THE IMPACT OF SOCIAL POLICY ON FEMALE LABOR SUPPLY IN TURKEY

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ABSTRACT

THE IMPACT OF SOCIAL POLICY ON FEMALE LABOR SUPPLY IN TURKEY

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Female labor supply is important for economic development, productivity, and gender equality. Governments and intergovernmental agencies have recently given great importance to this subject and made many economic and social policy suggestions to increase the female labor supply. Most of the existing empirical studies about measuring the effect of such policies on the decision of individuals are based on static econometric estimation methods and *ex-post* analysis. However, making an *ex-ante* analysis is very important to estimate and evaluate the impact of any policy.

Microsimulation is a method that can be effectively used for *ex-ante* analysis. This study uses a static microsimulation model to evaluate the impact of specific social and tax policies on the female labor supply in Turkey. This is the first study that estimates the participation and hour elasticities from the "Structural Discrete Choice Labor Supply Model" and uses the estimated elasticities for policy simulations in Turkey. Three sets of policies are examined: The reduction of VAT on some goods & services, wage subsidies for females, and early childhood education subsidies for females with 3-6 years old children.

Estimations and microsimulations are based on HBS micro-level data for the 2013-2019 period. A wage equation is estimated with Heckman's Two Step estimation procedure. Using the estimated wage rates, a Structural Discrete Choice Model is estimated by considering observed and unobserved heterogeneities in the utility function. It is found that some of the policies analyzed in this study lead to a significant increase in female employment and female wage income.

Keywords: Social Policy Impact Analysis, Discrete Choice Labor Supply, Female Labor Supply, Microsimulation

ÖZ

TÜRKİYE'DE SOSYAL POLİTİKANIN KADIN İŞGÜCÜ ARZINA ETKİSİ

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Kadın işgücü arzı, ekonomik kalkınma, verimlilik ve toplumsal cinsiyet eşitliği açısından önemlidir. Son dönemde devletler ve devletler arası kuruluşlar bu konuya büyük ölçüde önem vermişler ve kadın istihdamını artırmak için birçok ekonomik ve sosyal politika önerilerinde bulunmuşlardır. Bu tür politikaların bireylerin kararları üzerindeki etkisini ölçmeye yönelik mevcut ampirik çalışmaların çoğu, statik ekonometrik tahmin yöntemlerine ve *ex-post* analize dayanmaktadır. Ancak, herhangi bir politikanın etkisini tahmin etmek ve değerlendirmek için *ex-ante* analiz yapmak çok önemlidir.

Mikrosimülasyon, *ex-ante* analiz için etkin bir şekilde kullanılabilecek bir yöntemdir. Türkiye'de sosyal politikaların kadın işgücü arzı üzerindeki etkisini mikrosimülasyon yöntemiyle inceleyen çok az çalışma bulunmaktadır. Bu çalışma, belirli sosyal ve vergi politikalarının Türkiye'deki kadın işgücü arzı üzerindeki etkisini değerlendirmek için statik bir mikro simülasyon modeli kullanmaktadır. Bu, Türkiye'de "Yapısal Kesikli Seçim İşgücü Arzı Modeli"nden katılım ve saat esnekliklerini tahmin eden ve tahmin edilen esneklikleri politika simülasyonları için kullanan *ilk çalışmadır*. Üç dizi politika incelenmiştir: Bazı mal ve hizmetlerde KDV'nin düşürülmesi, kadınlar için ücret

sübvansiyonları ve 3-6 yaş arası çocuğu olan kadınlar için erken çocukluk eğitimi sübvansiyonları.

Tahminler ve mikro simülasyonlar, 2013-2019 yılları arasındaki HBS mikro düzey verilerine dayanmaktadır. Heckman'ın İki Aşamalı tahmin prosedürü ile bir ücret denklemi tahmin edilir. Bu tahmin edilen ücret oranı sonuçlarını kullanarak, fayda fonksiyonunda gözlemlenen ve gözlemlenmeyen heterojenlikleri dikkate alarak bir Yapısal Kesikli Seçim Modeli tahmin edilmektedir. Bu sosyal politikaların bir kısmının kadın istihdamında ve kadın ücret gelirinde önemli bir artışa yol açtığı tespit edilmiştir.

Anahtar Kelimeler: Sosyal Politika Etki Analizi, Kesikli Seçim İşgücü Arzı, Kadın İşgücü Arzı, Mikrosimülasyon

To the memory of my Daddy

watching over me in Heaven...

and

To Living for Happiness

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BKK: Bakanlar Kurulu Kararı (Decision of Council of Ministers)

EU: European Union

COICOP: Classification of Individual Consumption According to Purpose

GDP: Gross Domestic Product

HBS: Household Budget Survey

ILO: International Labor Organization

KEIG: Women's Labor and Employment Initiative (Kadın Emeği ve İstihdamı Girişimi)

MFSS: Ministry of Family and Social Services

MoNE : Ministry of National Education

MSMs: Microsimulation Models

OECD: Organization for Economic Co-operation and Development

SCT: Special Consumption Tax

TURKSTAT: Turkish Statistical Institute

UNICEF: United Nations Children's Fund

WB: World Bank

CHAPTER 1

INTRODUCTION

Female labor supply has become an important issue that increasingly attracts the attention of policymakers, economists, and women's organizations in various aspects of the economic and social field. "Female labor supply" is a broad concept that refers to the total number of hours or amount of labor women are willing and able to offer to the labor market. This concept considers factors such as education, skills, social and economic conditions, caring, and other household responsibilities that affect female decisions on labor force participation and working hours.

Female labor supply is one of the important determinants of economic development. As the female labor supply increases, economies can harness their human capital capacities more, increasing productivity and facilitating economic development. As females participate in the labor force, they can get economic independence in the household, reducing the (income) inequality in the family. Increased female labor supply can reduce the poverty of households and increase the standard of living conditions. On the other hand, female labor supply is essential for gender equality in the workplace and breaking down social barriers. Increased female labor supply also plays an important role in changing social and traditional norms assumed that women are responsible for caring and housework.

Female labor supply has been on the agenda of governments and intergovernmental agencies, such as the World Bank (WB), the United Nations (UN), and the International Labor Organization (ILO). Social policies aimed at increasing female labor supply have also been one of the prominent issues of the Turkish government's economic policy agenda in the last two decades because increasing it is one of the priorities for economic development and improvement in social welfare and gender equality in Turkey. Therefore, the female labor supply should be well-analyzed by policymakers using proper methods, such as structural labor supply modeling, to understand which policies could effectively raise female employment and participation rates.

The female labor force participation reveals a U-shaped pattern beginning from the first years of the establishment of the Republic in Turkey. In the first years, Turkey's female labor force participation rate was high because female employment in the agricultural sector was high. This rate decreased until the mid-2000s with urbanization and industrialization. Since the mid-2000s, female labor force participation and female employment have increased (except in 2020 because of the global COVID pandemic) with supply-side improvements such as the increase in education level employment, decrease in fertility, increase in the age of marriage and first birth, and technological developments that facilitate household chores (Dayıoğlu, 2022). This improvement is important for the Turkish economy.

The employment rate for the population aged 15 and over was 53.1% in Turkey in 2022, but there was a substantial discrepancy between female (only 35.1%) and male (71.4%) employment rates (TURKSTAT, 2023). Organization for Economic Cooperation and Development (OECD) statistics reveal that Turkey has the lowest female employment rate among OECD countries for the working age (15-64 years old) population. While the female employment rate was 63.4% for the average of EU countries and 60.4% for the average of OECD countries, it was only just 31.7% for Turkey in 2021 (OECD, 2023). The gender gap in the rate of participation is remarkable. Men are generally assumed to be breadwinners, and women are responsible for caring for the housework, as in stereotypical traditional judgments in the Turkish family system. According to the ILO, women spend 5.5 hours a day on unpaid work in the household. It is 1.5 hours for men in Turkey. Furthermore, the time women spend on paid work is less than one-third that of men (Dedeoğlu et al., 2021, p. 9).

The wage rate plays an essential role in labor supply decisions (for recent empirical studies on Turkey, see Dayıoglu & Kasnakoglu (1997), Tansel (1998), Taymaz (2009)). It is also apparent that the wage rate is one of the most significant factors in the economic well-being of individuals and an important indicator for social justice and the distribution of national income. Neo-classical economic theory states that individuals freely choose a job in the labor market, observing the market prices. The wage rate determines the participation decision of homo-economicus. An individual participates in the labor force if her value of leisure time and the total economic value of the housework and caring for household members do not exceed the market wage (Heckman, 1979, p.679). If the market wage rate is below the reservation wage, individuals do not prefer participating in the labor market.

Recent empirical studies show that social and tax-benefit policies substantially affect female labor supply decisions. Members of households make their labor supply decisions (namely, working or not working, part-time or full-time working, working in the formal or informal sector, working in the public or private sector, etc.) based on the income they will receive when employed. Social and tax-benefit policies such as the rate of social security premium, the income tax rate, and the benefits for disabled people and early childhood care affect the net income workers receive.

Most of the existing empirical studies about measuring the effect of social policies on the decision of individuals are based on static econometric estimation methods. They determine the relationship between the explanatory and dependent variables by estimating the parameters using the actual data. A standard econometric estimation method gives the sign and magnitude of parameters and allows evaluation of the results in an *ex-post* analysis. With the help of the development of software and programming facilities, the simulation methods extensively used in engineering applications have been adopted in social sciences for *ex-ante* evaluation. In modeling the behavior of individuals in response to a change in social or tax-benefit policy, the microsimulation model has been recently used in Economics. Since it ensures policymakers and researchers the convenience of examining the results of changes in the policy rules, it is an effective tool for Economics.

The microsimulation model was first used by Guy Orcutt in 1950 in social sciences. Orcutt and his colleagues developed this method to analyze the prospective effects of social and economic policies by considering the characteristics and behaviors of micro-units (Figari et al.,2014). In economics, it has become a convenient tool for comparing the impact of policy changes on economic agents using large micro-level datasets. Alternative and hypothetical policies were examined *ex-ante* using this technique to identify which policy would be the best for the target issue. Some prominent examples of tax-benefit or social policy models are EUROMOD (Sutherland & Figari, 2013), STATS (Wixon et al.,1987), STINMOD (Brown & Harding, 2002), POLIMOD (Redmond et al., 1998), TAXBEN (Giles & McCrae, 1995), DYNAMOD (Kelly et al., 2001), UKMOD (Richiardi et al., 2021) and LABORsim (Leombruni & Richiardi, 2006).

This dissertation is the first study that estimates the employment elasticities using the structural discrete choice labor supply and examines the effect of social and tax policies on women's labor supply decisions and income using a microsimulation model for Turkey. These elasticities are essential to assess the policies in many aspects. The study examines three main social and tax policies on how women select the labor supply statuses: non-employment, part-time employment, full-time employment, and overtime employment.

The female labor supply is modeled as a Structural Discrete Choice following the previous studies (see, for example, Van Soest (1995), Keane & Moffitt (1999), Blundell et al. (1999)). Discrete choice labor supply modeling has many advantages over continuous one. In the case of continuous labor supply models, the budget line becomes piecewise linear when a tax & benefit function is included in the utility maximization problem. The non-convexities and the existence of corner solutions make the problem difficult to solve and may lead to multiple equilibria. The discrete choice labor supply estimation procedure can efficiently deal with these non-convexities in the budget set. Since it is assumed that individuals make labor/leisure choice decisions from a relatively small number of hours levels, this simplifies the solution of the maximization problem. Furthermore, its flexibility allows *ex-ante* evaluation of possible effects of social & tax policies. Considering these advantages, the female discrete choice labor supply estimation procedure is used in our study. The estimation and model evaluation process is presented in Figure 1.

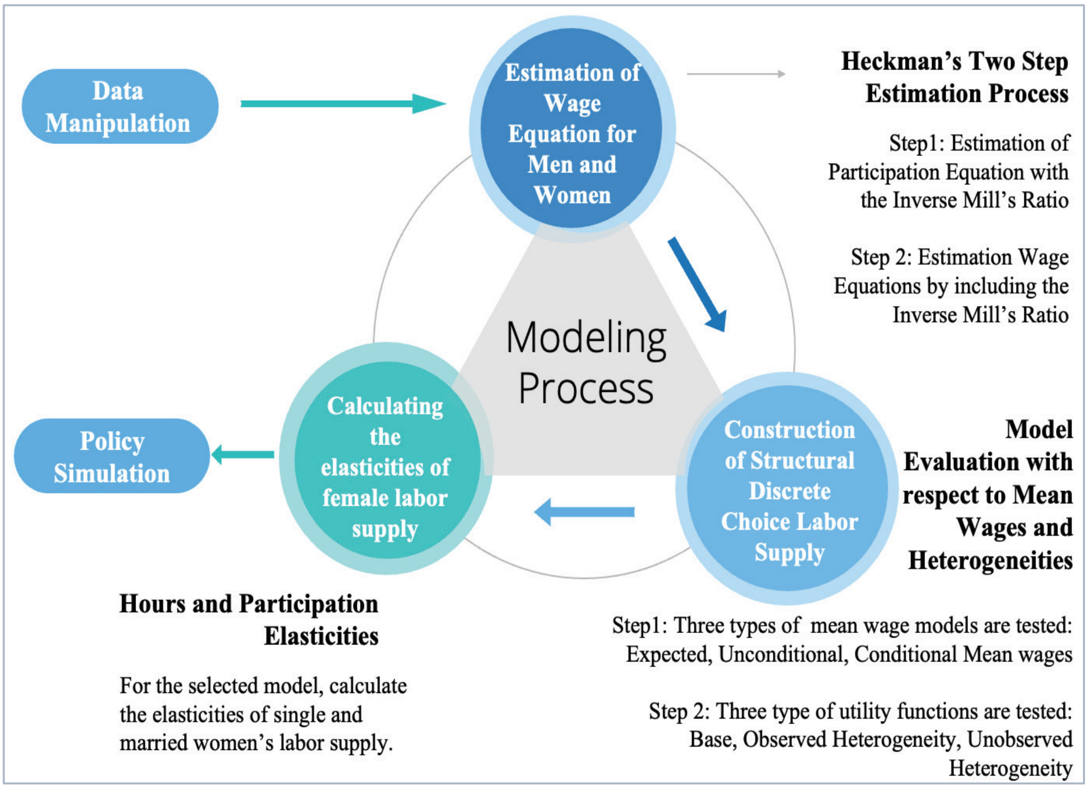


Figure 1: Structural Discrete Choice Labor Supply Estimation Process

All data manipulations, construction of models, estimation and simulations are performed with the R programming language for statistical computation.

The dissertation consists of seven chapters. After this brief introduction, the second chapter explains Microsimulation Models (MSMs) and a brief history of how this technique has been used in Economics. There are mainly two types of MSMs in the empirical literature, static and dynamic. Comparative information about the features and uses of these two models is provided, and the structure and characteristics of prominent tax-benefit and social policy microsimulation models such as EUROMOD, DYNAMOD, and STINMOD are explained in the context of discrete choice female labor supply. There are very few microsimulation models used to estimate the effects of social and tax policies on Turkey. These models are also explained in the second chapter.

In the third chapter, an overview of social policies implemented in Turkey are presented, and the trends in female labor supply in recent years are discussed. Three family types (single female, single male, and couple families) are constructed using the 2002-2019 Household Budget Survey (HBS) micro-level data collected by TURKSTAT, and descriptive statistics are summarized for these three types of families.

In the fourth chapter, the estimation procedure of the wage and employment equations are described, and the empirical literature on wage models on Turkey are reviewed. In this study, the wage model is estimated using Heckman's two-step estimation procedure. The model is estimated for males and females separately, and the estimation results of the wage and employment models are explained in detail.

In the fifth chapter, after a discussion on discrete choice labor supply models and their estimation, the econometric framework for female discrete choice labor supply used in our study is presented. The analysis considers the women in couples and single families as decision-makers, and the men's decisions are assumed as fixed. After examining different elements in designing the model, a model is chosen for the empirical application. Participation and hours elasticities are calculated for groups defined by age, education level, income quantiles, and the number of children for single and married women for each employment outcome. The participation elasticity refers to the extensive margin, and hours elasticity is the sum of extensive and intensive margins.
In the sixth chapter, three different policies with three alternatives are examined via our static microsimulation model by using the elasticities derived from the estimation of the structural model. The change in female labor supply and the income effect of these policies are discussed. The impacts of nine policies are compared in terms of their effect on female wages, employment, and disposable income. We have also calculated the effect of these policies on the government's budget.

Finally, the last chapter presents main findings, discusses policy implications, explains the limitations of our study, and provides recommendations for future research.

CHAPTER 2

MICROSIMULATION and FEMALE LABOR SUPPLY

2.1. Microsimulation as a Tool for Policy Analysis

Existing studies on social-economic system modeling are generally based on static econometric estimation methods. They try to determine the relationship between explanatory and dependent variables by estimating the parameters using the actual data. To understand how much affected an individual labor supply is with respect to a change in some socio-economic policy rules, a standard econometric estimation method, which gives the sign and magnitude of parameters, benefits from actual data and results in an *ex-post* analysis. With the help of the development of software and programming facilities, the simulation techniques used broadly in the engineering area have started to be applied in social sciences, so in Economics to get an *ex-ante* evaluation.

During the last three decades, for policy impact analysis on micro units, namely individuals, firms, households, etc., the microsimulation model (MSM) has been used in Economics. Microsimulation is a computer-dependent technique for modeling the behavior and interactions of micro units with the data according to predetermined probabilistic rules. It can be asserted that the microsimulation approach in social sciences, especially in economics, acts like an experimental method in biology or psychology; because all these branches of sciences compare the current state and the behavior of individuals before and after situation changes (Bourguignon & Spadaro, 2006). According to this argument, there is only one major difference between them: in economics, simulation is based on the change in socio-economic environment and imposed changes in behavior, so before and after situation can be compared *ex-ante* rather than *ex-post* (Bourguignon & Spadaro, 2006, pp. 77-78). This method is based on large cross-sectional datasets with information on individuals and households. Furthermore, it can easily capture the complexity of the system. According to Williamson (2007).

> *"Microsimulation (originally called microanalytic simulation) is a modeling technique that operates at the level of individual units such as persons, households, vehicles, or firms. Within the model, each unit is represented by a record containing a unique identifier and a set of associated attributes – e.g., a list of persons with known age, sex, marital and employment status; or a list of vehicles with known origins, destinations and operational characteristics".*

Citro & Hanushek (1994) stated that when debating a proposed social policy, analysts and policymakers need to know how it can affect the whole population and subgroups. This technique was pioneered by Guy Orcutt in 1950 in social sciences. Orcutt and his colleagues developed this method to analyze the prospective effects of social and economic policy implementation by considering the characteristics and behaviors of micro-units (Figari et al., 2014). Although the first seeds of microsimulation in Economics for policy analysis were planted by Orcutt in 1957, it has been mostly used since the early 1980s (Bourguignon & Spadaro, 2006). Because microsimulation modeling is seen as burdensome, many researchers preferred using something other than this method. However, with the help of a Panel, namely "Use of Micro-Simulation Methods in Policy Development and Decision Making" in 1990, the usage of this method accelerated (Anderson & Hicks, 2011). It has been started use to evaluate the effects of some public or social policies before they are implemented. It has played an important role in developing rational policy analysis. This also implies that alternative and hypothetical policies could be examined *ex-ante* and evaluated for which one would be the best in line with the objective. One could make a policy change by altering a set of parameters describing the actual policy and getting the effects (Redmond et al.,1998).

In economic microsimulation models, the modeling units are generally "individuals". Samples consist of hundreds of thousands of individuals in microsimulation models. The "Micro" prefix can sometimes be confusing. Although there is such a prefix, we simulate the whole system. This word refers to how we simulate the system (Spielauer, 2010). The basic forms of them are "static microsimulation models". These models basically investigate the difference between two situations. If the time dimension is inserted into those, then it is called a “dynamic microsimulation model”. Indeed, when microsimulations do not consider behavioral changes to any effect, they are called “static”, whereas dynamic microsimulation models consider behavioral responses to change in the (economic) environment. For example, Tax-Benefit models are included in the type of static microsimulation models in which behavior is assumed to be exogenous to the tax and benefit system. STAT for the USA, EUROMOD for 17 European countries, STINMOD for Australia, POLIMOD for UK and TAXBEN are some static tax-benefit microsimulation models. For instance, in dynamic models, a policy that increases social security benefits might lead to old aged individuals retiring earlier as a behavioral change. However, these behavioral changes are assumed to not occur in static microsimulation models.

Static microsimulation models are sometimes described as “arithmetic” or “accounting” models. They provide “morning after” effects of policy change (e.g., change in taxes and benefits) and thus provide ease of identification of winners and losers (Creedy & Duncan, 2002). Static microsimulation models are based on a large-scale cross-sectional data set. As stated in Creedy & Duncan (2002), the advantage of using such a data set is that one can easily get the heterogeneity at the individual and household levels.

Dynamic microsimulation models start from the same cross-sectional data set as static models. They differ from static models in how individuals move forward through time, which can occur by changing major life events such as education, marriage, divorce, having children, participation in labor supply, retirement, etc. (Brown & Harding, 2002). Therefore, in dynamic microsimulation models, large transition matrices are calculated to reveal the year-to-year changes in individuals’ life events. While dynamic microsimulation models can catch such changes over time, static microsimulation models can reveal the morning-after effects caused by policy changes.
Dynamic models are helpful for anticipating the long-term effects of policy changes and social and economic trends (Brown & Harding, 2002). According to Kelly et al. (2001), dynamic models can cope with the changes in individual characteristics over time, such as marriage, divorce, education, etc., in the calculation of future earnings, retirement earnings, labor force participation, and so on, while the other models cannot

do. For instance, DYNAMOD is a dynamic microsimulation model that considers the population's aging. It allows distributional analysis of future retirement incomes and behavioral changes' effect on future superannuation. (Kelly, et al., 2001) According to Bourguignon & Spadaro (2006), changes in the tax-benefit system has an impact on the budget constraint of the household. Then, households modify their disposable income as their labor supply is unchanged. With the income effects and changes in the after-tax price of labor, they also modify their labor supply decisions. These behavioral effects and the size of the effect are measured by dynamic MSMs.

With the help of computation tools, microsimulation modeling becomes a more useful method for analyzing the effect of socio-economic policy changes. Indeed, since it gives policymakers and researchers an opportunity to make comparisons of the effects of different policy reforms, it is today considered an efficient tool. The advantages of using MSMs can be explained in four points.

Firstly, contrary to the traditional method, which is the “representative agent model”, the microsimulation modeling method considers the “heterogeneity” of economic agents. This method constructs the model by determining different personal characteristics such as age, gender, education, labor supply preferences, etc. Therefore, it allows for separate analyses of subgroups. The representative agents model gives the results of policy changes analyzed in the general context, but it can miss the unexpected effects caused by the combination of individual characteristics, while MSMs can catch such cases (Bourguignon & Spadaro, 2006).

Secondly, it allows seeing both the analysis of the existing situation and the socio-economic results that might occur in the near real-time environment due to the change in the current situation. Thus, one can easily create new policy proposals.

Thirdly, with the help of the development software technologies, an increase or decrease in income can be modeled easily by microsimulation via changing some parameters in the model. Thus, no one has to deal with burdensome calculations.

Fourthly, MSM has an “aggregation” advantage. It allows the researcher to measure the cost and benefit of any policy change at the individual level and to aggregate these individual effects at a macro level.

