure 2: Mean Household Characteristics by Household Type in 2012/2013



Source: Based on data calculated from HIECS in Al Azzawi (2015b)

Figure 3: Number of Beneficiaries of Social Solidarity Pensions by Type of Pension in 2013



Source: Based on data from CAPMAS (2014). Social Services (Pensions and Assistance). Cairo: CAPMAS. Available at: http://www.capmas.gov.eg/Pages/StatisticsOracle.aspx?Oracle_id=891&page_id=5104.

Figure 4: Model Poverty Incidence Versus Wealth Index, Females to Household Size, and Lower Poverty Line in The Urban Governorates

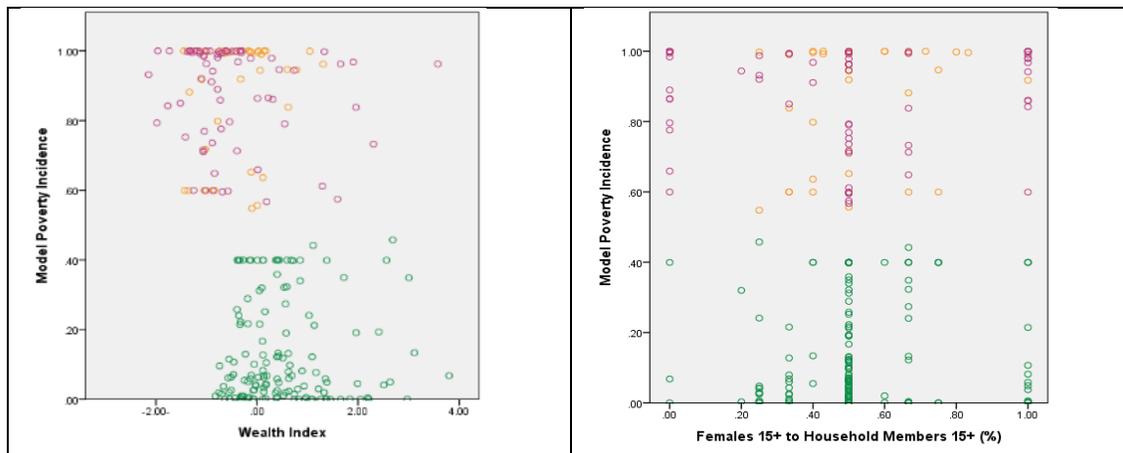


Figure 5: Model Poverty Incidence Versus Wealth Index, Females to Household Size, And Lower Poverty Line in The Lower Governorates

