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2010.34

Maison des Sciences Économiques, 106-112 boulevard de L'Hôpital, 75647 Paris Cedex 13
http://ces.univ-paris1.fr/cesdp/CES-docs.htm
ISSN : 1955-611X

Rethinking Time Allocation of Egyptian Females *

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Avril, 2010

*This work is carried out with the aid of a grant from the Population Council's WANA Regional Office in Cairo and has benefited from a financial support from the Economic Research Forum (ERF). I am very grateful to Ragui Assaad, Catherine Sofer and Pierre-André Chiappori for valuable discussions and suggestions. Also Thanks to all participants of the Economic Research Forum's 16th Annual Conference and the INED Conference on family economics.

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Abstract

Cet article étudie les divisions biaisées du travail au sein des ménages Egyptiens. La répartition classique entre travail marchand et loisir peut expliquer, en grande partie, l'utilisation du temps des hommes. Néanmoins, cette répartition néglige la totalité du temps que les femmes passent au travail domestique. A noter que l'occupation prédominante des femmes dans les pays en développement en général et en Egypte en particulier demeure invisible; les données statistiques sur le travail domestiques étant rares. Les données utilisées dans la présente étude proviennent des Enquêtes- emploi Egyptienne de 1998 et 2006. Une première partie de cette étude consiste à explorer ces données à partir de deux approches différentes: en coupe et longitudinale. Et, en deuxième partie, nous estimons- à partir de l'échantillon panel- un modèle de matching qui nous permet d'évaluer l'impact du mariage sur les offres de travail domestiques et marchandes des femmes Egyptiennes.

Abstract

The present research explores for the first time to our best knowledge the extremely biased division of labor within Egyptian households. Time activities in respect of paid and unpaid work are an important aspect of this study. The classical dichotomy of "work in the market" versus "leisure" may serve as a good approximation of the role the male plays in the production activity of the household but does gross injustice to the female since it overlooks the whole time she spends, outside the market, on domestic activities. And, studying the females' invisible unpaid work is crucial since it remains the female's main occupation. Time use profiles are constructed using the Egyptian time use data available, only for females, in the Egyptian Labor Market and Panel Surveys of 1998 and 2006. The empirical exercise consists in, on the one hand- analyzing the main features of Egyptian females' time allocation relying on both cross-sectional and longitudinal analysis. On the other hand, we estimate a Propensity Score Matching model in order to evaluate the effect of marriage on females market and domestic labor supplies.

JEL classification: D13, J16, J22.

Mots clés: Allocation du temps, Travail domestique, Approche Longitudinale, Matching, Egypte.

Keywords: Time Allocation, Domestic Production, Descriptive Analysis, Propensity Score Matching, Egypt.

1 Introduction

In the present study, we explore time allocations of Egyptian females. We properly distinguish between single and married females.

The need to adopt the household as a unit of analysis is particulary significant if the focus of attention is females' economic behavior as they tend to invest more time in activities that remain outside the cash economy. Economists have made a large effort to explain the market behavior of married women (i.e., patterns of participation, number of hours worked, determinants of wives earnings...). However, very little has been done to analyze the allocation of time within the home sector (Gronau, 1976). The classical dichotomy of "work in the market" versus "leisure" may serve as a good approximation of the role the male plays in the production activity of the household but does gross injustice, especially in developing countries, to the female. As Gronau said thirty years ago, calling the whole time spent by the female outside the market sector "leisure" is to overlook the production activities she engages in work at home. These activities are better termed "domestic production".

According to the UN convention "all persons of either sex who furnish the supply of labor for the production of economic goods and services" should have been included in labor force statistics during the last two decades (ILO, 1976:32, quoted in Beneria 1981: 21). In addition to that, economic activities are, theoretically, all those activities that satisfy human needs through the production of goods and services, regardless of wether they are channeled through the cash market or other forms of exchange. Then, there is no good reason why cooking and food processing should be considered less productive than growing food, especially that cooking for one's employer is an economic activity but cooking for one's own household is not (Waring, 1988). Adoption of such a definition would give visibility to females and children in national figures since they make important economic contributions to the domestic unit (and to the national economy) through these activities. Moreover, correct information on women's work is "crucial for diagnosing the causes of poverty and inequality - and for policy guiding policymakers in their attempts to improve living standards" (Schaffner, 2000a).

In addition to this, Neoclassical theory (Becker, 1965) has convincingly argued that

the division between females' participation in nonmarket activities and males' in market activities is based on efficiency and the maximization of utility. However, the latter does not seem to be justified since females contribution to their household often exceeds that of their male partner and their share of benefits is less (Folbre, 1984). Moreover, while many females contribute more hours of work to support their households than their husbands do, they are often heard to declare "I do not work" or "I am only a housewife", because their labor is not remunerated. And this has significant implications for their status and position not only in their households but also in society (Hoodfar, 1997).

Like in Gronau's (1976), the wife's time is an iceberg: We have plenty of information about the visible tip, the time spent in the market, but almost none about the submerged part spent at home. In other words, the problem of females' activities is that they are often not 'counted' in statistics, not 'accounted for' in representations of the economy and not 'taken into account' when policies are created (Elson, 2000). Suitable statistical means to recognize and make visible the full extent of the work of women and all their contributions to the national economy including their contribution in the unremunerated and domestic sectors (United Nations, Fourth World Conference on Women, 1995-68.b).

Let's start by defining the "Domestic Production". The latter represent all unpaid work done to maintain family members and/or a home. This topic has been widely recognized, in developed countries, as an important area of research study since the nineties. During the last decade, various studies and publications were the result of a strong turn of attention towards the analysis of the division of labor between members of the same household. Fewer studies on this topic have been conducted in developing countries as well as in the Arab world. In addition to this, most of the studies exploring the females participation in Egypt during the last decade concluded that educated females are tending to less participate in the labor market. The reasons of such a fact are usually analyzed relying on the labor market conditions and especially the privatization reforms that took place in the 1990's. However, the present research makes some evidences about new explanations of females' large non participation rates. The perfectly biased intrahousehold allocation of time prevents Egyptian married women to increase the time they spend in the labor market. Hus-

bands are assumed to not participate at all in domestic activities; which is quite close to the reality. and For that, the implementation of more serious family policies calling for a more equitable division of labor within the family are strongly needed to allow to married women, and specifically the more educated ones, to increase their market's labor supply. Also, part time jobs taking full account of the burden of females' household responsibilities are crucial to enforce females insertion in the labor market.

The paper is organized as follows: Section 2 exibits some stylized facts on females time allocation and marriage in Egypt. Section 2 is devoted to the presentation of the dataset used as well as the methodology adopted. Section 4 shows the empirical results. And, Section 6 goes on to conclude.