The literature on microsimulation in economics has expanded in recent years and deepened. Both static and dynamic microsimulation models have been constructed for many countries, especially in analyzing agents’ behavior on labor supply decisions after a social or tax-benefit policy. First, labor supply functions are estimated for a large scale of individual data and then simulate the changes in the budget set caused by policy reforms to analyze the effects of policy reforms in the microsimulation tradition. Furthermore, microsimulation models are also used to construct various indicators to measure how household disposable income is affected in terms of gross earnings or individual or household characteristics through interactions with the tax-benefit system. Table A.1 in Appendix A shows some prominent microsimulation models that capture the effect of policy change on labor supply decisions.

In the economic literature, MSMs are mainly used to determine the income distribution after a tax-benefit policy change, to analyze employment status behavior after social security policy changes, and to evaluate labor supply decisions of individuals or household after child benefit or in-work benefit policy changes. Mainly two research areas have been investigated related to analyzing labor supply behavior by using microsimulation modeling techniques in recent years. The first group is based on the effects of child benefits policies on the labor supply behavior of household members, and the second group focuses on the in-work benefit policies (Sutherland & Figari, 2013). For instance, Keane & Moffitt (1998), Michalopoulos et al. (1992), Kornstad & Thoresen (2007), Wrohlich (2004), and Ilkkaracan et al.(2015) are some studies on how the child determines the labor supply behavior of individuals or household – benefit policies. On the other hand, Bargain and Orsini (2006), Figari (2010), and Figari (2011) are some studies investigating the in-work benefit policies on the labor supply (Sutherland & Figari, 2013).

Early studies are based on static MSMs in the literature, while recent studies use dynamic modeling and extend the early static model into more complicated ones. For instance, POLIMOD and TAXBEN for the UK, STINMOD for Australia, STATS and KGB for the USA are some static MSMs analyzing labor supply behavior and income distribution effects caused by some policies. One of the most popular and wide-ranging static MSMs is EUROMOD. The static calculations based on the EUROMOD model are increasingly used in many studies to derive the budget sets for structural discrete choice labor supply models so that they can be used to determine the individual behavioral adjustments to policy changes. EUROMOD was built in 2012. Since then, it has contained 28 EU countries' data and models. It provides comparability about the effects of alternative social and economic policy scenarios among the countries. There are many simulations in EUROMOD as a component of disposable income, such as income taxes, social insurance contributions, family benefits, housing benefits, and other non-income benefits. It is static in a way that arithmetic simulation of taxes and benefits is calculated regardless of individuals' behaviors. Furthermore, it assumes the socio-demographic characteristics of the population do not change over time. In this model, the disposable income is first simulated before making a policy simulation. For doing this, taxes and social contributions are reduced, and cash benefits are added to the income. (Sutherland & Figari, 2013) . In the literature, many studies are using this model to simulate the effects of policy changes. For instance, Bargain et al. (2012) ensure a comparative analysis of labor supply elasticities for 17 European countries and the US by using EUROMOD modeling. Moreover, Colombino (2012), Liégeois and Islam (2012), Bargain and Orsini (2006), Colombino et al. (2010) Figari (2011) are some other examples. Also, Bargain et al. (2011), Bourguignon and Spadaro (2012), and Immervoll et al. (2007) use the estimated labor supply preferences and elasticities in order to determine the optimal tax policies (Sutherland & Figari, 2013).

On the other hand, MICSIM for the Netherlands, LABORsim for Italy, DYNAMOD for Australia, and GLADHISPANIA for Spain are other examples of dynamic MSMs. Some analyze the effect of tax-benefit policies, while others take retirement of superannuation policy changes into account to find behavioral changes in labor supply. One of the most comprehensive dynamic MSMs in the economic literature is DYNAMOD. In this model, there are 40 modules, and it contains approximately 150.000 individuals with 80 characteristics as the base population for Australia. In the superannuation modules, the effect of compulsory superannuation on the labor supply decision of individuals is examined by taking their characteristics into account. The effects of policy changes on individuals are measured by some life events such as death, fertility, disability, couple formation and dissolution, emigration, and immigration; education; labor force changes in earning income etc. By considering these life events through time, the model analyzes the effect of policy change on individuals' labor supply behavior. Blundell et al. (2000) is a significant study applying the behavioral microsimulation model based on discrete choice models. It evaluates the effects of working family tax credit (WFTC). It shows the importance of using discrete behavioral responses to evaluate the effects of the WFTC program because individuals′ decisions are shaped due to an increase in the labor force participation of single mothers. Similarly, Labeaga et al. (2008) analyze the likely effect using Spanish data. It examines the policy effect of constructing the transition matrices by combining the labor supply hours for household heads and their spouses. With the policy scenario's implementation, they observed a substitution between spouses' labor supply. Keane & Moffitt (1998) also analyze the effect of aid to families with dependent children on the individuals' labor supply, using behavioral MSM for the US. It includes socio-demographic characteristics such as education, age, the number of children, race, and region. Berger et al. (2011) investigate the labor supply behavior of females due to the change in tax-benefit policy by using EUROMOD for Luxembourg.

Since MSMs are based on large data, in the economic literature, the data used (panel or cross-sectional) include more than thousands of individuals. For instance, in TAXBEN and POLIMOD, more than 7.000 households are included. The most dramatic number of households is used in KGB, namely 200.000 households. Furthermore, in STATS, MICSIM, LABORsim, DYNAMOD, the data include more than 50.000 individuals.[1]

Generally, labor supply behavior analysis is based on individual decisions, which is the basic unit of the analysis. Some studies consider the labor supply behaviors of household' other members in analysis. Indeed, the decision to participate or not and the level of labor supply can be a joint decision between members. Hence, constructing

[1] The detailed information are presented in Table A.1.

the MSM and estimating the discrete choice model of labor supply requires some knowledge of household characteristics. For example, Berger et al. (2011) use individual decisions rather than joint decisions of couples in a household. They consider the labor supply decision of females in couples individually and include their partner's earnings as non-labor income in the maximization problem. Labeaga et al. (2008) constructs the model both on individual and population base and considers the spouses' decision when it analyzes the applied policy on the household head for Spain. In some studies, the utility maximization problems are constructed as "male-chauvinist". In such models, unlike the joint household maximization problem, it is assumed that the wife considers her husband's labor supply decision when deciding her labor supply level. However, the husband does not consider the wife's labor supply decision. For example, Wagenhals & Kraus (1998), Spahn et al. (1992), and Gustafsson (1992) can be defined as male-chauvinist models. Also, Kornstad & Thoresen (2007) construct the family decision model as family choices are made concerning mother's labor supply by taking the husbands' labor supply decisions are given. Wrohlich (2011), Michalopoulos et al. (1992) assume that females' labor supply decision is made by taking the other family members' actions are given. On the other hand, Van Soest (1995), Steiner & Wrohlich (2004), and Wrohlich (2004) construct the model as a joint household labor supply decision.

If we evaluate the studies in terms of the main findings, it is possible to collect them concerning the applied policy and their scope. Among those who investigate the effect of income tax policy on labor supply, Labeaga et al. (2008) find that the marginal utility of household head's leisure hours is positive while it is negative for spouses and couples. The results show that the participation rate of women is higher as their age increases, which means women need to remain in employment longer and they need leisure time at younger ages because of childcaring activities. It finds that low-educated men and women tend to work longer hours than high-educated ones. On the other hand, Berger et al. (2011) find that the reform has negligible effects on females in couples overall. In other words, there is a positive but small effect on working hours and participation rate. For single females, there are winners and losers. Single females who belong to the second and third quartiles do not change their participation rate and labor supply. However, those in the fourth quartile increase their labor supply by

12.7%, while the poorest decrease their labor supply by 3.9%. Tax reforms lead to more gain for females in the fourth quartile than females in the lower quartile. Indeed, the first quartile of single females diverges. MICSIM found that men in couples have much smaller labor supply elasticities than women in couples, especially if they have young children. The labor supply elasticity is relatively high for single parents with young children than for single parents with older children. It is also relatively low for singles without children. It is found that the cross-effects of the husband's income on the wife's labor supply are non-negligible, and the effect of marginal tax rates on total hours worked is limited.

Among the studies investigating the effect of childcare benefit policy change on females, Blundell et al. (2000) find that while participation rates among single mothers increased by 2.2%, it decreased for married mothers. Wrohlich (2004) finds a small but significant impact of childcare costs on mother’s labor supply behavior. The simulation results show that the 100% subsidy of childcare costs leads to a 3% point increase in mothers' labor force participation and a 9% increase in average working hours in Germany. Kornstad & Thoresen (2007) finds that the home care allowance for children and tax-free cash transfer to married or cohabiting families with children aged 1-2 leads to a 9% decrease in mothers’ labor supply in Norway. According to Michalopoulos et al. (1992), childcare subsidies would increase mothers’ labor supply by 7% under the refundable tax credit and 133% under the progressive tax credit.

As for the empirical literature for Turkey, a few studies investigate the effect of social or economic policies by using the microsimulation model. One of them is Ilkkaracan et al. (2015), which is from Levy Economics Institute. This study investigates the effect of Expenditure on Early Childhood Care and Preschool Education (ECCPE) on creating a female labor supply by comparing the effect of 20.7 billion TRY expenditures on ECCPE or physical infrastructure and public housing on the new job creation possibilities using the I-O method. 2011-HLFS and 2011-SILC data which TURKSTAT provides, are used in this study. The estimation is based on the microsimulation algorithm developed by Levy Economics Institute. It finds that with the increase in ECCPE, job creation is more than twice and half that of the increase in the physical construction sector.

Another important study is Albayrak et al. (2016) in Turkey. In this study, direct and indirect tax burdens due to the changes in tax-benefit policies on the individual and household levels are estimated using the static microsimulation model for 2003-2013. The cross-sectional data, which is HBS provided by TURKSTAT, for 2003, 2006, and 2013 are used. Four microsimulation processes are examined. They find that the differentiation of the VAT ratios between 2003 and 2013 and the decrease in VAT on some goods and services cannot decrease the tax burden. Furthermore, the Cost of Living Allowance, which was first started to be applied in 2008, does not affect the tax burden of households. It is concluded that tax policy can only successfully affect income distribution positively by reducing indirect tax burdens.

Another study to analyze the situation before and after the policy is Yılmaz et al. (2016) for The Scientific and Technological Research Council of Turkey (TUBITAK) project. In order to examine the effect of the redistribution of income taxes, it aims to calculate the gross incomes and Turkey's Gini coefficient by using the Household Budget Survey (HBS) for 2002-2013. A comparison of Gini coefficients is made within the scope of the study for both the results for Turkey and the OECD country results to look at the change in public policies after tax and transfer expenditures. In the study, tax burdens are calculated over individual incomes. The household's tax burden is calculated by aggregating on a household basis. The income deciles of household disposable income are constructed, and calculated taxes are added. Then the income decile groups are re-constructed. In order to determine the situation before the policy, the transfer incomes are subtracted. The study concludes that the redistribution of income taxes creates income inequality. Compared to other countries, it concludes that Turkey's tax and transfer system cannot sufficiently improve the inequality between the highest and lowest income groups.

A detailed report by the Ministry of Family and Social Policies which is prepared for the project in the field of Social Inclusion Policies by the common working group formed the social inclusion policies are examined in the context of the relations between demographic changes-income distribution-poverty-employment-education by using dynamic microsimulations (Ministry of Family and Social Policies, 2017). In the report, the number of poor households and people in the period until 2040 is estimated by taking the official poverty definitions into account. The estimations are made under eight different scenarios and macro and micro-econometric models. In the study, projections for the field of social policy are developed to cover the next thirty years. It concludes that changing productivity growth rates via changing employment rates and GDP have a lower impact on inequality and poverty than in scenarios assumed to impact the income generation process directly..

Furthermore, İlkkaracan et al. (2021) examine the effect of public expenditures on Early Childhood Education and Care (ECEC) on employment and income generation, time allocation to paid and unpaid work, and poverty by using microsimulations which are based on the labor demand side. It uses the macro and micro policy modeling following the İlkkaracan et al. (2015) and Levy Institute Measure of Time and Income Poverty (LIMTIP) by matching the dataset from the 2015- Time Use Survey and the Survey on Income and Living Conditions (SILC) in Turkey. The study estimates the policy impact on household income, consumption expenditures, and individuals’ time spent on unpaid work. It concludes that public spending on ECEC services creates over a million new jobs in the care sector; however, it causes time poverty for women having small children. Moreover, the results show that the opportunity cost of women’s participation in the labor market is determined by access to jobs, wages, and the availability and costs of substitutes for household production.

The very recent study is Erol (2022), a tax benefit microsimulation model for Turkey, namely TURKMOD. This study constructs a model for evaluating the effect of tax-benefit policies on income distribution and redistribution using the SILC. The study's primary goals are to ensure the comparability of the tax system and the effect of tax policies in Turkey on income equality and distribution with the EU-28 countries, using the same methodology as EUROMOD. The model first calculates the conversion of net income to gross income. It includes only direct taxes; indirect taxes are not included due to the limitations in TR-SILC data. Comparing the Gini coefficients of Turkey and EUROMOD countries, it concludes that the impact of Turkish fiscal policy is a less income equalizer than the EU.

Since there are just a few studies for Turkey's case, it is crucial to develop such a model. In fact, there is nearly no study evaluating the effect of some social and tax policies on Turkey's female labor supply decision by microsimulation modeling method. Due to the lack of such studies in the Turkish empirical literature, this dissertation will significantly contribute to the literature.

2.2. Female Labor Supply

Social policies and tax-benefit policies have a strong effect on the labor supply decision of individuals. Members of the household make their own labor supply decisions (namely working or not working, part-time or full-time working, working in the formal or informal sector, working in the public sector or private sector, etc.) because of some implemented social or tax-benefit policies such as changing social security premium rate, income tax rate, wage tax rate, or allowances for disabled people or early childhood care, etc. Modeling the labor supply behavior of agents in economics is a crucial issue. In the microeconomic literature, there are different kinds of modeling approaches.

Individuals supply their labor to earn income so that they consume goods and services; thus, they maximize their utility. The microeconomic theory assumes that having more leisure time increases utility levels. In other words, individuals' utility level is positively related to goods and services consumed that they could afford with income earned by supplying labor and spending time for leisure (Mathis & Koscianski, 2002, pp. 552-553). The traditional approach to labor supply modeling assumes that the work hours, which is a choice variable, are piece-wise linear and unconstrained, and the budget set is convex (Berger et al., 2011). Thus, the neoclassical labor supply model asserts that individuals maximize their utility by choosing the optimal working hours subject to a budget constraint.

The first-generation method related to the analysis of labor supply is based on the maximization of a direct utility function under the assumption of continuous hours of work, which is known as the *Hausman approach* [2] (Löffler, Peichl, & Siegloch, 2018). Individual's maximization problem can be written as the following:

$$\begin{array}{lll} \text{Maximizing utility} & U(c,h) & \\ \text{subject to budget constraint} & w.h + \mu = c & (1) \end{array}$$

where c represents consumption, h represents continuous working hours, w is the net wage rate, and μ is the non-labor income. In this problem, wage rates depend on the chosen points on the budget constraint, and they are determined endogenously, in contrast with the commodity demand model (Creedy & Duncan, 2002).

The criticisms of this approach are threefold: (i) Estimations are based on *a priori* assumptions; (ii) the estimation procedure is cumbersome, especially when there is a tax & benefit function in the model. (iii) the estimated elasticities are sensitive to the underlying wages (Löffler et al., 2018). According to Creedy & Kalb (2006), inserting a tax function in the utility maximization problem makes the problem very complicated because of the nonlinear character of the tax rate. Since the budget line is piecewise-linear because of the tax-benefit function, the continuous hours approach must be tackled with the convex and non-convex ranges in the budget set. Therefore, the maximization problem of the utility function with continuous preferences subject to non-linear budget constraints and such complexities would come up with multiple equilibria and tangency problems (Creedy & Kalb, 2005). Thus, it is important to consider how to deal with the nonlinearity and complexities of tax programs when analyzing the effects of tax-benefit policies.

Real-life constraints should be considered when evaluating the impact of tax-benefit or social policies on individuals' labor supply decisions. Since there are a finite number of hours levels to be chosen (such as full-time or part-time working options), the discrete hours labor supply modeling is much more realistic than continuous hours labor supply modeling. Besides, the discrete labor supply modeling has advantages in empirical estimation based on cross-sectional surveys dealing with population heterogeneity (Creedy & Kalb, 2006). Also, it is easy to tackle the non-linear income

[2] See Hausman (1981)

taxes in the discrete choice approach. Contrary to continuous hours labor supply modeling, it is unnecessary to impose coherency conditions (such as monotonicity and quasi-concavity of the utility function) *ex-ante.* One can check them after the estimation, *ex-post* (Berger et al., 2011). Since there is an assumption behind discrete hours labor supply modeling, which is that individuals make labor/leisure choice decisions from a relatively small number of hours levels, this simplifies the solution of the maximization problem. According to some researchers, the discrete choice labor supply approach is more flexible, so it should be used in particular for making *ex-ante* evaluation of the effect of a policy change (Pasifico, 2009, p. 2).

There are many studies on discrete choice of labor supply to simulate the individual reactions to changes in tax-benefit policies. These studies generally use the "structural model", which estimates the wage equation and labor supply decisions jointly, and they ensure direct estimations of preferences over income and working hours (Figari et al., 2014). McFadden (1974) uses a discrete choice model with random utility maximization as a milestone study. It states that the relationship between modeling an individual behavior and data on population choices is decisive when the agent's alternatives are qualitative. It asserts that the econometric model of qualitative choice behavior assumes that individual choices have parametric probability distribution and are multinomially distributed. Most of the discrete choice labor supply models are based on the theoretic argument of McFadden (1974). Van Soest (1995) asserts that the main advantages of these kinds of models are that they can cope with the non-convexities and nonlinearities in the budget set. In other words, nonlinear taxes, unemployment benefits, or other policy implementations can easily be tackled. Furthermore, Blundell et al. (2000) use the structural labor supply modeling to determine the effect of working families' tax credit policy on the participation decision of females because the budget set faced by households in the UK is non-convex, and taxes are non-linear. Since behavioral changes are likely to occur at the corners or kinks of the labor supply functions, the discrete choice labor supply modeling makes estimations easier and more realistic. At the same time, continuous models cannot overcome those difficulties (Labeaga et al., 2008).

Individuals maximize their utility from household income and from leisure subject to budget constraint and the time limitation such that:

Maximizing utility $U = U(y, h; X)$

Subject to $y \leq w.h + \mu - T(h, w, \mu, X)$

where y is income and determined in terms of wages (w), non-labor income (μ), categorical hours of work time (h -such as part-time working, full-time working) and tax function (T (.)) which is non-linear and parametric. X represents demographic characteristics of individuals such as age, marital status, gender, education level etc. There is nonlinearity in the budget constraint in this problem. This non-linearity in budget constraint is generated by tax-benefit program. Because of non-linearity, the solution of discrete choice of utility maximization problem becomes complex one. While the optimization of the continuous choice problem can be solved for given marginal tax-rate and thus get a parametric Marshallian labor supply function, the discrete choice modeling starts by specifying the utility and the parameters (Labeaga et al., 2008, p.255).

Following the McFadden (1974) the utility related to each discrete hours level of work can be described as a function of measured utility and error term. It can be shown as the following:

$$U_i^* = U\,(h_i |\, X) + \varepsilon_i$$
$$= U_i + \varepsilon_i$$

$U\,(h_i |\, X)$ is nonstochastic part of utility and it refers to the representative taste of the population. The error term,ε_i , can be caused by unobserved preference characteristics or individual characteristics (Creedy & Kalb, 2006, pp.39-40). Depending on the distribution function of ε_i, there are probability density function. Let the hours level be *i,* then utility maximization implies that this hour level is chosen if

$$U_i^* \geq U_j^* , \qquad \forall\, j$$

In other words, the individual chooses the alternative that maximizes his/her utility implying the following:

$$P_i \equiv P\,(h_i|\,X) = P\,[\varepsilon_j - \varepsilon_i < U\,(h_i|\,X) - U\,(h_j|\,X)\,] \qquad \text{for all j} \neq i$$

There are two necessary conditions to be held. In the discrete choice labor supply modeling, it is sufficient to check for quasi-concavity to satisfy these two conditions (Creedy & Kalb, 2006).

In the empirical world, there are different methods for estimating the discrete choice of labor supply in terms of the utility function used, types of labor supply choices, econometric specification, and methodology. These studies are summarized in Table A.2. Most of the empirical study in the literature concentrates on female labor participation and labor supply decisions resulting from policy implementation. A large body of them uses discrete choice modeling with the microsimulation model. In order to understand the behavioral mechanism resulting from some policy changes, such as an increase in the subsidy to households for early childcare or a decrease in the taxes or costs of childcare, the dynamic and arithmetic microsimulation model is examined. Some of these studies are based on choosing continuous hours of work. Burtless & Hausman (1978), Arrufat & Zabalza (1986), Hausman (1981), Hausman (1985), and Aaberge et al. (1999) can be shown as early examples of continuous labor supply modeling. These traditional models assume that the decision variable (work hours) is piecewise linear and unconstrained. As an alternative, most recent studies adopt the discrete choice modeling consisting of a finite number of subsets (Berger et al., 2011). This thesis is based on the analysis of the discrete choice modeling approach.

Since the discrete choice modeling of labor supply is based on the comparison of different utility levels, it is crucial to determine its form. In the empirical literature, many utility forms are used, such as translog, quadratic form, Box-Cox transformed, and Stone-Geary form. Besides, there can be other forms for modeling discrete choice of labor supply. The earliest study belongs to Van Soest (1995) in the empirical world. It applies a discrete choice approach to determine the structural model of family supply by using 1987 Socio-Economic Panel data for Dutch families with at least husband

and wife are 16-65 years of age. It focuses on the spouse's behavior in "two adult families." Then, the utility function is described in the translog form, which includes the wife's leisure, the husband's leisure, and family income, and the model is estimated via the smooth simulated maximum likelihood method. Following Van Soest (1995), Wrohlich (2004), Steiner and Wrohlich (2004), Euwals & Van Soest (1999), Flood et al. (2003), Haan (2006), Flood et al. (2007) use the translog form of utility in discrete choice labor supply modeling. On the other hand, most studies use the quadratic form of utility, namely Keane and Moffitt (1998), Labeaga et al. (2008), Wrohlich (2011), Berger et al. (2011), Bargain et al. (2014). Most of these studies add the quadratic forms of variables and their cross sections into the utility function. Van Soest et al. (2002) use the higher degree polynomial form. In addition to these forms, Kornstad and Thoresen (2007), Aaberge et al. (1995, 1999), Blundell & Shephard (2012) use the Box-Cox form of utility, and Michalopoulos et al. (1992), Dagsvik & Storm (2006) use Stone-Geary form of utility in discrete choice labor supply modeling.

Determination of labor supply choices in the modeling procedure is also significant to get an accurate estimation. Most of the empirical studies are constructed on three labor supply choices with respect to discrete hour's levels such as "non-employment", "part-time employment" and "full-time employment". Some of these studies differ in the definition of part-time and full-time employment working hours. Generally, full-time employment is assumed to be working 40 hours/week in line with the legislative regulations of states. For example, Steiner and Wrochlich (2004), Wrochlich (2004), and Keane and Moffitt (1998) categorize working choices such as 40 hours and more working in a week as full-time employment and working between 1 and 40 hours as part-time employment. Some other studies describe these employment categories by taking descriptive statistics of the data and country-specified rules into account. Kornstad and Thoresen (2007) consider 32 hours/week full-time for Norway, while Wrochlich (2011) defines it as 37 hours/week for Germany. Berger, Islam and Liegeois (2011) define the labor supply choices in terms of hours worked but in yearly units. Some structural studies construct the set of choices related to both labor supply and policy argument and make a joint estimation. For example, Wrochlich (2011) adjusts labor supply choices as hours based such that: "non-employment", "marginal employment (8 hours in a week)", "part-time employment (20 hours in a week)", "full-time employment (37 hours in a week)". Childcare costs are categorized into three groups: "no childcare", "part-time childcare", and "full-time childcare". Then, for joint estimation, the decision set consists of 12 choices. A similar method is used in Michalopoulos et al. (1992). Moreover, Dagsvik & Storm (2006) and Blundell & Shephard (2012) determine the median points of some working hour intervals as discrete choices.