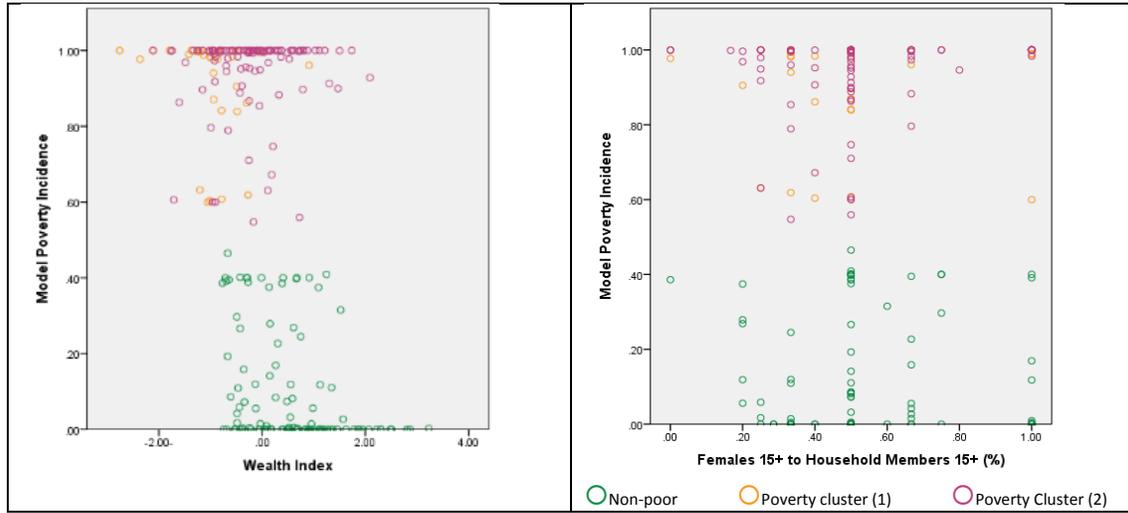


Figure 6: Model Poverty Incidence Versus Wealth Index, Females to Household Size, and Lower Poverty Line in The Upper Governorates

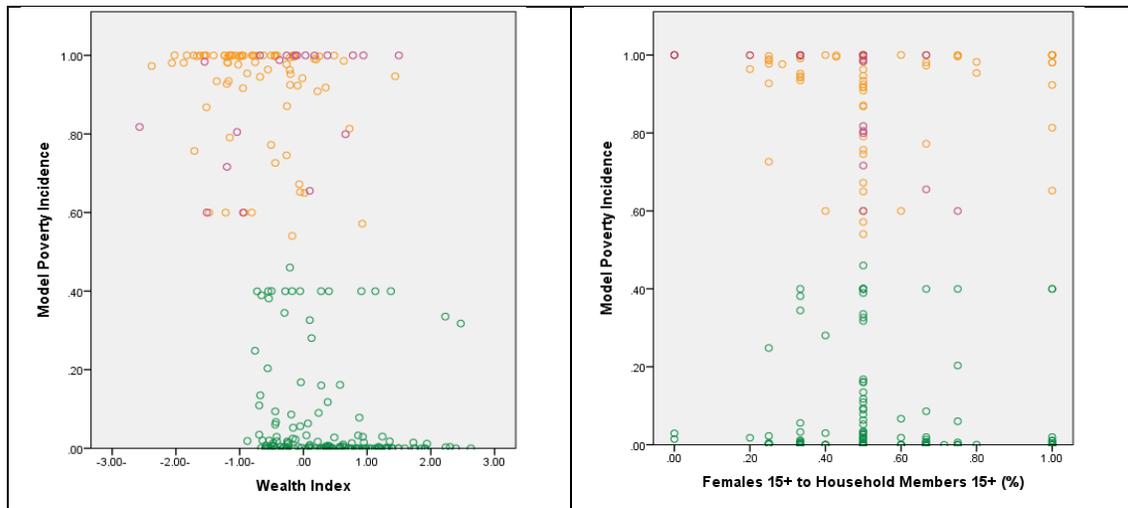


Figure 7: Model Poverty Incidence Versus Wealth Index, Females to Household Size, and Lower Poverty Line in The Frontier Governorates