2 New Conceptualizations and Females' Time Allocation

In Egypt, as in most of developing as well as developed countries, researchers and policy makers call governments to give a considerable attention to the interaction between work and the family in order to increase females' participation rates. There is an extensive literature on the "dilemmas" of modern family life (Frinking and Willemsem, 1997; Gerson, 1985). It has to be recognized that the division of paid (market) and unpaid (domestic) work does not only concern the family unit but also the whole society since it has many socioeconomic implications. It also seems that even though women's level of education has considerably increased differences in paid work- though narrowing- are still largely persisting. Regarding the quasi absence of time allocation literature in Egypt (and in the Arab world), the present work aims at studying the allocation of time between market and domestic work to allow for a better measurement and consideration of female's work. This needs to be extended, in future works, to the study of the allocation of time of both sexes in order to allow for a better understanding of modern households and consequently, to implement active family policies. But for this, researchers need more detailed time use data on both sexes in Egypt and in the MENA region general.

Despite all the changes that have occurred in the cultural and economic contexts in Egypt, domestic production continues to be considered as a typically female chore. Studying domestic production is then crucial to illustrate the economic contribution of housewives to the financial affaires of a household and to society at large. Note that the abuse of the "housewife" concept in collecting data has been a major source of underreporting and misunderstanding of female's gainful employment (Ibrahim, 1983).

Several questions arise: Did the increase in the females' participation rates during the last decade imply a substitution of work at home by work in the market. How did the domestic production change over time (especially with the decrease in fertility and increase of time saving devices). How does marriage affects time uses of Egyptian females. Note that the present study remains descriptive and particularly aims at having a glance on how Egyptian females used their time, the evolution of time allocation patterns, and the difference between single and married time uses.

As showed in previous empirical studies in Egypt, at different points of time 1988, 1998 and 2006, over 65 percent of ever married females are not actively engaged in market production and during any given year not more than 30 percent participate in the labor market (Assaad, 2007; Assaad and El-Hamidi, 2009). In other words, the wife's sole occupation in Egypt remains housewife. The main serious limitation is that in Egypt, detailed time use data are only available for females. Males are thus assumed to not contribute at all to domestic production. Their time use is then entirely devoted to market work and leisure. A more complete time use survey on both sexes is crucial for more complete studies on time allocation. Although, it remains useful to examine the factors that determine the females time allocation. The first part of this section is dedicated to the presentation of the data we data. In a second stage, we conduct a cross-sectional analysis aiming at exploring Egyptian females time uses by different work categories in 2006. Then, using both surveys of 1998 and 2006, we make use of the panel aspect of the data in order to observe differences in females time uses that result from changes in the marital status. In the bellow analysis, we distinguish between three main work categories. (1) Market work encompasses all activities that produce goods and services that contribute to national wealth and economic growth (Donahoe, 1999). The latter includes all

market and subsistence activities whether these activities are paid in monetary, in kind or unpaid work for family. (2) Domestic work involves all unpaid work done to maintain family members and/or a home. It includes housework and child care activities. And finally, (3) total work regroups that last two categories to account for the total time spent per week in all work categories. Typically, subtracting this latter from the total weekly time available for individuals- 24 hours multiplied by 7 days equals 168 hours per week- would allow the calculation of the weekly time of leisure.

3 Data

We are fortunate to have both the Egyptian Labor Market Survey 1998 and the Egyptian Labor Market Panel Survey 2006 that include a whole section on females and children time spent not only in market and subsistence work but data is also available for the domestic activities. In a first part of the study- the cross sectional analysis- our sample contains all women aged between 16 and 64; which represents a total of 5 767 women from the 2006 survey. Moreover, a sample for single and married males is created due to the same sample selection. Those constitute a random sample of the population. In the ELMPS of 2006, a whole section is devoted to time use of Egyptian women. We base our analysis on a specific question: how did you spend the preceding week. The domestic activities were classified into 14 groups. However, for the 1998's survey, only three aggregated questions are available. For this reason, we conduct the cross sectional analysis only on the 2006's survey since we are convinced that the latter is able to reflect the real time females spend in domestic activities. Data also have background information for each respondent including age, education, occupation, work status, spouse's education, individual earnings, family income, family's welfare, and a lot of information regarding parents' background, fertility, marriage costs etc...

In the bellow analysis, I also explore the panel aspect of the data by making use of both surveys. The idea is to consider all females who were single in 1998 and to follow their marital status till 2006. Some of the latter got married between the two dates and others remain single and did not change their marital status. In the

longitudinal analysis, we have a sample of 1 850 females.

4 Descriptive Analysis

4.1 A Cross-sectional Analysis

As it is showed in the table 1, actually married females with children spend, in mean, 51.72 hours per week on domestic chores. And, assuming that males do not participate at all in domestic activities, these women's weekly time spent on total work (hours spent on both market and domestic production) is 60.98; that exceeds the declared time that married males spend in market work. However, time use data on both sexes would allow a more precise comparison between men and women's time allocation. table 1 also display mean hours of single females as well as married females without children by work activity. Despite the similar number of hours women of these two categories spend in market work, married women without children spend about 10 hours more in housework activities compared to their singles counterparts. Clearly, marriage, as expected, seems to significantly increase one female's family burden and reduces her leisure time; which consequently affects her participation and labour supply decisions.

[Table 1 about here]

Table 2 displays sample means by marital status, work category and age group. As expected, for single and married women, those aged between 36 and 45 years old are those who spend the higher number of mean hours in market activities. Interestingly, single and married females of all age groups spend similar number of hours in market work. However, married females tend to spend longer hours in domestic activities than their singles counterparts. For instance, for the 16-35 age group, married and single females spend in mean 32.05 and 18.91 hours respectively in domestic activities. This leads to a significant difference between time spent by these women in total work which consequently affect their leisure time and creates what social scientists call "the double burden problem". Similarly, married females aged between 46 and 64 years old spend 40.91 hours in mean in total work relative to only 31.75 hours for their singles counterparts. To put into a nutshell, married

females in general do not work less in the market but do work much more at home than singles. And, this should be considered by policy markers by creating more jobs that allow the reconciliation between private and professional lives.

[Table 2 about here]

Turning our analysis to the impact of the presence of children in the household on married females' time uses taking into full consideration different age groups. For the 36-45 age group, as showed in table 3, we observe that married females without children spend in mean 5 hours more in market activities relatively to those married with children. On the other hand, having children imply a significant increase the time spent on child care activities. Consequently, married females with children spend about 15 hours more than singles on domestic activities. Then, in total, having children largely influences the total work; 60.85 hours for those having children and 50.59 hours for females without children. For instance, for all age groups, females with children spend a significantly larger number of hours in total work. In table 3 we observe that females with children work in total double the time females without children do. For females aged between 16 and 35, 62.30 and 37.54 mean hours are spent in total work respectively for females with children and those without. This is also verified for the other aged groups. In conclusion, as well as marriage, fertility is an important factor affecting women's both market and domestic labor supplies.

[Table 3 about here]

Table 4 represents the mean hours spent by married females in work category by number of children. It distinguishes between three types of married females: those not having children, those having only one child and females having two or more children. We observe that the first child is the one who matters the most in terms of changing time use patterns. For instance, females having one, two and more children have similar time use features. However, when married females having no children are compared to those having one child, we find out that the latest group of women spend in mean only one hour less in market work and about 20 hours more in domestic work. This is mainly due to the significant increase in time spent in child care activities when having a first child.