For estimation procedures, several methods are used in the literature. There is no consensus on which model to utilize and whether estimated wage rates are to be used for non-employed individuals (Löffler et al., 2018). The wage imputation into the model determines the estimation procedure. There are two methods: estimating the wages for non-workers or a full sample. Generally, wages and labor supply decisions are estimated separately in a two-step procedure following Heckman (1979). (See Kornstad and Thoresen (2007), Wrochlich (2004)). According to Löffler et al. (2018), the estimation results of the models are driven by the prediction approach of wages. It asserts that choosing to predict wage rates for only non-workers or a full sample can cause double the estimated labor supply elasticities.

Furthermore, determining the model specification is crucial. Most studies are based on the logit model and its extensions. The standard discrete choice approach is the "Conditional Logit Model" in the early literature. This approach is based on the "homogenous error variances", a very restrictive assumption (Haan, 2004). Steiner and Wrochlich (2004) and Wrochlich (2004) use the conditional logit model. While the former uses the maximum likelihood estimation procedure, the latter use Heckman's (1979) two-stage estimation procedure. Although the conditional logit model is used in the econometric literature, it has some shortcomings from the restrictive assumptions. These can be summarized in three main points: repeated choices over time, no taste variation, and substitution patterns (Haan, 2004). Because of these limitations, more general models have been developed for discrete choice labor supply modeling in the literature. One of them is the "Multinomial Logit Model", which estimates binary logits for all possible outcomes simultaneously and compares them (Long, 1997).

Since there are multiple and categorical choices to be selected by an individual, the Multinomial Logit Model (MNLM) is used in the literature to estimate the discrete choice labor supply. Keane and Moffitt (1998), Labeaga et al. (2008), and Berger et al. (2011) use the multinomial logit model in their studies. Aaberge et al. (1995), Keane and Moffitt (1998), Van Soest et al. (2002), Van Soest (1995), and Blundell and Shephard (2012) do not estimate wages and labor supply decisions separately. Indeed, they use Simulated Maximum Likelihood Estimation. The studies which use other econometric modeling are summarized in Table A.2.

Estimating the labor supply choice models and getting the estimated parameters are not enough to conclude. Indeed, the size and signs of labor supply elasticities are so crucial that one can make implications for policy analysis by using these tools. The literature has yet to have a consensus on the magnitude of labor supply elasticities. While one study reaches negative wage elasticity for response to hours worked for single individuals, others conclude with zero or positive signs (See Labeaga et al. (2008), Michalopoulos et al. (1992), Berger et al. (2011)). Regarding elasticity of participation, there are also differences in studies according to being single or married, female and male. Reasons for differences in sign and magnitude of labor supply elasticities depend on differences in individual preferences, country-specific rules, and norms. Table A.2 contains detailed information about estimated labor supply elasticities in the literature. Generally, policy implications have a negligible effect on the labor supply of men rather than women. For some countries, the income effect of wage increases or increases in given benefits on the females' elasticity of labor supply is larger than the substitution effect, so the labor supply decreases in terms of hours worked or labor force participation. For some countries, the fact is the opposite. For example, while in Germany, Italy, the UK, the USA and Spain, there is a positive relationship between non-labor income and labor force participation for females, Kornstad & Thoresen (2007) show that cash transfers for preschool children lead to mothers withdraw from the labor force in Norway. On the one hand, in the literature, the sign of elasticity of labor supply for wage rate can be differentiated between married mothers (or mothers in couples) and single mothers for some countries; on the other hand, this may not occur for some other countries. For instance, Michalopoulos et al. (1992) show that the elasticity of hours worked with respect to wage increase is positive for married mothers and negative for single mothers in Italy. Also, it is the same for Luxembourg as Berge et al. (2011) and for the UK, as Blundell et al. (2000) states. However, in Spain, the elasticity of hours worked with respect to wage is positive for both single and married females. (See Labeaga et al., (2008)). Even within a country, there can be different labor supply elasticity rates regarding wage rates. Wrohlich (2004), Steiner & Wrohlich (2004), and Wrohlich (2011) find that the elasticities of participation rate and hours worked are different for females in West Germany and East Germany because of different preferences and work experience constructed by socialism in East Germany. Instead of these country-specific differences in labor supply elasticities, most of the studies in literature reveal that childcare costs tend to decrease labor force participation of women with preschool children (For example, Wrohlich (2004), Wrohlich (2011), Leombruni & Richiardi (2006), etc.)

There are significant studies related to the female labor supply modeling for Turkey. These models are generally based on determining the participation decision. Among these studies, individual-specific variables such as age, level of education, and marital status are used as explanatory variables in common. In addition to these variables, Dayıoğlu & Kasnakoğlu (1997) and Dayıoğlu (2000) use the number of children, household size, household head or not, other household member's income, education level of household head, and individual's unpaid income as explanatory variables for the participation equation. Tansel (1998), Tansel (2005), and Cudeville & Gurbuzer (2010) expand the model by using the unearned income of an individual and the other household members. Tansel (2005) also includes the amount of land owned as a participation decision variable in the model.

Moreover, Taymaz (2009) moves this model one step further by using the child dummy, which represents the individual as a daughter/son, daughter/son-in-law, granddaughter/son, or other relatives/nonrelative aged less than 30, and the parent dummy which is the inverse of the child dummy. It also adds the cross-products of these dummies with the family size. It also creates the variable that measures whether there is any registered person in the household and the variables which measure whether there is an unemployed household head. Taymaz (2010) constructs the model including age, education level dummy variables, marital status, whether the household head is unemployed or not, a dummy variable for the child, the interaction of household size and parent, household size, and child dummy for the labor market participation model. In order to consider the macroeconomic conditions, Alcan (2018) includes the ten-year average growth rate and time trend.

Dayıoglu & Kasnakoglu (1997), Dayıoğlu & Kırdar (2010), Alcan (2018) construct the discrete choice labor supply with a binary dependent variable for men and women, which is entering the labor market or not. Alcan (2018) uses the weighted linear probability model for the estimation, Dayıoğlu & Kırdar (2010) uses the logistic regression model. Tansel (1998), Taymaz (2009), and Taymaz (2010) use the multinomial logit model for the selection decision.

The estimated results of empirical studies for Turkey are similar in general. The probability of female participation is increasing with the level of education in almost all studies. Tansel (2005) finds that education has a significant and positive effect on increasing the probability of joining the public sector, state-owned enterprises, and private sector. Taymaz (2009) states that more educated employees prefer formal employment.

According to the estimation results of Tansel (1992), Dayıoğlu & Kırdar (2010), Taymaz (2009), Taymaz (2010), Cudeville & Gurbuzer (2010), Alcan (2018), there is a hump-shaped relation between age and the probability of being in the labor market for females. Women residents in rural areas have more propensity to participate. Dayıoglu & Kasnakoglu (1997) reaches that single women have more propensity to participate in the labor market than married women. Alcan (2018) finds a positive relationship between the ten-year average growth rate, time trend, and participation probability.

Dayıoğlu & Kırdar (2010), Cudeville & Gurbuzer (2010), Alcan (2018) find that having children reduce the probability of female participation. In addition, as the number of children increases, this probability decreases. Tümen & Turan (2020) proves that the increase in family size via multiple births leads to a decrease in the hours of work of females and participation in the labor force.

Tansel (1992), Tansel (1998), Tansel (2005), Cudeville & Gurbuzer (2010) find that the probability of female participation decreases with household wealth. Dayıoglu & Kasnakoglu (1997), Taymaz (2010) find that the effect of household size is negative for female labor market participation. Furthermore, according to the estimation results of Taymaz (2010), being unemployed for the household head is also negative for female labor market participation.

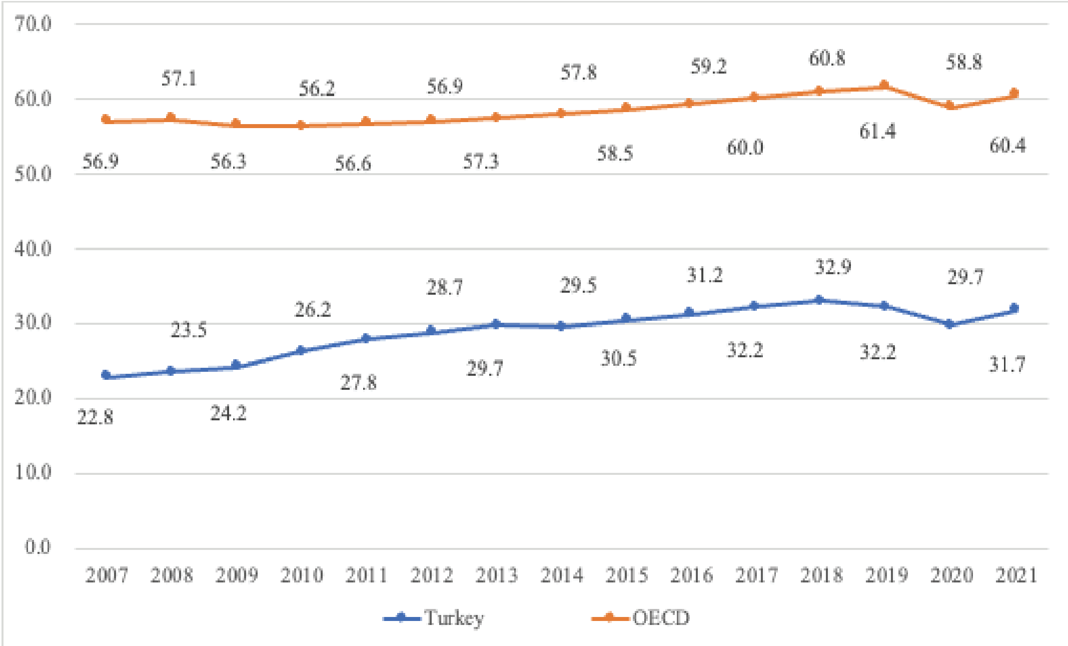
CHAPTER 3

FEMALE LABOR SUPPLY AND SOCIAL POLICIES IN TURKEY

3.1. Main Trends in Female Labor Supply in Turkey

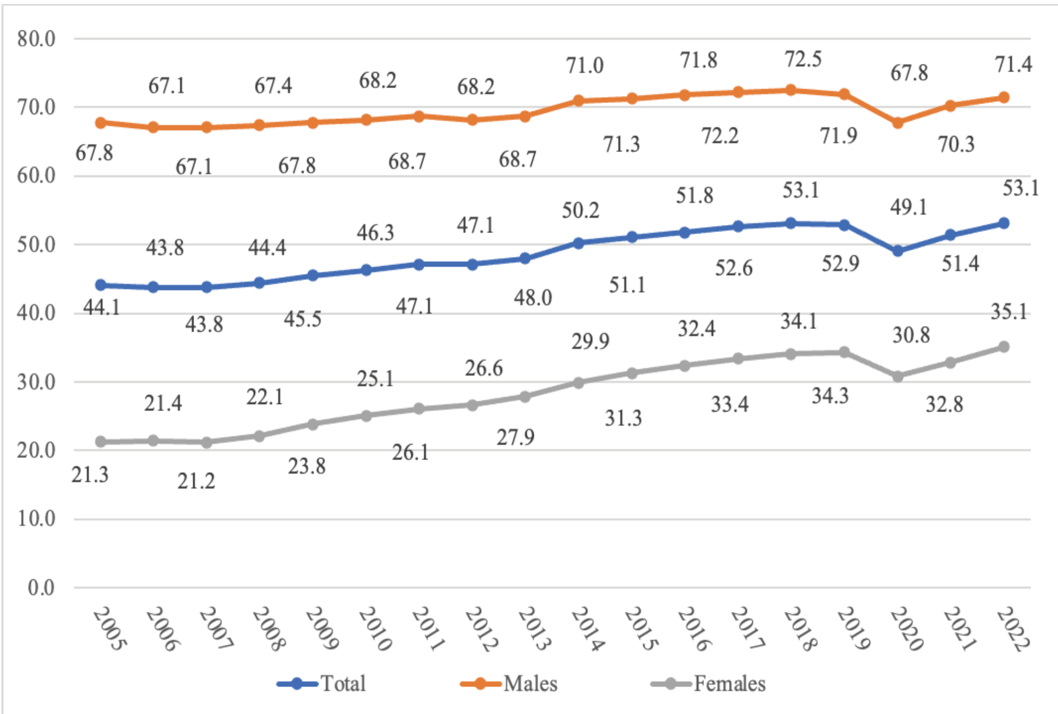
OECD defines the labor force participation rate as the labor force divided by the total working-age population. The working-age population indicates individuals aged between 15-64 (OECD, Labor Force Participation Rate (Indicator), 2023). Since the mid-2000s, the female labor force participation rate has increased. This is a remarkable development for economic growth in Turkey. Despite this positive development, male participation and employment rates are higher than female. Most intergovernmental agencies try to produce policy tools for increasing female labor supply and female employment for further economic development, productivity, and gender equality, especially for developing countries such as Turkey.

In the first years of the establishment of the Republic, the female labor force participation rate in Turkey was high, as more women were employed in the agricultural sector. This rate decreased until the mid-2000s with the migration from rural to urban areas. Since the mid-2000s, female labor force participation and female employment have increased (except in 2020 because of the global COVID pandemic) with supply-side improvements such as the increase in education level employment, decrease in fertility, increase in the age of marriage and first birth, and technological developments that facilitate household chores. Female labor force participation, which first decreases and then increases, is interpreted within the framework of the U-hypothesis. (Dayıoğlu, 2022; Tunalı et al., 2021). Employment rates for women are 32.2% and 31.72% in 2019 and 2021, respectively. However, even if the female labor force participation rate increases, Turkey has one of the lowest employment rates for females among the OECD countries (Figure 2).



Source: OECD Labor Market Statistics, (Data extracted on 09 Jan 2023 07:33 UTC (GMT) from OECD.Stat)

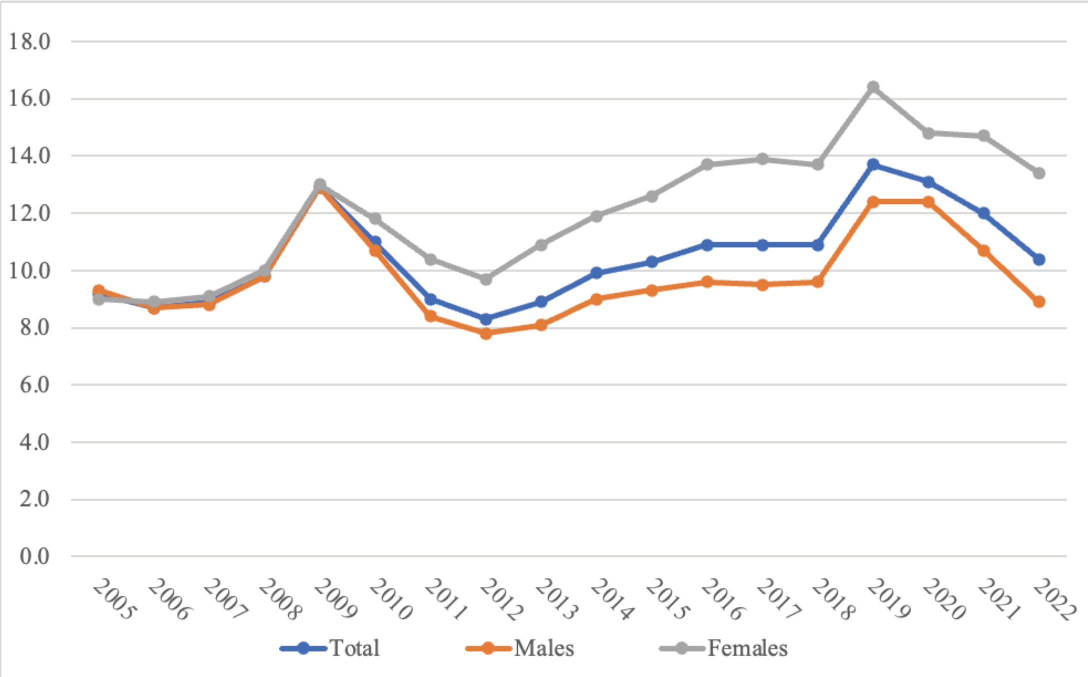
Figure 2: Employment Rate of Females, Aged 15-64 in Turkey and the OECD Countries, 2007-2021 (%)



Source: TURKSTAT, Labor Force Status of the Population Statistics

Figure 3: Labor Force Participation Rates in Turkey by Gender, 2005-2022 (%)

In Turkey, female labor force participation rates are lower than that of males. These low rates pull-downs the overall participation rates. Moreover, the unemployment rates for women are higher than that of males since 2010 (Figure 4).

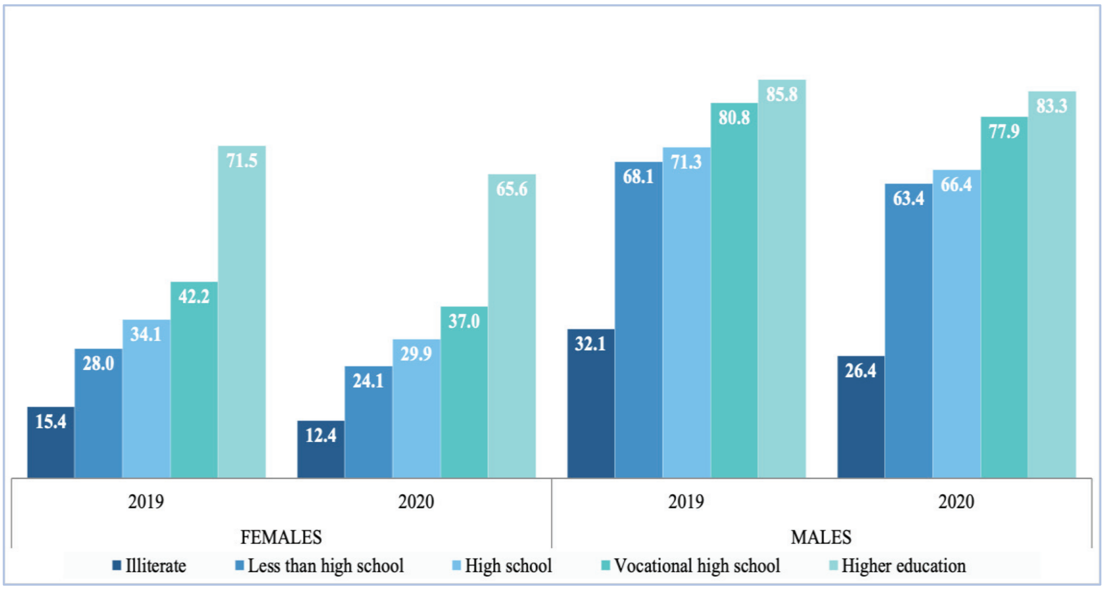


Source: TURKSTAT, Labor Force Status of the Population Statistics

Figure 4: Unemployment Rates in Turkey by Gender, 2005-2022 (%)

In the ninth development plan, there were statements about aiming to increase the participation of women in the workforce. World Bank emphasizes that increasing female labor force participation is crucial for economic growth and poverty reduction. Furthermore, World Bank states that the higher rate of female employment leads to higher investment in girls' education, creating a positive externality for the welfare of the next generations (World Bank Report, 2009). When the labor force participation rates for males and females are compared by educational level for the years 2019 and 2020, it can be seen that as the educational level increases, the participation rate also increases (Figure 5). However, it is noticeable that the female participation rate is still lower than that of males.

In order to analyze the female labor supply, many studies have been published in Turkey. Some studies, such as Dayıoğlu & Kasnakoğlu (1997), define the main factor affecting the participation decision as the difference between reservation and market wage levels.



Source: TURKSTAT, Women in Statistics, 2021

Figure 5: Labor Force Participation Rates by Gender and Educational Level, 2019 and 2020 (%)

If the market wage level is below the reservation, then women do not prefer participating in the labor market. Some other studies, such as Tansel (2001), Taymaz (2010), Tsani et al. (2012), and Göcen (2020), analyze the relationship between economic growth and the labor force participation of women. On the other hand, most of the studies focus on women's demographic or individual characteristics. Palaz (2010) indicates that females' characteristics, such as age, educational level, the number of children, and children's age, etc. affect women's labor force participation. Furthermore, it concludes that limited labor market choice and some institutional barriers to education and training affect women's employment. Hoşgör & Smits (2008) defines the modernization of women as being highly educated, having a spouse with higher occupations, having fewer children, and living in an urban area. Thus it asserts that modernization suppressed traditional gender roles and thus it leads to an increase in women's rate of participation in the labor market women. Taşseven et al. (2016) indicate that educational attainment and fertility postponement increase female labor force participation.

Aldan (2021) emphasizes that women have less unobservable skills and career motivation, so female labor force participation is affected negatively. Dayıoğlu & Kırdar (2010) emphasize that fertility, high internal migration, and being a low-skilled employee leads to a decrease in wage, thus reducing the participation of females. Tümen & Turan (2020) finds that for formally employed women, wages and participation in the labor market decrease as the family size increases with giving birth. Tunalı et al. (2021) also emphasize the relationship between the female labor participation rate and age, year, and cohort effects.

3.2. Social Policies in Turkey

Many social programs are applied to eligible people to increase their welfare in Turkey. Implemented social benefit programs vary in terms of target group, scope, and attributes of the programs. Within the scope of social benefit programs, health services for persons deprived of payment are provided; also, for poor children, students, elderly, and disabled people, cash and in-kind benefits are provided. Such programs include cash transfers for education, health, shelter and in-kind transfers such as firewood, clothes, and household goods to unemployed, elderly, and disabled people.

These programs, which are implemented by the Ministry of Family and Social Services (MFSS), can be categorized into four main titles: Transfers to families, transfers for education, health benefits, and elderly-disabled benefits.[3]

3.2.1. Transfers to Families

They generally consist of cash transfers given to households whose per capita income is less than 1/3 of the net minimum wage. There are also a few in-kind transfers in this group. Unless other requirements are necessary, these transfers focus on the poor and older than 18 years old people.

***Food Aids*:** his program was first introduced in 1976 by Law No. 2022. Since then, it has been implemented twice a year before Ramadan and Eid al-Adha to meet the basic needs of families in need, such as food and clothing. This program is for households

[3] These policies are summarized and translated from MFSS Activity Reports from 2005-2019.

whose per capita income is below 1/3 of the net minimum wage. Older than 18 years old household members can apply for this program.

Shelter Aids**:** This program was first introduced in 1976 by Law No. 2022. It also covers households whose per capita income is less than 1/3 of the net minimum wage and who live in ungainly old, neglected, and unhealthy houses. These aids are cash and in-kind transfers for the maintenance and repair of their homes, reinforced concrete house construction, prefabricated house construction, and purchase of household goods. Support is given according to the need.

Social Housing Project**:** This program benefits households who do not have social security and are poor and needy. It covers the construction of houses through the Housing Development Administration of Turkey (TOKİ). The house is given to needy persons in a refund payment method. Repayments are completed in 270 months.

