Effects of Home Appliances on Female Labour Participation in South Africa

FREEING WOMEN FROM HOUSEWORK

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SUMMARY

This research analyses the role of home appliances on Female Labour Participation in South Africa. The increase of the female labour participation is crucial for the development of a country, nonetheless, at this moment, only 40 percent of women between 20 to 49 years old, in South Africa, are engaged in a non-agricultural occupation. Through a bivariate cross-tabulation analysis and a multivariate logistic analysis, the effect of home appliances is studied. Moreover, individual and family characteristics, as well as socio-cultural and geographical context, are accounted for. The findings show how the refrigerator and the washing machine can be associated with women being employed, and to access upper non-farming positions. Furthermore, the need for the appliances is larger with the addition of a husband or a child in the house. Following these results, this paper advises the creation of social policies to spread the ownership of the refrigerator and the washing machine among South African women.

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1. INTRODUCTION

Women are known to be essential for economic development (Eynon, 2017). According to the World Bank, females account for 49.5 percent of the global population (The World Bank, 2019). However, the ratio of females over 15 years old compared to males of the same age that participate in the labour force is set at 67 percent; according to the International Labour Organization (ILO) estimates (The World Bank, 2019). In fact, the ratio is even more disparate in low and middle-income countries; the last data from 2010 showed that 76.5 percent of the male population over 15 years old participates at the labour force, but only 47.6 percent of females are working or actively looking for a job (The World Bank, 2019).

Developing countries should understand the factors that lead to this situation because the addition of more than the 50 percent of women, who currently are not working, would have a positive impact on their economy. Despite other factors, the social norm that designates women as the responsible of fertility, childcare and household chores has been signalled as the main barrier for women to enter the labour force (Jamali, 2009; Psacharopoulos & Tzannatos, 1989; Tambunan, 2009; Gündüz-Hosgör & Smits, 2008; Bittman, Rice, & Wajcman, 2004; Evans & Angrist, 1998; Momsen, 1991; Tzannatos, 1999).

Unfortunately, women face this unequal burden in both developed and developing countries; however, in developed countries, performing household tasks is not as costly. As an example, if we imagine a woman washing her clothes in a city or town within The Netherlands, we will picture her introducing the clothes in a washing machine, and once finished, either she will hang them out to dry or will introduce them into a dryer. But then, if we imagine a woman doing the same in a developing country, we possibly will picture her in a river or a big pond, hand washing the clothes. As we can imagine, cooking and cleaning are the two most time-consuming household chores (Gupta & Ash, 2008), but, if the house includes a refrigerator and a microwave, or a washing machine, the time used will probably decrease considerably.

In addition, the effect of the ownership of such appliances has been proven empirically as a crucial element in the increase of female labour participation (FLP). Precisely, some researches studied this effect during the second half of the 20th century period in certain developed countries, such as the US or the UK (Tzannatos, 1999; Coen-Pirani, León, & Lugauger, 2008; Greenwood , Sheshadri , & Yorukoglu, 2005).

For instance, for the authors Greenwood et al (2005), the technology revolution that aroused from the Second Industrial Revolution, was also accompanied by the "Household Revolution", in which most households acquired home appliances for the first time, later affecting the labour market. If this so-called “household revolution” occurred in developed countries, could it be the case that in developing countries, females can profit by investing in the acquisition of certain home appliances, thus, liberating themselves from hours of work on the household and being able to

enter the labour market? To answer this question, this paper will focus on the effect that the ownership of basic household appliances, such as the refrigerator and the washing machine, have in the participation of females in the labour force. The aim of this paper is not only to answer this question, but to revive a topic which was applied to developed countries during the last century and it is not currently studied in developing countries.

Naturally, when setting this research, it was relevant to take into account that these assets are considered as luxury items in some middle-income countries, and surely in most low-income ones. Therefore, to study the effect of a refrigerator or a washing machine it is crucial that there is some percentage of ownership in the country, as well as some intra-country variation. Following this idea, there were two options to consider: India and South Africa. Moreover, as with any econometric analysis, it was also important to check the availability of good data. Because of the high interest, availability of data in India was not a problem; nevertheless, the Demographic and Health Survey from South Africa from 2016 was available through the Global Data Lab, with rich and updated information.

As an upper middle-income country, South Africa's level of development allows most of the population to own a refrigerator, with 74.2 percent of the total population owning at least one. However, only a 34.2 percent of the population owns a washing machine (Global Data Lab, 2019). This is not surprising since refrigerators are considered less luxurious than washing machines, and therefore, more accessible for the poorest population (Smits & Steendijk, 2015). Moreover, the level of inequality amongst the population in South Africa offers the opportunity to observe the effect of home appliances in different income groups.

Overall, the research question of this paper is the following:

Does the ownership of home appliances, more precisely the refrigerator and the washing machine, help women to enter the labour market in South Africa?

To provide an answer, this paper is divided into the following sections: first, a literature survey on female labour participation is presented, giving an overview of barriers for women to enter the labour market, mainly focusing on the role of women within the household. Second, theoretical background more centred on South Africa is provided, analysing its women and FLP rates. Next, the source of the data is explained, as well as the methods and variables used for the econometric analysis, followed by the results, and the limitations aroused while performing the analysis. The last section concludes.

2. FEMALE LABOUR PARTICIPATION

Then, this section poses the theoretical background of female labour participation in order to understand the access barriers. Later, it focuses on housework and the time allocation of the same, and, last, on how home appliances can affect it.

BARRIERS TO ENTER THE LABOUR FORCE

Due to their importance in economic growth and development, the barriers for women to enter the labour market have been studied extensively (Tzannatos, 1999; Momsen, 1991). Some of the factors that have been proven to affect women's participation in the working market, are the following: economic development of a country, its level of industrialisation and availability of jobs (Psacharopoulos & Tzannatos, 1989; Pampel & Tanaka, 1986); improvements in technology and the reduction on the wage gender gap (Jones, Manuelli, & McGrattan, 2003); the level of education (Psacharopoulos & Tzannatos, 1989; Boserup, 1970); fertility and the use of the contraceptive pill (Pampel & Tanaka, 1986; Tambunan, 2009; Smith & Ward, 1985; Goldin & Katz, 2002; Cavalcanti & Tavares , 2008; Evans & Angrist, 1998; Galor & Weil, 1996); and gender inequality (Goh, 2012; Jamali, 2009; Tambunan, 2009; Gupta & Ash, 2008).

Indeed, gender inequality is a crucial element when studying women because, unfortunately, every aspect of a women's life depends on the value received by society, when compared to men. Then, the same occurs when studying the labour market and the availability of women to access it: social norms are relevant. For instance, Jamali (2009) refered to the reconciliation of different female roles as the reason for women to become entrepreneurs in developing countries (Baughn, Chua, & Neupert, 2006). In addition, it mentions how it is due to gender inequality that women are burdened with the necessity to reconcile their market job with their household chores (Jamali, 2009).

Let us take a closer look into some of the factors posed earlier now adding the existence of the social norm that defines women as the major responsible member for childcare and household maintenance. Firstly, a higher level of development of a country is expected to increase the availability of jobs for women (Psacharopoulos & Tzannatos, 1989). However, in different regions in Turkey where there is a good economic development and availability of jobs, there are still women that are not able to access the labour market due to the patriarchal ideology of their region, through which women are controlled by their husbands or relatives, and often undervalued when compared to men (Gündüz-Hosgör & Smits, 2008).

Secondly, examining level of industrialisation, although unexpected, its effect is not always positive. Level of industrialisation has a U-shaped effect with an initial negative impact and a later positive one (Psacharopoulos & Tzannatos, 1989; Gündüz-Hosgör & Smits, 2008). Boserup (1970) showed that the initial negative effect occurs because those women working previously on

the agriculture sector are not able to combine a market job with their household chores, and therefore they do not access the labour market (Momsen, 1991; Boserup, 1970). Later, also accompanied by a change on the role of women in society, such as better access to education, or lower fertility, employment opportunities in the market labour increase, and therefore the percentage of FLP also increases (Psacharopoulos & Tzannatos, 1989; Galor & Weil, 1996).

Thirdly, in societies where women are less valued, they generally have lower access to education; this affects their later access to better quality jobs and later affects their choice to remain in the non-market/household production. This chain reaction can be explained following the neoclassical school model. This model defines the choice of women to enter the labour market as a choice maximization between the market job and household production (Psacharopoulos & Tzannatos, 1989). Then, with lower level of education, it might not be possible for women to access a job that offers them enough benefit compared with the goods obtained through household activities, and then, the choice will be to remain responsible of the household chores. As just mentioned, gender plays a major role in education; since the major role for women in patriarchal societies is based on childcare and household maintenance, the general belief is that girls do not need to be educated in school, reducing parent's incentive to invest in their female children's education (Gündüz-Hosgör & Smits, 2008).

To sum up, there is a general conclusion on previous literature: even with a high level of development or industrialisation, or even if women were better educated, their social definition as the responsible member for household chores will persist as a barrier for them to access the labour market, because their time is first devoted to the household.

However, not everything is negative. Even if women maintain this housewife role, there are ways in which this burden might be eased up; that is, by, for example, using servants, prepared food, restaurant meals, or using household technology (Heisig, 2011). For instance, Collver and Langlois published in 1962 a cross-country research focused on how income inequality among women influenced their time devoted to housework in which household appliances were considered one of the main factors, to which, of course, wealthier women had better access (Collver & Langlois, 1962).

Focusing on this idea of the ownership of technology, in 2005, Greenwood, Sheshadri and Yorukoglu (from now on GSY) presented what they named the "Household Revolution". This revolution referred to the liberation of women due to the ownership of household appliances. The authors believed that these appliances reduced the time women needed to devote to household work, and therefore, with more time available, women were able to enter the labour market (Greenwood, Sheshadri, & Yorukoglu, 2005). The idea is quite intuitive if we also consider the theory of time allocation, as explained next.

TIME ALLOCATION OF HOUSEWORK

In short, the main principle of economics is to be able to allocate scarce resources for utility maximization. According to Aguiar and Hurst (2006), time of members of the household can be divided into four categories: time spent at market work, time spent in a non-market production, time devoted to childcare, and, leisure time. Non-market production refers to those "goods and services household members produce for their own consumption by combining their unpaid labour and the goods and services they acquire on the market" (Chadeau, 1992). Furthermore, non-market production describes home production including two categories; first, core activities such as cleaning or cooking, and second, the activities devoted to obtaining goods and services, such as grocery shopping (Aguiar & Hurst, 2006). Of course, the more time devoted to non-market production, the less time available for the other three categories. Furthermore, if we consider that childcare is part of home production, and we eliminate the existence of leisure time, then the choice remains between market work and home production.