[Table 4 about here]

Turning our analysis to working females, we observe, as shown in table 5, that regardless the marital status women spend as expected, a larger weekly number of hours in the private sector relatively to both the public sector and the independent work. Note that the private sector encompasses both formal and informal jobs. For this reason, the private sector mainly employs single females; 70.34 percent of all females working in the private sector are singles. Clearly, this demonstrates the inefficiency of this sector to account for the family/ professional reconciliation issue; which forces women to drop out the labor force when they marry and have children. For this, married females with children are largely concentrated in the public sector due to greater prevalence of family-friendly policies- as maternity leave, flexible hours, and work from home jobs- in this sector (Sieverding, 2010). In effect, as we observe in table 5, 59.68 percent of all females working in the public sector are married females with children. The latter observation shows to what extent these family-friendly policies are crucial in order to encourage women to keep their jobs after marriage. Similarly, the independent sector seems to be dominated by married females for the same reasons. In effect, as it will be shown in the empirical results section, having a family projet positively and significantly increases one females' market labor supply.

[Table 5 about here]

Table 6 displays sample means of married females by levels of education. Interestingly, we observe that all married females spend the same number of hours, in mean, in housework activities no matter their level of education. However, more educated females spend longer hours taking care of their children. Consequently, married females with higher levels of education, contrarily to what expected, spend longer hours in domestic activities as a whole. Illiterate females, females having a less than intermediate education, females with intermediate education and females with above than intermediate education spend in mean 42.97, 48.23, 51.06 and 48.01 weekly hours respectively in domestic activities. In addition to this, females having intermediate education and above have higher market labour supplies than females with less than intermediate education. Consequently, as shown in the last line of

table 6, the more married females are educated and the more they spend time in total work.

[Table 6 about here]

In contrast, as presented in table 7, single females with high levels of education spend between 5 and 10 weekly hours less in domestic work relatively to illiterate single females. And, females having an above intermediate education have higher market labor supplies compared to less educated ones. Surprisingly, the total work of illiterate single females is significantly higher relatively to females with less than intermediate educated and females with intermediate education; 34.79, 20.04, and 29.07 mean hours respectively. Nevertheless, the most educated single females- having an above intermediate education- spend about 41 hours per week in all work categories; which represent the highest labor supply.

[Table 7 about here]

Similar results are presented in figures 1, 2, 3, 4, 5, and 6. Note that, in the figures bellow, we distinguish between general and technical education; which seems to have important implication on our analysis. In conclusion, Contrarily to Singles, married women tend to spend much more time in domestic activities and fewer hours in market activities.

[Figure 1 about here]

This result is verified for females of all levels of education except for illiterate and general intermediate education. As shown in figure 2, married illiterate females spend longer hours in both domestic and market work. And, this is also the case of married females having a general education who, contrarily to technical educated ones, spend a larger number of hours in all work category than their singles counterparts.

[Figures 2 and 3 about here]

4.2 A Longitudinal Analysis

The aim of this section is to understand how do females' time allocation change as they transition into marriage. To address this question, I rely on the panel aspect

of the ELMS and ELMPS data. And, to observe how a change in females marital status would affect their time allocations between different working categories, I restrict the sample to single females aged from 13 to 35 years old in 1998, which yields to a final sample of 1 144 females. Note that I restricted the sample to females aged from 16 to 35 in 1998 as 16 is the legal age of marriage.

In the present longitudinal descriptive analysis, I compare time use of females who remained single during the whole 8 years period to those who got married between 1998 and 2006.

Table 11 represents means and standard deviations- by females marital status in 2006- with respect to demographic and socioeconomic variables such as the highest educational attainment, region of residence, age, Parental household wealth in 1998, parental education levels, number of children if married, access to basic services in 2006 -as water, electricity etc..- as well as other variables reflecting the working status, market labour supply and domestic labour supply in 1998 and in 2006.

[Table 11 about here]

Turning our analysis to the evolution of females time allocation from 1998 to 2006, we observe in figure 7 that- by age category in 2006, only for females who remained single in both dates- both domestic and market labour supplies do not change significantly between the two dates. Only for single females aged between 36 and 45 years old in 2006, their market labor supply increases from 30 weekly hours in 1998 to reach 48 weekly hours in 2006. This could be due to the fact that these women are discouraged and decided to stop the spouse's search at the age of 40 and are, in 2006, devoting all their time to market work.

[Figure 7 about here]

In contrast, time uses of females who transited into marriage have significantly changed between 1998 and 2006. In figure 8, we observe that the transition into marriage increases dramatically the time spent in domestic activities. This result is valid for all age groups. If we turn our analysis to the females aged from 26 to 39 in 2006 (and from 18 to 31 in 1998), we find out that their domestic labor supply rose from 22 to 53 mean hours in 1998 and 2006 respectively; as a result of transition

into marriage. Despite this large change in domestic labour supply, market labour supply after marriage tend to be quite similar to that before marriage.

[Figure 8 about here]

In addition to this, table 12 displays the transitions from/into market activities by females marital status in 2006. Clearly, a large part of females who were active in 1998 continue to participate in market work in 2006 conditional on remaining single; 75 percent of singles to participate in the labour market. Contrarily, when they transit into marriage, about 60 percent of females dropped out the labor force. In other words, marriage seems to increase the probability of exiting the labour force.

[Table 12 about here]

Similarly, when looking at the impact of transition into marriage on participation in domestic work, we observe that whether the woman participated or not in domestic activities in 1998, marriage results in the transition of 100 percent of those women into domestic work.

[Table 13 about here]

Both cross-sectional and longitudinal analysis presented above illustrated that females who transited into marriage are less likely to pursue their market work and more likely to be involved in domestic work than their unmarried peers.

5 Methodology: Propensity Score Estimator

The main objective of the present section is to estimate the effect of the treatment- the transition into marriage- on both market and domestic females labour supplies. To do this, I opt for a matching estimation in order to establish a causal relationship between females marital status and domestic versus market participation. In other words, we are interested measuring the response to the treatment "getting married" to a benchmark "remaining single".

In observational studies, by definition there are no experimental controls. therefore, there is no direct counterpart of the Average Treatment Effect ATE calculated as

a mean difference between the outcomes of the treated and nontreated groups. In other words, the counterfactual is not identified. As a substitute we may obtain data from a set of potential comparison units that are not necessarily drawn from the same population as the treated units, but for whom the observable characteristics, $\mathbf{x}$, match those of the treated units up to some selected degree of closeness.