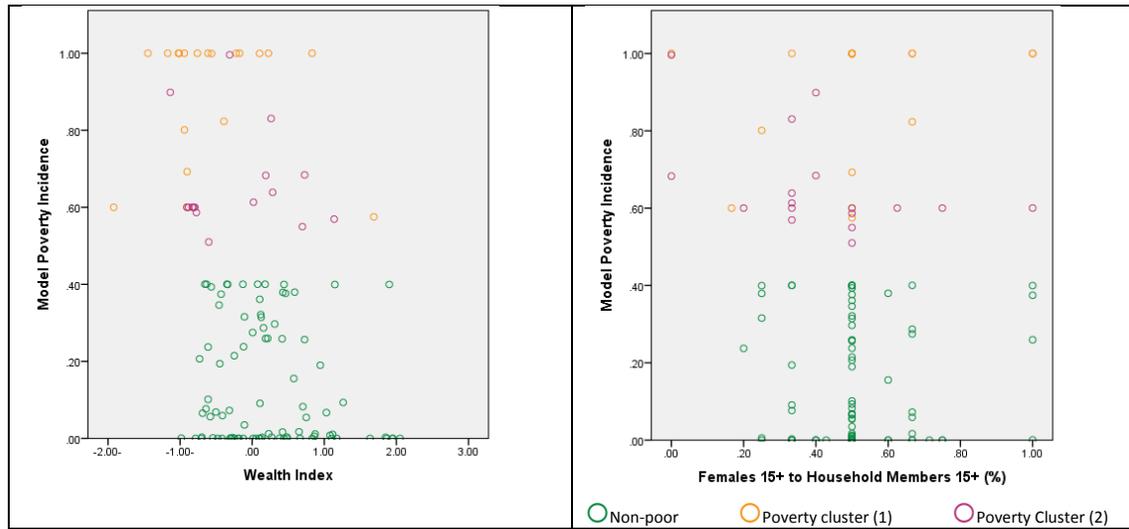


Table 1: Percentage of Households Receiving a Non-Contributory Pension, by Age and Sex of Household Head in 2006

Age/gender	Male Head of Household	Female Head of Household
25-29	2.2	2.9
30-39	2.9	8.6
40-49	4.3	18.0
50-59	2.9	15.8
60+	9.7	19.3

Source: Sieverding & Selwaness (2012) based on calculations from the 2006 ELMPS.

Table 2: The Distribution of SFD Projects and Loans by Gender

	Males	Females
Number of micro & small projects	119,825	87,807
%	58	42
Value of loans (in million EGP)	3470.8	1017.4
%	77	23

Source: SFD (2015). Summary Report on the Performance of the Social Fund for Development during 2015 (in Arabic). Cairo: SFD.

Table 3: Summarization of Poverty Classification Across All Regions for Sampled Households

Endogenous variables	Regions			
	Urban	Lower	Upper	Frontier
X1: rural dummy variable		1 st	1 st	1 st
X2: vulnerable houses dummy variable	2 nd	1 st	1 st	1 st
X3: do not own resident houses dummy variable	-	1 st	-	2 nd
X4: natural logarithm of the household size	1 st	-	-	1 st
X5: female-headed households dummy variable	2 nd	-	1 st	-
X6: HHH with higher education degrees dummy variable	Non-poor	Non-poor	2 nd	1 st
X7: percent of females with higher education degrees to the total household members	-	Non-poor	Non-poor	2 nd
X8: percent of number of females 15+ to the total household members 15+	-	-	2 nd	2 nd
X9: percent of unemployed females to the total household members	-	-	-	-
X10: percent of females out-of-labor force to the total household members	2 nd	2 nd	Non-poor	-
X11: percent of females out-of-human force to the total household members	2 nd	2 nd	Non-poor	2 nd
X12: percent of casual female workers and females work in private sector to the total household members.	1 st	1 st	2 nd	-
X13: maximum type of work among the females' household members	2 nd	Non-poor	1 st	2 nd
X14: percent of female household members under the cover of social security to the total household members	1 st	1 st	2 nd	-
X15: percent of female household members under the cover of medical insurance to the total household members	1 st	Non-poor	1 st	2 nd
X16: own ration card dummy variable	2 nd	2 nd	Non-poor	-
X17: natural logarithm of percent of household expenditure on health to the total household income	-	1 st	-	-