Charcoal Aids: This benefits-in-kind are given to low-income families to meet their winter fire needs, at least 500 kg per household, including free-of-charge coal aid. This program has been implemented since 2003 once a year for winter. AÇSHB asserts that underground resources are brought to the economy; significant contribution is made to the transportation sector and employment.

Cash Benefits Program for Females Whose Husband Died*:* These are cash benefits given to women who have lost their officially married spouses and need social security and poor ones within the scope of Law No. 3294. It has been implemented since 2012, and the cash benefit is paid bimonthly. Divorced women could not benefit from this program.

Aid Program for Poor Families of Soldiers**:** It is ensured that the poor and needy citizens who do not have social security are supported during their military service. This program has been implemented since 2013. Payments are made every two months in cash.

Aid for Poor Soldier's Children**:** These are cash benefits given to children under 18 whose father is in military service and in need under Law No.3294 on the

Encouragement of Social Assistance and Solidarity. It has been implemented since 2015 bimonthly.

Orphan Aid**:** This is a regular and cash social assistance program for children under 18 years old whose mother or father has passed away within the scope of Social Assistance and Solidarity No. 3294. It has been implemented since June 2015 in cash.

Birth Aid**:** Turkish citizens and Blue Card holders who give live births can benefit from this aid program since 15.05.2015. This benefit is a one-time cash payment for households.

3.2.2. Transfers for Education

These transfers provide cash and in-kind benefits to low-income families to help them meet children's school needs in primary and secondary education. While the proportion of transfers for educational purposes within the aid activities of the Social Assistance and Solidarity Encouragement Fund was 23% in 2002, it is approximately 32% in 2015 and 44.4% in 2019.

Course Material Aid: These benefits are educational material grants to low-income families (household income per person is less than 1/3 of the net minimum wage), and in need and have no social security, and have children of primary and secondary school age as required by law numbered 3294. It covers basic school needs such as primary school and high school level gowns, shoes, and bag stationery. These benefits are given twice a year during the education period.

Conditional Education Aid: They are provided to poor and needy families without social security on condition that they send their children to school. Conditional education aid is provided to families in the poorest 6% of the population who cannot send their children to school due to financial difficulties, provided that their children attend school. This policy has been applied since the 2003-2004 academic year. The amount of cash benefits varies between boys and girls due to positive discrimination.

Lunch Aid: In collaboration with MEB, lunch is provided to poor students who are moved to the centers where the schools are located. It has been implemented since the 2003-2004 academic year, and lunch is given every day in each semester.

Course Book Aid: Primary and secondary school students' course books are distributed for free. It has been implemented since the 2003-2004 academic year.

Student Housing, Transportation, Accommodation Aid: As a requirement of law numbered 3294, this policy provides transportation, lunch, housing, etc., for primary and secondary school students outside the transport system via Social Assistance and Solidarity Foundations.

Transportation Services of Disabled Students**:** Support is provided in cooperation with the Ministry of National Education to ensure the access of disabled students with special education needs to schools. It has been provided since the 2004-2005 academic year.

Dormitory Construction: Dormitories with a capacity of 100, 200, and 300 people are built where secondary school students are needed. Poor students can utilize these dormitories.

3.2.3. Health Benefits

These are generally provided for those without health insurance, are poor, and are disabled.

Disabled Aids: It is a social assistance program to meet the needs of all kinds of tools to facilitate the integration of poor, disabled citizens into society. It has been implemented since 1997. The amount of aid is determined according to the needs of disabled persons.

General Health Insurance Premium Support (GHIPS): The health insurance premiums of the citizens who do not have social security and meet the income criteria are paid to the Social Security Institution (SSI) by our Ministry. If the per capita income level is below 1/3 of the gross minimum wage, the state pays the GSS premium. Before 01.01.2012, within the scope of health aid, health expenses exceeding the payment capacity of the citizens who were not covered by the green card and without the green card and the medicine and treatment expenses of the citizens without social security were covered. However, with the entry of Law No.

5510, the treatment and health care costs of all our citizens are included in this scope on 01.01.2012.

General Health Insurance Participation Support: In the scope of 5510 Social Insurance and General Health Insurance Law articles 60 / c-1 and 60 / c-3, it covers the general health insurers' and their dependents' refunds of expenses for hospital, medicines, prescriptions, and optical contributions.

Conditional Health Aid: They are provided to families who need social security and have low-level income and send their children to health check-ups, while mothers are required to go to health check-ups during pregnancy and give birth in the hospital. This policy has been implemented since 2003. Within the scope of Conditional Health Assistance, families in the poorest part of the population are provided with regular cash on the condition that they take their children between 0-6 years of age to health checks regularly, provided that women have given birth at the hospital and regularly go to the doctor.

3.2.4. Transfers to Elderly and Disabled People

Turkish Citizens over 65 years of age who do not benefit from an income or monthly benefit from any Social Security Institution and whose income per person in the household is less than 1/3 of the monthly net amount of the minimum wage and persons with disabilities over the age of 18 and persons who are legally obliged to take care of disable persons who have not completed the age of 18, can benefit these transfers in the requirement of the Law No. 2022 on "Providing Monthly Payment to Turkish Citizens Who are Over 65 Years Old, in Need and Powerless and Alone".

Old Age Benefit: These benefits are cash payments ruled by Law No. 2022 to needy old-aged persons. Individuals older than 65 years of age and who do not have any social security or alimony can benefit from this transfer. Payments are made quarterly. This policy has been implemented since 1976.

Disabled Benefit: These are cash transfers given to individuals with 40% or more disability, as required by law numbered 2022. According the rule, beneficiary person should not have social security and income per person in the household should be less than 1/3 of the monthly net amount of the minimum wage. This policy has been implemented since 2005. Payments are made quarterly in total amount.

Benefits for Relatives of Disabled Persons under 18 Years Old: These payments are made to 40% or more relatives of disabled people who are cared for, reside in the same household, and are under 18. Furthermore, the income per person in the household should be less than 1/3 of the monthly net amount of the minimum wage. Payments are made quarterly. These benefits have been given since 2005.

Aid to Silicosis Patients: Workers who suffer from silicosis, defined as lung disease, cannot benefit from social security under Laws No. 5510 and 506 as they have worked uninsured. With the amendment made to Law No. 2022 in 2011, this benefit is provided social benefit to silicosis patients who could not benefit from the protective provisions within the scope of social insurance and who lost at least 15% of their ability to earn in the profession due to their illness. With this amendment in the law, the children can be connected monthly. However, assistance is only provided to applicants within three months from this amendment's publication date. The benefits are paid every three months. No new applications have been received for these aids.

Home Care Aid**:** Individuals who have 50% or more disability with a health board report can benefit from this aid. The average monthly income per person in the household should be less than 2/3 of the net monthly minimum wage in order to benefit from this aid. It has been implemented since 2005. The payments are made monthly.

3.3. The Data and the Characteristics of Female Labor Supply in Turkey

In this dissertation, Household Budget Survey (HBS) micro-level data of the Turkish Statistical Institute (TURKSTAT) for the years between 2004 and 2019 are used.[4] This survey has been carried out annually by TURKSTAT since 2002. It is the most important data source that includes information about socio-economic attributes such as age, education, job status, and work conditions. Furthermore, it also has information

[4] Since the COVID-19 Pandemic occurred in 2020, the survey was not conducted for this year.

about consumption expenditures and details of the household, the income levels and details of the household, and the characteristics of the house they live in. Since HBS is a data set that can represent the structure of households in the country and it is a rich dataset containing detailed information on the consumption of household and working hours, wages, other earnings, and income sources on the individual and household bases, this data set is preferred to use for analyzes. Therefore, this dataset has many advantages in estimating the effect of tax-benefit or social policy change on households' individual labor supply decisions.

The survey aims to produce information on consumption habits, consumption preferences, and patterns by tracking conditions such as the characteristics of the household, employment status, and conditions such as working hours, wages, and total income of the household and its source. The survey also intends to determine the items for consumer price indices obtaining base year weights. It also assists the minimum wage determination studies by compiling the necessary data (TURKSTAT, 2020).

The first survey, namely the "Household Income and Consumption Expenditures Survey" was conducted on the civil servant household in Ankara in 1954. Afterward, between 1964-1970, 1973-1974, and 1978-1979, this survey was applied with determined scopes, and Consumer Price Indices (CPIs) were established based on these years. The Household Income and Consumption Expenditures Survey of 1994 was conducted differently than the other surveys, with two separate questionaries to determine household consumption expenditures and income distribution. The results of this survey were used to calculate the CPIs.

The survey contains urban-rural levels between the years 2002 and 2013. At the beginning of 2002, it was applied monthly to 650 urban and 150 rural households because the Turkish Statistical Institute planned to conduct a small scale. It was conducted on 25,920 households in 2003, 8,640 households in 2004-2008, and 13,248 households between 2010-2014. Furthermore, 15,552 households are covered in the years 2015-2019. The number of households that HBS covers is shown in Table B.1 in Appendix B.

The survey covers all household members in Turkey. The institutionalized population, such as people living in nursing homes, prisons, hotels, childcare centers, hospitals, people who are in military service, and the nomadic population, are excluded from the survey sample. The TURKSTAT selects the sample via a stratified two-stage cluster sampling method. The surveyed households are changing every month for one year. It provides cross-sectional data on households but does not have a panel dimension. HBS has three different questionnaires: Individual, Household, and Consumption. These three files are connected via the attribute (primary key) "BIRIMNO", which is the household ID number.

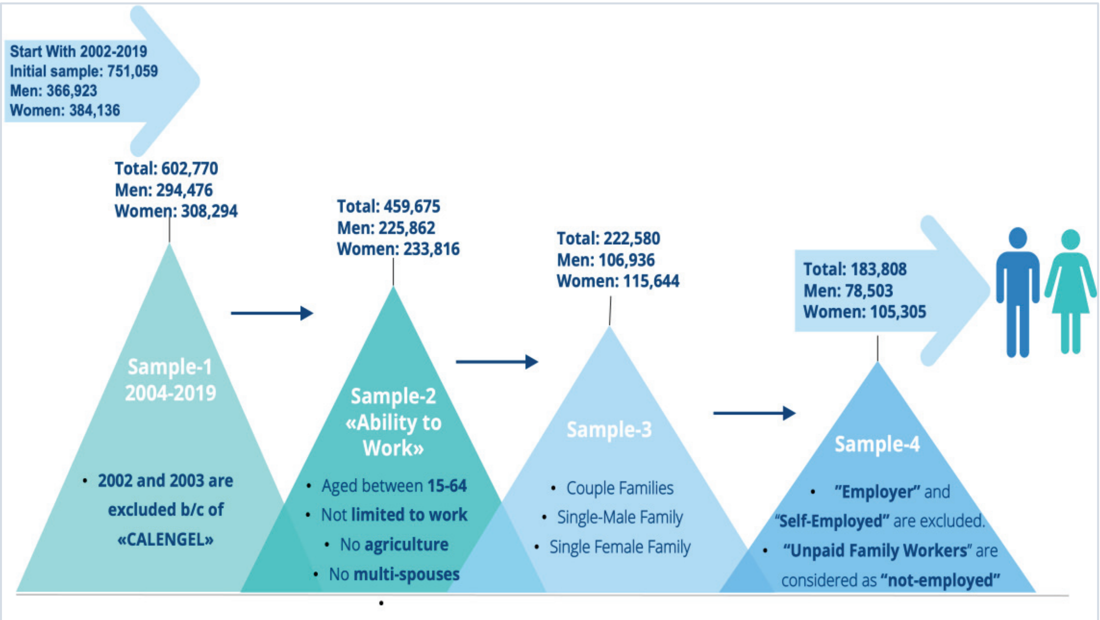
The individual-based questionnaire includes data on individuals' characteristics such as age, gender, education level, marital status, relationship with the reference person, health insurance ownership, whether there is a disability that interferes with daily activities or working activities, working status, working sector, weekly working hours, employment status in the job, duration of employment, total annual cash and in-kind income, transfers, annual income from other sources (e.g., assets, rent), etc.

The household-based questionnaire includes information on household-level data such as household type, type of residence, ownership status of the house, monthly rent amount, imputed rent, area of residence, the existence of debt of house, size of residence, ownership of car, motorcycle, sea crafts, house, secondary house, summer house, land, plantation, household facilities and articles such as furniture, refrigerator, elevator, washing machines, dryers, carpet cleaner, air-conditioner, etc., and total disposable income including imputed rents, total household consumption, etc.

The consumption-based questionnaire is based on the Classification of Individual Consumption by Purpose (COICOP), established by the United Nations. Until 2015, the version COICOP_HBS version was used. Since 2015, the new version of COICOP (v.2011) has been used to classify. The main expenditure groups are two digits, and the subgroups are five digits. This file contains approximately 199 items of goods and services until 2015; and approximately 300 items after 2015.

The scope of the survey in terms of consumption expenditures is the purchases of household in the survey month, the consumption of their products in the survey month and those produced in previous months but consumed during the survey month, consumption of in-kind income for employed members of a household, and goods that are purchased for gift or donations. The information on the household's disposable income during the last 12 months is recorded as an income.

The dissertation uses the cross-sectional dataset for the years 2004-2019. The micro-unit of the survey is the household, composed of individuals living together. This dataset allows controlling for individual characteristics. The data manipulation process is summarized in Figure 6.



Source: Author's Own Calculations Using 2002-2019 HBS.

Figure 6: The Data Manipulation Process

The initial sample belongs to the period 2002-2019, comprising 751,059 observations, of which 384,136 are women and 366,923 are men. Table B.2 in the Appendix shows the number of observations of the initial sample for men and women, namely "Sample-1" and the ones scaled down for analysis, according to years. In the dissertation, analyses are made using households that include *at least one individual who has the ability to work*. Since the questionnaire of the years 2002 and 2003 does not include information on whether a household member has limitations in activities related to work because of a health or mental problem to work or not, which is encompassed by the variable "CALENGEL", these years are not utilized in the analyzes. Therefore, the data which is used for this dissertation consists of 602,770 observations, of which 294,476 are men and 308,294 are women for the years 2004-2019. In other words, the sample contains families that include at least one individual aged between 15 and 64 and is not limited to activities related to work because of a health or mental problem. Furthermore, since the effect of tax-benefit and social policy on the individual's behavior of labor supply is analyzed, the sample is narrowed by excluding the households with one of the spouses working in the "agricultural sector" because most of the employment in the agriculture sector consists of self-employment and non-wage family workers and therefor the dynamics of employment in agriculture is quite different from the non-agricultural sector (Tunalı & Başlevent, 2002). In addition, households with multi-spouses are excluded from the sample. Finally, this sample, which is "Sample-2", ends up with 459,675 observations, of which 233,816 are women, and 225,862 are men, as shown in Table B.2.

This dissertation aims to estimate the discrete choice labor supply functions and to determine the own-wage elasticities. Thus, analyses and estimations are made for different types of households. In this context, household types are constructed as three-fold for descriptive analyses: *couple-family, single-female family, and single-male family*. After rearrangements of the data, the new sample, "Sample-3" consists of 222,580 observations. The number of observations for men and women in this sample is 106,936 and 115,644, respectively.

To better understand the impact of policy changes on wages and labor supply choices, we have narrowed our sample to only include those who are classified as "regular employees" or "casual employees." This means that observations from employers and self-employed individuals have been excluded from our data. Additionally, unpaid family workers are considered to be "not employed." It's important to note that working conditions can differ greatly between rural and urban areas, particularly for women. However, there is no differentiation between these areas in the HBS data after 2014. Therefore, we have excluded households with individuals working in the agricultural sector (such as agriculture, forestry, and fishing) from our pooled sample in order to eliminate the rural area from our analysis.

Following the dataset rearrangements, the final sample includes approximately 183,808 individuals, with 78,503 being men and 105,305 being women. This sample is labeled as "Sample-4" in Table B.2. The weights are determined by the variable "FAKTÖR," which is based on population projections from the Address-Based Population Registration System (ABPRS) computed by TURKSTAT.

In this dissertation, we analyze how social and tax policy changes affect individual decisions regarding employment. To do this, we classify labor supply into four categories based on weekly working hours: "Not Employed", "Part-Time Employment", "Full-Time Employment", and "Over-Time Employment". The variable used to measure weekly working hours is obtained from the HBS survey and represents an individual's normal working hours in their main job. If an individual is unable to provide a specific time, we rely on their actual working hours over the past four weeks.

In this study, if an individual is eligible for work (no disability and aged between 15-64) and works “0” hours weekly, then s/he is assumed to be not-employed. Among the individuals who are eligible for the labor force, the ones who are working “1-30” hours in a week are considered in “Part-Time Employment”; the ones who are working “31-49” hours in a week are considered “Full-Time Employment” and the ones who are working 50 and more hours are considered in “Over-Time Employment”. The descriptive analyzes are evaluated under these labor supply categories. Since there are indicators of the beginning of an economic crisis in Turkey for the year 2019, descriptive statistics[5] are constructed by taking the data of the year 2018 to be given more accurate information.

3.3.1. Individual Characteristics

3.3.1.1. Age

The Human Capital Theory states that "age" plays a significant role in determining an individual's labor market status. In the HBS individual-based questionnaire, which is

[5] Unless otherwise noted, weighted variables are used in all tables and figures. Weights are calculated by TURKSTAT at the household level on the basis of the Address Based Population Registration System (ABPRS).

provided by TURKSTAT, there is a question measuring the age of individuals in household. In the years 2002-2005 and 2011-2019, the “yas” variable measures the age of household individuals. Besides, in the years between 2006 and 2010, the variable “yasgrup” refers to individuals’ age interval. There are 13 intervals as the following: “0-5”, “6-14”, “15-19”, “20-24”, “25-29”, “30-34”, “35-39”, “40-44”, “45-49”, “50-54”, “55-59”, “60-64”, “65 and over”. Since there is no exact age information of individuals for the years between 2006 and 2010, the “yasgrup” variable is constructed for all the years in the dataset.

The sample analyzed for labor supply decisions does not include individuals under the age of 15 due to their exclusion from the labor force according to the International Labor Organization's employment definitions. Likewise, those over the age of 65 are considered retired and are therefore not included in the labor supply decision-based analyses.

Table 1 shows the number of people by age for men and women according to the household types, namely couple family, single-male family, and single-female family for the year 2018. The data reveals that there are more individuals within the productive age range of 35-39 compared to younger and older ages for both genders. Additionally, after reaching 34 years old, the number of single men decreases, while the number of single women gradually increases with age.

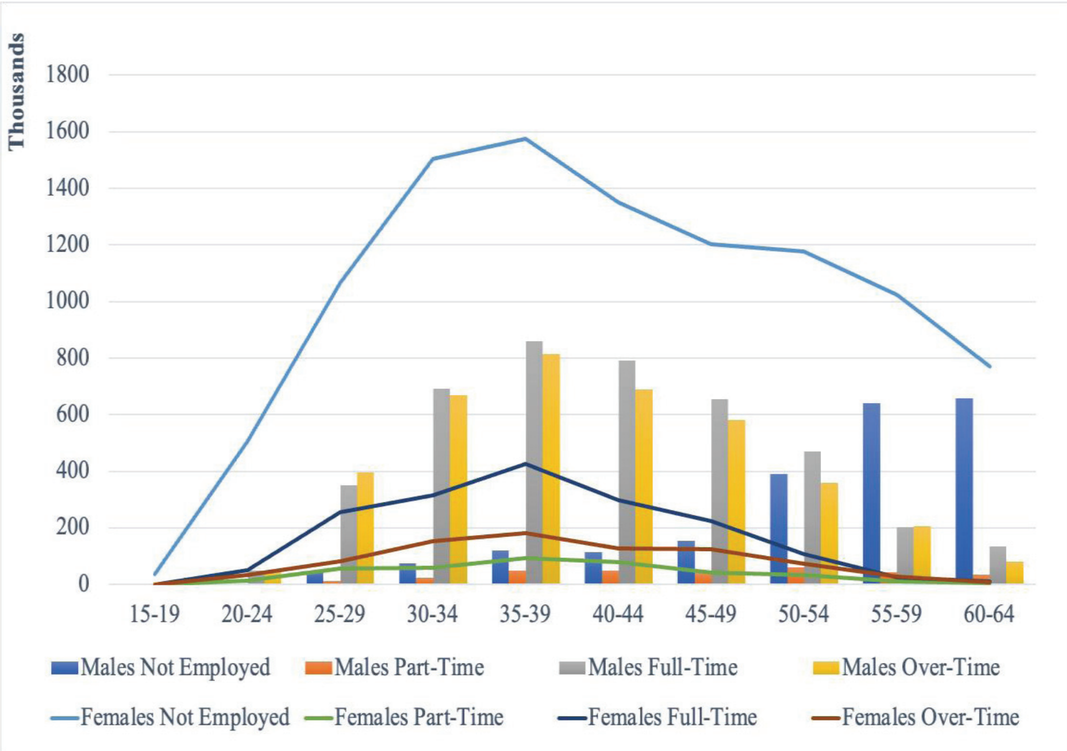
Table 1: Number of Individuals by Age Groups and Family Types, 2018

	Males		**Females**	
Age Groups	*Couple Family*	*Single-Male Family*	*Couple Family*	*Single-Female Family*
15-19	1,328	12,575	36,801	2,098
20-24	98,063	136,711	604,848	48,905
25-29	804,244	238,832	1,460,508	147,629
30-34	1,457,513	238,505	2,033,331	188,916
35-39	1,842,664	195,051	2,275,403	172,164
40-44	1,645,682	162,282	1,852,631	198,905
45-49	1,431,736	131,825	1,591,493	248,087
50-54	1,283,506	130,393	1,393,692	303,177
55-59	1,093,907	96,818	1,087,671	335,492
60-64	906,207	113,635	794,695	372,778

Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

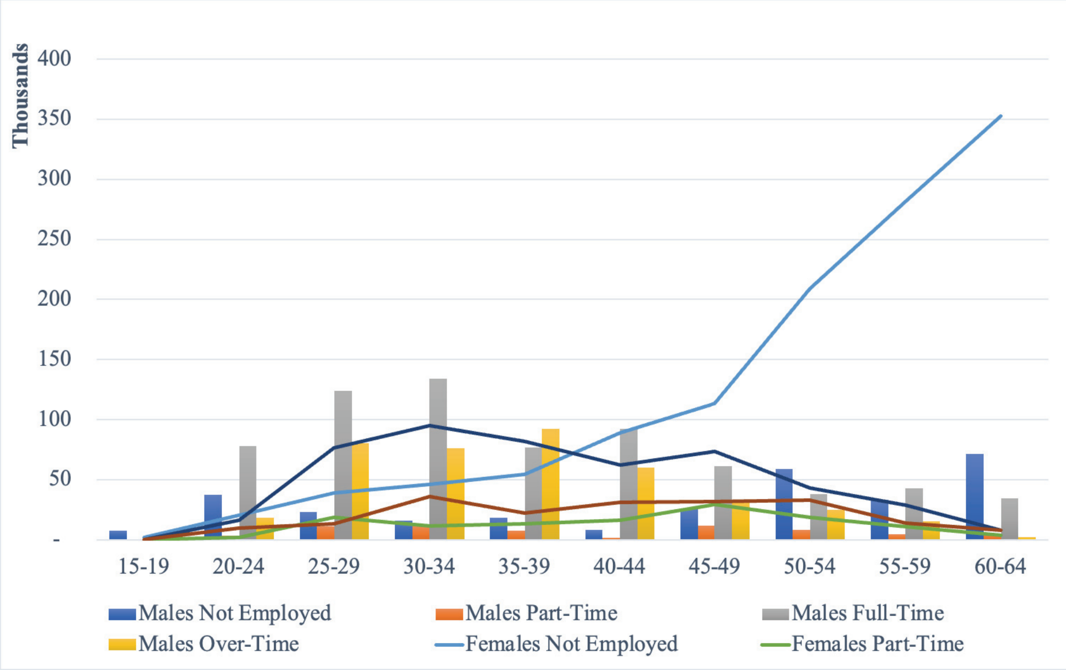
Figure 7 and Figure 8 show us the number of observations according to labor supply status and ages for couple-family and single-family, respectively. For the year 2018, the number of not-employed men in couple families increases as age increases, while there is a hump-shaped relationship between age and not-employment for women. On the other hand, in single families these relations are just the opposite. The relationship for not-employed men is U-shaped although it is increasing for the not-employed women.