The method of propensity score (Rosenbaun and Rubin, 1983) is a popular inexact matching method. Rather that match on the regressors it matches on the propensity score. Even here an exact match is not possible, so the comparison units are those whose propensity scores are sufficiently close to the treated unit. The propensity score, the conditional probability of receiving treatment given x, denoted $p(\mathbf{x})$, was suggested by (Rosenbaun and Rubin, 1983) as a matching measure. The idea here is that, if the data justify matching on $\mathbf{x}$, then matching based on propensity score is justified. A propensity score is usually estimated using a parametric model such as a logit or probit. For implementation of the PSM, one controls for the covariates by controlling for a particular function of the covariates, specifically the conditional probability of treatment, $Pr[D_i = 1 \mid x_i]$. That is, matching is on the propensity score. This can be easily calculated by (for example) a logit regression. Moreover, one can also control for lagged variables by including them in the vector of covariates. If selection bias is eliminated by controlling for x_i, it is is also eliminated by controlling for the propensity score. Conditioning on the propensity score is often simpler than conditioning on a large dimension vector $\mathbf{x}$.

When treatment is not by random assignment but depends stochastically on a vector of observable variables $\mathbf{x}$, as in observational data , or when the treatment is targeted to some population defined by some observable characteristics (such as age, sex, or socioeconomic status), then the concept of propensity scores is useful. This is a conditional probability measure of treatment participation given $\mathbf{x}$ and is denoted $p(\mathbf{x})$ (Cameron and Trivedi, 2005), where

$$p(x) \quad = \quad Pr[D = 1|X = x], \tag{1}$$

The propensity score measure can be computed given the data $D_i = \mathbf{x}_i$) by going a logit regression. An assumption that plays an important role in treatment evaluation

is the balancing condition, which states that

$$D \perp x \mid p(x), \tag{2}$$

This can be expressed alternatively by saying that for individuals with the same propensity score the assignment to treatment is random and should look identical in terms of $\mathbf{x}$ vector.

A useful result about conditional independence given $p(\mathrm{x})$ due to Rosenbaum and Rubin (1983) states that

$$y_0, y_1 \perp D \mid x \Rightarrow y_0, y_1 \perp D \mid p(x), \tag{3}$$

This implies that the conditional independence assumption $\mathbf{x}$ implies conditional independence given $p(\mathrm{x})$, that is, independence of $y_0, y_1, andD$ given $p(\mathrm{x})$. To obtain this result, note that

$$\begin{aligned} Pr[D = 1 \mid y_0, y_1, p(x) &= E[D \mid y_0, y_1, p(x)] \\ &= E[E[D \mid y_0, y_1, p(x), x] \mid y_0, y_1, p(x)] \\ &= E[E[D \mid y_0, y_1, x] \mid y_0, y_1, p(x)] \\ &= E[E[D \mid x] \mid y_0, y_1, p(x)] \\ &= E[p(x) \mid y_0, y_1, p(x)] \\ &= p(x), \end{aligned} \tag{4}$$

Here the second and third lines follow from the law of iterated expectations. The fourth line uses conditional independence. The intuition behind is that $p(\mathbf{x})$ is a particular function of $\mathbf{x}$ and; in a sense, contains less information than $\mathbf{x}$.

Using a sample of 1 144 women, I estimate the average treatment effect on the time spent in domestic activities as well as its effect on market labour supply. Results of the latter estimates are presented in the following section.

6 Empirical Results

Table 14 displays the results of the determinants of the treatment. Basic demographic and socioeconomic characteristics are used as covariates. Clearly, the probability of being treated increase with the level of education. In other words, females having a less than intermediate level od education as well as those having a general intermediate level of education are fortunate to have higher probabilities of getting married between 1998 and 2006 relative to their illiterate peers. Turning the analysis to regions, we can observe that- with Cairo and Alexandria as reference- living in rural areas increases significantly the probability of being treated. I also controlled for other covariates as whether the female was working in 1998 as well as for the parental household wealth in 1998. But the latter do not seem to have significant effects the treatment.

[Table 14 about here]

Table 15 shows matching estimates. When looking at the ATE lines, we observe that, not surprisingly, treated females spend- in mean- about 30 hours more on domestic work and 8 hours less on market work compared to their untreated peers. The latter results seems confirm our hypothesis that marriage alone explains an important part of the low females participation in Egypt. Again, Egyptian married females need more equitable allocation of domestic activities within their own households as well as more efficient family-friendly policies in the labor market.

[Table 15 about here]

7 Research's Contribution and Policy Implication

We have plenty of information and studies about the time that females spend in the market but none on the submerged part spent at home. Economists have made a large effort to explain the market behavior of married women, that is, their pattern of participation, the number of hours worked, the determinants of wives earnings, their occupational choice, and the male- female wage differential. However, the present research is the first to analyze the allocation of time within the home sector, an

allocation which may have an impact on the well- being of the family that is not less important than the change in the woman's working habits. Actually, it seems quite difficult to detect the influence of policy measures on the actual individual behavior, especially with regard to work, child care and housekeeping. It is necessary though to calculate how much time is spent on each of the above activities. No money is involved in work like cooking, taking care of the children or house cleaning, though much time is needed for this kind of work. If women have to pay for the value of domestic work for reconciling family and working life, the risk for them to leave their labor market position as well as their independent incomes becomes higher. Thus, Egypt, as most of developing and developed countries, needs for many regulation reforms to reduce the persistent gender biased intra household division of labor. For this, policies that support women's access to productive employment, with equal wages for equal jobs, taking full account of the burden of women's family and household responsibilities are strongly needed to be considered. An example of such kind of jobs could be part time jobs. Hence, we expect the results of this study to be of great importance to policymakers and Non Governmental Organizations; especially when designing family policies. More specifically, effective state policies are needed to actively support the role of the family, i.e. of women, to substitute the lacking welfare state to affect towards the division of paid and unpaid work. Then, policies affecting not only women's participation in the labor force but also people's attitudes towards the division of paid and unpaid work are needed. And, it seems that the existing policies in Egypt are not sufficient in the respect. The aim of this project is then, first, to explore this new area of research in Egypt in order to gain insight into policy measures that are effective in influencing women's time allocation. Our target is thus to propose, relying on empirical results, more effective policies in Egypt that would allow not only the increase of women's participation to paid work but also a more equitable division of labor within families: Flexible employment facilities the reconciliation of work and family life. Best practice arrangements could be: employee sovereignty over working times, equal access to productive employment with equal wages for equal jobs (for men and women), promotion and benefits, the reconciliation of paid work and family life. It is surely important to find appropriate forms of intervention for supporting the family, which should combine financial sup-

port for beneficiaries, without undermining the structure of family life. Organized voluntarism could also play an important role, while the informal networks, which have traditionally sustained the family, should be reinforced.

Definitions

The Market Definition of Labor Force "includes All females engaged in economic activities for purposes of market exchange." (Assaad and El-Hamidi, 2009).

The Extended Definition of Labor Force " includes those engaged in the production and processing of primary products, whether for the market, for barter, or for their own consumption; the production of all other goods and services for the market; and, in the case of households that produce such goods and services for the market, the corresponding production for their own consumption. The extended definition includes many women engaged in animal husbandry and the processing of dairy of products for purposes of household consumption, in addition to those engaged in market activity." (Assaad and El-Hamidi, 2009).