An important name when considering time allocation, and, more precisely, time devoted to household production, is Gary Becker. In 1965, Becker introduced a mathematical explanation for time allocation, which for the first time considered the household not only as a unit of consumption but also as a unit of production (Becker, 1965). Based on the Beckerian model, Coen-Pirani, et al (2008) introduced the utility function of women when deciding whether to enter the market or not, based on preferences of consumption between market goods (c) or home-produced goods (χ), and their degree of substitution. The mathematical expression is the following:

$$U = u(c) + g(\chi),$$

“Where the functions u and g are assumed to be strictly increasing, strictly concave, and differentiable” (Coen-Pirani, León, & Lugauger, 2008).

Developing this formula, they constructed a model in which to produce home goods two inputs should be considered: the labour hours (usually of women), and the units of home appliances. That means, the higher quantity of hours or appliances, the larger the production of home good. As mentioned earlier, when time is mostly allocated to the labour market the one devoted to non-market production decreases, the marginal utility of home-produced goods will decrease as women enter the labour market.

Without going into more detail regarding the mathematical development, the main argument retrieved from Coen-Pirani et al (2008) is that households maximize their utility equation by choosing market goods and household appliances, as well as whether the woman works in the market, subject to the home-production function and the budget constraint of the household. In addition, linking it back to the origins of time allocation, Mincer (1962), considered that if women

were likely to allocate non-market time for home production, then, the elasticity for female labour supply would be higher than the labour supply elasticity for males (Mincer, 1962), which indicates how FLP depends much more on household chores, differing from male's labour force participation.

IMPACT OF HOUSEHOLD APPLIANCES

Thus, the allocation of time provides a positive, intuitive relationship between the ownership of home appliances and female labour participation (FLP). Despite this intuition, there was not previous empirical foundation to prove it (Coen-Pirani, León, & Lugauger, 2008). Using the model presented above, Coen-Pirani et al (2008) decided to conduct their empirical research, with which they were able to provide significant results confirming GYS's theory. The empirical research was conducted using micro-level data, and it studied the impact of the ownership of household appliances in the increase of FLP for married women in the US from the 60s to the 70s. The results proved that one third of the increase was due to owning such appliances (Coen-Pirani, León, & Lugauger, 2008).

On the other hand, Vanek (1974) conducted a research regarding whether the time devoted to household chores was reduced by the ownership of appliances in the US from 1926 to 1966 and found that there was not a significant change. However, Vanek (1974) did not have data regarding the ownership of household appliances, and used "the passage of the years to stand as a proxy for the progressive diffusion of domestic technologies to all American households" (Bittman, Rice, & Wajcman, 2004), which questions the validity of the results. Similarly to Vanek (1974), Bittman et al (2004) also conducted their research studying whether the ownership of some household technologies reduced the total housework time, but this research focused on Australia in 1997; the authors concluded that there was not a significant reduction. In this case, and although the authors have good data regarding ownership of appliances, they could not test the relationship of refrigerators or washing machines with the time devoted to housework because by 1994 refrigerators and washing machines in Australia were present in most of the households, and there are no statistically significant results. Instead, they centred their results on other home appliances such as the microwave, freezer or dishwasher (Bittman, Rice, & Wajcman, 2004), and as this research focuses on developing countries and the mentioned appliances are highly luxurious, these results are, unfortunately, not applicable. Apart from these studies, other researches on FLP for the same period in the US gave more relevance to the reduction of the gender gap in wages or the decrease on fertility as main factors for its increase (Smith & Ward, 1985; Cavalcanti & Tavares , 2008).

After presenting these studies, the question of interest for this research is whether the positive effect of household appliances on female labour participation could happen in developing countries. The current situation of some developing countries might not be the same as the US between the 1950s and 2000, for instance in some the basic refrigerator is barely extended, such

as in Burundi, with 1.41 percent rate of ownership, while others it is more extended, such as South Africa, with the 74.7 percent (Global Data Lab, 2019).

Nonetheless, the level of industrialisation in developing countries is improving, leaving subsistence production in second place. Therefore, the time of changes is happening now, and it is important to develop strategies that will support women to enter the labour force, mostly outside the agricultural sector. Although the agricultural sector is not irrelevant, it is through the non-agricultural labour market that women can truly empower themselves (Spierings, Smits, & Verloo, 2010).

Nevertheless, it does not mean that women in rural areas should be ignored; however, they might not need such appliances as much. On one hand, in rural areas, due to the predominance of subsistence labour, it can be discussed that household chores do not interfere as much with females working (Momsen, 1991). Simple tasks, such as collecting water for cooking, may demand a large quantity of time, mainly in the least developed areas, but they are considered as part of the daily life and do not keep women from working on their lands. Furthermore, according to Pampel and Tanaka (1986), it is in industrialised areas, and more precisely in the service sector, where household chores and family care become much of a burden for women to enter the labour force (Pampel & Tanaka, 1986). Yet, the development of industrialised areas can also mean better access to basic utilities such as electricity or water supply, household assets or services such as servants or laundry shops.

In conclusion, during this section, I have presented the barriers for women to enter the market labour, being gender inequality the most important one. The same social norms that influence gender inequality, also affect the decision-making process of women regarding whether their time is allocated mainly to market or non-market activities. The ownership of household appliances have been presented as an asset that can decrease the time devoted to housework, thus, decreasing the barrier that gender inequality creates for women.

3. WOMEN IN SOUTH AFRICA

Because this study focuses in South Africa, the next section analyses gender inequality, female labour participation, and the ownership of household appliances, that is, the refrigerator and the washing machine, at a national level.

First, in order to explain the current gender structure of South Africa, we need to take a quick look back in history. South Africa is heavily influenced by its colonial period, in which, first, the Dutch, and later, the British, transferred their culture into native African tribes. Because part of the European population moved to South Africa, the situation of these immigrant women was similar to their fellow citizens in the Netherlands or the United Kingdom. For instance, Dutch settlers were based on a patriarchal society and they considered women as the responsible member of the household (Walker, 1990); subsequently, they enforced this social structure into the Africans.

Continuing with Walker's insights on the lives of women in South Africa before 1945, altogether with patriarchal societies, the role of mining at the end of the 19th century influenced the role of women heavily. That means, because South Africa's economy was based on the extraction of diamonds, men were needed in mining areas, for which they had to migrate and leave their families behind. Although some restrictions appeared later, initially, families were allowed to travel together; still, not all women wanted to travel with their husbands. Before mining, most of the families based their income on agriculture and when males left, women had to stay at home to take care of their children and the lands of the family (Walker, 1990).

Leaving women behind also contributed to the increase of women looking for jobs. Because salaries from males were not high enough, additional sources of income were needed, and many women, feeling responsible of their family, decided to contribute to the income of the household (Berger, 1983). This necessity explains the increase on the number of women migrating; however, most of them were single and those married or with children had to rely on relatives to care of their children (Berger, 1983; Goldberg, 2013). This fact shows how those women with more household responsibilities', that is, the married ones, had more difficulties balancing family duties with a non-farm job. Once again, gender norms were a decisive factor for women not to enter the labour market.

The barriers for South African women increased later when the government created permits in the form of passes and established restrictions on transport. As an example, for a woman to enter industrialised areas, it was necessary to prove that either its husband or father had been a resident there for two years (Walker, 1990). Moreover, those women that were able to access the cities started to work mainly as domestic servants, teachers, or in the textile industry, which, interestingly, were also considered as a "natural extension of women's abilities" (Walker, 1990). This means that socially, women were allowed into these roles because these roles were understood as female roles, which a patriarchal society could accept more naturally. Once again,

this example supports the idea presented earlier regarding how gender norms can become barriers for women entering the labour force.

Unfortunately, the situation of all women in South Africa was not the same. Another crucial factor that needs consideration when looking into the culture of South Africa is race or ethnicity (Berger, 1983; Eynon, 2017). If we focus on black South African women, the situation was much worse. As posed by Pandit (2002), black women were suffering from a "triple burden" based on race, class and gender (Pandit, 2002). For instance, in 1935, white females composed 80 percent of the FLP (Walker, 1990). The situation for coloured or black women got worse during the apartheid period (Pandit, 2002), but the overall situation for female workers improved, also following other global improvements on gender equality (Eynon, 2017). It was later, with the end of apartheid that conditions of discriminated races began to improve; however, the effects of race differentiation are still present nowadays (Zuma, 2015; Eynon, 2017; Goldberg, 2013). As Eynon (2017) remarked too, during this last period after the apartheid, women's rights and the female labour market started to improve; nevertheless, South Africa continuous to be a patriarchal society. Below, some figures support this claim.

UPDATED FIGURES

If we observe South Africa on a global scale, on one side, it was ranked as the 19th position, over more than 140 countries, following the Global Gender Gap Report (World Economic Forum, 2018). However, on the other side, Gender Inequality Index (GII) of South Africa was 0.389 by 2017 (United Nations, 2018), ranking the country on the 90th position of 160 countries.

Secondly, the Global Data Lab presents a patrilocality index equal to 0.64 percent by 2016. A larger patrilocality index indicates that the possibility of women living with the family of their husband after marriage is high compared to other countries with a lower index. It is also linked to a lower supply of females into the labour market (Landmann, Seitz, & Steiner, 2017). The situation is worse for poorer women, and especially for those poor in rural areas, for the index is equal to 1.45 percent in rural areas and 1.38 percent for the poor, opposed to 0.24 percent in urban areas and 0.56 percent for the rich (Global Data Lab, 2019).

Thirdly, violence against women is also an important indicator. According to the 2018 report on Crime against Women in South Africa, the “violent crimes against women, such as sexual assault, increased drastically between 2015/16 and 2016/17” (Statistics South Africa, 2018). Besides, as the "One in Nine Campaign" claims, only one out of nine women facing an assault will report it, which could translate into an even larger increase (Zuma, 2017).

In conclusion, following these measures: GII, patrilocality, and violence towards women, it is not strange to find criticism from South African feminist associations towards the 19th position on the Global Gender Gap Report.

As one might expect, inequality is present in the labour market as well. The female labour force participation rate for women over 15 years old is at 48.43 percent (The World Bank, 2019) while male participation is at 62.35 percent (The World Bank, 2019), almost 14 points higher. Therefore, less than half of the female population that can work is participating in the labour market.

This does not mean that the rest 51.56 percent are not contributing to the economy. Family workers, which refers to those women who assist their relatives on a self-employed business, or un-paid workers, such as those women who devote their time to self-subsistence farming or household production, are not included in this measure (The World Bank, 2019). It is necessary to remark that household production refers to household chores, such as cooking, washing clothes, ironing, maintenance of the house, etc., but more essential is that doing these tasks is not remunerated. This decreases monetary power of women, limiting their freedom of choice, and at the same time, not contributing to the improvement of the economy (Schwartz Cowan, 1983).

As mentioned earlier, cooking and cleaning are the two most time-consuming tasks from the broad spectrum of household chores; any small change might have a big effect on the total added time. In South Africa, the time used for cooking ranges from two to six hours, and that is without including the time for grocery shopping (Toman & Bluffstone, 2017). Now, without a proper refrigerator, perishables would not last long, which would imply several trips to the closest shop, then, increasing the time spend on cooking. Fortunately, 74.2 percent of the population owns a refrigerator; however, if we take a detailed look, there is a big gap among the lowest 25 percentage of population, in which only 29.3 percent owns the fridge, and the highest 25 percent, in which 99.6 percent has it (Global Data Lab, 2019).