Moreover, there is a hump-shaped relationship between age and full-time working and over-time working in the couple and single-family types for men and women. While the number of observations for part-time working single-male reveals the U-shaped relationship according to age, it reveals a fluctuating relationship for single women working part-time.



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 7: Number of Individuals by Age Groups and Labor Supply Status, Couple Families, 2018



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 8: Number of Individuals by Age Groups and Labor Supply Status, Single Families, 2018

3.3.1.2. Education

The Human Capital Theory asserts that an increase in employees' education levels leads to an increase in their productivity. The wage rate is significantly affected by the education levels of the employees, as one of the critical arguments for labor supply.

Between 2002 and 2014, the HBS individual-based questionnaire had eleven categories for educational status. In 2015, this number increased to twelve categories by combining "illiterate" and "literate but not completed any school", and separating "master's degree" and "doctorate" as well as higher educational institutions for "4 years" and "5-6 years". Currently, the educational status categories in the HBS individual-based file are: "No Diploma", "Primary School", "Secondary School", "Vocational school at secondary school level", "High school", "Vocational school at high school level", "Higher educational institutions for 2-3 years", "Higher educational institutions and faculties for four years", "Faculties for 5 or 6 years", "Masters (Except faculties for 5 or 6 years)", and "Doctorate". It is important to note that these categories have changed since 2015, resulting in some adjustments.

Firstly, since the number of observations of some categories is relatively low, “Secondary School” and “Vocational school at secondary school level” are merged. Furthermore, higher education for four years, master’s, and doctorate degrees are combined for the estimation.

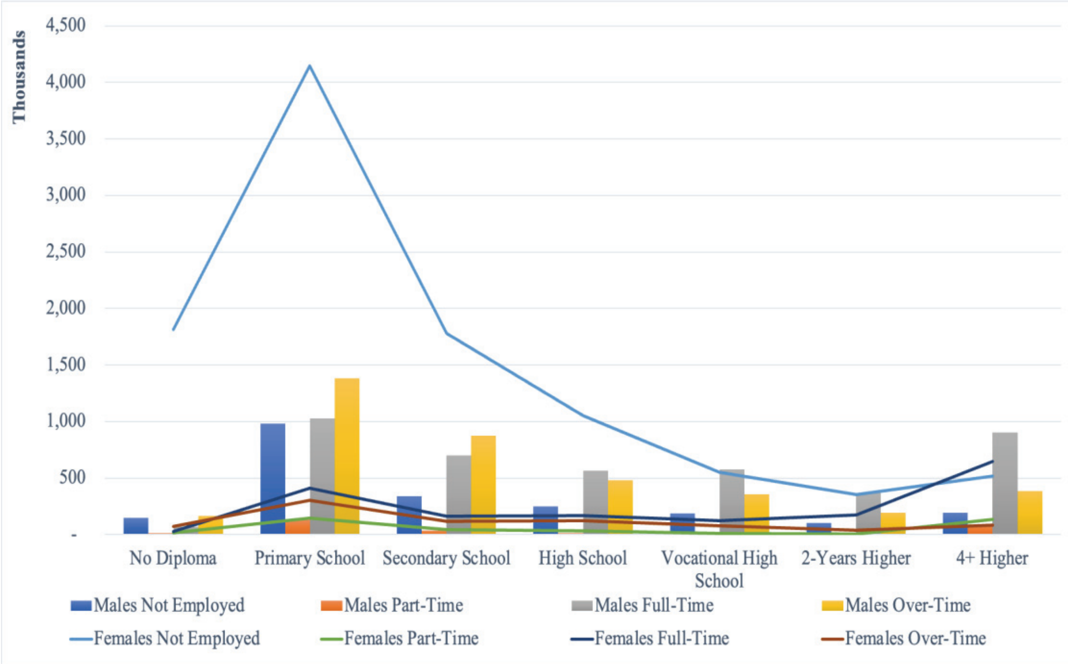
Table 2 shows the number of individuals by education level by family types (couple families, single-male families, and single-female families) for 2018. According to this table, the number of men and women with primary school diplomas in couple families is higher than those with other educational levels. In addition, these two groups reveal a U-shaped relation, except for the primary-school graduates, as the education level increases. It can be inferred that there is also U-shaped relation between men and women in single-family types.

Table 2: Number of Individuals by Education Level and Family Type, 2018

	Males		Females	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
No Diploma	397,066	22,962	1,927,463	292,407
Primary School	3,524,549	258,315	5,001,025	693,987
Secondary School	1,948,935	238,750	2,103,695	190,896
High School	1,309,285	182,243	1,378,170	214,916
Vocational High School	1,134,305	125,894	765,731	107,312
2- Year Higher	679,911	135,976	575,349	70,547
4+ Higher	1,570,800	492,488	1,379,641	448,084

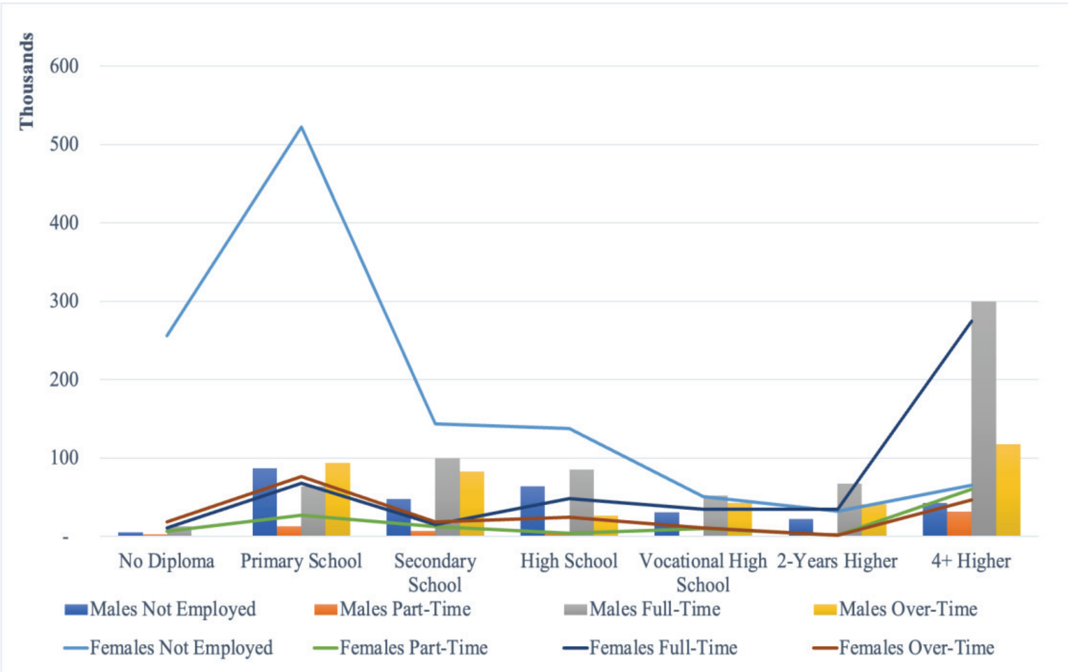
Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 9 and Figure 10 reveal the number of observations by labor supply status and education levels for couple-family and single-family, respectively. According to these figures, not-employed males and females mainly consist of primary school graduates in couple and single families. The number of not-employed females who graduated from primary school is significantly higher than males. As the education level increases, the number of not-employed women decreases, except those with a university or higher degree diploma. In line with this fact, the number of full-time employed females roughly increases as the level of education increases.



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 9: Number of Individuals by Education Level and Labor Supply Status, Couple Families, 2018



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 10: Number of Individuals by Education Level and Labor Supply Status, Single Families, 2018

The number of over-employed men with primary school diplomas is higher than the ones with other educational levels. Furthermore, the number of full-time employees with university and higher degree diplomas takes the highest share among men. However, the number of not-employed with primary school diplomas takes the highest share among women.

3.3.1.3. Disability in the Daily Life

In the HBS, whether household members have limitations in daily activities or not is measured by "gunengel" variable between 2004 and 2019. This variable is also included in the model since this is a significant situation for household members' decision about entering the labor market. The number of observations for men and women with disability status for 2018 is included in Table 3.

Table 3: Number of Individuals by Disability in Daily Life and Family Type, 2018

	Males		**Females**	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
Disabled	47,876	2,402	60,243	18,329
Not Disabled	10,516,975	1,454,225	13,070,830	1,999,821

Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

According to Table 4, the number of observations for not-disabled men and women is higher for not-employment and full-employment labor status than the other employment statuses for both couple and single-family types.

Table 4: Number of Individuals by Disability in Daily Life, Family Type and Labor Supply Status, 2018

	Not Employed	Part-Time	Full-Time	Over-Time
Males				
Couple-Family				
Disabled	22,080	2,687	19,213	3,896
Not Disabled	2,184,549	314,769	4,184,650	3,833,008
Single-Family				
Disabled	NA	NA	2,402	NA
Not Disabled	301,255	66,086	679,539	407,345

Table 5: Number of Individuals by Disability in Daily Life, Family Type and Labor Supply Status, 2018 (continued)

Females				
Couple-Family				
Disabled	49,045	2,576	8,039	583
Not Disabled	10,162,066	392,808	1,703,878	812,078
Single-Family				
Disabled	15,402	NA	2,927	NA
Not Disabled	1,193,276	124,079	483,946	198,520

Source: 2018 Household Budget Survey Micro - Level Data, TURKSTAT

3.3.2. Household Characteristics

3.3.2.1. Number of Children

When parents have children, it can impact their decision to work due to the cost of missing out on time with their kids. Research shows that women, in particular, may choose not to work or only work part-time when they have children under the age of six. As a result, the impact of having children of different ages is studied separately for men and women based on their family situation.

There are four age groups considered, which are “preschool children”, “school-age children”, “young children”, and “adult children”. Each category is assigned a value of 0, 1, or 2. A value of “0” indicates that the person has no children, a value of “1” means that they have one child, and a value of “2” means that they have two or more children.

The group known as "Preschool children" refers to kids between the ages of 0-5 and are identified as "son/daughter" in the "yakinlik" variable (relationship with the head of the household) in HBS. The "School-age children" group is made up of kids aged 6-14, while the "young children" group includes those aged 15-19. Additionally, the model includes children who are able to work but are not employed and still reside with their parents. This means that individuals aged 20-64 who are identified as "son/daughter" in the "yakinlik" variable and are unemployed are classified as "adult children".

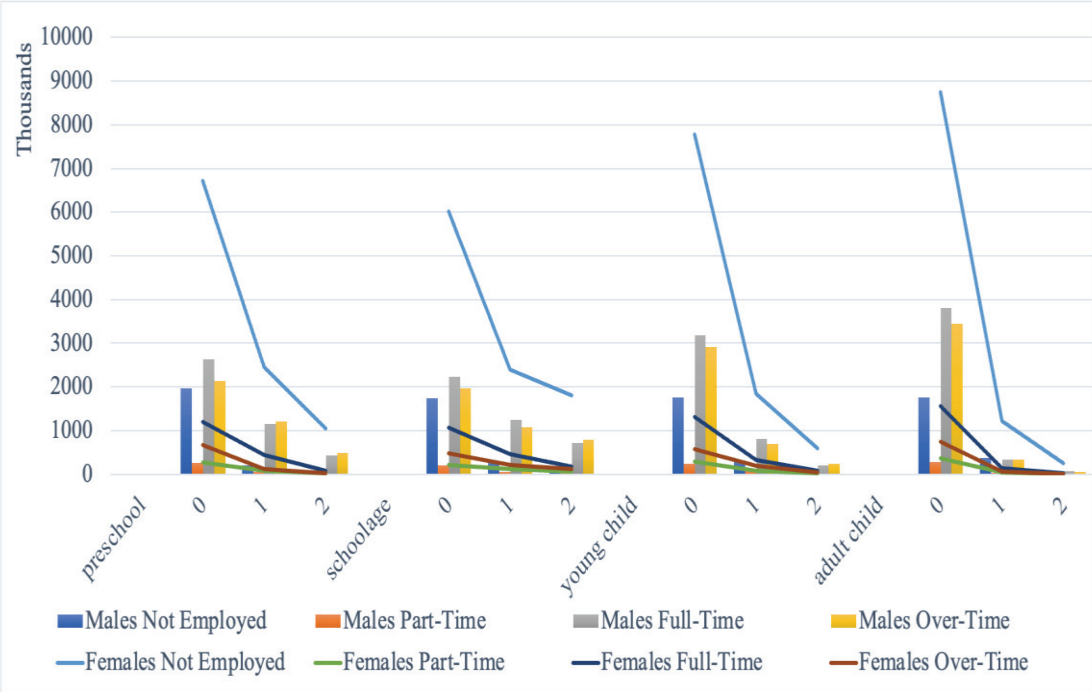
Table 5 shows us the number of observations for children in different age groups for couple and single-family types. For both family types, the number of observations of not having children is greater than the ones of having children. Furthermore, the number of men and women who has at least one child in couple family is higher than that of single-family type.

Table 6: Number of Individuals by Children and Family Type, 2018

	Males		**Females**	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
preschool				
0	6,980,274	1,447,870	8,850,133	1,916,735
1	2,602,862	8,757	3,082,243	77,466
2	981,715	-	1,198,697	23,950
schoolage				
0	6,137,890	1,422,242	7,777,765	1,739,668
1	2,687,708	19,844	3,195,925	212,853
2	1,739,253	14,541	2,157,383	65,629
young child				
0	8,103,956	1,427,772	9,957,966	1,767,083
1	1,897,537	23,837	2,436,222	199,173
2	563,358	5,019	736,886	51,894
adult child				
0	9,291,127	1,441,945	11,418,437	1,775,769
1	1,084,092	9,684	1,446,344	202,447
2	189,632	4,997	266,293	39,935

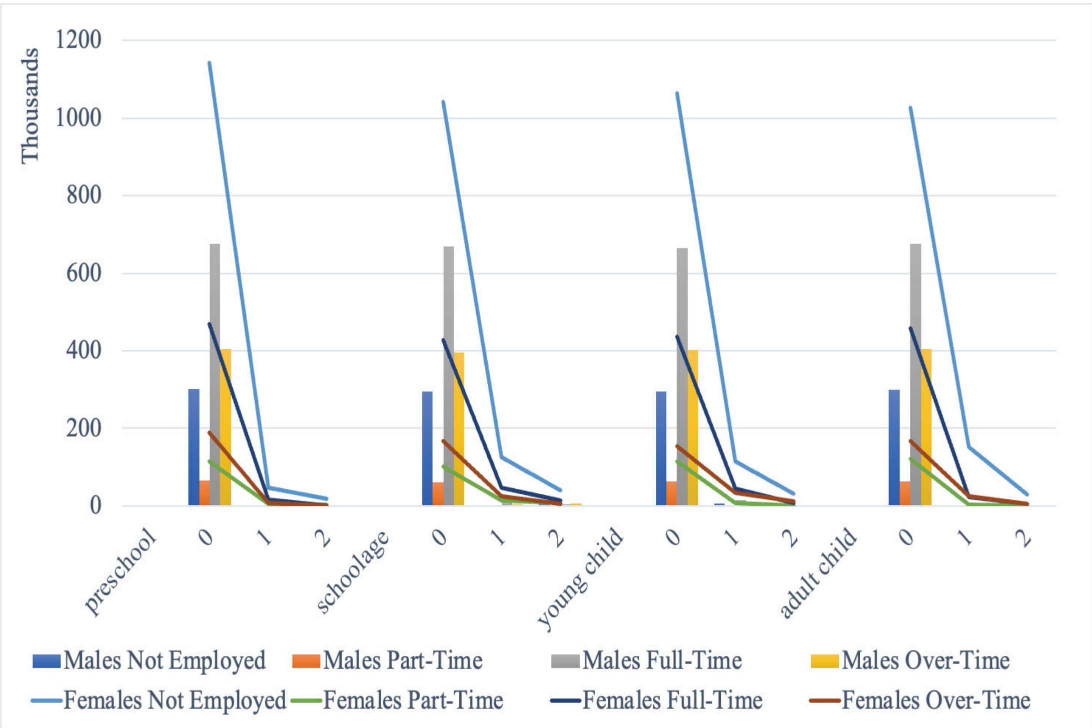
Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 11 and Figure 12 reveal the number of observations according to labor supply status and the number of children in the household for couple-family and single-family, respectively. It is noticed that men who have at least one preschool child mostly work full-time and overtime. On the other hand, women with at least one preschool child are mainly not-employed in the couple family type. Men who do not have children generally work full-time jobs. However, women without children are not-employed for both couples and single families. Additionally, the number of not-employed women decreases as the number of children increases.



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 11: Number of Individuals by Children and Family Type, 2018



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 12: Number of Individuals by Number of Children and Labor Supply Status, Single Families, 2018

3.2.2.2. Any Disabled Person in Household

The presence of a disabled person in the household may affect the labor supply decisions of household members. Women generally undertake the care of that person. For this reason, the presence of any disabled person in the household should be considered to estimate labor supply decisions.

The "anydisabled" variable, which refers to the existence of any disabled person in the household, is created by using the question "calengel" in the HBS measuring whether the member has been limited in activities related to work because of a health or mental problem and the question "yakinlik" measuring the relationship with the household reference person. This variable includes the disabled persons in the household except for the reference person.

Table 7: Number of Individuals by Disabled Person in Household and Family Type, 2018

	Males		**Females**	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
Any Disabled Person	688,329	58,016	10,695	1,322
Not Disabled Person	9,876,522	1,398,611	120,616	18,860

Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

Table 6 indicates that the number of observations for any disabled person is lower than that of the not-disabled person in both family types. There are more such persons in single-female families than in single-male families. According to Table 7, if there are any disabled persons in a couple-families, the number of men who work full-time and over-time jobs is higher than those who are not-employed or working in part-time jobs. However, the number of women who are not employed is higher than the ones in other employment statuses if there is any disabled person in the household. Moreover, the number of women working overtime in single families is higher than men working in the same employment status if there is a disability in the household. This fact also holds for both men and women in single-type families.

Table 8: Number of Individuals by Disabled Person, Family Type and Labor Supply Status, 2018

	Not Employed	*Part-Time*	*Full-Time*	*Over-Time*
Males				
Couple-Family				
Any Disabled Person	178,506	21,859	253,017	234,948
Not Disabled Person	2,028,123	295,596	3,950,846	3,601,956
Single-Family				
Any Disabled Person	22,197	4,319	10,385	21,115
Not Disabled Person	279,058	61,767	671,556	386,231
Females				
Couple-Family				
Any Disabled Person	772,580	25,874	99,913	171,088
Not Disabled Person	9,438,532	369,510	1,612,004	641,573
Single-Family				
Any Disabled Person	81,670	9,026	17,257	24,210
Not Disabled Person	1,127,008	115,053	469,617	174,310

Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

3.3.2.3. Household Ownership Status

The household questionnaire includes questions regarding the number of automobiles, motorcycles, sea craft, dwellings, flats, summer houses, fields, lands, plantations, and greenhouses owned by households. Ownership of these assets can affect an individual's decision about labor supply. Thus, these variables are considered in the modeling. In the HBS, these variables are included separately and merged based on their types due to a low number of observations. The analysis only includes the "otoadet" variable, which measures the number of cars owned by households, as jeeps, vans, and motorcycles are not included in the 2007 HBS and later years. Additionally, the "konutsay" variable is created by adding the number of detached dwellings, flats, and summer houses. The maximum number of houses owned is limited to two. If a household owns more than two houses, this number is merged with two. The ownership of fields, plantations, and greenhouses is combined in square meters under the "tarlasay" variable. The number of hotels and commercial shops owned by households are combined in the "isyerisay" variable. The number of commercial shops is set to either 0 or 1, meaning more than one commercial shop is merged with 1.

When assessing the living situation of household members, we use the "mulkiyet" variable to determine the ownership status of the house. This variable has four categories in the HBS household-based questionnaire: (i) owner, (ii) tenant, (iii) lodging, and (iv) not the owner but also not paying rent.

Additionally, the "kon_borc" variable is used to evaluate any liabilities on the house. This variable can impact employment status, whether someone is working part-time or full-time.

Table 9: Number of Individuals by Ownerships and Family Type, 2018

	Males		Females	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
Home Ownership Status				
Owner	5,281,638	398,766	6,943,441	862,584
Tenant	3,518,841	781,470	4,126,536	885,654
Lodging	283,387	53,614	275,921	3,614
Not owner but also not paying rent	1,480,984	222,777	1,785,176	266,298
Housing Debt				
No	9,244,456	1,407,754	11,599,576	1,894,382
Yes	1,320,395	48,873	1,531,497	123,769
Automobile				
0	5,319,782	1,011,930	6,373,737	1,636,046
1	4,991,094	420,010	6,286,447	370,741
2	253,975	24,686	470,889	11,363
Commercial Shop				
0	10,326,606	1,419,887	12,551,638	1,987,898
1	238,245	36,740	579,435	30,253

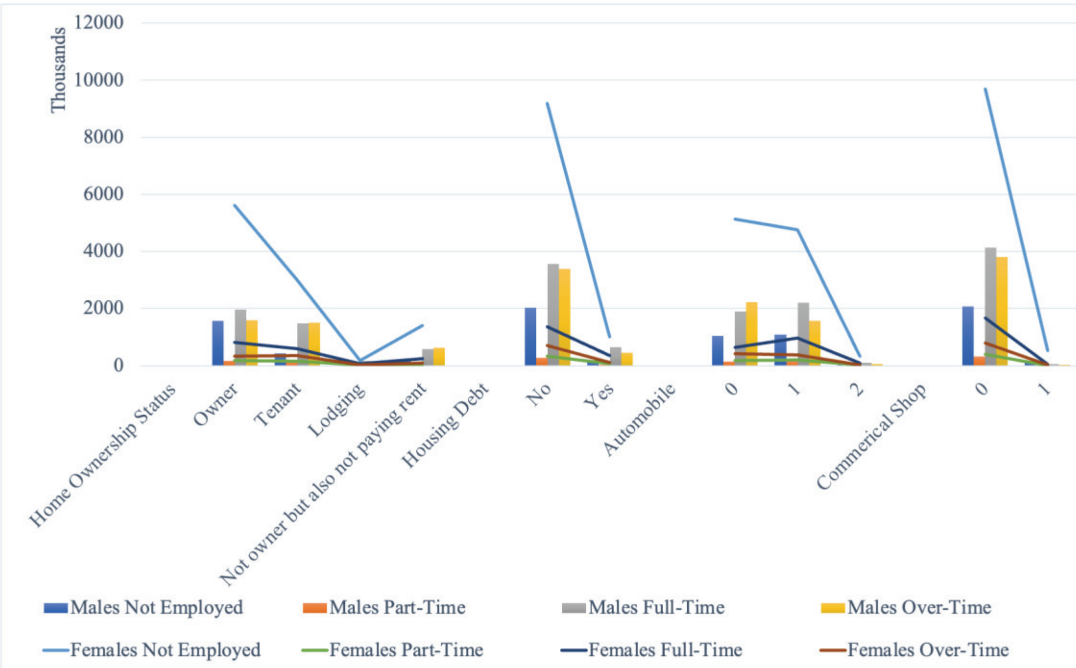
Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

Based on Table 8, it appears that for each family type, the number of women with different home ownership statuses is higher than that of men. However, men seem to outnumber women when it comes to living in lodging. Among those who own their homes, more women have housing debt than men. Additionally, both couple and single-family types have more women with at least one car compared to men. However, not having a car is more common than having one for both men and women in each family type. The same trend is observed for commercial shop ownership.