Domestic Activities is identified as the unpaid work done to maintain family members and/or a home. In the present study, we distinguish between two categories of domestic work. The first category is "housework" and the second is "'child care". In our data, "housework" includes agriculture activities, raising poultry, producing butter/ cheese, cooking, washing dishes, doing laundry, cleaning house, collecting water, collecting firewood, helping in construction work, caring for the sick/ the elderly and shopping for the household. And, regarding "Child care", it represents the time spent taking care of children.

The Extra-Extended Definition of Labor Force includes those considered as working due to the market definition, the extended definition, or engaged in domestic activities.

Tables and Figures

Tables

Descriptive Statistics

Table 1: Sample means by marital status, work category and presence of children in the household*

	Singles	**Married without children**	**Married with children**	**All**
***Time use **				
Market Work	**8.87**	**7.56**	**9.26**	**8.83**
Domestic Work	**20.84**	**32.58**	**51.72**	**37.53**
Housework	19.97	31.74	38.86	**30.97**
Child Care	0.87	0.84	12.86	**6.56**
Total Work	**29.71**	**40.14**	**60.98**	**46.36**
N	4103	2000	5526	**11629**

Notes: i. * This table shows females time uses using weekly hours of work. ii. Child care represents the time spent taking care of children. iii. Total work represents the sum of all time spent on work in the market and work at home.
Source: Constructed by the author using the ELMPS of 2006.

Table 2: Sample means by marital status, work category and age group

	Singles			**Married**		
	16-35	**36-45**	**46-64**	**16-35**	**36-45**	**46-64**
Time Use						
Market Work	**7.89**	**19.26**	**8.81**	**5.49**	**18.31**	**8.05**
Domestic Work	**18.91**	**34.49**	**22.94**	**32.05**	**32.28**	**32.86**
Housework	18.28	31.35	21.99	31.92	32.03	31.64
Child Care	0.63	3.14	0.95	0.12	0.25	1.22
Total work	**26.80**	**53.75**	**31.75**	**37.54**	**50.59**	**40.91**
N	2954	284	865	640	65	1295

Source: Constructed by the author using the ELMPS of 2006.

Table 3: Sample means of married females by presence of children, work category and Age Group

		16-35	36-45	46-64
Married No children				
	Market Work	**5.49**	**18.31**	**8.05**
	Domestic Work	**32.05**	**32.28**	**32.86**
	Housework	31.92	32.03	31.64
	Child Care	0.12	0.25	1.22
	Total Work	**37.54**	**50.59**	**40.91**
	Observations	**640**	**65**	**1295**
Married With Children				
	Market Work	**6.46**	**13.83**	**13.11**
	Domestic Work	**55.84**	**47.02**	**39.42**
	Housework	38.98	39.24	36.80
	Child Care	16.86	7.77	2.62
	Total Work	**62.30**	**60.85**	**52.53**
	N	**3379**	**1645**	**502**

Source: Constructed by the author using the ELMPS of 2006.

Table 4: Time uses of Egyptian married females: Sample Means by number of children

	Number of children			
	Zero	**One**	**> 2**	**Total**
Time Uses				
Market work	**7.61**	**6.43**	**10.08**	**8.83**
Domestic work	**32.74**	**53.91**	**51.15**	**46.72**
Housework	31.9	36.23	39.65	37.04
Child care	0.84	17.68	11.49	9.68
Total work	**40.35**	**60.34**	**61.23**	**55.5**
N	1989	1229	4293	7511

Source: Constructed by the author using the ELMPS of 2006.

Table 5: Sample means by marital status, presence of children and working sector (only for working females)

	Singles	**Married without Children**	**Married with Children**	**All**
Public	**41.11**	**41.41**	**40.55**	37.72
	(23.3%)	(17.03%)	(59.68%)	(100%)
Government	40.93	41.16	40.42	
Public entrep.	42.84	44.92	43.25	
Private	**54.27**	**47.12**	**43.2**	51.70
	(70.34%)	(6.3%)	(23.36%)	(100%)
Formal	51.09	45.15	44.7	
Informal	55.93	49.45	45.84	
Independ.	**36.99**	**31.43**	**32.89**	33.75
	(27.23%)	(17.58%)	(55.18%)	(100%)
N	**830**	**409**	**1369**	**2608**
	(31.83%)	(15.68%)	(52.49%)	(100%)

Source: Constructed by the author using the ELMPS of 2006.

Table 6: Sample means of Egyptian married females by level of education

	Level of education				
	Illiterate	**Less than interm.**	**Interm.**	**Above interm.**	**Total**
Age	40.17	34.78	31.36	33.99	36
Time Uses					
Market work	**6.68**	**3.14**	**9.79**	**17.66**	**8.83**
Domestic work	**42.97**	**48.23**	**51.06**	**48.01**	**46.72**
Housework	36.42	38.51	37.87	36.08	37.04
Child care	6.55	9.72	13.18	11.94	9.68
Total work	**49.65**	**51.37**	**60.85**	**65.67**	**55.5**
N	3241	955	2146	1167	7511

Source: Constructed by the author using the ELMPS of 2006.

Table 7: Time Uses of Egyptian Single Females: Sample Means by Level of Education

	Level of education				
	Illiterate	**Less than interm.**	**Interm.**	**Above interm.**	**Total**
Age	42.73	22.45	23.05	28.02	29.41
Time Uses					
Market work	**8.73**	**3.77**	**9.02**	**19.66**	**8.97**
Domestic work	**26.06**	**16.27**	**20.05**	**21.35**	**21.05**
Housework	24.76	15.70	19.20	20.73	20.17
Child care	1.29	0.56	0.85	0.62	0.88
Total work	**34.79**	**20.04**	**29.07**	**41.01**	**30.02**
Observations	1211	1026	1296	522	4056

Source: Constructed by the author using the ELMPS of 2006.

Table 8: Sample means of single females by work category and working sector

	Public	**Private**	**Independent**	**Housewives**	**All**
Time Use					
Market work	**41.11** (31.33%)	**54.27** (32.29%)	**36.99** (36.39%)	**0.00** (0%)	100%
Domestic work	**25.61**	**14.62**	**31.77**	**20.21**	
Housework	24.39	14.36	30.04	19.39	
Child care	1.22	0.26	1.73	0.83	
Total work	**66.72**	**68.89**	**68.76**	**20.21**	
N	260 (6.40%)	268 (6.61%)	302 (7.45%)	3226 (79.54%)	2608 (100%)

Source: Constructed by the author using the ELMPS of 2006.

Table 9: sample means of married females without children by work category and working sector

	Public	**Private**	**Independent**	**Housewives**	**All**
Time Use					
Market work	**41.42**	**47.12**	**31.43**	**0.00**	
	(46.45%)	(5.87%)	(47.68%)	(0%)	(100%)
Domestic work	**32.3**	**32.08**	**42.22**	**31.64**	
Housework	31.7	31.04	41.16	30.8	
Child care	0.6	1.04	1.06	0.84	
Total work	**73.72**	**79.2**	**73.65**	**31.64**	
N	190	24	195	1580	1989
	(9.55%)	(1.21%)	(9.80%)	(79.44%)	(100%)

Source: Constructed by the author using the ELMPS of 2006.