Regarding cleaning, there is no exact information on how long the process of washing clothes takes without using the machine. Nonetheless, it appears that fifteen hours per day is a close estimation. As developed countries used to do, women have a designated day in which they go to the river or the nearest water source, to be able to wash their clothes (Schwartz Cowan, 1983). According to the last report from Nielsen, “in Africa/Middle East [the] use of in-home washing machines and dryers (46%) is lower than in any other region” (The Nielsen Company, 2016). Indeed, in South Africa, only 34.2 percent of the population owns a washing machine. Furthermore, when observing the different income groups, the inequality is tremendous; less than 2 percent of the lowest 25 percent of the population owns a machine, but on the highest group, more than the 85 percent has it (Global Data Lab, 2019).

Thus, taking into account previous researches and considering that household appliances facilitate household chores, which consequently may free women from household time, thus, allowing them to enter the labour market, two hypotheses are presented:

Hypothesis 1: The ownership of a refrigerator facilitates women in South Africa, between 20 to 49 years old, to enter the labour market.

Hypothesis 2: The ownership of a washing machine facilitates women in South Africa, between 20 to 49 years old, to enter the labour market.

CONTROL FACTORS

Despite the possible influence from the ownership of home appliances, other factors might also affect the decision-making process of women of whether or not to enter the labour market. In order to avoid confounding results, the analysis includes several control factors in the regression.

The first group of control variables corresponds to the individual characteristics of women. This category includes age, level of education, and whether she is married or not. The effect of age is not expected to be linear since younger women are usually single and participating in the labour force. Then, as they grow older, they may exit the market to get married or extend the family with children (Momsen, 1991), returning later to the market. On the other hand, the level of education is expected to have a clear positive impact, as a higher education would translate into access into better jobs (Psacharopoulos & Tzannatos, 1989; Boserup, 1970). Furthermore, being married is expected to influence negatively because married women's responsibilities increase when compared to single women (Aguiar & Hurst, 2006).

The second group of control variables corresponds to family characteristics. Children are an meaningful factor for women (Cavalcanti & Tavares , 2008). Indicating whether the woman is a mother is not enough, it is also relevant to specify the number of children, as well as whether any of them is under 6 years old. On one side, the larger the number the more time women might devote to childcare (Evans & Angrist, 1998). On the other side, a larger amount of children might also translate into housework helpers, mostly with daughters, allowing women to enter the market force (Goldberg, 2013; Hersch & Stratton, 1994). In addition, because children start school at the age of 5-6 years old, having children under six should affect the mother even more, because the time devoted to childcare is larger (Connelly, 1992).

Last, the regression includes socio-economic and cultural factors such as the economic status, ethnicity, and the degree of traditionalism of their environment, as well as the differentiation between a woman living in an urban area or a rural.

Because the data available do not indicate the economic status of women directly, following Spierings et al (2010) the occupation of the husband is used as a measure for the economic status of the wife; unfortunately, this does not allow measuring the status of single women. On one hand, a higher status might affect negatively for two reasons; first, a more traditional husband

with a high income might expect his wife to stay at home; and second, a job might not be needed economically. However, it can also affect positively because a higher income gives access to better services, such as servants who take care of the household, or, because the professional environment of the husband improves wife's employment opportunities (Smits, Ultee, & Lammers, 1996).

As a main cultural factor and following the theoretical background presented earlier, being an African/black woman is expected to affect the participation in the labour force negatively due to xenophobic differences carried on from the apartheid (Goldberg, 2013; Pandit, 2002; Norling, 2015). Being white is expected to have a positive impact due to their previous privileges, which might continue nowadays (Zuma, 2015).

Furthermore, similarly to Spierings et al (2010), the degree of traditionalism is measured with five proxies: the education of the partner, the difference in age between partners/spouses, whether the nuclear family is extended or not, the age in which her first child was born, and whether she is considered the head of the household. A higher education of the partner, as well as being older for the first birth, and being the head of household are translated into a lower degree of traditionalism, and therefore, should have a positive effect on women to enter the market. On the contrary, a larger difference in age and an extended family are expected to signal more traditional families, which would affect the entrance to the labour force negatively (Spierings, Smits, & Verloo, 2010).

Moreover, the model includes a variable accounting for whether the woman lives or not in an urban area. Living in a rural area is expected to affect negatively due to a lower level of industrialisation and a higher level of subsistence farming in the rural area (Boserup, 1970). Although this variable is not a proxy for traditionalism, living on a rural area might also translate into a more traditional society, which could also affect female labour participation negatively due to a decreased access to education (Huisman & Smits, 2015).

Last, because the refrigerator or the washing machine might be more relevant in some contexts, there is an additional analysis including interactions with the fridge and with the washing machine to account for different scenarios. Due to a large number of interactions, only those significant are included in the results.

4. DATA, METHOD, AND VARIABLES

This section is divided into three sub-sections: firstly, the source of the data gathered; secondly, the methods used to examine this data; and thirdly, the definition and measurement of the variables selected that allows to answer the research question posed earlier.

DATA

The data of this paper derive from the Database Developing World, which includes harmonised household-level datasets from different sources and supplements it with context data (www.datdevworld.org). In this case, the data were not yet harmonised, but it was pulled directly from the Woman's Questionnaire section of the 2016 South Africa's Demographic and Health Survey (SADHS). The SADHS includes representative women aged 15 to 49 in South Africa and gathers information on characteristics of the woman herself, her reproductive behaviour and contraception as well as her health, information on her children's health and nutrition, her social status and her husband's background, among other topics (The DHS Program, 2019). Therefore, no complementary data have been added. For this research, only women on the age range from 20 to 49 years old have been selected, either married or single. Hence, the total number of cases studied is 6,641.

METHOD

To study the relationship between the female labour participation in South Africa and the ownership of home appliances (refrigerator and washing machine) two methods are presented. First, a bivariate cross-tabulation, which shows clearly the percentages of women within each occupational sector with a set of specific characteristics. Second, a multivariate logistic regression analysis is used to show the effect of each variable on female labour participation numerically while controlling for possible confounding factors, described in the previous section.

VARIABLES

For both analyses, the amount and type of variables used are not the same. This subsection presents the different variables included in each analysis and how are they measured. Thus, the paragraph below starts presenting the dependent variables, and later, the following paragraphs introduce the explanatory variables.

Firstly, female labour participation (FLP) is measured in three categories: (1) Not Employed, (2) Low non-farmers and (3) Upper non-farmers. Since each category is studied independently in a different model, they are measured individually as bivariate dummy variables indicating whether (1) or not (0) the women are included in that category, therefore, having three different models. Following Spierings et al (2010), the category "Not employed" includes women working in the

agricultural sector and women defined as not working. The reason to gather them together is that, similarly to other developing countries, females in South Africa perform farming tasks at their farms as part of their daily housework, but they do not consider themselves as employed just for doing these tasks, then, when asked about it, they are “non-employed”. Naturally, it makes the distinction between both categories very challenging to establish (Spierings, Smits, & Verloo, 2010). Moreover, as mentioned earlier, the meaningful change for women is to enter the non-agricultural market, because then it is when they become more independent.

To test if adding these two categories is influencing the results, I have performed two more analysis, one only including farmers, and one only with non-employed. The number of women in the agriculture sector is too low to find significant results, with only 1 percent of the total women being farmers. Furthermore, the results of the first model, including women not working and farmers, do not differ significantly from the results of the model that includes only women that are not working. Appendix 1 indicates the results of the robust test.

Regarding the other two categories, “low non-farmers” includes all those women defined as manual workers, employed as household or domestic workers, and working on the services sector. Last, “upper non-farmers” includes professionals, technical and managerial women, and those working in the clerical sector. The main criteria used to differentiate between low or upper non-farmers has been the mean of years of education for each sector. While upper non-farmers’ education ranges from 11.8 to 13.6 years, low non-farmers have a range from 9.5 to 10.9 years. Within low non-farmers, domestic workers have are an exception with a lower mean of 8.6 years. However, because women in this sector also work away from home, in which case home appliances might be as relevant, these are included in the low non-farmers category.

Focusing now on the explanatory variables, the figure below summarizes all the independent variables that are included in this research. The main objective of this research is to observe the variation of female labour participation (FLP) depending on the ownership of a refrigerator and/or a washing machine. These main variables are included as two bivariate dummies, being equal to 1 if the household has the item or equals 0 if not. Moreover, the analysis includes several control factors that can influence the variation on FLP; these factors are the characteristics of women, their families or household characteristics, and their socio-economic and cultural environment, as well as their geographical location.

Among the characteristics of women, the variables included are age, level of education, and their marital status. Age is measured in three categories for both, the bivariate cross-tabulation, and the logistic regressions, being (1) 20 to 29 years old, (2) 30 to 39, and (3) 40 to 49. Then, level of education has four categories: (1) Some education, which includes those women with no education as well as with some primary education, (2) Some secondary, and (3) Some tertiary. Marital status is indicated with a categorical variable being (1) Single woman, (2) Married or living together, and (3) Widowed or Divorced.

Home Appliances	Individual	Household Structure	Socio-Economic	Cultural	Geographic
• Fridge • Washing Machine	•Age •Level of Education •Marital Status	•Number of Children •Child under 6 years old •Number of Adults	•Husband's Occupation	•Ethnicity •Age difference of marriage •Age at first birth •Female Head •Husband's level of Education	•Urban Area

Figure 1: List of Independent Variables

Among household characteristics, the analyses include the number of children, followed by whether any of them is younger than six years old, and the number of adults living in the household. The number of children is measured as a categorical variable with four categories: (1) none, (2) 1 or 2, (3) 3 or 4, and (4) 5 children or more. Having children younger than six years old is indicated with a dummy variable equal to 1 if there is any, or 0 if none; no distinction is made on the number of children under 6 since the burden does not double with an additional young child. An interval variable indicates the number of adults. Also, in the cross-tabulations analysis, two more variables are included: the number of daughters and the number of sons that remain at the household. Both variables are indicated categorically being (1) None, (2) 1 or 2, (3) 3 or more. The econometric analysis does not include this distinction since it does not bring additional information to the analysis.

To establish the social status of the woman, the occupation of the husband is included. Regarding cultural variables, the variables included are ethnicity, the age difference among partners, whether the female is the defined head of the household, the age of the woman at her first birth, and the level of education of her partner. Occupation of the husband is measured similarly to women's occupation but with an additional distinction, instead of being based on education, it is based on the social status derived from their positions; then, it is indicated with

five categories: (1) farmers, (2) blue-collar workers, (3) low white-collar workers, (4) high white-collar workers, and (5) unknown. For the cross-tabulations' analysis, ethnicity is measure with four categories: (1) African/Black, (2) White, (3) Coloured, (4) Asian, Indian, or other ethnicities. For the logistic regression, white and Asian & Indian are merged into a category, since their pattern is quite similar, and each ethnicity includes a few cases, then, ethnicity is divided into 3 categories: (1) African/Black, (2) Coloured, and (3) White, Asian, and Indian.