Figures 13 and 14 provide insight into the number of ownership observations based on labor supply status for couple-family and single-family, respectively. Figure 13 shows that most house-owner women in couple-family are not employed, while most house-owner men work full-time jobs. On the other hand, the number of not-employed single men who own a house is higher than those who work part-time, full-time, or over-time. In addition, among the house owner couples with no housing debt, men generally work as full-time employees, while women are not employed.

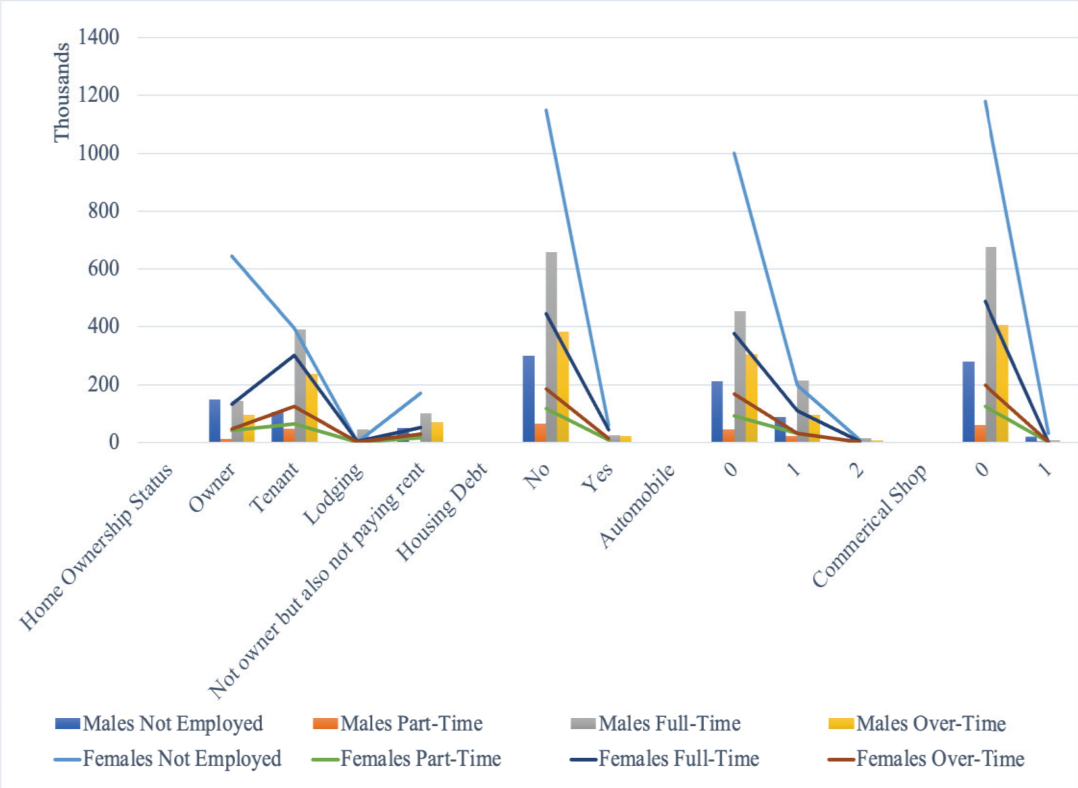
Furthermore, the number of not-employed women having at least one car is higher than that of working ones. In comparison, the number of men working as full-time employees with at least one car is higher than the men in other employment statuses for couple families. This fact is also true for single-family types.

As for commercial shop ownership, the number of not-employed women with no commercial shop is higher than those working as part-time, full-time, or overtime employees for both family types. Moreover, the number of full-time employed men with no commercial shop is higher than that of other employment statuses for both family types.



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 13: Number of Individuals by Ownership and Labor Supply Status, Couple Families, 2018



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 14: Number of Individuals by Ownership and Labor Supply Status, Single Families, 2018

3.3.3. Labor Market Indicators

3.3.3.1. Experience

The Human Capital Theory states that experience plays a significant role in determining an individual's labor market status and wage rate. With increasing experience, it is expected that productivity and wage rates will also increase.

The HBS individual-based questionnaire includes a question called "süre_yil," which measures the duration of employment in the main job in years. This data is yearly-based, and if the duration of employment is less than six months, it is recorded as "0." This variable is used as a measure of experience in the analysis. Table B.4 indicates that the average experience for women has increased over the years. Additionally, Table 9 shows that in 2018, men had a higher average experience than women.

Table 10: Level of Experience by Family Type, 2018

	Males		Females	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
Mean	7	4.96	1.416	2.52
Median	4	2	0	0
Max.	45	39	45	42

Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

According to Table 10, both types of families have highly experienced male and female full-time employees. In couple families, men generally have more experience than women in each labor supply status. However, for single females working full-time, they tend to have more experience than their male counterparts.

Table 11: Level of Experience by Family Type and Labor Supply Status, 2018

	Males				Females			
Couple-Family	*Not Employed*	*Part-Time*	*Full-Time*	*Over-Time*	*Not Employed*	*Part-Time*	*Full-Time*	*Over-Time*
Mean	0	8.39	10.04	7.93	0	5.85	7.24	4.8
Median	0	4	7	5	0	3	5	3
Max.	0	45	42	44	0	45	40	35
Single-Family								
Mean	0	6.77	6.81	6.07	0	6.61	8.35	5.15
Median	0	2	3	4	0	3	4	4
Max.	0	32	39	30	0	33	42	27

Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

3.3.3.2. Wages

The definition of "wage" is a topic of debate, as it can vary depending on factors such as location, industry, and employment status. Additionally, the definition can differ between the public and private sectors, leading to differences in wage calculations. The International Labor Organization (ILO) defines "wage rate" as including basic wages, as well as family or cost-of-living allowances and regularly paid allowances, which was established in the 12th International Conference of Labor Statisticians in 1973.[6]

[6] For more information: see Resolution concerning an integrated system of wages statistics, adopted by the Twelfth International Conference of Labour Statisticians (October 1973),

The HBS individual-based file includes questions about wages and earnings, which are categorized as either in-cash or in-kind. In this study, wages are calculated based on the ILO's definition, including both cash and in-kind earnings. Specifically, the annual wage income in cash (ucra_yil), annual wage income in kind (ucrn_yil), annual bonus income, premiums, tips (ikrprim_yil), and annual tax returns (viade_yl) are aggregated to determine the "wage" variable.[7]

In this study, wages are examined and estimated on a monthly basis. To do so, the annual wages stated are divided by the number of months worked by household members in the past year to obtain the monthly wage rate. However, the "calay_yil" variable is not available for the year 2012 in HBS, making it impossible to obtain monthly wage rate data for that year. Additionally, to reduce the impact of extreme values in the wage variable, any data exceeding ten times the median of a given year is adjusted to ten times the median of that year.

Table 11 indicates the summary statistics of nominal wages in TL with respect to gender and family types for 2018.[8] Men's average wages are higher than women's across all family types. Interestingly, single-family types have higher mean wages for both men and women compared to couple-family types. To express nominal wages in real terms, we can multiply wage values from 2018 with 1.63 and wage values from 2022 with 4.35, using 2013 as a base year. For consumer price indexes, please refer to Table B.5 in Appendix B.

Table 12: Level of Wages by Family Type, 2018

	Males		**Females**	
	Couple Family	*Single-Male Family*	*Couple Family*	*Single-Female Family*
Min	208	227.2	129	129
1 th Quarter	1,950	2,000	1,543	1,600
Median	2,544	2,708	1,950	2,225

https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_087496.pdf

[7] Since there is no information about annual tax-returns in the questionnaire for the year 2009 and after, the wage variable does not include the tax-returns.

[8] It is possible to express nominal wages in real terms by multiplying the wage values of 2018 by 1.63 and the wage values of 2022 by 4.35 taking 2013 as the base year. The consumer price indexes are presented in Table B.5 in Appendix B.

Table 13: Level of Wages by Family Type, 2018 (continued)

Mean	3,094	3,182	2,521	2,845
3 rd Quarter	3,650	4,008	3,287	3,872
Max	24,667	13,075	16,937	12,762

Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

Table 12 reveals that both men and women earn higher wages on average for full-time employment compared to part-time and overtime employment. Additionally, overtime employment results in higher wages than part-time employment. It is worth noting that there is a notable discrepancy between men and women's average wages for part-time and overtime employment, with men's wages being higher than women's on average. This difference is particularly noticeable in couples' families.

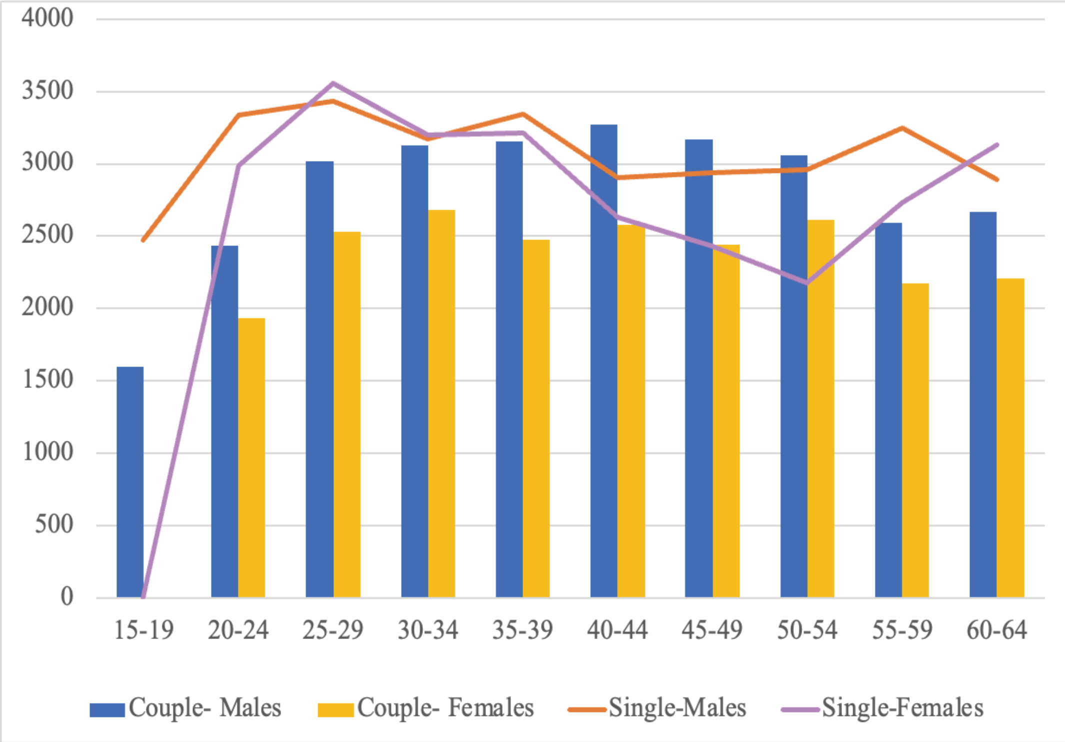
Table 14: Mean Wages by Labor Supply Status, 2018

	Males				**Females**			
	Not Emp.	*Part-Time*	*Full-Time*	*Over-Time*	*Not Emp.*	*Part-Time*	*Full-Time*	*Over-Time*
Couple-Family	NaN	2394.14	3351.93	2855.65	NaN	1658.45	2978.65	1960.06
Single-Family	NaN	2203.52	3398.32	3006.77	NaN	2020.28	3337.97	2316.42

Source: 2018 Household Budget Survey Micro Level Data, TURKSTAT

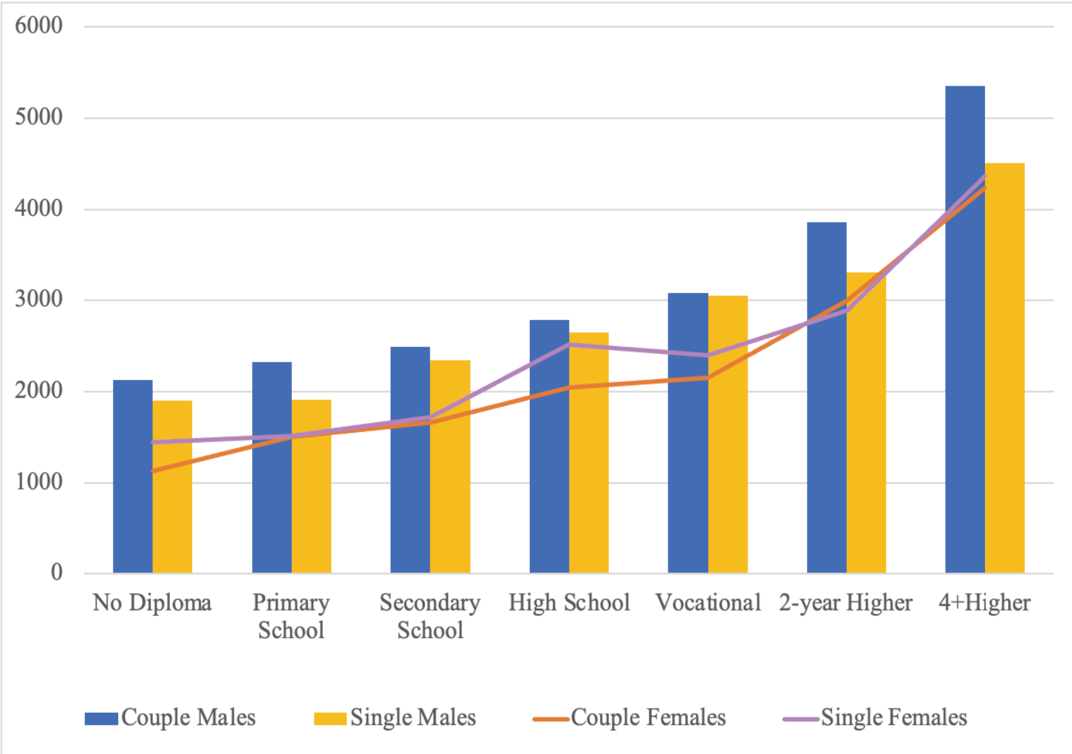
According to Figure 15, the average wages of men are higher than women's wages in both single and couple families. As the age increases, there is not a significant increase in average wages. However, men's wages are consistently higher than women's wages in every age group, regardless of family type. Women's wages exhibit a U-shaped relationship with age, while men's wages have a smoother relationship.

Figure 16 shows the mean wages of men and women according to educational levels for couple and single-family types. As education levels go up, both men and women tend to earn more, regardless of whether they are part of a couple or single-family. However, it is clear from the graph that women tend to earn less than men at every educational level.



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 15: Mean Wages by Age Groups, 2018



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 16: Mean Wages by Education Levels, 2018

3.3.3.3. Other Household Income

When analyzing labor supply decisions, it's important to consider household incomes beyond just wages, especially for women. The HBS individual-based file includes many questions about additional household incomes, which are categorized as "Household Income Other than Wage" and "Household Social Income". Tables B.6 and B.7 in Appendix B outline the income items included in these categories.

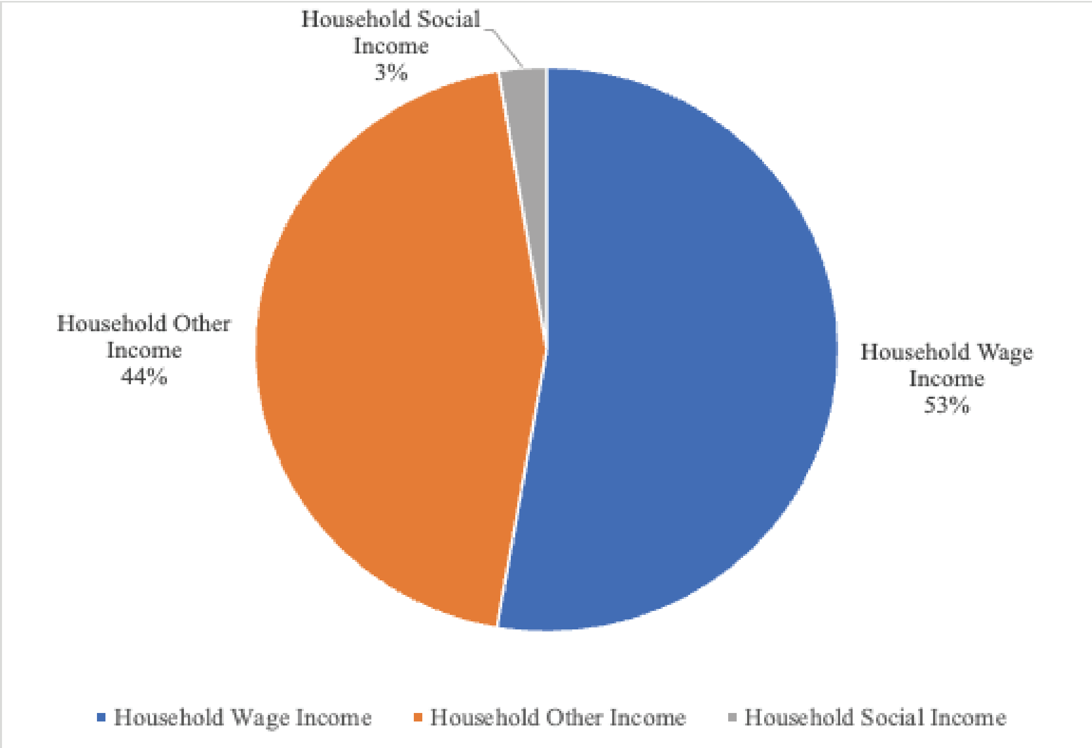
Figure 17 presents the number of households receiving social and non-wage incomes. It shows that the number of households receiving social benefits from the government increased until the 2008 economic crisis, then decreased until 2015 before increasing again. Meanwhile, the number of households with non-wage income has generally increased except for in 2007, 2011, and 2014.

Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 17: Number of Households with Social and Other Income, 2004-2019

According to Figure 18, when looking at household incomes, wage incomes make up 53%, while households' other income makes up 44%, and social income makes up 3%

in 2018. Over time, wage income has been increasing while non-wage income has been decreasing (see Table B.8).



Source: 2018 Household Budget Survey Micro-Level Data, TURKSTAT

Figure 18: Distribution of Total Household Income, 2018

CHAPTER 4

DETERMINANTS OF FEMALE WAGES

In order to examine the effects of tax and social policies on the selection decision of labor supply status, it is necessary to find the wages of individuals because it affects the net income of households. Therefore individuals can decide which type of labor supply statuses to participate in due to policy implications. This dissertation examines how females select the labor supply statuses, namely non-employment, part-time employment, full-time employment, and overtime employment, due to social or tax policy. In order to be able to examine this, we need to get the wages of individuals first.

To find the wages, Heckman (1979)'s selection corrected two-stage wage estimation method is used. The selection part consists of the choice between "not-employed" or "being in the labor market". Thus, the probit model is used to estimate the participation part and extended version of Mincer-type wage equation is estimated by taking the selection correction into account.

4.1. Estimation Methods for the Wage Equation

The first point to be noted about the "wage" is the complexity of this concept. The definition and the determinants of "wage" could vary according to countries, geographical regions, sectors, and whether the enterprises belong to the public or private sector.

There are numerous debates in literature surrounding the definition of "wage." The International Labour Organization (ILO) defines the "wage rate" as including basic wages, which are time-based wages paid by the typical working unit, as well as family or cost-of-living allowances and other guaranteed and regularly paid allowances. In the theoretical realm, two groups of wage-earning models are commonly discussed in literature: Mincer-Becker's "Human Capital Models" and the "Hedonic Model."

The "Human Capital Model" is the most significant of these models, as it proposes a relationship between wages and education and experience. This model was developed by Mincer (1958; 1974) and Becker (1962; 1964). Becker (1962) posited that personal incomes are tied to the amount of investment made in human capital (Acun, 2018).

The "Mincerian Wage Equation" is a well-known and widely used model among human capital models. Created by Mincer in 1974, it utilizes a linear function that takes into account education, experience, and a quadratic term of experience. The wages are defined as logarithmic so that it guarantees that “zero” wages are excluded. Furthermore, logarithmic wage function ensures the better fit (Tansel, 1992, p. 3). Mincer (1974) computes the experience as age minus the number of years of schooling minus the age of entry into school. It constructs the earnings function as the following:

$$ln\, E_t = ln\, E_s + \beta_1 t + \beta_2 t^2 \tag{4.1}$$

where *t* is the years of experience and E_s is earnings after graduation from schooling. Mincer (1974) asserts that if the experience is continuous and starts immediately after graduation from school, then the experience would be equal to the current age minus the age at completion of schooling. It defines the experience such as t= (A- s- b), where A is the current age and b is the age of beginning school. [9]

The Mincer equation focuses on incomes and the differences that arise throughout the lives of individuals who receive education at different levels. It reveals how an individual’s personal income is affected by an additional education year and an additional year of experience. According to this model, wages increase at a decreasing rate as individuals get older. Indeed, as age increases with the educational level, the ges increase at the beginning of work-life, and it starts to decrease relatively towards the end of his/her working life.

[9] For detailed information, see the Mincer (1974), pp.83-96

Whether an individual will participate in the labor market depends on the individual's leisure time and reservation wages, which are defined especially for women as the total economic value of the work they do at home. Heckman (1974) calls the market wage as "offered wage" and defines it as the wage that an individual faces in the labor market. He calls the reservation wage as "asking wage" and defines it as the wage an individual gives value to his/her time (Heckman, 1974, p.679). Theoretically, individuals compare this reservation wage with the offered wage, and if their reservation wage is lower than the market wage, they choose to participate in the labor market. Since the wage is available only for individuals who participate in the labor market, there can be selection bias in the OLS estimations. According to Heckman (1979) the sample selection bias can be caused by two reasons. First, the self-selection by individuals or data units that are used. Second, a researcher can behave as an individual who makes self-selection, or data can be operated similarly while selecting the sample (Heckman, 1979, p. 153). In order to eliminate the sector selection bias in the estimation of wage equation with OLS and thus control for unobserved heterogeneity, Heckman (1976, 1979) developed a two-step procedure to correct self-selection bias.

Heckman (1979) proposes a method to correct the selectivity bias, which calls for using the inverse Mill's ratio as a regressor in the wage equation. Under the assumption that wages are normally distributed, the selection bias corrected terms, namely lambda, can be derived. The lambda is defined as the following:[10]

$$\lambda = \frac{\phi(\mathrm{I})}{\Phi\,(\mathrm{I})} \tag{4.2}$$

where $\phi(.)$ is the normal density and $\Phi\,(.)$ cumulative normal distribution. If the value of lambda is larger, then more serious selectivity problem occurs.

Let the w_i^* is the wages for all individuals who are employed or not-employed, which is dependent on the observable individual characteristics, X_i and unobservable variables u_i such that

[10] See Heckman (1974) for details in the estimation of Equation (4.2)

$$\ln(w_i^*) = X_i'\beta + u_i \tag{4.3}$$

Moreover, the actual wage, i.e., w_i, is only observed if the latent variable is positive such that $s_i^* > 0$. This latent variable also includes the benefits of employment (Breunig & Mercante, 2010, p. 50). It can be represented as the following:

$$s_i^* = Z_i'\gamma + v_i \tag{4.4}$$

Since s_i^* contains the benefit of employment, it should intuitively include all of the variables in X_i. Furthermore, according to Heckman's (1974) reservation wage model, this latent variable should also include the variables of the cost of being employed (Breunig & Mercante, 2010, p. 50).