Table 4: Sampled Households' Characteristics According to WIQ in all Regions

Endogenous variables	Wealth Index Quantiles				
	1 st	2 nd	3 rd	4 th	5 th
X1⁽¹⁾⁽³⁾					
Urban	70	85	96	124	146
Rural	98	95	80	55	25
X2⁽¹⁾⁽³⁾					
Households that reside in non-vulnerable houses	117	160	174	177	171
Households that reside in vulnerable houses	51	20	2	2	0
X3⁽¹⁾⁽³⁾					
Households that own their houses	31	32	28	61	53
Households that do not own their houses	137	148	148	118	118
X4⁽²⁾ : natural logarithm of the household size	1.203	1.331	1.410	1.343	1.357
X5⁽¹⁾⁽⁴⁾					
Male headed-households	126	147	151	151	148
Female headed-households	42	33	25	28	23
X6⁽¹⁾⁽³⁾					
HHH with lower or non-education degrees	161	170	157	147	88
HHH with higher education degrees	7	10	19	32	83
X7⁽²⁾⁽³⁾ : percent of females with higher education degrees to the total household members	0.004	0.012	0.011	0.050	0.129
X8⁽²⁾ : percent of number of females 15+ to the total household members 15+	0.530	0.538	0.500	0.504	0.524
X9⁽²⁾⁽⁴⁾ : percent of unemployed females to the total household members	0.001	0.001	0.005	0.007	0.010
X10⁽²⁾ : percent of females out-of-labor force to the total household members	0.281	0.301	0.291	0.321	0.301
X11⁽²⁾⁽⁵⁾ : percent of females out-of-human force to the total household members	0.154	0.124	0.101	0.122	0.088
X12⁽²⁾⁽³⁾ : percent of casual females' workers and females work in private sector to the total household members.	0.084	0.084	0.061	0.018	0.023
X13⁽¹⁾⁽³⁾					
Unknown	15	6	5	4	2
Traditional workers	117	132	124	154	105
Skilful and technical workers	33	34	27	2	3
Professionals and employees	3	8	20	19	61
X14⁽²⁾⁽³⁾ : percent of female household members under the cover of social security to the total household members	0.141	0.121	0.081	0.091	0.173
X15⁽²⁾⁽³⁾ : percent of female household members under the cover of medical insurance to the total household members	0.138	0.193	0.179	0.214	0.290
X16⁽¹⁾⁽⁴⁾					
households that do not own ration card	29	24	29	36	49
households that own ration card	139	156	147	143	122
X17⁽²⁾ : natural logarithm of percent of household expenditure on health to the total household income	-3.036	-3.025	-3.037	-3.065	-2.910

Notes: ⁽¹⁾ numbers indicate the household counts for the variables' categories. ⁽²⁾ numbers indicate the variables' averages, and the measurement units rely to the variable's definition. ⁽³⁾ highly significant correlate to the wealth index at 0.999 confident limit. ⁽⁴⁾ highly significant correlate to the wealth index at 0.99 confident limit. ⁽⁵⁾ highly significant correlate to the wealth index at 0.95 confident limit.

Table 5: Summarization of Poverty Classification Across All Regions for Non-Sampled Households

Endogenous variables	Regions		
	Urban	Lower	Upper
X1: rural dummy variable	-	Non-poor	1 st
X2: vulnerable houses dummy variable	2 nd	Non-poor	1 st
X3: do not own resident houses dummy variable	Non-poor	1 st	2 nd
X4: natural logarithm of the household size	2 nd	Non-poor	-
X5: FHHs dummy variable	2 nd	-	1 st
X6: HHH with higher education degrees dummy variable	1 st	Non-poor	Non-poor
X7: percent of females with higher education degrees to the total household members	1 st	Non-poor	Non-poor
X8: percent of number of females 15+ to the total household members 15+	Non-poor	-	-
X9: percent of unemployed females to the total household members	2 nd	Non-poor	-
X10: percent of females out-of-labor force to the total household members	1 st	1 st	2 nd
X11: percent of females out-of-human force to the total household members	2 nd	2 nd	-
X12: percent of casual female workers and females working in the private sector to the total household members	1 st	-	2 nd
X13: maximum type of work among the female household members	Non-poor	Non-poor	Non-poor
X14: percent of female household members under the cover of social security to the total household members	1 st	2 nd	1 st
X15: percent of female household members under the cover of medical insurance to the total household members	Non-poor	Non-poor	1 st
X16: owning ration card dummy variable	1 st	2 nd	2 nd
X17: natural logarithm of percent of household expenditure on health to the total household income	1 st	1 st	1 st