Moreover, to indicate the difference in age between partners, four categories are used: (1) Female older than male by more than a year, (2) Similar age, which includes female than male older up to 1 year, and male older up to 3 years, (3) Male older by 4 to 9 years, (4) Male older by 10 years or more. The other variables defining the family composition, that is, whether it is an extended family or not, and whether the female is the head of the household or not, are indicated with a bivariate dummy variable equal to 1 if so, or 0 if not. In order to indicate the age of a woman at her first birth, for the cross-tabulations analysis, a categorical variable is being used equal to (1) Younger than 20, (2) From 20 to 29, and (3) Older than 30. For the logistic regression, a dummy variable is included equal to 1 if the woman has had a child being 18 years old or lower, and equal to 0 if not. Last, education of the partner is measured equally in five categories: (1) none, (2) Some primary, (3) Some secondary, (4) Some tertiary and (5) unknown/no husband.

Furthermore, geographically, the analysis indicates with a dummy variable whether (1) or not (0) the woman lives in an urban area. No additional differentiation regarding the area of residence is accounted for during this research.

5. RESULTS AND DISCUSSION

Having presented the different variables included, now the results of the different analyses are presented. The first section focuses on the information extracted from the bivariate cross-tabulations. The second section focuses on the econometric analysis, that is, the multivariate logistic analysis.

The purpose of the cross-tabulations is to observe if within each occupational sector, there are specific characteristics that make certain women distinctive. Nonetheless, this analysis does not provide any measurement on whether this possible distinct characteristic helps the entrance to the position or not, that is, of causality. It is the econometric analysis that examines the effect of each variable on the participation of women in the labour market.

BIVARIATE CROSS-TABULATIONS

During this section, four different tables specify the percentages of women with or without a specific characteristic among each occupational sector. Following the same scheme used when describing the different variables, the first table focuses on the ownership of home appliances. Then, the second table presents the characteristics of the women themselves. The third one focuses on the characteristics of their households/families. Last, the fourth table focuses on their environment according to socio-economic, cultural, and geographical characteristics.

Having said this, let us start with Table number 1. At the bottom, the table indicates the percentage of women in each category from the total sample population. Figure 2 summarises the results into an image, and shows how non-employed women account for 60 percent of the total, low non-farmers account for almost a fourth (24.7%), and upper non-farmers for only a 14.5 percent. Therefore, most women are either farmers or not working, and the majority of the women who enter the labour market do it as low non-farmers.

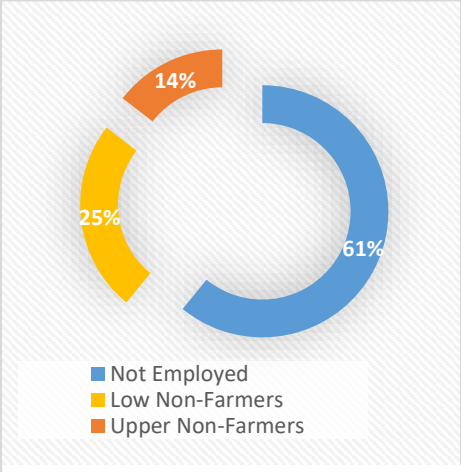

Figure 2: Percentages of FLP categories.

To point out, within the category “Not employed” there are women who label themselves as not working and women working in agriculture; however, only 120 out of the 4,045 women in this category are categorised as farmers, representing less than the 2 percent of the total sample. As

explained earlier, this is because women working on their lands mostly do not label themselves as agriculture workers, but that does not mean they are not farmers.

Focusing now on the right side at the top of the table, we can observe that the refrigerator, which is a less luxurious asset, is largely extended among South African women: almost 8 out of 10 women own it (78.2% of the total). Moreover, the difference among occupational groups is not too large, with the lowest percentage equal to 75 percent among not employed, then 76.5 percent within low non-farmers, and 94.3 percent among upper non-farmers. On the other hand, washing machines are not as accessible, with only 3.5 women out of 10 owning it (35.3%). The disparity among different occupations is bigger; while barely 29 percent of not employed women and 35.3 percent of low non-farmers can acquire the washing machine, the percentage of ownership among women in high occupations doubles to 62.4 percent. Taking into account that higher occupations also provide the necessary means for women to hire domestic labour (servants), the inequality from those women not working to upper non-farmers becomes even greater.

Table 1: Amount & (Percentages) of women within each occupation category according to the ownership of home appliances.

	Not employed	Low non-farmers	Upper non-farmers	Total
Fridge				
Yes	3034 (75)	1250 (76.5)	908 (94.3)	5192 (78.2)
No	1011 (25)	383 (23.5)	55 (5.7)	1449 (21.8)
Washing machine				
Yes	1170 (28.9)	576 (35.3)	601 (62.4)	2347 (35.3)
No	2875 (71.1)	1057 (64.7)	362 (37.6)	4294 (64.7)
Number of women	4045 (100%)	1633 (100%)	963 (100%)	6641
Total % per occupation	60.9	24.6	14.5	100%

Now, following with Table number 2, which focuses on the individual characteristics of the women, we can observe that, regarding their age, only among non-employed women a younger age predominates, with a 47.8 percent, and, among non-farmers, the most common age range is comprised between 30 to 39 years old. Because higher education would be finished at the age of 23, young girls still pursuing a tertiary education are classified as not working. Regarding education, despise the different occupations, secondary is the most common level reached. There is not much difference between not employed and low non-farmers; however, upper non-farmers differentiate themselves with the largest percentage of women with tertiary education: 4 women out of 10 have at least some.

Table 2: Amount & (Percentages) of women within each occupation category according to individual characteristics.

	Not employed	Low non-farmers	Upper non-farmers	Total
Age				
20-29	1935 (47.8)	461 (28.2)	318 (33)	2714 (40.8)
30-39	1207 (29.8)	604 (37)	358 (37.2)	2169 (32.7)
40-49	903 (22.3)	568 (34.8)	287 (29.8)	1758 (26.5)
Education				
Some primary	662 (16.4)	257 (15.7)	15 (1.6)	934 (14.1)
Some secondary	3122 (77.2)	1259 (77.1)	561 (58.3)	4942 (74.4)
Some tertiary	261 (6.5)	117 (7.2)	387 (40.2)	765 (11.5)
Marital Status				
Single	2347 (58)	866 (53)	473 (49.1)	3686 (55.5)
Married/living together	1563 (38.6)	663 (40.6)	452 (46.9)	2678 (40.3)
Divorced/widowed	135 (3.3)	104 (6.4)	38 (3.9)	277 (4.2)
Number of Women	4045 (100%)	1633 (100%)	963 (100%)	6641 (100%)

Furthermore, regardless of their occupational status, the largest proportion of women in South Africa are single (55.5%). Because there is a large number of young girls in the research, it could be that their weight is influencing the total results. Nonetheless, it is interesting that also among employed women, low and upper, single women are also the largest group. Having less married women working is what we could expect, since married women have a larger burden of housework, and need to devote more time to the household. Having such a large percentage of single women among women not working is quite surprising because young girls are expected to enter the labour force, then leaving it to take care of the family, and returning if needed, when children do not need as much care. In this case, those young girls still studying, or a high young unemployment rate, could be affecting the results.

Now, Table 3 specifies the percentages depending on the characteristics of the household. As expected, among women not working and low non-farmers is where women have a higher number of children; still, most women in South Africa have either one or two children only. Upper non-farmers are the exception since barely 19 percent have more than two children. Therefore, either it is easier to reach a higher labour position without many children, or, another option is that once women reach this position, they prefer not to expand their families.

Regarding the age of children, almost 6 women out of 10 have a young child, under 6 years old. Surprisingly, we can observe that almost half of the women in the labour market have a young child, which could contradict the idea that childcare forces woman out of the labour market. Following these results, we cannot interpret whether the effect is positive or negative. However, it is clear that the number of women working that have a young child is much lower than the number of not working women. Nonetheless, among non-farmers, there is barely the same number of women with or without the young child, indicating how the young child might not affect them negatively. Most probably, these women can pay for childcare or leave their children with family members as they used to do (Berger, 1983; Goldberg, 2013).

Table 3: Amount & (Percentages) of women within each occupation category according to household characteristics.

	Not employed	Low non-farmers	Upper non-farmers	Total
Number of Children				
None	745 (18.4)	192 (11.8)	168 (17.4)	1105 (16.6)
1 or 2	2150 (53.2)	919 (56.3)	606 (62.9)	3675 (55.3)
3 or 4	928 (22.9)	440 (26.9)	177 (18.4)	1545 (23.3)
5 or more	222 (5.5)	82 (5)	12 (1.2)	316 (4.8)
Children <6 years old				
No child	745 (18.4)	192 (11.8)	168 (17.4)	1105 (16.6)
Yes	2393 (59.2)	746 (45.7)	423 (43.9)	3562 (53.6)
No	907 (22.4)	695 (42.5)	372 (38.7)	1974 (29.8)
Daughters at home				
None	2140 (52.9)	887 (54.3)	555 (57.6)	3582 (53.9)
1 or 2	1730 (42.8)	697 (42.7)	389 (42.4)	2816 (42.4)
3 or more	175 (4.3)	49 (3)	19 (2)	243 (3.7)
Sons at home				
None	2099 (51.9)	865 (53)	508 (52.8)	3472 (52.3)
1 or 2	1782 (44)	707 (43.3)	433 (45)	2922 (44)
3 or more	164 (4.1)	61 (3.7)	22 (2.3)	2470 (3.7)
No. Adults in hh				
1 or 2	1976 (48.9)	935 (57.3)	541 (56.2)	3452 (52)
3 or 4	1498 (37)	516 (31.6)	315 (32.7)	2329 (35.1)
5 or more	571 (14.1)	182 (11.1)	107 (11.1)	860 (12.9)
Number of Women	4045 (100%)	1633 (100%)	963 (100%)	6641 (100%)

Moreover, differentiating between having daughters and having sons in the household do not create a difference in proportions as we could have expected. The purpose of differentiating between having daughters or sons at home is to observe if the presence of a daughter lowers the proportion of women not working compared to having a son in the household. Following previous literature, the daughter should allow the female to enter the labour market because girls are expected to help with household tasks, while boys are not. However, the percentages of non-employed women with daughters or sons in the house are almost the same.

Last, at the bottom of table 3, we can observe that the most common household is formed by 1 or 2 adults, regardless of the woman's occupation. Then, the higher the number of adults, the bigger the proportion of non-employed compared to the other categories. Nonetheless, the difference in proportions among women who are not working compared to those working as non-farmers regarding living with more adults is not as large as expected. The expectations regarding the difference in proportions between non-employed and employed were higher because more adults could translate into a higher burden of housework for the woman, making it more difficult to enter the labour market. Moreover, having a larger number of adults might translate into having more sources of income, therefore, erasing the necessity of women to participate in the labour market, again, increasing the "non-employed" proportion. Following these results, it is possible that more adults are more of an assistance than a burden or, that a larger monetary power among upper non-farmers allows them to have domestic help, reducing the burden of an extended family.