Table 10: Sample means of married females With children by work category and working sector

	Public	**Private**	**Independent**	**Housewives**	**Total**
Time Use					
Market work	**40.55**	**45.2**	**32.89**	**0.00**	
	(48.65%)	(6.50%)	(44.70%)	(0%)	(100%)
Domestic work	**46.03**	**45.62**	**54.5**	**52.39**	
Housework	36.09	32.49	46.99	38.26	
Child care	9.94	13.12	7.51	14.13	
Total work	**86.58**	**90.82**	**87.39**	**52.39**	
N	666	89	612	4153	5522
	(12.06%)	(1.61%)	(11.08%)	(75.25%)	(100%)

Source: Constructed by the author using the ELMPS of 2006.

Table 11: Variables Mean and Standard Deviation by Marital Status in 2006

	Singles			**Married**			**All**		
Variable	N	Mean	Sd. Dev.	N	Mean	Sd. Dev.	N	Mean	Sd. Dev.
age 1998	469	20,49	4,78	675	19,99	3,43	1144	20,19	4,04
age 2006	469	27,55	4,90	675	27,09	3,52	1144	27,28	4,15
Age Marriage	-	-	-	675	23,49	3,64	675	23,49	3,64
Market hrs. 1998	54	11,72	7,95	110	10,74	6,58	164	11,06	7,05
Market hrs. 2006	166	45,60	12,50	121	41,04	10,78	287	43,68	12,00
Domestic hrs. 1998	469	18,79	17,65	675	23,48	16,97	1144	21,56	17,40
Domestic hrs 2006	469	21,65	17,80	675	52,22	31,60	1144	39,69	30,74
Father Educ 2006	160	3,06	2,31	664	2,90	2,23	824	2,93	2,25
Mother Educ 2006	59	1,53	1,29	655	1,98	1,80	714	1,94	1,77
Nbr. Children 2006	-	-	-	675	1,35	0,86	675	1,35	0,86
Nbr. Children 1998	-	-	-	-	-	-	-	-	-
Working in 2006	469	0,35	0,48	675	0,17	0,38	1144	0,25	0,43
Working in 1998	469	0,17	0,37	675	0,15	0,35	1144	0,15	0,36
low Wealth 1998	469	0,84	0,36	675	0,86	0,34	1144	0,85	0,35
high Wealth 1998	469	0,16	0,36	675	0,14	0,34	1144	0,15	0,35
Educ1 2006	469	0,08	0,27	675	0,09	0,29	1144	0,09	0,28
Educ2 2006	469	0,12	0,32	675	0,13	0,34	1144	0,13	0,33
Educ3 2006	469	0,01	0,09	675	0,01	0,12	1144	0,01	0,11
Educ4 2006	469	0,30	0,46	675	0,39	0,49	1144	0,35	0,48
Educ5 2006	469	0,07	0,25	675	0,06	0,24	1144	0,06	0,25
Educ6 2006	469	0,36	0,48	675	0,29	0,45	1144	0,32	0,47
HH size 2006	469	5,30	2,18	675	3,55	1,37	1144	4,27	1,95
HH size1998	469	6,36	2,69	675	6,56	2,82	1144	6,48	2,77
Cairo 2006	469	0,21	0,41	675	0,15	0,36	1144	0,17	0,38
Alex. 2006	469	0,16	0,36	675	0,15	0,36	1144	0,15	0,36
Region1 2006	469	0,19	0,39	675	0,15	0,35	1144	0,16	0,37
Region2 2006	469	0,20	0,40	675	0,19	0,39	1144	0,19	0,39
Region3 2006	469	0,13	0,33	675	0,22	0,42	1144	0,18	0,39
Region4 2006	469	0,12	0,32	675	0,15	0,35	1144	0,13	0,34
Basic services 2006	469	3,12	1,25	675	3	1	1144	2,86	1,17

Notes: i. Region1 represents Urban lower Egypt, Region2 represents Urban Upper Egypt, Region3 represents Rural lower Egypt, and Region4 represents Rural Upper Egypt. ii. Educ1 is "Illiterate", Educ2 is "less than intermediate" education, Educ3 is the "general intermediate" education, Educ4 id the "technical intermediate", Educ5 is the "above intermediate", and Educ6 is the "university" level of education.
Source: constructed by the author using the ELMS of 1998 and the ELMPS of 2006

Table 12: Transitions from/into Market Work by marital status in 2006

	Singles			Married		
	Market work 2006			Market work 2006		
Market work 1998	**No**	**Yes**	**Total**	**No**	**Yes**	**Total**
No	285	106	391	500	76	576
	72,89	27,11	100	86,81	13,19	100
	93,75	64,24	83,37	89,45	65,52	85,33
Yes	19	59	78	59	40	99
	24,36	75,64	100	59,6	40,4	100
	6,25	35,76	16,63	10,55	34,48	14,67
Total	304	165	469	559	116	675
	64,82	35,18	100	82,81	17,19	100
	100	100	100	100	100	100

Note: All females are single in 1998.
Source: Constructed by the author using the panel sample 1998-2006.

Table 13: Transitions from/into Domestic Work by marital status in 2006

	Singles			Married		
	Domestic work 2006			Domestic work 2006		
Domestic work 1998	**No**	**Yes**	**Total**	**No**	**Yes**	**Total**
No	21	133	154	0	142	142
	13,64	86,36	100	-	100	100
	43,75	31,59	32,84	-	21,04	21,04
Yes	27	288	315	0	533	533
	8,57	91,43	100	-	100	100
	56,25	68,41	67,16	-	78,96	78,96
Total	48	421	469	0	675	675
	10,23	89,77	100	-	100	100
	100	100	100	-	100	100

Note: All females are single in 1998.
Source: Constructed by the author using the panel sample 1998-2006.

Empirical Results

Table 14: Probability of the Treatment

Treated	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
age 2006	0.657***	0.102	6.420	0.000	0.457	0.858
age square 2006	-0.011***	0.002	-6.530	0.000	-0.014	-0.008
Educ2 2006	0.283*	0.157	1.800	0.072	-0.025	0.592
Educ3 2006	0.608	0.375	1.620	0.106	-0.128	1.343
Educ4 2006	0.366***	0.132	2.780	0.005	0.108	0.624
Educ5 2006	0.203	0.192	1.060	0.290	-0.173	0.579
Educ6 2006	0.141	0.143	0.990	0.323	-0.139	0.421
Region2	-0.096	0.117	-0.820	0.410	-0.326	0.133
Region3	0.038	0.111	0.340	0.735	-0.179	0.254
Region3	0.377***	0.123	3.060	0.002	0.135	0.618
Region4	0.249*	0.139	1.790	0.074	-0.024	0.522
Working 1998	-0.038	0.118	-0.320	0.748	-0.269	0.193
wealth 1998	-0.075	0.053	-1.430	0.153	-0.179	0.028
Constant	-9.536***	1.511	-6.310	0.000	-12.498	-6.574
Pseudo R2	0.055					
Log likelihood	-728.841					
Prob > chi2	0.000					
N	1140.000					

Note: i. Dependent Variable is a binary variable that is equal to one if the female got married between 1998 and 2006 and, equals to zero if the female remained single at least till 2006. ii. *** statistically significant at the 1% level, ** statistically significant at the 5% level, * statistically significant at the 10% level.