Table 6: Summarization of Classification Rates Across All Regions

Classification Statistics	Regions			
	Urban	Lower	Upper	Frontier
Sensitivity: the percent of correctly classified poor households as poor households.	98%	100%	98%	88.9%
100-Specificity (Fall-out): the percent of misclassified non-poor households as poor households.	30%	46%	26%	18.9%

Annex 1:

Table 1.1: Poverty Incidences of Selected HH Structures According to Different Regions and Socio-Economic Situations

Case (1)	HH structure:							
	<ul style="list-style-type: none"> — Father, 60 years, completed higher education, working in government sector. — Mother, 50 years, completed secondary education, out-of-labor force. — Daughter, 30 years, completed higher education, working in private sector, accountant. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 							
	Model variables: X1= HH in urban areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= male-headed-household, X6= HHH with higher education, X7= one females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= one unemployed female (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= zero out-of-human force female out of HH-members, X12= one female working in private sector out of HH-members, X13= professional, X14= one female under the cover of social insurance out of HH-members, X15= two females under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.		
G1	G2	G1	G2	G1	G2	G1	G2	
0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Case (2)	HH structure:							
	<ul style="list-style-type: none"> — Father, 60 years, completed higher education, working in government sector. — Mother, 50 years, completed secondary education, out-of-labor force. — Daughter, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 							
	Model variables: X1= HH in urban areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= male-headed-household, X6= HHH with higher education, X7= one females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= two unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= zero out-of-human force female out of HH-members, X12= zero female working in private sector out of HH-members, X13= no working females, X14= zero female under the cover of social insurance out of HH-members, X15= one female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.		
G1	G2	G1	G2	G1	G2	G1	G2	
0.0	1.0	0.0	0.0	1.0	0.0	0.1	1.0	
Case (3)	HH structure:							
	<ul style="list-style-type: none"> — Father, 60 years, completed higher education, working in government sector. — Mother, 50 years, completed secondary education, out-of-labor force. — Daughter, 30 years, completed higher education, working in private sector, accountant. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 							
	Model variables: X1= HH in rural areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= male-headed-household, X6= HHH with higher education, X7= one females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= one unemployed female (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= zero out-of-human force female out of HH-members, X12= one female working in private sector out of HH-members, X13= professional, X14= one female under the cover of social insurance out of HH-members, X15= two females under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.		
G1	G2	G1	G2	G1	G2	G1	G2	
0.0	0.0	0.0	0.0	0.2	0.0	1.0	0.0	
Case (4)	HH structure:							
	<ul style="list-style-type: none"> — Father, 60 years, completed higher education, working in government sector. — Mother, 50 years, completed secondary education, out-of-labor force. — Daughter, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 							
	Model variables: X1= HH in rural areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= male-headed-household, X6= HHH with higher education, X7= one females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= two unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= zero out-of-human force female out of HH-members, X12= zero female working in private sector out of HH-members, X13= no working females, X14= zero female under the cover of social insurance out of HH-members, X15= one female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.		
G1	G2	G1	G2	G1	G2	G1	G2	
0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	