Before continuing with the last table, let us re-examine the assumption presented earlier. According to the results of table 2, there is an assumption regarding how unemployment or the engagement of women into a high level of education could the possible reasons for having a large proportion of young women non-employed. However, following the results in table 3, fertility eems to be a more important factor; most of the non-employed women have at least one child, also being younger than 6 years old. It could be that the percentages of women with a child correspond to older women, but only 18 percent of women in that category do not have children, while almost 50 percent of them are younger than 28 years old. The existence of a large group of single women with a small child could be a possibility of acting as a barrier for them to enter the labour market.

Now, examining table 4, the first block provides information regarding the social status of women, the second focuses on cultural factors and the last on their geographical environment.

Starting with social status, which is given by the husband's occupation, most women share the same, given by a blue-collar job, which corresponds to manual workers and household and domestic workers. There is a match between males with high white-collar jobs and females with upper non-farming jobs, which would support the idea presented by Smits, Ultee, and Lammers (1996); the idea is that the husband's professional environment improves wife's employment opportunities. It is quite interesting that there is a substantial percentage of upper non-farmers

women whose husbands' have a lower social position according to their employment: 11.4% of upper non-farmers have a husband with a blue-collar job.

Presenting cultural factors, in table 4 there are ethnicity and traditionalism as two relevant factors that may affect women. African/Black women predominate among South African women (86.6%), followed by Coloured, White, and Asian or Indian. Then, although the highest proportions within each occupation correspond to African/Black women, they have a smaller representation in higher occupations. The exception corresponds with White women; while among not working women there is barely a 1.6% representation, among upper non-farmers they represent the 9.7%. That is, barely 2 non-employed women out of a 100 are ethnically White, but this is multiplied by 5 in higher occupations, with almost 10 women out of a 100. This results support the inequality among races presented in previous literature (Pandit, 2002; Walker, 1990). Furthermore, and although there is even less representation of the Asian, the Indian, or other ethnicities, they follow a similar pattern as White women.

Table 4: Amount & (Percentages) of women within each occupation category according to socio-economic, cultural, and geographical environment.

	Not employed	Low non-farmers	Upper non-farmers	Total
Socio-economic				
Husband's occupation				
Farmer	109 (2.7)	44 (2.7)	6 (0.6)	159 (2.4)
Blue-collar job	628 (15.5)	265 (16.2)	110 (11.4)	1003 (15.1)
Low white-collar job	148 (3.7)	113 (6.9)	86 (8.9)	347 (5.2)
High white-collar job	131 (3.2)	56 (3.4)	153 (15.9)	340 (5.1)
Unknown/no husband	3039 (74.9)	1155 (70.7)	608 (63.1)	4792 (72.2)
Cultural				
Ethnicity				
African/black	3618 (89.4)	1419 (86.9)	716 (74.4)	5753 (86.6)
White	65 (1.6)	22 (1.3)	93 (9.7)	180 (2.7)
Coloured	321 (7.9)	182 (11.1)	128 (13.3)	631 (9.5)
Asian, Indian, & other	41 (1)	10 (0.7)	26 (2.7)	77 (1.2)
Traditionalism				
Age difference				
Woman older by more than 1 year	107 (6.8)	59 (8.9)	35 (7.7)	201 (7.5)
Similar age (woman 1 year older, or man 3 years older)	477 (30.5)	252 (38)	194 (42.9)	923 (34.5)
Husband older than female by 4 to 9 years	627 (40.1)	249 (37.6)	165 (36.5)	1041 (38.9)
Husband older than female by 10 years or more	352 (22.5)	103 (15.5)	58 (12.8)	513 (19.2)
Total with husband	1563 (38.6)	663 (40.6)	452 (46.9)	2678 (40.3)
No partner/husband	2482 (61.4)	970 (59.4)	511 (53.1)	3963 (59.7)
Age first birth				
None	709 (17.5)	169 (10.3)	164 (17)	1042 (15.7)

Younger than 20	1588 (39.2)	686 (42)	243 (25.2)	2536 (38.1)
From 20 to 29	1663 (41.1)	727 (44.5)	502 (52.2)	2892 (43.4)
Older than 30	85 (2.1)	51 (3.1)	54 (5.6)	190 (2.8)
Extended family				
Yes	1607 (39.7)	485 (29.7)	264 (27.4)	2356 (35.5)
No	2438 (60.3)	1148 (70.3)	699 (72.6)	4285 (64.5)
Female head				
Yes	2317 (57.3)	967 (59.2)	498 (51.7)	3782 (56.9)
No	1728 (42.7)	666 (40.8)	465 (48.3)	2859 (43.1)
Husband's education				
Some primary	315 (7.8)	112 (56.9)	20 (2.1)	447 (6.7)
Some secondary	827 (20.4)	387 (24.1)	232 (24)	1446 (21.8)
Some tertiary	108 (2.7)	48 (2.9)	138 (14.3)	294 (4.4)
Unknown/no husband	2795 (69.1)	1086 (66.5)	573 (59.5)	4454 (67.1)
Geographical				
Urban				
Yes	2117 (52.3)	975 (59.7)	71 (73.8)	3803 (57.3)
No	1928 (47.7)	658 (40.3)	252 (26.2)	2838 (42.7)
Number of women	4045 (100%)	1633 (100%)	963 (100%)	6641 (100%)

Next, traditionalism examines the percentages of women within each occupational sector according to the difference in age with the husband/partner, also, according to the age of the woman at her first birth, whether she finds herself in an extended family, whether she is the head of the household, and, according to the level of education of her husband.

Starting with the difference in age, regardless of their job most of the women with a husband have an older spouse, from 4 years to 9 years older. Usually, a bigger difference in age would translate into a more traditional household, which usually considers women as the responsible member in charge of housework. The results presented to support this argument. As shown, equal marriages predominate among women in upper non-farming occupations, while among not employed, there is a higher gap on age.

Furthermore, there is not much difference within not employed or low non-farmers regarding the age of their first birth. There is almost the same proportion of those who had their first child younger and those who had them above the average, which is 20 years old. The most significant difference is among upper non-farmers, with only 1 out of 4 women had their first birth while being younger than 20, and among who there is the highest proportion of women that wait to be 30 years old or more to start a family.

Most households are not extended but the proportion of extended families is larger within not employed. This results support how traditionalism can act as a barrier for women entering the labour force. On the other hand, most females in South Africa are heads of their households,

which would contradict the households being traditional since a male head usually represents a more traditional environment.

Nevertheless, the reason for a high proportion of female heads could be historical. According to the literature presented earlier, migration has been a crucial factor in the development of the labour market in South Africa, leaving the responsibility of the household to women, then, allowing female to become heads of the household more often.

Last, a lower level of education among husbands could also signal a more traditionalism household, and a barrier for women to participate in the labour market. For instance, if the table had shown a high percentage of husbands with only primary education among non-employed women, this could signal a traditional household. Nonetheless, the largest percentage of husbands with primary education is among low non-farmers. Moreover, secondary is the most frequent level attained, similarly to women. Once again, there is a match between males with tertiary education and upper non-farmers women, suggesting how a more educated man would accept his partner/wife to work.

The final section in table 4 shows the percentages of women who live in either an urban area or not. Living in an urban area is clearly crucial for women within higher occupations. While the proportion of not employed is almost 50/50, the gap towards urban areas increases in each category, reaching a proportion of 73.8% within upper non-farmers. Therefore, better access to urban areas might be a relevant factor for those non-employed women who pursue a higher occupation in the labour market.

After having examined the cross-tabulations we have a clearer picture of the situation of women from 20 to 49 years old all over South Africa. Most women are not working or working their lands, and although most of them have a refrigerator (78%), only a few have the washing machine (35%). Moreover, the youngest predominate among non-employed women, while among non-farmers older women are the majority. Generally, women have at least a secondary level of education, but upper non-farmers most commonly reach the tertiary level. Furthermore, the highest proportion of women are single, mainly among those not working. The most common household has 1 or 2 children, and 1 or 2 adults; when the number of children or adults increases, the proportion shifts towards non-employed women. There is a match between the social status given by the employment of the husband with the occupation of the woman. Regarding their culture, African women are the predominating ethnicity in South Africa but their representation among upper positions is reduced, with an increase in the proportion of white women. Moreover, it is among non-employed women where traditional households are more represented. Last, upper non-farmers predominate in urban areas whereas non-employed females stay in less urbanized areas.

MULTIVARIATE LOGISTIC ANALYSIS

In order to observe the effects of house appliances on female labour participation, there are three ordinary logistic regressions performed separately, one for each occupational category: (1) Not employed, (2) Low non-farmers, and (3) Upper non-farmers. Through the different logistic analyses, the results presented show which variables are relevant for women to belong to each sector.

To remind the variables presented in section 4, individual characteristics of women account for age, education and marital status. Then, household characteristics include the number of children, and if any of them are below 6 years old, and, the number of adults in the household. Last, socio-economic, cultural, and geographical characteristics, give us information on their environment.

Then, before proceeding to read Table 5, which presents the results of the logistic regression analysis, it is worth mentioning how to interpret it. The results correspond to the log odds of women, within a certain occupational category, depending on each independent variable; Model 1 contains the results for the category “Not employed”, Model 2 indicates the results for “Low non-farmers”, and Model 3 presents the results for “Upper non-farmers”. Moreover, the odds are included between brackets.

The reason to include both coefficients is the following. Log odds show clearly whether a particular independent variable can be positively or negatively associated with women belonging to the category in hand. Nonetheless, the odds indicate in clearer the size of this effect when the independent variable increases by one unit. For example, regarding the coefficients of the variable “Fridge” in Model 3, the log odds indicate that women with a fridge are positively associated with being upper non-farmers. In the same way, the results in brackets show how owning a fridge increases the odds for women to be upper non-farmers by 2.4 times compared to those women without it, or by 140%.

Then, starting with Model 1, the coefficients show how women who own a fridge or a washing machine are positively associated with being employed. The effect size of the coefficient of the washing machine is larger than the coefficient of the fridge; the fridge reduces the odds of being non-employed by 14 percent and the washing machine reduces them by 30 percent. Moreover, the coefficient of the fridge is significant on a 95% confidence interval and the coefficient for the washing machine is significant at a 99% confidence interval, which makes this last one more statistically significant.