Table 15: Matching Estimates

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Domestic Hrs 2006	Unmatched	52.231	21.672	30.560	1.618	18.880
	ATT	52.269	21.542	30.727	1.823	16.850
	ATU	21.718	49.884	28.166		
	ATE			29.678		
Market Hrs 2006	Unmatched	7.368	16.208	-8.840	1.170	-7.550
	ATT	7.340	16.539	-9.199	1.868	-4.930
	ATU	16.088	9.817	-6.271		
	ATE			-7.999		

Notes: i. ATT: Average treatment effect on the treated. ii. ATU: Average treatment effect on the untreated. iii. ATE: Average treatment effects.

Table 16: Treatment assignment

	Common support		
Treatment assignment	Off support	On support	Total
Untreated	1	465	466
Treated	4	670	674
Total	5	1,135	1,140

Notes: i. The overlap condition for persons with the same x value in X are allowed to have a positive probability of being in treated and control groups.

Table 17: Determinants of domestic Labor supply

	Singles (16-64)	**Married (16-64)**	**All**
	Coefficient	Coefficient	Coefficient
age 2006	2,617***	1,412***	4,049***
age square 2006	-0,034***	-0,023***	-0,047***
Age at marriage	-	0,212**	-
HH whealth in 1998	-1,360***	0,891**	-1,009***
Basic Services in 2006	-0,641	-0,753*	-1,622***
Educ dummy2	14,185***	1,349	7,925***
Educ dummy3	3,723	-0,802	10,953***
Educ dummy4	8,473***	1,865	12,243***
Educ dummy5	9,460***	2,141	12,764***
Educ dummy6	6,654***	-1,913	9,463***
Number of Children in HH	1,454*	4,890***	6,138***
Parent in the HH	-	-30,323***	-24,164***
Sister/Bro. in law	-	-	-26,280***
Mother in law	-	-15,750	-39,366***
Dummy for Family Projet	1,021	-1,559	-0,891
Region dummy 2	0,667	-7,404***	-4,042***
Region dummy 3	-0,551	-4,176***	-1,887***
Constant	-22,570***	22,121***	-41,202***
Sigma	19,494	27,028	25,718
Log Likelihood	-6868,7003	-18045,825	-33284,573
Pseudo R squared	0,0188	0,0109	0,0626
N	1835	3851	8554

Notes: i. Tobit Results. ii. Dependent Variable: weekly hours spent on Domestic Work.

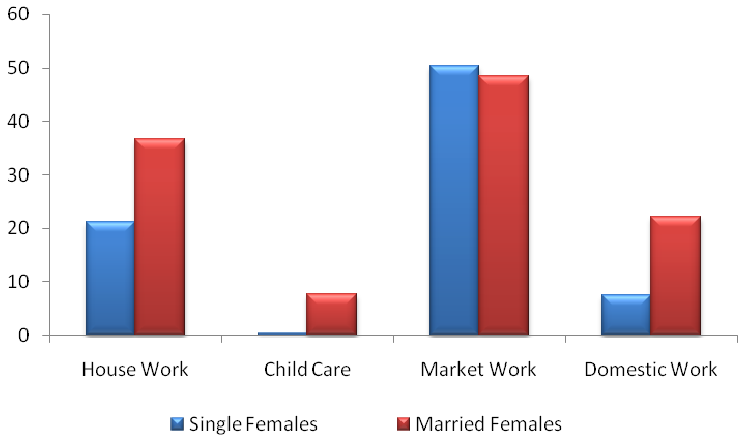
Table 18: Determinants of Market labor supply

	Singles (16-64) Coefficient	**Married (16-64)** Coefficient	**All** Coefficient
age	-0,350	0,429	0,103
age square	0,003	-0,006*	-0,002
Age at marriage	-	0,097	-
HH whealth in 1998	-0,212	-1,159***	0,368***
Basic Services in 2006	-0,510	-0,120	-0,026
Educ dummy2	-1,542	-0,387	-0,016
Educ dummy3	20,031	-3,974	3,616
Educ dummy4	1,412	-1,896	-2,061
Educ dummy5	-1,482	-2,592	-3,407***
Educ dummy6	-8,518**	-1,659	-4,390***
Number of Children in HH	2,459	-0,517	-1,053***
Parent in the HH (dummy)	-	-14,810	-0,362
Sister/Bro. in law	-	-	-6,277
Presence of a Mother in law	-	-	-20,724
Dummy for Family Projet	0,637	1,305*	1,855***
Region dummy 2	-3,816**	-2,988***	-3,678***
Region dummy 3	-8,665***	-4,823***	-6,308***
Constant	67,175***	61,426***	62,445***
Sigma	13,104	11,787	12,939
Log Likelihood	-1244,3003	-3681,4066	-5886,6716
Pseudo R squared	0,0418	0,0253	0,0267
N	313	948	1480

Notes: i. Tobit Results. ii. Dependent Variable: weekly hours spent on Market Work.

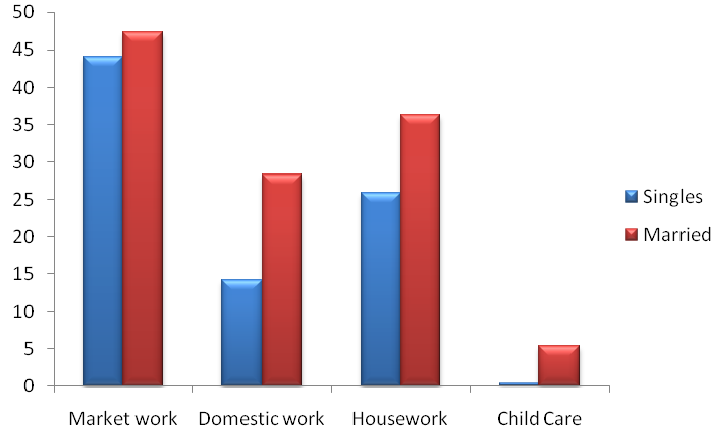
Figures

Figure 1: Time allocation by marital status



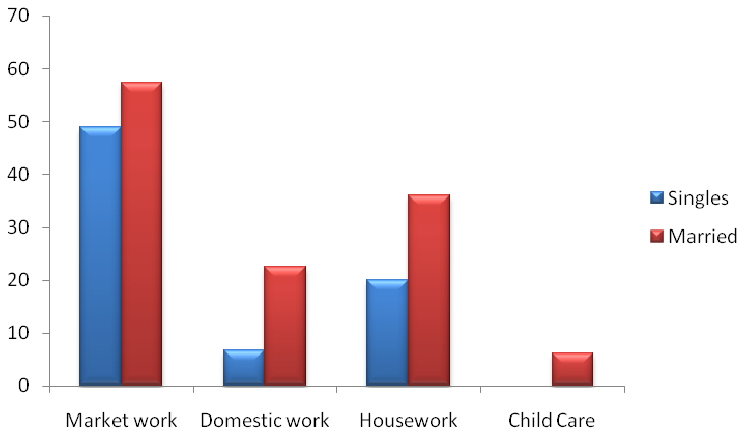
Source: Constructed by the author using the ELMPS 2006.