Assuming that the u_i and v_i are jointly normally distributed, first the "γ" in Equation (5.10) is estimated and these are utilized to estimate the following equation with the sample including the observed wages:

$$\ln(w_i) = X_i'\beta + \rho\lambda(Z_i'\hat{\gamma}) + u_i \tag{4.5}$$

where λ is the inverse of the Mill's ratio from Heckman's model. Indeed, it can be described as the covariance between the error term in the wage offer equation and the error term in the latent variable equation. It corrects the biased, $\mathrm{E}[v_i | s_i^* > 0] \neq 0$ (Ermisch & Wright, 1994, p. 187). Here ρ is the coefficient of the Heckman's λ. The ρ, in Heckman's reservation wage model, contains two effects: First, if unobservable characteristics lead to higher wage, then these lead to a higher probability of being employed, and this effect will be positive. Second, as stated before, it includes the difference between the variance of wage offers and the covariance between wage offers and reservation wages. If the covariance between reservation wages and offered wage exceeds the variance of the offered wage, then this effect will be negative (Breunig & Mercante, 2010, p. 50). Breunig & Mercante (2010) show that it can be negative if the latter effect dominates the former in the data.[11]

[11] The negative sign of rho can be seen as a "problem" caused by the misspecification of the wage and the selection equations of the model because a positive sample selection effect is usually assumed.

The participation decision model is presented below:

$$P = \alpha' Z + u_i \tag{4.6}$$

P is a binary dependent variable representing the participation decision. It takes the value 1 if an individual participate in labor market; and takes 0 otherwise. Z is a set of personal and household characteristics that affect the participation decision of individuals, and *u* is a random error term.

From the equation 4.1 and 4.3 the *e* and *u* have bivariate normal distribution with the variances σ_e and σ_u , respectively, and the latter one is normalized to one (Tansel, 1992, p.4). Then the probit specification should be as the following:

$$\text{Prob}\,(P=1) = \text{Prob}(\,u > -\,\alpha' Z) = F(\alpha' Z) \tag{4.7}$$

where F is the cumulative density function of u. According to Heckman (1979), the Maximum Likelihood Estimation of system constructed by (4.1) and (4.7) provides consistent and efficient parameters (Tansel, 1992).

4.2. Review of Literature on the Determinants of Wages in Turkey

Numerous studies in empirical literature have utilized Heckman's two-step estimation framework to estimate wages. In Turkey, there is a significant amount of literature on wage estimation utilizing this method. Studies have further developed the Mincer-type wage model by incorporating various variables, primarily in research conducted for Turkey. Some studies include individual or household characteristics, while others incorporate firm-specific properties.

Tansel (1992) was one of the first studies to enrich the wage model by considering individual characteristics. The study developed the Mincer-Type wage equation by including educational dummy variables, experience, quadratic term of experience, age

However, a negative value is found in many in empirical studies (for example, see Ermisch & Wright (1994)). Nicodemo (2007) also finds negative coefficients for Germany, Denmark, the UK, and Finland, and insignificant coefficients for France, Ireland, Italy, Spain and Austria.

group dummies, and their cross products, individually and as household unearned income, regions, and cities in which the reference person lives.

In terms of individual characteristics, Hisarcıklılar & Ercan (2005), Ilkaracan & Selim (2007), Cudeville & Gurbuzer (2010), Akhmedjonov (2012), Akay & Uyar (2017), Paolo & Tansel (2017), Acun (2018), Çınar & Öz (2018), Alcan & Özsoy (2018) has contributions to the model by including variables such as being household head, gender, marital status, number of children, knowledge of the foreign language, having driving license, health status. Furthermore, Tansel (1992, 2005), Dayıoğlu & Kasnakoğlu (1997), Tunalı & Başlevent (2002), Hisarcıklılar & Ercan (2005), Illkaracan & Selim (2007), Akay & Uyar (2016, 2017), Paolo & Tansel (2017) include the dummies related to the regional and residential areas.

On the employment-specific variables, Dayıoğlu & Kasnakoğlu (1997) developed this model using the employment types such as wage earner, self-employed, and employee. Hisarcıklılar & Ercan (2005) improve the model by adding the dummy variables for full-time/ part-time employment, firm size by the number of employees, and a dummy variable for being the household head. Akay & Uyar (2017) uses the social insurance status of an individual as a dependent variable. It also includes the "permanency of job". Taymaz (2009) extends the model by adding the "working time" as an explanatory variable. Akhmedjonov (2012) adds the public/private sector dummies and economic sector (mining, manufacturing, health, and services) dummies. Furthermore, Paolo & Tansel (2017) includes the graduated field, the firm size, and its quadratic term of it as explanatory variables in the wage equation.

Empirical studies are based on different datasets for Turkey. Most studies are based on Household Labor Force Survey such as Tunalı & Başlevent (2002), Tunalı & Başlevent (2002), Taymaz (2009), Akay & Uyar (2016), Balkan & Başkaya & Tümen (2016), Akay & Uyar (2017), Paolo & Tansel (2017), Acun (2018), Arabacı & Arabacı (2020), and Toksöz & Memiş (2020). On the other hand, Tansel (1992), Dayıoglu & Kasnakoglu (1997), Tansel (1998), and Tansel (2005) use the Household Expenditure Survey, and Alcan & Özsoy (2018) uses the Turkish Income and Living Conditions

Survey. Very few empirical studies estimate the wage equation using the Household Budget Survey, namely Cudeville & Gurbuzer (2010) and Akhmedjonov (2012).

In line with the questions in the dataset, some studies use the log of wages on an hourly basis, and others use it on a monthly basis. While the Dayıoglu & Kasnakoglu (1997), Tansel (1998, 2005), Tunalı & Başlevent (2002), Hisarcıklılar & Ercan (2005), Akay & Uyar (2016), Akay & Uyar (2017), Paolo & Tansel (2017), Alcan & Özsoy (2018), Toksöz & Memiş (2020) take the wages as hourly unit, some other studies such as Tansel (1992), Illkaracan & Selim (2007), Taymaz (2009), Cudeville & Gurbuzer (2010), Balkan & Başkaya & Tümen (2016) and Acun (2018) uses the monthly wages. Like Dayıoğlu & Kasnakoğlu (1997), most of these studies add cash and in-kind payments from primary and secondary jobs in calculating the log wages.

For the sake of brevity, the results of the studies can be summarized that the returns to education are increasing with the level of schooling for both men and women. Furthermore, experience and interaction variables of these are found to be significantly positive. The quadratic terms of experience have significantly negative signs in line with the expectations. Individual unearned and household unearned income are significantly negative, which implies that these lead to a lower probability of being wage earners for both men and women. However, the marginal increase in those variables can change the probability of being a wage earner in different magnitudes according to marital status, gender, and sectors. The details of the studies are presented in Table A.3.

4.3. Determinants of Female Wages: Model and Estimation Results

In this section, we use Heckman's two-stage estimation procedure to estimate the Mincer-type wage equation, which includes participation selection correction terms in the wage model. We employ Probit analysis to identify the factors that influence the participation probability of individuals in the labor market and their relative importance. The model covers all employed and non-employed individuals and is estimated separately for both men and women. As this dissertation focuses mainly on females, we will be explaining the estimation results of the female wage model.[12]

Individuals decide to work for wages by comparing the expected wage from the labor market with the opportunity cost of engaging in other activities. When the wages in the labor market exceed the opportunity cost, individuals choose to become wage earners. To estimate the wage equation, we use an extended version of the Human Capital Model of earnings. In this study, the wage model is postulated as the following:

$$\text{Log W} = \beta' X + e \qquad (4.5)$$

where *"W"* is the monthly wages, "*X*" is the vector of explanatory variables that determines the wages, and *"e"* is the error term. The variables in the participation part and the wage equation are presented in Table 13.

Table 15: Explanatory Variables in the Wage Model

Employment Equation	**Wage Equation**
Age Groups	Age Groups
Educational Level	Quadratic Term of Age Group
Having Disability in Daily Activity	Educational Level
Any Disabled Person in Household	Interaction of Experience and Education Levels
The Number of Infant Children	Quadratic Terms of Interaction of Experience and Education Levels
The Number of Preschool Children	Having Disability in Daily Activity
The Number of School Age Children	The Number of Children
The Number of Young Children	Labor Supply Choice
The Number of Adult and Not-Employed Children	Employment Status of Spouse
The Number of Commercial Shops	Years
The Ownership Status of the House	Inverse Mill's Ratio
The Status of Any Liability on House	
The Number of Automobiles	
Log of Other Household Income	
Log of Household Social Income	

[12] For estimations of models and measuring effects of policy implications, the population-weighted data is used via the variable "FAKTOR" in HBS. These weights are calculated according to 2012 population projections based on Address Based Population Registration System by TURKSTAT. Furthermore, the estimation results for men are statistically and theoretically meaningful. These results are presented in Table C.1, in the Appendix C.

Table 16: Explanatory Variables in the Wage Model (continued)

The Number of Other Household Members	
Being in Couple Family or Not	
Employer or Self-Employed Spouse	
Spouse Not Eligible for Work	
Years	

Initially, the model is estimated for three periods: after 2012, between 2004-2019 (except 2012), and before 2012. These three models are very similar to each other in a general sense. The only differences are due to the number of infant children and the year dummy variables. The number of "Infant children" dummy variable is constructed by using the exact completed age of children, which is 0-2 years of age. Since the information on exact completed age are not available for the years between 2006 and 2010, this dummy variable is only used the model, which is run for the years 2013-2019. Comparing the estimation results and the R^2 of three models, the one which is run for the years after 2012 is the best model in terms statistically and theoretically. The model explains 62% of the variation in female earnings. Thus, this model is used in the continuation of the study.

4.3.1. Estimation Results for the Employment Equation

Age Group

Age is included as a dummy variable in the model by groups. For both men and women, ten age dummies are referring to the groups: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, in which the 15-19 age group is the base category.

It can be seen from Table 14 age dummies are statistically significant, and the signs of coefficients are in line with the expectations. The estimation results show a hump-shaped relationship between age and the probability of female employment. As the age increases, the probability of being in the labor market increases for males until the 35-39 age group at an increasing rate, and then this rate starts to decrease. In line with the expectations, the probability of being in the labor market is negative for the oldest age group, namely women who are 60-64 years old.

Table 17: Determinants of Employment: Estimation Results of the Probit Model

	Estimate	Std. Error	t-value	Pr(>|t|)	
Intercept	-1.352	0.003	-420.717	0.000	***
Age Group					
20-24	0.436	0.003	137.220	0.000	***
25-29	0.782	0.003	250.250	0.000	***
30-34	0.981	0.003	313.889	0.000	***
35-39	1.072	0.003	342.264	0.000	***
40-44	0.990	0.003	315.934	0.000	***
45-49	0.794	0.003	253.274	0.000	***
50-54	0.389	0.003	123.572	0.000	***
55-59	0.098	0.003	30.715	0.000	***
60-64	-0.225	0.003	-69.138	0.000	***
Education Level					
Primary School	0.273	0.001	466.690	0.000	***
Secondary School	0.359	0.001	511.567	0.000	***
High School	0.508	0.001	704.809	0.000	***
Vocational	0.679	0.001	863.866	0.000	***
2-year Higher	1.089	0.001	1304.534	0.000	***
4+ Higher	1.672	0.001	2329.196	0.000	***
Disability					
Disability in Daily Activity	0.010	0.002	5.254	0.000	***
Any Disabled Person in HH	0.678	0.001	1052.415	0.000	***
Number of Children					
1 Infant	-0.592	0.001	-1181.242	0.000	***
2+ Infant	-0.864	0.002	-517.448	0.000	***
1 Preschool	-0.365	0.000	-774.150	0.000	***
2+ Preschool	-0.497	0.001	-345.327	0.000	***
1 School age	-0.175	0.000	-425.685	0.000	***
2+ School age	-0.443	0.001	-824.982	0.000	***
1+ Young	-0.029	0.000	-68.195	0.00	***
1+ Adult	-0.123	0.001	-225.227	0.00	***
Having Commercial Shops	-0.292	0.001	-320.127	0.000	***
House Ownership Status					
Tenant	0.254	0.000	620.988	0.000	***
Lodging	0.287	0.001	291.859	0.000	***
Not the owner but also not paying rent	0.105	0.001	209.062	0.000	***
Liability on House	0.325	0.001	638.912	0.000	***
Having Automobiles	0.069	0.000	204.255	0.00	***
Log of Other Household Income	-0.048	0.000	-869.894	0.000	***
Log of Household Social Income	-0.041	0.000	-476.041	0.000	***
The Number of Other Household Members	-0.005	0.001	-10.417	0.000	***

Table 18: Determinants of Employment: Estimation Results of the Probit Model (continued)

Being in Couple Family	-0.460	0.001	-832.117	0.000	***
Employer or Self-Employed Spouse	-0.079	0.001	-142.385	0.000	***
Spouse Not Eligible for Work	-0.172	0.001	-189.933	0.000	***
Years					
2014	-0.029	0.001	-48.252	0.000	***
2015	0.042	0.001	70.319	0.000	***
2016	0.020	0.001	33.611	0.000	***
2017	0.029	0.001	49.289	0.000	***
2018	0.056	0.001	94.491	0.000	***
2019	0.071	0.001	121.645	0.000	***

Note: Signif. Codes: 0 ‘***’ 0.001‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Education

Educational level is included in the employment model and wage equation as dummy variables. There are seven educational levels such as “No Diploma”, “Primary School”, “Secondary School”, “High School”, “Vocational High School”, “2- Years Higher”, and “4 + Higher”. The base category is “No Diploma”. It is expected that as the educational level increases, the probability of being employed also increases due to the increasing opportunity cost of not working.

It can be seen from Table 14 that all estimated coefficients of educational dummies are statistically significant and positively affect the probability of employment. As the educational level increases, the estimated coefficients of dummy variables of education increase, indicating that the probability of employment increases with the level of education compared to individuals who have not completed any school.

Disability in Daily Activity

The fact that an individual has disabilities in carrying out her daily activities affects his/her decision to enter the labor market. Therefore, to measure whether this affects employment decisions, the dummy variable is included in the employment model. The base category is “Not disability”. According to estimation results, having a disability in daily life has an incremental positive effect.

Any Disabled Person in Household

The presence of a disabled person in the household may affect the labor force employment decisions of household members. This may impact women more, especially those who undertake caring, cleaning, and maintenance work.

It is included as a dummy variable, of which "Not Any Disabled Person" is the base category. Estimation results imply that the existence of any disabled person in a household positively affects the probability of being in the labor market.

The Number of Children

Since having children can affect the opportunity cost of working, it is one of the main determinants of being in the labor market or not. Especially, having children tends to reduce women's employment with infant or school-age children. For this reason, the employment part of the model includes infant, preschool, school-age, young children, or adult children on labor supply decisions.

These variables are constructed according to the ages of the children. Table 15 indicates the construction of dummy variables related to children with respect to different ages. Since there is information about the completed exact age for the years after 2012, "infant children" and "preschool children" dummies can be used to estimate for years after 2012. The base category for each variable is "none child".

Table 19: Dummy Variables for the Number of Children

Name of Variable	Criterion	Dummy Variables
Infant Children	0-2 years old	None, 1 Child, 2+ Children
Preschool Children	3-5 years old	None, 1 Child, 2+ Children
School-Age Children	6-14 years old	None, 1 Child, 2+ Children
Young Children	15-19 years old	None, 1+ Child
Adult Children	20-64 years old & Not-Employed	None, 1+ Child

According to estimation results, all of the dummy variables are statistically significant, and the coefficients are negative, meaning that having children affect the female's probability of being labor market negatively as in line with the expectations.

The Number of Other Household Members

Empirical studies show that household size can affect the employment decision of individuals either positively or negatively. As the number of members increases, it is expected that the probability of employment increases. However, since women are seen as care-giving people in Turkish social life, it can be negative for women. Thus, a variable related to the number of household members (except the reference person) is included in the model.

As can be seen from Table 14, the estimated coefficient of the variable is statistically significant at a 0.1% significance level. It has a negative sign, which might imply that women undertake the daily care of household members.

House Ownership Status

The ownership status of the house where household live currently can affect the employment decision of individuals. Since the ownership of a house ensures individuals' confidence, they are expected to be less willing to join the labor market. On the contrary, being a tenant is expected to encourage individuals to work more and thus participate in the labor market.

In this context, the house ownership status dummy variable is included in the employment part of the model. There are four categories related to this variable in the model: (i) owner, (ii) tenant, (iii) lodging, and (iv) not the owner but also not paying rent.

Estimation results indicate that all categories are statistically significant at 0.1% significance level, and they have positive signs. These results show that females with other types of homeownership are more likely to participate in the labor force, compared to the "owner", which is the base category.

Liability on House

Homeowners' decisions to join the labor market may vary depending on whether they have home debt. In order to measure this effect, the binary dummy variable related to the status of any liability on the house is included in the employment part of the model.

The base category refers to “not having liabilities”. It is expected that women with liability on the house are more likely to join the labor market. Estimation results support this expectation with the estimated coefficient, which is 0.32. The results are statistically significant at 0.1% significance level.

Having Commercial Shops

Real estate or commercial workplace ownership can affect employment decisions of individuals. The number of hotels and commercial shops household own is a dummy variable in the employment model. The number of commercial shops is set by numbers “0” and “1”, which means more than one commercial shop is merged with “1”. Having commercial shops is expected to decrease the probability of being in the labor market.

According to estimation results, the coefficient of the dummy variable for having a commercial shop is significantly negative at the 0.1% significance level (Table 14), in line with the expectations.

Number of Automobiles

Ownership of any automobile can affect the decision on employment. To examine this effect, the dummy variable is included in the employment part of the model. It is seen from the estimation results that having an automobile is statistically significant at the 0.1% significance level and has a positive sign.

Log of Other Household Income

In empirical studies, household income, other than wages, is found to significantly affect household members’ employment decision. Schultz (1990) asserts that the propensity to work in the labor market can decrease as the other household income increases. In this dissertation, the effect of other household members' incomes on the employment decision is examined by aggregating the incomes such as agricultural income, pension income, elderly pay, etc. By converting the annual values into monthly ones and taking the logarithm of the variable, it is included in the employment part of the model.[13] The variables in HBS questionnaires are aggregated in the "log of other household income" variable, which are presented in Table B.6. It is expected that as the level of other household income increases, the probability of employment decreases.

As can be seen from the estimation results (Table 14), the log of other household income is statistically significant at the 0.1% significance level. It affects women's employment probability negatively.

Log of Household Social Income

In order to examine the effect of the household income from the government as a social policy tool on the probability of being employed, these kinds of incomes are included in the model by aggregated in one variable. The "Log of Household Social Income" variable in the participation model is constructed as a summation of incomes presented in Table B.7. It is included in the participation part of the model by converting the annual values into monthly values and taking the logarithm of the variable.[14]

Similar to "other household income", the variable "household social income" has a negative effect on the probability of being employed for women, as can be seen from Table 14. The estimated coefficient is statistically significant at the 0.1% significance level. It has relatively less impact than the other household income (i.e., -0.041).

Being in Couple Family or Not

Most empirical studies show that the type of family (being in a couple family or a single family) that individuals live in is an essential factor determining the individuals' employment decision. Since men are generally considered as breadwinner persons, and women are assumed to be the caregiving person in the household, being a couple family can decrease female employment probability. At the same time, it is expected to increase men's participation.

[13] The variables are included in HBS as annually. Assuming that individuals are gaining these income items in each month, the variables are converted in monthly base dividing by 12.
[14] The variables are also included in HBS as annually. Assuming that individuals are gaining these income items in each month, the variables are converted in monthly base dividing by 12.

In order to examine this, the dummy variable ("esli") is included in the participation part of the model. It takes one if an individual is in a couple and takes zero otherwise. The base category is "not being couple". According to estimation results, the coefficient is statistically significant at 0.1% significance level. In line with the expectations, it has a negative effect on women's employment probability (i.e. -0.46).

Employer or Self-Employed Spouse

The employment status of spouses also has an impact on this decision for couples. Indeed, having an employer or self-employed spouse, defined as working in a fixed job, is expected to affect the probability of employment.

Estimation results in Table 14 indicate that having a spouse working in a fixed job (i.e., employer or self-employed) affects the female employment probability at the 0.1% significance level. This effect is negative (i.e., -0.079) for women. This indicates that self-employed or employer spouses of women might be working in more income-generating jobs so that women may not need to work.

Having a Spouse Not Eligible for Work

Eligibility for work has been defined as being in 15-64 years old and not having a disability for work in the previous chapter. Having a spouse who is not eligible for work can affect the employment probability. Thus, to examine the effect of having a spouse who cannot work, the dummy variable is included in the employment part of the model. It might have different effects on men and women. Especially in Turkey, men's and women's household roles and responsibilities are determined by social norms. Since women are assumed to be caregiving persons in Turkish society, having a spouse not eligible for work might negatively affect the female employment probability.

It can be seen from Table 14 that this variable is statistically significant at 0.1% level. As in line with the expectations, the sign of the estimated coefficient is negative for women (i.e., -0.172), meaning that having such a spouse decreases the employment probability.

Dummy of Years

For model construction, there are 13 dummies for the overall model. However, three models are estimated for different time periods, as explained above. Finally, the model is run for the years after 2012. Therefore, there are seven dummy variables for years, of which 2013 is the base category. As can be seen from Table 14, the dummies for the years are statistically significant at the 0.1% significance. The signs of dummies are positive, except for 2014.

4.3.2. Estimation Results for the Wage Equation

Using the labor market participation selection results, the selectivity corrected wage equations are estimated for men and women separately[15]. Estimation results are in line with the empirical literature, which are presented in Table 16.

Educational Level

In Human Capital theory, education is one of the most critical factors determining an individual's wage rate. Individuals with higher human capital have more chances to work in good conditions and thus have much probability of getting a higher wage rate than individuals with less human capital. One of the most prominent indicators of human capital is the level of education. Empirical studies also have found that wages increase as the education level increases. Furthermore, the returns of education may differ between men and women. In this study, the wage rate is expected to increase as the level of education increases.

Estimation results imply that all educational levels are statistically significant at the 0.1% level (Table 16). All estimated coefficients are positive, which implies that women who have diplomas earn higher wages than the ones who do not complete any school.

Disability in Daily Activity

Whether an individual has disabilities to carry out daily life activities or not might affect the wages of individuals.

[15] Since in this dissertation, female labor supply is examined mainly, the estimation results of the male wage equation are presented in the Table C.2 in Appendix C.

It can be seen from Table 16 that it is statistically significant at the 0.1% significance level and has a positive effect on female wages.