Interestingly, age has an opposite effect to expectations. Previous literature showed how the maximum economic activity is generally associated with women in their early twenties (Momsen, 1991). Later, women would leave the market because of marriage or because of children, perhaps

returning when children are more independent. In this case, the coefficients show a positive and statistically significant effect on women being employed at an older age, compared to younger ones. Nevertheless, a cohort of young girls still pursuing their education could drive these results. Tertiary education, which finalises at the age of 23 years old, is also associated with higher chances of employment; thus, older women could be more prepared to enter the labour market due to a higher level of education, not because of their age. Not only tertiary education is significant for being employed. Women with secondary education have 14 percent lower odds of being non-employed, compared to those with only primary level. Nonetheless, the effect of tertiary education is stronger, reducing the odds of women being non-employed by 74 percent, again, compared to women with a primary level of education.

In line with the expectations, being married or having a child younger than six years old, are negatively related to being employed. It is likely that married women and those with a young child devote more time to household maintenance or childcare; therefore, they would not have sufficient time to dedicate to the labour market. However, the results regarding the number of children are contrary to expectations: they show how having children is positively associated with women entering the labour market. The effect is stronger if the number of children is either one or two, with a decrease of 32 percent in the odds for non-employment; only if the woman has five children or more, the relationship becomes negative, increasing the odds of non-employment by 1.1 times; yet, this last coefficient is not statistically significant.

On one side, having a child means women have the responsibility of childcare and the burden of more housework. Childcare will take up time and therefore affect their ability to enter the labour market (Aguiar & Hurst, 2006; Roberts & Rupert, 1995). However, another view could be that if these children are not too young, they might be contributing to housework, allowing the mother to participate in the labour force (Hersch & Stratton, 1994). Moreover, previous literature referred to women in South Africa being encouraged to enter the labour market to support their families because their spouses had migrated to the mining areas for work but their salaries were insufficient (Boserup, 1970). This might still be occurring, or, it might be embedded in the social norms of South African women. We cannot be certain of what is causing women in South Africa to show this trend opposite to expectations, but as mentioned, the results show a positive relationship between children and the participation of women in the labour market.

Regarding the effect of social status, shown by the occupation of the husband, it appears that women married to farmers have larger chances of being non-employed or farmers. It is quite reasonable, because if the family owns land where the husband works, women will most likely help with farming as well. Thus, for the rest of women, with husbands in blue or white-collar occupations, the odds of being non-employed decrease. Nonetheless, only the coefficient of a low white-collar job is statistically significant, decreasing the odds of non-employment by almost half.

Culturally, being African/Black, and living in a more traditional household are positively associated with being non-employed. The coefficient of being coloured is negative and statistically significant for women to be non-employed compared to African women. Being White, Asian, or Indian is also negatively associated with non-employment, but statistically insignificant. Besides, a higher difference in age, an extended household, not being the head of the household and a lower level of husband's education are related to higher chances of being non-employed. However, the coefficients of the last two variables are not statistically significant.

Surprisingly, having the first child while being younger than 18 years old is not associated with non-employment. Similarly to the results observed with the number of children, having a child while being young might be acting as an incentive for women to enter the labour force.

Lastly, living in an urban area is negatively correlated with being non-employed. The odds of being non-employed are 18 percent lower if women live in an urban area compared to those living in a rural area. This might be due to the lower access of non-farming jobs in rural areas, or because in these areas, women most likely engage in farming at their lands.

Model 2 shows the coefficients contributing to the variation of low non-farming women, which include those employed as domestic, manual or services' workers. The relationship between having a fridge and being a low non-farmer would appear to be negative, thus, having lower odds of being employed in a low non-farming position if owning the appliance. On the other side, having a washing machine would be positively associated, thus, increasing the odds of women entering these occupations, compared to those women who do not have the machine. Notwithstanding, neither the coefficients of the fridge nor the washing machine are statistically significant, which could be due to a better reconciliation between housework and this type of jobs. For instance, manual workers also include those women who work with pottery, these women may work from home and later sell their products in the market.

Similarly to Model 1, age appears to have a positive and statistically significant relationship with women being employed in a low non-farming position. Older women have better chances of entering the market than younger women. This is a bit surprising because women within this category have an average of secondary education level. Thus, in this case, it would not be expected that the group of girls around the early twenties, who may still be studying, could influence the results regarding low non-farming occupations.

Table 5: Results of the Logistic Regression of selected independent variables on the log odds of being a Non-employed, of being employed in the low non-farming sector, and of being employed in the upper non-farming sector. (Odds ratio between brackets).

	Model 1. Not employed		Model 2. Low Non-Farmers		Model 3. Upper Non-Farmers	
Intercept	1.404***	(4.071)	-1.130***	(0.323)	-6.134***	(0.002)
Fridge	-0.150**	(0.861)	-0.079	(0.924)	0.893***	(2.444)
Washing machine	-0.358***	(0.699)	0.108	(1.114)	0.496***	(1.642)
Age						
20 to 29	Reference		Reference		Reference	
30 to 39	-0.415***	(0.660)	0.477***	(1.612)	0.072	(1.074)
40 to 49	-0.553***	(0.575)	0.628***	(1.874)	0.074	(1.077)
Education						
Some primary	Reference		Reference		Reference	
Some secondary	-0.358***	(0.8699)	0.059	(1.061)	1.680***	(5.364)
Some tertiary	-1.349***	(0.260)	-0.539***	(0.583)	3.333***	(28.010)
Marital status						
Single	Reference		Reference		Reference	
Married/Living together	0.451***	(1.570)	-0.429***	(0.651)	-0.188	(0.829)
Divorced/Widowed	-0.047	(0.954)	0.125	(1.133)	-0.203	(0.816)
No. of children						
None	Reference		Reference		Reference	
1 or 2	-0.381***	(0.683)	0.325***	(1.385)	0.251***	(1.285)
3 or 4	-0.189*	(0.828)	0.238**	(1.268)	0.002	(1.002)
5 or more	0.100	(1.105)	0.030	(1.030)	-0.614*	(0.541)
Child under 6 years	0.337***	(1.401)	-0.286***	(0.751)	-0.196**	(0.822)
Number of adults (18+) in HH	0.026	(1.027)	-0.009	(0.991)	-0.042	(0.959)
Husband's Occupation						
Farmer	Reference		Reference		Reference	
Blue collar	-0.036	(0.964)	-0.009	(0.991)	0.608	(1.836)
Low white collar	-0.629***	(0.533)	0.285	(1.330)	1.195***	(3.302)
High white collar	-0.420*	(0.657)	-0.340	(0.712)	1.473***	(4.363)
Unknown	0.046	(1.047)	-0.273	(0.761)	0.897**	(2.453)
Ethnicity						
African/Black	Reference		Reference		Reference	
Coloured	-0.265***	(0.767)	0.089	(1.093)	0.346***	(1.414)
White/Asian/Indian	-0.138	(0.871)	-0.886***	(0.412)	0.819***	(2.269)
Difference in age						
Similar age	Reference		Reference		Reference	

Women older by 4 years or more	-0.056	(0.946)	0.044	(1.045)	0.041	(1.042)
Male older by 4 to 9 years	0.200***	(1.221)	-0.136*	(0.873)	-0.139	(0.871)
Male older than 10 years	0.473***	(1.605)	-0.291***	(0.748)	-0.480***	(0.619)
Birth younger than 18	-0.182***	(0.833)	0.245***	(1.278)	-0.085	(0.919)
Extended household	0.235***	(1.265)	-0.251***	(0.778)	-0.082	(0.922)
Female head	-0.042	(0.959)	0.032	(1.033)	0.044	(1.045)
Husband's Education						
Some primary	Reference		Reference		Reference	
Some secondary	-0.128	(0.879)	0.120	(1.127)	0.300	(1.350)
Some tertiary	-0.154	(0.858)	-0.230	(0.795)	0.477*	(1.612)
Unknown	-0.036	(0.964)	0.027	(1.027)	0.227	(1.255)
Urban	-0.189***	(0.827)	0.085	(1.088)	0.298***	(1.347)
N TOTAL	**4045**		**1633**		**963**	

***p-value<0.01 **p-value<0.05 ***p-value<0.01**

Checking education, the coefficient for a secondary level is not statistically significant. Only the coefficient for tertiary education can be negatively associated with low non-farming, and statistically significant, compared to those women with primary education. Those women with primary education have more chances to work in lower occupations than those women who reached a tertiary level. Altogether with the results observed for non-employment, the coefficient of tertiary education could mean that women with higher education are most likely to enter higher occupations since they are also less likely to be non-employed.

The negative effect observed on being employed from marriage, or from having a young child, can also be observed for women in low non-farming jobs. Again, having children is positively associated with being employed in the low non-farming sector. The effect is stronger for women who have only 1 or 2 children than those who have 3 or 4, and there seems to be almost no relationship, and statistically insignificant, if the number of children is 5 or above.

Regarding the effect of the occupation of the husband, no occupational category appears to have any statistically significant relationship with a woman being a low non-farmer or not. Nonetheless, ethnicity is statistically significant. Being White, Asia, or Indian is associated with not being employed as a low non-farmer, which means that the chances of working within this occupational category are higher if the woman is African/Black but if she would be White, Asian or Indian, her chances would be reduced by almost a 60%. Although the coefficient in Model 1

was not statistically significant, the relationship with being non-employed and being White, Asian, or Indian, was negative. Thus, it would be expected that White women are most likely to enter upper occupations, compared to African women.

Moreover, traditionalism appears to have a similar effect on women entering low non-farming occupations, as into non-employed women. In this case, living in an urban area would be positively associated with being a low non-farmer; nonetheless, the coefficient is not statistically significant. Urban areas might be less relevant for lower non-farming positions because manual and services workers might find jobs in rural areas, for instance, in small markets.

Model 3 presents the coefficients of the contribution from explanatory variables to upper non-farmers. Examining it, we can observe that both the fridge and the washing machine's coefficients appear to be positively and statistically significant associated with being employed in upper positions. On one side, these results would be in line with the results presented by Coen-Pirani et al (2008) indicating how having these appliances increases the chances of women to access upper positions. On the other side, women who reach upper non-farming occupations may have a higher monetary power to invest in home appliances.

In this model, the coefficients of age have no statistically significant effect. Nonetheless, the association between upper positions and tertiary education appears to be strong, positive, and significant. The chances of a woman with tertiary education to enter the upper non-farming market labour increase by 28 times, compared to the odds of a woman with just a primary level. Also, the coefficient of being married does not have a statistically significant contribution towards women entering upper positions or not.

The effect of children in upper non-farmers is quite surprising because while with low non-farming occupations the reconciliation with family might be more plausible, I would expect upper non-farmers to need a higher dedication towards their jobs, leaving less time for family care. Nonetheless, the results show how having one or two children is positively associated with women being upper non-farmers. Being in this category increases the odds by 1.28 times for upper non-farmers compared to women with no child. Nonetheless, we cannot be certain if having one child or two facilitates the access for women to upper positions, or if women in upper positions prefer to have one or two children only. It could also be that, women in upper positions have the economic power to hire domestic workers and babysitters, thus, not being disturbed from their jobs.

Moreover, although a child is positively associated, a child under 6 years is negatively associated to the odds of a woman to be an upper non-farmer. The chances decrease by 18% compared to women with an older child.