Figure 2: Time allocation by marital status: for illiterate



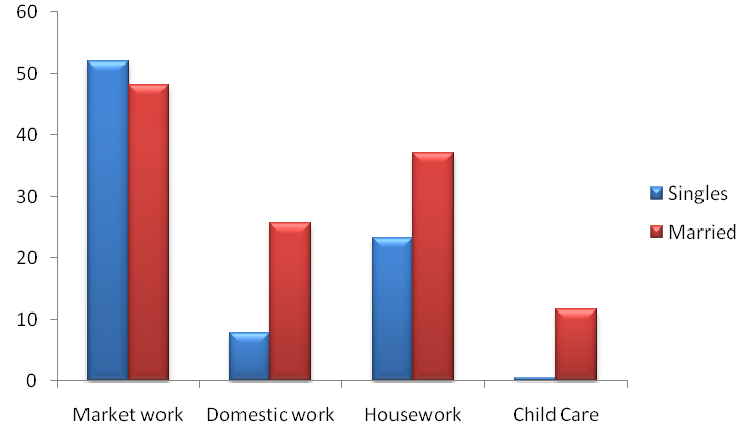
Source: Constructed by the author using the ELMPS 2006.

Figure 3: Time allocation by marital status: for general intermediate



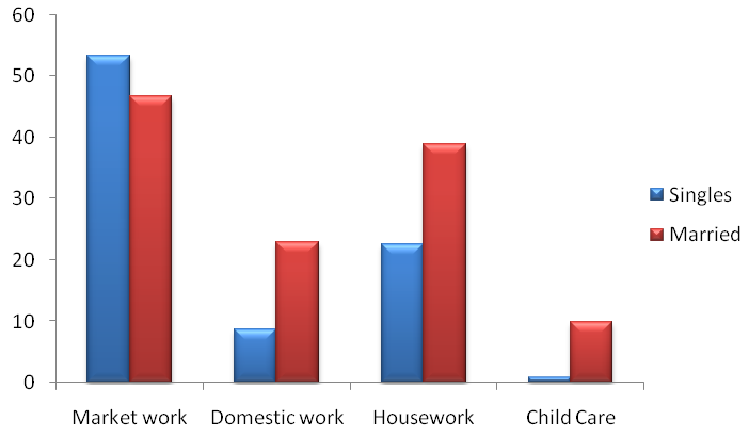
Source: Constructed by the author using the ELMPS 2006.

Figure 4: Time allocation by marital status: for technical intermediate



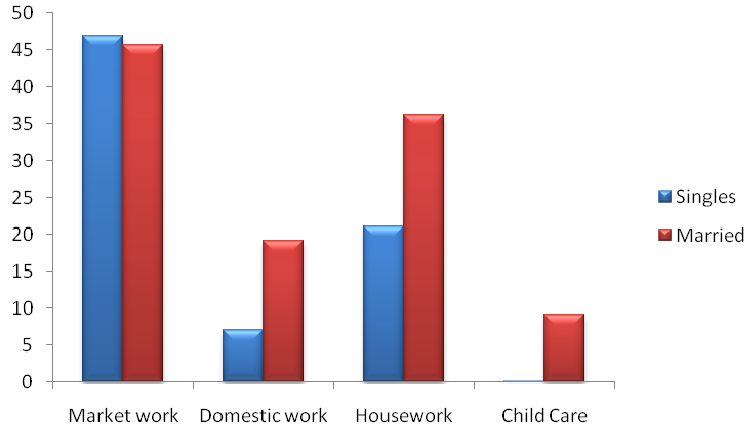
Source: Constructed by the author using the ELMPS 2006.

Figure 5: Time allocation by marital status: for above intermediate



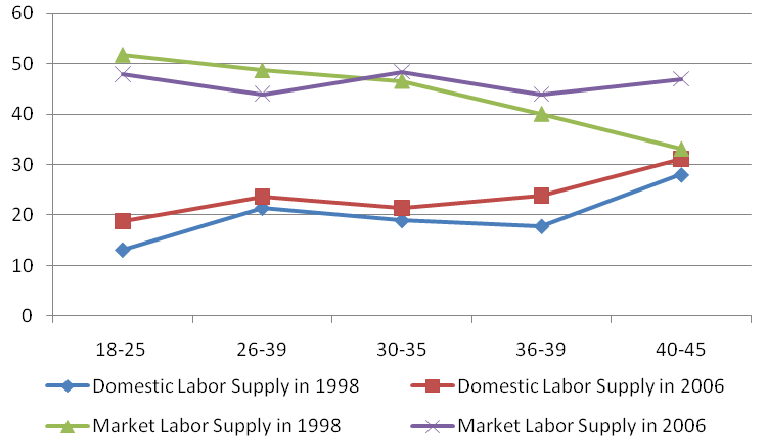
Source: Constructed by the author using the ELMPS 2006.

Figure 6: Time allocation by marital status: for university



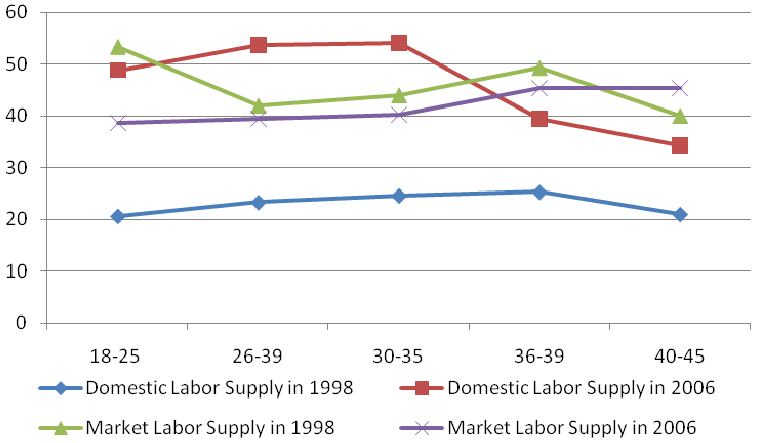
Source: Constructed by the author using the ELMPS 2006.

Figure 7: Evolution of time allocation by age group 1998-2006: Singles



Source: Constructed by the author using the ELMPS of 1998 and 2006.

Figure 8: Evolution of time allocation by age group 1998-2006: Married



Source: Constructed by the author using the ELMPS of 1998 and 2006.

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