Case (5)	<p style="text-align: right;">HH structure:</p> <ul style="list-style-type: none"> — Father, 60 years, completed higher education, working in government sector. — Mother, 50 years, completed secondary education, out-of-labor force. — Son, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 						
<p style="text-align: right;">Model variables:</p> <p>X1= HH in urban areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= male-headed-household, X6= HHH with higher education, X7= zero females have higher education degree out of HH-members, X8= two females (15+) out of four HH-members (15+), X9= one unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= zero out-of-human force female out of HH-members, X12= zero female working in private sector out of HH-members, X13= no working females, X14= zero female under the cover of social insurance out of HH-members, X15= one female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.</p>							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.	
G1	G2	G1	G2	G1	G2	G1	G2
0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0
Case (6)	<p style="text-align: right;">HH structure:</p> <ul style="list-style-type: none"> — Father, 60 years, completed higher education, working in government sector. — Mother, 50 years, completed secondary education, out-of-labor force. — Son, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 						
<p style="text-align: right;">Model variables:</p> <p>X1= HH in rural areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= male-headed-household, X6= HHH with higher education, X7= zero females have higher education degree out of HH-members, X8= two females (15+) out of four HH-members (15+), X9= one unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= zero out-of-human force female out of HH-members, X12= zero female working in private sector out of HH-members, X13= no working females, X14= zero female under the cover of social insurance out of HH-members, X15= one female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.</p>							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.	
G1	G2	G1	G2	G1	G2	G1	G2
0.0	1.0	0.0	0.0	1.0	0.0	0.1	1.0
Case (7)	<p style="text-align: right;">HH structure:</p> <ul style="list-style-type: none"> — Grandmother, 65 years, completed primary education, out-of-labor force. — Mother, 50 years, completed secondary education, out-of-labor force. — Son, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 						
<p style="text-align: right;">Model variables:</p> <p>X1= HH in urban areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= female-headed-household, X6= HHH without higher education, X7= zero females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= one unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= one out-of-human force female out of HH-members, X12= zero female working in private sector out of HH-members, X13= no working females, X14= zero female under the cover of social insurance out of HH-members, X15= zero female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.</p>							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.	
G1	G2	G1	G2	G1	G2	G1	G2
0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0
Case (8)	<p style="text-align: right;">HH structure:</p> <ul style="list-style-type: none"> — Grandmother, 65 years, completed primary education, out-of-labor force. — Mother, 50 years, completed secondary education, out-of-labor force. — Son, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, unemployed. — Son and daughter, dalliances, in secondary and primary education. 						
<p style="text-align: right;">Model variables:</p> <p>X1= HH in rural areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= female-headed-household, X6= HHH without higher education, X7= zero females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= one unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= one out-of-human force female out of HH-members, X12= zero female working in private sector out of HH-members, X13= no working females, X14= zero female under the cover of social insurance out of HH-members, X15= zero female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.</p>							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.	
G1	G2	G1	G2	G1	G2	G1	G2
0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0
Case (9)	<p style="text-align: right;">HH structure:</p> <ul style="list-style-type: none"> — Grandmother, 65 years, completed primary education, out-of-labor force. — Mother, 50 years, completed secondary education, out-of-labor force. — Son, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, working in private sector, vocational worker. — Son and daughter, dalliances, in secondary and primary education. 						

<p>Model variables: X1= HH in urban areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= female-headed-household, X6= HHH without higher education, X7= zero females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= zero unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= one out-of-human force female out of HH-members, X12= one female working in private sector out of HH-members, X13= vocational worker, X14= one female under the cover of social insurance out of HH-members, X15= one female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.</p>							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.	
G1	G2	G1	G2	G1	G2	G1	G2
1.0	0.0	0.0	1.0	0.1	0.0	0.0	0.0
Case (10)		HH structure:					
		<ul style="list-style-type: none"> — Grandmother, 65 years, completed primary education, out-of-labor force. — Mother, 50 years, completed secondary education, out-of-labor force. — Son, 30 years, completed higher education, unemployed. — Daughter, 18 years, completed secondary vocational education, working in private sector, vocational worker. — Son and daughter, dalliances, in secondary and primary education. 					
<p>Model variables: X1= HH in rural areas, X2= not vulnerable house, X3= Own the residence house, X4= HH size six members, X5= female-headed-household, X6= HHH without higher education, X7= zero females have higher education degree out of HH-members, X8= three females (15+) out of four HH-members (15+), X9= zero unemployed females (15+) out of HH-members, X10= one out-of-labor force female out of HH-members, X11= one out-of-human force female out of HH-members, X12= one female working in private sector out of HH-members, X13= vocational worker, X14= one female under the cover of social insurance out of HH-members, X15= one female under the cover of medical insurance out of HH-members, X16= HH own ration cards, X17= HH expenditure on health is 5% from the total HH income.</p>							
Urban Govs.		Lower Govs.		Upper Govs.		Frontier Govs.	
G1	G2	G1	G2	G1	G2	G1	G2
1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0