In line with the arguments of Smits et al (1996) a higher social status, given by a husband whose occupation is among the white-collar sector, is associated with women being able to enter

upper non-farming positions. That is, women married to a farmer have the lowest chances of entering the upper non-farming labour market.

Nonetheless, if the marriage is more traditional, with a husband 10 years older or more, the relationship becomes negative and the chances of the woman decrease by a 39%, compared to women who are married to a similar age's male. In the same way, the other variables linked with a more traditional household can also be negatively associated with being an upper non-farmer.

Moreover, African/Black women have lower chances of being upper non-farmers. The coefficients for other ethnicities show a positive association to being upper non-farmer compared to being African; yet, being White, Asian, or Indian has a stronger effect than being Coloured.

The last coefficient, which indicates if women live in an urban or a rural area, shows a positive association between urban areas and upper non-farming positions. Women in urban areas have a 1.35 times higher odds of entering this occupational sector than women in rural areas.

If we sum up the results presented in Models 1, 2 and 3, we can deduct the following assumptions. First, the refrigerator and the washing machine can be associated with better chances for women to enter the labour market, and to access upper non-farming positions. For women in low non-farming positions, it might be easier to reconcile housework with a job at the market labour, since the positive association is not present in the results. Second, for upper non-farmers, the possibility to pay for domestic workers might reduce the necessity to reconcile house and market labour. Nonetheless, the coefficients may be still positive due to a reverse causality issue, which would mean that a higher monetary power would upper non-farmers to purchase the appliances. Last, the triple burden mentioned in Pandit (2002) is present still; African women are worse off than White women are.

INTERACTION ANALYSIS

In order to observe if the effects of the fridge or the washing machine are different depending on the context, there is an analysis including interactions. This section contains two tables, the first one indicates the significant interactions with the home appliance "refrigerator", and the second one includes the interactions with the "washing machine" that was significant.

To understand the following tables, it is necessary to take into account the results presented in the table no.5. The interpretation of interaction effects is not equal to the interpretation of the main effect. Interactions indicate the degree in which the main effect is influenced by the context. For instance, Model 1 showed how secondary education decreased the odds of women being non-employed by 30 percent, compared to women who had only some primary. According to table 6, having a fridge increases the chances of employment for women with secondary education, compared to those with a level of primary education.

All significant interactions with the fridge show how this appliance might be associated with an increase in chances of women to enter the FLP. For instance, the negative association to employment with being married, or having a child under 6 years old, is counterbalanced if the woman owns a fridge. Therefore, women with a husband or living with their partner, or that have a young child, can be associated with better chances of being employed if they own the refrigerator, compared to those who do not. In the same way, the negative effect of an extended household in non-employment appears to be compensated with the appliance.

Table 6: Logistic Regression with "Refrigerator" Interactions. (Odds ratio between brackets).

	MODEL 4. NOT EMPLOYED	MODEL 5. LOW NON-FARMERS	MODEL 6. UPPER NON-FARMERS
Fridge			
Educ; some secondary	-0.342* (0.710)		
Married/ living together	-0.690** (0.501)	0.637** (1.891)	
Child under 6	-0.334** (0.716)	0.333*** (1.396)	
Unknown husbands' occupation			2.280** (9.777)
Coloured	-0.623** (0.536)		
Woman older by 4 years or more			1.357** (3.884)
Extended	-0.339* (0.712)		
Urban	-0.255* (0.775)		0.968*** (2.634)
N total	**4045**	**1633**	**963**

*p-value<0.01 **p-value<0.05 ***p-value<0.01

Being coloured is shown in table 5 to be associated to higher chances of employment, compared to African/Black women. In the same way, having a fridge decreases the chances of employment for African women, compared to the chances of Coloured women. In this situation, it is difficult to observe how the fridge might ease up a task for Coloured women but not to Africans. Therefore, it might be a case of reverse causality, where Coloured women have better access to owning a fridge than African women have. Similarly, adding the ownership of the refrigerator with living in an urban area increases the chances of employment even more. That is, women in urban area have already better chances of being employed than those women in rural areas, and their chances are higher.

Furthermore, Model 5 indicates how for low non-farmers the negative effect of marriage or a young child is compensated by the refrigerator. Nonetheless, in Model 6 we can observe how for upper non-farmers, the ownership of a fridge is not significant for married women, or for those who have a young child. These results could be due to better access to substitutes due to a higher monetary power, such as domestic workers, also associated with having an upper non-farming job.

In addition, those wives who have a fridge and a similar age than their husbands have lower chances to enter the upper non-farming labour market compared to the chances of women who are older than their husbands are. Moreover, if a woman, who also lives in an urban area, owns a fridge, the chances of being employed in the upper non-farming sector are enhanced.

Now, examining Model 7 in table 7, we can observe how the washing machine increases the chances of younger women of being employed compared to the group of older women. Interestingly, women who have a washing machine and one or two children have higher chances of being non-employed than women who have no child. Considering how having children was associated with women entering the labour market in table n.5, it is surprising how the ownership of an appliance, which is supposed to help to facilitate an exhausting household chore, increases the chances of being non-employed. Then, a possible assumption might be that a woman who has the monetary power to acquire a washing machine, is also able, and might prefer, to exit the labour market to take care of her children.

Nonetheless, when the child is younger than six years old, the ownership of the washing machine increases the chances of women to be employed, compared to the chances of women who have no child under six.

Table 7: Logistic Regression with "Washing Machine" Interactions. (Odds ratio between brackets).

	MODEL 7. NOT EMPLOYED	MODEL 8. LOW NON-FARMERS	MODEL 9. UPPER NON-FARMERS
Washing machine			
40-49 years old	0.352*** (1.421)		-0.640** (0.527)
1 or 2 children	0.407*** (1.503)	-0.385* (0.681)	
Child under 6	-0.462*** (0.630)	0.382*** (1.465)	0.355* (1.426)
No. Of adults in hh		0.1** (1.105)	-0.123* (0.884)
Coloured	-0.589*** (0.555)	0.393* (1.482)	
Male older than 10 years	0.418*** (1.519)		-0.599** (0.549)
Female head		0.302* (1.352)	-0.653*** (0.521)
N total	**4045**	**1633**	**963**

***p-value<0.01 **p-value<0.05 ***p-value<0.01**

Similarly to what has been observed in table 6, the washing machine also decreases the chances of coloured women to be non-employed, when compared to African women. Again, a possible explanation could be a reverse causality case, where Coloured women have better access to owning the appliance. Last, the coefficient for the interaction washing machine – male older than 10 years old shows how in a traditional marriage, if the woman also owns a washing machine, the chances of employment decrease, compared to those wives with a similar age than their husband. This fact can be explained since in a more traditional marriage women are not

expected to be employed, and if the household has the necessary income to purchase a washing machine, then there might be no necessity for the woman to work.

The effect of the washing machine for low non-farmers who have one or two children, or who have a child under six years old, is the same as observed with non-employment. The chances of being a low non-farmer decrease with the machine for women who have at least one child, compared to the chances of women who have no children. However, when the child is under six, owning the appliance increases the chances of women being low non-farmers.

Furthermore, there is a weak effect of the washing machine for women who have a higher number of adults in the household, increasing the chances compared to those with a lower amount. The washing machine also increases the chances for coloured women to become low non-farmers compared to the chances of African women.

Last, being a female head was positively associated with women being low non-farmers, but statistically significant. If in addition to being the head of the household, the woman has a washing machine, the chances of being a low non-farmer also increase. On the contrary, Model 9 shows how for upper non-farmers, the ownership of the appliance decreases the chances of women being in this occupational category when they are the head of the household, compared to women whose husband, or relative, is the head of the household.

This result is quite surprising since a female head could be associated with higher chances of being employed, and the washing machine is also associated with better access to the upper non-farming labour market. Nonetheless, a female head with the monetary power to purchase the washing machine might prefer to be non-employed.

In the same way, having the washing machine decreases the chances of the older group of women of being upper non-farmers, compared to the chances of the youngest ones. According to the expectations, the washing machine increases the chances of being upper non-farmers for women with a child under six years old, compared to women with no young child. The appliance compensates for the burden of the young child.

Moreover, for women who are married to a traditional husband, 10 years older or more, the washing machine also decreases the odds of being an upper non-farmer. Again, the assumption links having a high-income or a traditional marriage where women would not need to work, and a more powerful stipulation of gender roles. Similarly, having a washing machine decreases the chances of women being upper non-farmers for those who have a higher number of adults in the household.

6. CONCLUSION

The main goal of this paper has been to study whether the ownership of home appliances, more precisely, the refrigerator and the washing machine, affect female labour participation in South Africa. The reason to examine variables on female labour participation is its relevance towards a higher development, economically and socially. Interestingly, home appliances might be an option to increase it.

The base for this intuitive reasoning starts with gender roles. Gender define the woman as the responsible member of the household chores. Due to that, she is forced to spend a large amount of her time in housework, which impedes her to enter the labour market. Besides the necessity for women empowerment, to fight gender inequality, the acquisition of home appliances could be a useful tool to reduce the time devoted to household chores. A reduction in time dedicated to housework could facilitate the reconciliation between housework and family care with their jobs. As Sirianni & Negrey (2000) mentioned, "household tasks might lead women to leave the market, but any market labour does not alter household tasks" (Sirianni & Negrey, 2000).

As the results show, only 40 percent of women in South Africa are engaged in non-agricultural occupations. The other 60 percent of the female population are non-employed or engaged in agricultural work. Moreover, those working in agriculture are most likely working their lands on either a subsistence manner or trading items in the informal market. And those defined as non-employed are as well most likely farming their lands. In addition, from the 40 percent that enter the labour market, 24.5 percent corresponds with those women working in low non-farming positions, and only 14.5 percent indicate upper non-farming occupations. Nonetheless, it is important to remark that the sample includes a big number of young girls, around the 20 years old, who are currently classified as not working, but who might be studying and could enter the labour market during the next years.

Furthermore, through the multivariate logistic analysis, I could found whether the refrigerator and the washing machine might be associated with women entering the labour market or not, in South Africa. Following the results presented in models 1, 2, and 3, having a fridge indicates a positive association with women being employed, with 14 percent lower odds of being non-employed with the appliance, as well as to be employed in high non-farming occupations, with 2.4 times larger odds than those women who do not have it. In addition, regarding the washing machine, its relationship is also positive for women to enter the labour market, having 30 times lower odds of being non-employed if having it, compared to those without it, and, with 1.64 times larger odds of being an upper non-farmer. Interestingly, there is no significant effect within women in low non-farming occupations, for either the refrigerator or the washing machine. A possible reason why these results might appear could be due to a larger possibility of

reconciliation between low non-farming tasks and housework. Among low non-farmers, there might be cases of workers who sell products on the market of the village, and who might be creating their items from home.

Regarding the rest of the variables studied, the most relevant one is undoubtedly education. The results presented are in line with the arguments exposed by Boserup (1979) or Psacharopoulos and Tzannatos (1989). They refer to the idea that women with tertiary education have a much larger opportunity to enter the labour market in upper positions. In fact, the odds of being non-employed with tertiary education are almost 75 percent lower, compared to women with some primary education. Moreover, having such a high level of education translates into 42 percent lower odds of being employed in a low non-farming occupation, while they increase 28 times for being employed in upper non-farming positions; always when compared to those women who only reached a primary level of education.

Surprisingly, the variable “age” does not behave as expected; it acts as a positive factor for FLP instead of having an initial negative trend followed by a positive one, as we could have expected. This situation could be occurring because this research does not include women younger than 20 years old, thus, losing the initial negative effect. Alternatively, since young women might be pursuing a higher level of education, when they are older they are also more prepared to enter the non-agricultural market, which allows them later to reconcile their work and family care.

Another surprising variable is the number of children. On the one hand, we have literature mentioning how a decrease in fertility increases female labour participation (Cavalcanti & Tavares , 2008), and literature indicating how childcare would decrease the time women can dedicate to the market labour (Aguiar & Hurst, 2006). On the other hand, for women in South Africa, children appear to be more of an incentive than a burden for women to enter the labour market. The odds of being non-employed are 32 percent lower if having a child or two, compared to not having any.

In this case, the results could be driven by a group of young, single, and non-employed women, who have no child and not enough education or experience to be in the labour force. Another reason might be cultural and/or historical, because, as mentioned in section 3, women in South Africa were encouraged to enter the labour market to support their families due to the insufficient salary of their husband’s. This culture might have continued, in which case, a child might trigger the necessity of a gainful job.

Despite these results, if the child is under six years old, then the effect is negative, and women are less likely to be employed. Since most women have at least some secondary education, it would be expected that their children attend school as well. Then, most likely, once children start school, around the age of six, women might enter the labour force once more.

Moreover, being married is also negatively associated with females entering the labour force, and even more if their marriage is traditional. A household is considered traditional if the husband is much older than the female, if her parents or her husband's parents are living in the house as well, or if she was younger than 18 when she had her first child. Nonetheless, marriage might also be positive. There is a match between spouses; for instance, the odds of a woman married to a male with a high white-collar occupation are 4.36 times larger to enter the labour market with a high non-farming job, compared to a woman married to a farmer spouse. This result would be in line with the argument presented by Smits et al (1996).

The results also show how the situation of African women is worst, which corresponds to the "triple burden" presented by Pandit (2002), and even more if they live in a rural area. Taking into account the end of the apartheid was only 25 years ago, it is not surprising that we find these differences marked by ethnicity. Nonetheless, due to the repression they lived, if the government is somehow trying to increase female labour participation, African women should be the main target. The odds of being employed in an upper non-farming position increase by 2.27 times just for being White, compared to African/Black women.

Next, looking into the interaction analysis, it shows how the fridge is a good resource for non-employed and low non-farmers women who are married or have a child under 6 years old. The fact that for upper non-farmers the fridge does not depend on the context that much could be due to the access of these women to other substitutes such as domestic workers, prepared meals, or restaurants (Heisig, 2011). In addition, those women who live in an urban area and have a fridge too are even more favoured to enter an upper occupation.

Similarly, the washing machine is mostly relevant if the woman has children, at least one or two, and if any of these are under young. Taking into account that to wash clothes by hand demands around15 hours per day, it is not surprising that women with a larger number of children, or adults in the household, are favoured by the machine. Moreover, even upper non-farmers married to a traditional husband have better chances to enter the labour force if they have the appliance compared to those who are older than their husband is.

Gathering all these results, the hypotheses of this research are supported: home appliances appear to be relevant tools for women to enter the labour force. They are not as imperative for those women who can reconcile their work with the house, but when housework increases, possibly with a husband or children, these appliances are more meaningful. This conclusion brings the necessity of home appliances to the spotlight.

Fortunately, something that seems to be extended in South Africa, is the existence of laundry rooms where women can use washing machines. As mentioned by Schwartz (1983), communal services might be a solution for those families who are not able to afford the machine at their house; still, it demands of a person to go to the shop and do the laundry. Moreover, these

shops are extended mostly in urban areas, which increases the inequality for women in rural areas. Investing in public laundry rooms, or helping women establishing it, might be an opportunity for the South African government to help women in rural areas.

Establishing a communal refrigerator, either in an urban or a rural area, does not seem as plausible. Even though this appliance is much extended, with 78 percent rate of ownership, the government should create policies to help those families with a lower income so they could acquire the refrigerator.

South Africa is luckily a country that is in the direction of development. Nonetheless, it has a long way to achieve still, and women should be encouraged to participate on it, not only because they are an asset that should be used, but also because that will empower them. For the most part, the time they invest in their household is the main barrier to enter the labour force, therefore, the government needs to look for actions to facilitate housework and improve female labour participation. Home appliances might be an approach, and they should not be ignored.

LIMITATIONS

Naturally, with any research, there are limitations to the data gathered. First, the regression analysis does not allow proving for causality between the explanatory variables and the dependent variable; it only allows to establish a possible relationship between the explanatory and the dependent variable. Moreover, another clear limitation is the low amount of information on the characteristics of the husband. When posing this research, the goal was to analyse the impact of the home appliances for both, single and married women. Nonetheless, for some of the control variables, such as the husband's occupation and level of education, there was information for only 30 percent of the cases, which may have weakened the model. For instance, in the case of the fridge and the washing machine in upper non-farmer women, both have a positive effect. Nonetheless, the limitation to control for social status, due to the low amount of information on the occupation of the husband, creates a doubt to weather part of this effect is driven by the socio-economic power of women who work in these positions or if the appliances actually may contribute to lower housework and increase female labour participation.

Moreover, during the first part of this paper, gender inequality has been a crucial factor to take into account. Even though the variables used as proxies for traditionalism were controlling for an unequal household, other variables would have been interesting to add into the model but there was no enough information. As to expect, more traditionalism translates into a higher inequality between spouses, with the female being inferior compared to the male. Nonetheless, even in a less traditional household, social norms might affect women. The variables that I would have liked to include were "Decision maker for using contraception" and "Person who usually decides how to spend respondent's earnings". These variables would have indicated whether the woman has the power to decide for herself or if the husband or a relative were deciding for her. Nevertheless, there were not enough cases to add them to the model.

Besides, religion, which influences the role of women in society and the household, would have been an appealing variable to add to the model. However, there was no information within the Demographic and Health Survey.

FUTURE RESEARCH

Regarding future researches, it would be interesting to differentiate between those women who are still studying and those that are simply non-employed. This differentiation might solve the possible bias this group of students create. Moreover, an analysis focused on either single or married women would give more accurate insights because single and married women have different responsibilities and it would allow the creation of more customised policies. The differentiation between women who work from home or not would help distinguish the effect of home appliances more precisely. Moreover, it could show how a harder reconciliation of house and work may demand of appliances more than an easier one. Last, it would be interesting to observe which regions are more in need of appliances, and in which it might not be needed anymore, for instance, differentiating between urban areas where laundry rooms are more extended than those areas where there are barely any. Studying each case more precisely would increase the possibility to create better interventions.

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8. APPENDIX

Appendix 1: Robust test to select dependent variable between categories Not Employed & Farmers, only Not Employed, or only Farmers.

	MODEL I NOT EMPLOYED /FARMERS	MODEL II NOT EMPLOYED	MODEL III FARMERS
INTERCEPT	1,404*** (4.071)	0.613*** (1.846)	0.022 (1.022)
FRIDGE	-0.150*** (0.861)	-0.113 (0.893)	-0.134 (0.875)
WASHING MACHINE	-0.358*** (0.699)	-0.354*** (0.702)	-0.194 (0.823)
AGE			
20-29	Reference	Reference	Reference
30-39	-0.415*** (0.660)	-0.423*** (0.655)	0.237 (1.268)
40-49	-0.553*** (0.575)	-0.487*** (0.615)	-0.629 (0.533)
EDUCATION			
Some primary	Reference	Reference	Reference
Some secondary	-0.358*** (0.699)	-0.163*** (0.849)	-1.250*** (0.286)
Some tertiary	-1.349*** (0.260)	-1.123*** (0.325)	-3.202*** (0.041)
MARITAL STATUS			
Single	Reference	Reference	Reference
Married/ living together	0.451*** (1.570)	0.538*** (1.713)	-1.120*** (0.326)
Divorced/ widowed	0.047 (0.954)	-0.075 (0.928)	0.224 (1.251)
NO. OF CHILDREN			
None	Reference	Reference	Reference
1 or 2	-0.381*** (0.086)	-0.382*** (0.682)	-0.020 (0.980)
3 or 4	-0.189*** (0.828)	-0.225*** (0.799)	0.387 (1.473)
5 or more	0.100 (1.105)	-0.106 (1.111)	-0.055 (0.947)
CHILD UNDER 6	0.337*** (1.401)	0.362*** (1.436)	-0.454*** (0.635)
NO. OF ADULTS IN HH	0.026 (1.026)	0.027 (1.027)	-0.022 (0.978)
HUSBAND'S OCCUPATION			
Farmer	Reference	Reference	Reference
Blue-collar	-0.036 (0.964)	0.312*** (1.367)	-1.414*** (0.243)
Low white-collar	-0.629*** (0.533)	-0.247 (0.781)	-2.695*** (0.068)
High white-collar	-0.420* (0.657)	-0.064 (0.938)	-2.134*** (0.118)

No husband or unknown	0.046 (1.047)	0.410*** (1.507)	-1.723 (0.179)
ETHNICITY			
African/black	Reference	Reference	Reference
Coloured	-0.265*** (0.767)	-0.317*** (0.729)	0.732*** (2.079)
White/Asian/Indian	-0.138 (0.817)	-0.144 (0.866)	-0.284 (0.753)
DIFFERENCE IN AGE			
Women older by 4 years or more	Reference	Reference	Reference
Similar age	0.056 (1.058)	0.044 (1.045)	0.001 (1.001)
Male older 4- 9 y	0.256*** (1.291)	0.243*** (1.275)	0.003 (1.003)
Male older +10 y	0.529*** (1.697)	0.549*** (1.731)	-0.442 (0.643)
FIRST BIRTH <18 Y.O.	-0.182*** (0.833)	-0.192*** (0.826)	0.189 (1.207)
EXTENDED	0.235*** (1.265)	0.269*** (1.308)	-0.404 (0.668)
FEMALE HEAD	-0.042 (0.959)	-0.041 (0.960)	0.012 (0.988)
HUSBAND'S EDUCATION			
Some primary	Reference	Reference	Reference
Some secondary	-0.128 (0.879)	-0.117 (0.890)	0.051 (1.052)
Some tertiary	-0.154 (0.858)	-0.139 (0.870)	-0.092 (0.913)
Unknown	-0.036 (0.964)	-0.014 (1.015)	0.420 (0.657)
URBAN	-0.189*** (0.827)	-0.085 (0.919)	-1.252*** (0.286)