Table 20: Determinants of Female Wages: Estimation Results of the Monthly Wage Model

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	5.840	0.105	55.63	0.00	***
Education Level					
Primary School	0.137	0.023	5.88	0.000	***
Secondary School	0.201	0.029	6.89	0.000	***
High School	0.357	0.030	11.97	0.000	***
Vocational	0.395	0.032	12.50	0.000	***
2-year Higher	0.641	0.034	18.74	0.000	***
4+ Higher	0.978	0.035	28.23	0.000	***
Disability in Daily Activity	0.022	0.064	0.34	0.734	
Age	0.060	0.024	2.54	0.011	*
Quadratic Term of Age	-0.004	0.002	-2.79	0.005	**
Full-Time Employment	0.612	0.013	47.11	0.000	***
Over-Time Employment	0.627	0.015	42.25	0.000	***
Not Employed Spouse	0.046	0.015	3.00	0.003	**
The Number of Children	-0.016	0.010	-1.66	0.10	.
Years					
2014	0.105	0.019	5.61	0.000	***
2015	0.199	0.018	10.99	0.000	***
2016	0.366	0.018	20.63	0.000	***
2017	0.431	0.018	24.27	0.000	***
2018	0.567	0.018	31.67	0.000	***
2019	0.722	0.018	40.64	0.000	***
Interaction of Experience and Education Levels					
Experience*Low Level Education	0.023	0.003	6.70	0.000	***
Experience*High Level Education	0.033	0.002	14.90	0.000	***
Quadratic Term of Exp.*Low Level Edu.	-0.001	0.000	-4.05	0.000	***
Quadratic Term of Exp.*High Level Edu.	0.000	0.000	-6.14	0.000	***
Inverse Mill Ratio	-0.128	0.018	-7.03	0.000	***
Multiple R-Squared: 0.6208					
Adjusted R- Squared: 0.62					
Sigma: 0.498					
Rho: -0.256					

Note: Signif. Codes: 0 ‘***’ 0.001‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Age and Quadratic Term of Age

In the wage part, "age group" is included as a numeric value, which can be thought to represent the experience of individuals. As the individuals' age group increases, wages are expected to increase. On the other hand, to take the non-linearities in the age group into account, the quadratic term of it is included in the wage model.

Estimation results (Table 16) indicate that the age group and the quadratic term of age are statistically significant (p-values are 0.05 and 0.001, respectively). In line with the expectation and the empirical literature, the sign of age group is positive, and the quadratic term of age is negative. This implies that there is a concave relationship between wages and age group.

Labor Supply Status

Working hours are one of the most decisive determinants of the wage rate. In this study, the weekly working hours are assumed to determine the type of labor supply statuses such that working 1-30 hours in a week is considered "Part-Time Employment"; working 31-49 hours in a week is considered "Full-Time Employment", and working greater than or equal 50 hours in a week is considered as "Over-Time Employment". These three types of labor supply statuses are dummy variables in the wage equation, among which "Part-Time Employment" is the base category.

Estimation results indicate that the labor supply status dummies are statistically significant at 0.1% significance level and have a positive effect on the wages of females compared to part-time employment.

Employment Status of Spouse

In couple families, whether the spouse works or not affects the net wages because it affects the Minimum Living Allowance (MLA) in Turkey. In order to examine this, the dummy variable related to the employment status of spouses is included in the wage equation. When constructing this binary variable, it is assumed that if a spouse is employed as a regular wage earner, causal employee, employer, or self-employed, then this person is employed and takes the “0” value; otherwise, it is not employed and takes the value “1”. The base category is employed spouse, which takes the zero value.

In Table 16, it can be seen that it is statistically significant at the 1% significance level, and having not employed spouse has a positive effect on women’s log wages.

The Number of Children

The number of children is one of the significant determinants of the calculation of Minimum Living Condition in Turkey. Minimum Living Allowance is implemented as a percentage of the gross wage for the first two children and the other children of the employee. As the number of children increases, the non-taxed part of the wage increases, so it affects the net wages. Therefore, children under 20-24 age are included in the wage model. More than three children are merged with three children. If both spouses are working, then the number of children is included in the male wage function. On the other hand, if a woman’s spouse is not working, then the number of children is included in the women’s wage function. According to estimation results, the number of children is statistically significant at 10% significance level and has a negative effect on wages.

Interaction of Experience and Education Levels

Wages are determined according to the labor productivity of individuals in the labor market. According to the Human Capital Model, an employee's productivity depends on the human capital they possess. Experience (“sure_yil” variable) is accepted as one of the most critical human capital factors (Tansel, 1992, p.3).

On the other hand, wages may vary for occupational groups. In occupations requiring low-level skills, the individuals are likely to receive low wages, while in occupations requiring high-level skills, the opposite situation is expected. Assuming a robust relationship exists between occupation and education level, the education level is used as a dummy for occupation, because there is no information about the occupation of non-employed individuals. In this context, education level is divided into two groups: low-level education (primary school and secondary school diplomas), and a higher level of education.

In order to examine this effect, the interactions of experience with low-level education and high-level education are inserted into the model. Estimation results indicate that these variables are statistically significant for females at the 0.1% significance level. As it is expected, the signs of the estimated coefficient of these variables are positive.

In order to consider the nonlinearities in the interaction of experience and education level, quadratic terms of them are included in the wage model. In line with the expectations, these are significantly negative. Estimation results imply that as the level of education increases, the returns of it increase at a decreasing rate, which is suggested by Mincer (1974).

Dummy of Years

As can be seen from Table 16, all dummy variables related to the years are statistically significant at the 0.1% significance level. Compared to the base year, i.e., 2013, wages are higher for all years.

Selectivity Correction Term

The coefficient estimates of the Inverse Mill's Ratio is statistically significant at the 0.1% significance level. The coefficient has negative sign.

CHAPTER 5

DETERMINANTS OF FEMALE LABOR SUPPLY

This chapter presents the econometric framework and estimations results of the female discrete labor supply model. The analysis considers the women in couple/married or single families as decision-makers. In the Turkish family system, men are generally assumed to be breadwinners, and women are assumed to be responsible for caring for the housework, so women's decisions about whether or not to join the workforce can be more flexible. For this reason, while the decisions of men are assumed as fixed, the labor supply decisions of women are analyzed in two dimensions: intensive margin, which is how individuals respond by varying their hours of work, and extensive margin, which is a decision about entering the labor force or not.

The decision on labor supply is examined by using a Structural Discrete Choice Model. After estimating the appropriate model, the uncompensated hours and participation elasticities are calculated for various categories of single and married women in terms of age, educational level, and income quantiles, whether having infant, preschool, school-age, young, and adult children for each employment outcome. Additionally, for married women, the elasticities are calculated according to their spouse's employment status.

5.1. Structural Discrete Choice Models

Discrete choice models are the structural models that were introduced in the empirical world by McFadden (1974), Van Soest (1995), Aaberge et al. (1995), and Flood et al. (2003). They are derived from the decision-makers' utility-maximizing behavior. They estimate the utility function of decision-makers by taking into account their entire budget set so that these models are well-suited to labor supply modeling (Singhal, 2021, p.2). The advantage of applying the discrete choice modeling to the labor supply decision is that it can capture the heterogeneity in the labor supply responses in socio-economic or demographic subgroups.

Individuals maximize their utility by choosing the optimal work and leisure time subject to time-endowment and budget constraints. The individual, who receives wage for the time allocated to work, has access to final consumption goods with her income and increases the level of utility by allocating the remaining time to recreational activities. Individual characteristics such as age, education, gender, etc., in the utility function, are considered fixed, and the utility function can be represented as the following:

$$U = U(c, l; X) \tag{5.1}$$

where c is consumption, l is leisure and X is the vector of individual-specific characteristics.

Discrete choice models are based on the principle that agents choose the outcome that maximizes her/his objective functions. On the individual's utility maximization ground, these models define the best outcome that maximizes the individual's utility. The individual-i faces J+1 alternatives and gets a different level of utility with for each choice such that U_{ij} , j=0,1,…..,J, where j=0 refers the non-employment. The utility is known to the individual but not by the researcher. From the decision-maker's point of view, the alternative that provides the highest utility is chosen. Thus, the individual choses the alternative k, if and only if $U_{ik} > U_{ij}$, $\forall j \neq k$. The researcher can observe some attributes of alternatives that individual faces but not the utility. For example, individuals can decide by considering the work flexibility, nature of work, etc., which are not observed by the researcher (Singhal, 2021, p.3). Assume that the representative utility is $V_{ij} = V(x_{ij}, s_j)$ consisting of observed and unobserved attributes. The observed and unobserved utility that the researcher faces would not equal each other. This difference is represented by ε_{ij} in a way that $U_{ij} = V_{ij} + \varepsilon_{ij}$ (Train, 2009, pp. 14-15).

For the sake of clarity, let us assume that there are two alternative outcomes, 0 and 1, creating the choice set C= {0, 1}. Then the Random Utility Model specifies the utilities such that;

$$
\begin{aligned}
U_o &= V_0 + \varepsilon_0 \\
U_1 &= V_1 + \varepsilon_1
\end{aligned}
\tag{5.2}
$$

where V_0 and V_1 are the deterministic components and ε_0 and ε_1 are the random components of the utility. These random components are assumed to be independently and identically distributed. Let's assume that alternative 1 is chosen. The probability of selecting the alternative 1 by an individual i can be represented as the following:

$$
\begin{aligned}
Pr_i(\mathrm{y} = 1) &= Pr_i(U_1 > U_o) \\
&= Pr_i(V_1 + \varepsilon_1 > V_0 + \varepsilon_0) \\
&= Pr_i(\varepsilon_0 - \varepsilon_1 < V_1 - V_0) \\
&= \mathrm{F}\ (V_1 - V_0)
\end{aligned}
\tag{5.3}
$$

where F is the cumulative distribution function of the difference of these error terms, i.e. $(\varepsilon_0 - \varepsilon_1)$ (Cameron & Trivedi, 2005, pp. 476-477). Under the assumption that the deterministic part of utility consists of $X'\beta$ such that $V_0 = X'\beta_0$ and $V_1 = X'\beta_1$. If the $V_1 - V_0 = X'\beta$; then

$$
Pr_i(\mathrm{y} = 1) = F\ (X'\beta) \tag{5.4}
$$

This can be generalized for all possible alternatives.

$$
\begin{aligned}
Pr_i(k) &= Pr_i\big(U_{ik} > U_{ij}\big), && for\ all\ j \neq k \\
&= Pr_i(U_{ij} - U_{ik} < 0), && for\ all\ j \neq k \\
&= Pr_i(\varepsilon_{ij} - \varepsilon_{ik} < V_{ik} - V_{ij}), && for\ all\ j \neq k \\
&= Pr_i(\widetilde{\varepsilon_{jk}} < -\widetilde{V_{jk}}), && for\ all\ j \neq \mathrm{k}
\end{aligned}
\tag{5.5}
$$

where the "~" signs and j denote differencing with respect to reference alternative k (Cameron & Trivedi, 2005, p. 504). Using the density function f(ε_i), the cumulative probability can be written as the following;

$$Pr_i(k) = \int_{\varepsilon}^{\cdot} I(\varepsilon_{ik} - \varepsilon_{ij} < V_{ij} - V_{ik}, \ \forall j \neq k).\mathrm{f}(\varepsilon_i).d\varepsilon_i \tag{5.6}$$

where I(.) is the indicator function that takes the value "1" if the expression in the parenthesis is true, and "0" otherwise. This integral is multidimensional on the density of the unobserved part of the utility, i.e., f(ε_i). $Pr_i(k)$ represents the proportion of individuals who prefer alternative-k within the population who encounter the same observed utility for each alternative as individual-i (Train, 2009, pp. 15-16).

The probability, as stated in Equation (5.6), is a multidimensional integral, let us say J+1-dimensional over the J+1 error terms in $\varepsilon_i = \varepsilon(\varepsilon_{i0,\dots\dots\dots}\varepsilon_{iJ})$. For each alternative, there are J+1 errors and J error differences. Therefore, the probability can be rewritten as a (J) dimensional over the density of error differences such that

$$Pr_i(k) = \int I(\widetilde{\varepsilon_{k\,jm}} < \widetilde{V_{\imath m}} - \widetilde{V_{\imath k}}, \forall k \neq m) g(\widetilde{\varepsilon_{\imath m}}) d(\widetilde{\varepsilon_{\imath m}}) \tag{5.7}$$

Given the presence of unobserved components, we can integrate out the distributions and get the likelihood as the following:

$$L_i = \int_{\varepsilon}^{\cdot} \prod_{j=0}^{K} d_{ij} \left(\frac{\exp(U_{ij})}{\sum_{k=1}^{K} U_{ij}} \right) \phi(\varepsilon) d(\varepsilon) \tag{5.8}$$

where d_{ij} is a dummy variable. It is equal to "1" for observed outcome and "0" otherwise.

The utility function includes consumption expenditures that are assumed to be equal to the individual's total income that includes the wage income in the alternative the individual is employed. The estimation of the discrete choice model requires the wage rates the individual would get for each alternative. Since the wage rates are not observed for non-employed people and observed for only one alternative for those employed, they are "imputed" by using the estimates of a reduced form wage equation. The procedure proposed by Heckman (1979) is used in the literature for imputing the wage rates.

The Multinomial Logit Model (MNLM) is a preferred model for discrete choice modeling if there are more than two ordinal and qualitative choices. If the dependent variable takes two values by indicating the preferences, these binary preference models are called probit and logit models. Multinomial Logit Model (MNLM) is an extended version of such binary models. According to Long & Freese (2001), the multinomial logit models can simultaneously estimate the binary logits for all possible comparisons among the outcome categories (Long & Freese, 2001, pp. 172).

Multinomial logit models have unordered outcomes, indicating more than two choices. In each choice, the individual prefers one alternative from the group of choices. Moreover, these alternatives should be independent of each other, and are labeled arbitrarily (Wooldridge, 2002, s. 497).

As mentioned above, when there are J+1 alternatives, the probability of selecting one alternative among these J+1 alternatives is the probability of obtaining a higher utility than the other alternatives. Under the assumption $U_{ixk} = f(X_{ik})$, that is X represents the characteristics that determine the choice alternatives, and ε_{ij} are independently identically distributed (iid) Type-1 Extreme Value;

$$U_{ixk} = x_{ij}'\beta + \varepsilon_{ij} \tag{5.9}$$

Let the probability of selecting outcome-m, Pr (y=m| x), is a function of the linear combination of x, $x\beta_m$ where $\beta_m = (\beta_{0m} \ldots\ldots \beta_{km} \ldots\ldots \beta_{Km})'$. x is the (1xK) vector of explanatory variables (first element is unity), β_{0m} is the intercept term and β_{km} is the coefficient for the effect on outcome m. Since the probabilities should be non-negative and their sum should be 1, the conditional probabilities can be written as the following (Long, 1997, pp.152-153)

$$\Pr(y = m|\, X) = \frac{\exp(X\beta_m)}{\sum_{j=0}^{J}\exp(X\beta_j)}, \qquad m=0,1,\ldots,J \qquad (5.10)$$

Greene (2002) states that the estimated equations provide a set of probabilities for the J+1 choices for an individual with characteristics x_i to make a decision. Since the probabilities sum should be one, only J parameter vectors are needed to determine the J + 1 probability. Thus, in order to make the model be determined, Greene (2002) imposes the $\beta_0 = 0$ restriction into the model.[16] With the inclusion of this restriction, exponential of X* β_0 would be

$$\exp(X\beta_0) = 1 \qquad (5.11)$$

Therefore, the model turns to be the following equality:

$$\Pr(y = 0|\, X) = \frac{\exp(X\beta_0)}{\sum_{j=0}^{J}\exp(X\beta_0)} = \frac{1}{1+\sum_{j=1}^{J}\exp(X\beta_j)} \qquad (5.12)$$

For all m values, the model would be as the following:

$$\Pr(y = m|\, X) = \frac{\exp(X\beta_m)}{1+\sum_{j=1}^{J}\exp(X\beta_j)} \quad \text{where } \beta_0=0 \text{ and } j=1, 2 \ldots J \qquad (5.13)$$

Since there is a probability function of each outcome for each observation, the model can be estimated by using the *Maximum Likelihood Estimation (MLE)* method. Wooldridge (2002) states that the MLE method gives a consistent and unbiased estimator. Mc Fadden (1984) proves that the Hessian matrix of the log-likelihood is negative definite, so that the log-likelihood of the MNLM is globally concave, and thus maximum likelihood estimators are unique (McFadden, 1984, pp. 1413-1415).

The estimation of the "wage elasticity" is one of the main objectives of any study on labor supply because it is essential for any policy simulation analysis. There are two elasticity concepts used in the empirical literature: "*the uncompensated (Marshallian) wage elasticity*" and "*the compensated (Hicksian) wage elasticity*". The uncompensated wage elasticity is the percentage change in labor supply in response to a 1% change in the wage rate. It can be formulized as the following:

[16] For detailed information see Greene (2002) and Scott (1997)'s part "The MNLM as a Probability Model"

$$\in^{U} = \frac{dh}{dw}\frac{w}{h} \tag{5.14}$$

On the other hand, the compensated wage elasticity is derived from the Slutsky equation, and it refers to substitution effect of the equation (Bargain & Peichl, 2016, p. 6) because it excludes the income effect caused by a change in the wage rate. It can be represented as the following:

$$\in^{C} = \in^{U} - \frac{w.h}{y}\frac{dh}{dy}\frac{y}{h} \tag{5.15}$$

where w is the wage, h is the labor supply in hours terms, y is the non-labor income.

There is no explicit labor supply function in the discrete choice labor supply model. With the help of the utility function's estimated parameters, the "labor supply function" can be determined in terms of a distribution of hours worked. Thus, the uncompensated wage elasticity of labor supply cannot be applied in the discrete hour's context as in the standard continuous utility function concept (Creedy & Kalb, 2006, pp.42). Instead, the probabilities of being at each discrete hours points are used, and the expected value of hours worked is calculated in the discrete choice labor supply models. Then, the individual's wage rate is increased (or decreased) by a certain amount (1%, 10% etc.), and the new expected value of hours worked is computed. Thus, elasticity is calculated by dividing the percentage change in expected labor supply by the change in the wage rate (Creedy & Kalb, 2006, pp.43).

5.2. Econometric Results for Female Labor Supply in Turkey

We define four labor supply decision outcomes, namely *"Non-Employment (NE)", "Part-Time Employment (PT)", "Full-Time Employment (FT)", and "Over-Time Employment (OT)"*. The "Non-employment" category is taken as the base category. The utility function outlined above is estimated for two demographic groups, single and married women, separately.

The HBA dataset provides information on net incomes of household members. We pool the data for years 2013-2019, and use the Consumer Price Index (CPI, 2013 = 1) to deflate all monetary values.

Since wages cannot be observed for different labor statuses from the data utilized, it is necessary to estimate the wage rate for each individual. Löffler et al. (2018) shows that how the wage rate is estimated considerably affects the value of elasticities calculated from the discrete choice labor supply model. Thus, in this study, we estimate three sets of wage rates to check the effect of wage estimation method on labor supply elasticities.

The wage rates are estimated and imputed in the structural discrete choice model as following:

Expected Wage: $E[\log(w_i)] = \ln(\widehat{w_i}) = X_i{}'\hat{\beta}$ (5.16)

Unconditional Wage: $\log(w_i) = X_i'\hat{\beta} + u_i$ (5.17)

Conditional Wage:

For employed: $E[\ln(w_i) \mid s = 1] = \ln(\hat{w}_i^e) = X_i'\hat{\beta} + \hat{\rho}\,\frac{\phi(Z_i'\hat{\gamma})}{\Phi(Z_i'\hat{\gamma})}$ (5.18)

For not-employed : $E[\ln(w_i) \mid s = 0] = \ln(\hat{w}_i^{ne}) = X_i'\hat{\beta} + \hat{\rho}\,\frac{-\phi(Z_i'\hat{\gamma})}{1-\Phi(Z_i'\hat{\gamma})}$ (5.19)

For the expected wage, the predicted values from the wage equation are used. The unconditional estimator gives the best estimate of the wages if one does not know whether an individual is working or not. If the researcher knows that an individual is working, then a conditional predictor that takes into account the fact that the individual is employed (or not) can be used (Breunig & Mercante, 2010, p. 50). In this study, the structural discrete choice labor supply models are estimated twice for the unconditional and conditional wages. In the first case, a random prediction "error" (the u term) is drawn from a normal distribution with mean zero and standard deviation equal to the standard deviation of the error term of the wage equation, and is integrated out in calculating the choice probabilities. The hours and participation elasticities are calculated for each model. For comparison, all elasticities estimation specific to each model are presented in Table 18 and Table 19.

Following Van Soest (1995), the *"*Translog*"* form is used for the utility function. This specification allows for diminishing returns via quadratic terms (Creedy & Kalb, 2006, p.52). Moreover, three types of utility functions are estimated. The "Base Model" includes only income and leisure time variables. The "Unobserved Heterogeneity" model includes a random component for income and leisure time so that individuals with the same income and leisure time may have different preferences because of unobserved heterogeneity, whereas the "Observed Heterogeneity" model includes a number of covariates that affect the utility of income and leisure time for each individual, i.e., preferences depend on observed and unobserved heterogeneity across individuals.

The base model is constructed by including only the income of the household (I), its quadratic term (I^2), working hours (H, the leisure time is equal to 24 minus the hours worked), its quadratic term (H^2), the cross product of income and working hour (I*H), and also Full-Time Employment dummy variable (FT). The full-time dummy variable is equal to1 if the individual works full-time or over-time, and is used to control for the cost of working full-time. In line with the empirical and theoretical studies in the literature, the utility is expected to increase with income and decrease with work hours, or, in other words, increase with leisure and home production (Creedy & Kalb, 2006, p.52). The quadratic terms control for changes in marginal utility. The marginal utility of income is expected to decrease with an increase in income, and the marginal disutility of hours worked is expected to increase as an individual works more.

In the *"Unobserved Heterogeneity"* model, the unobserved heterogeneity for income and working hours are taken into account by adding random components for the income and working hours variables (the v_1 and v_2 terms, see Equation 5.21 below). Finally, the *"Observed Heterogeneity"* model includes variables on individual characteristics interacted with the cross products of income and working hours variables. Estimated models are formulized as the following:

<u>Base Model</u>:

$$U(I_{Hj};\, H_j) = \beta_1 I_{Hj} + \beta_2 H_j + \beta_3 I_{Hj}^2 + \beta_4 H_j^2 + \beta_5 H_j * I_j + \beta_6 FT_j + \varepsilon_{Hj} \qquad (5.20)$$

<u>*Utility with Unobserved Heterogeneity:*</u> (5.21)

$$U(I_{Hj};\, H_j;\, v_1;\, v_2) = (\beta_1 + v_1) I_{Hj} + (\beta_2 + v_2) H_j + \beta_3 I_{Hj}^2 + \beta_4 H_j^2 + \beta_5 H_j * I_j + \beta_6 FT_j + \\ + \varepsilon_{Hj}$$

Utility with Observed Heterogeneity: (5.22)

$$U(I_{Hj};\ H_j;\ v_1;\ v_2) = (\beta_1 + v_1)I_{Hj} + (\beta_2 + v_2)H_j + \beta_3 I_{Hj}^2 + \beta_4 H_j^2 + \beta_5 H_j * I_j + \beta_6 FT_j + \alpha_1 X'I + \alpha_1 X'H + \varepsilon_{Hj}$$

where X is the vector of individual characteristics, and includes the variables that are presented in Table 17. Some of the coefficients of the individual-level variables can be defined as "alternative-specific". This specification allows for heterogeneous effect of variables on preferences across choice alternatives (part-time, full-time and over-time work). The v_j terms represent the unobserved individual preferences which are assumed to be independent and normally distributed. There are two reasons for the existence of this random term. First, there can be a latent factor that affects the preferences so that the existence of such a random term ensures the relaxation of the IIA (Independence of Irrelevant Alternatives) assumption.[17] Second, it includes the heterogeneity in preferences (Pacifico, 2009, p.6).

Table 21: Income and Hours Interaction Variables

Description
Any Disabled Person in Household
Employment Status of Spouse
Spouse Not Eligible for Work
Employer or Self-Employed Spouse
Having Disability in Daily Activity
The Number of Commercial Shops
The Status of Any Liability on House
The Ownership Status of the House- Tenant
The Ownership Status of the House -Lodging or Not Paying Rent
The Number of Automobiles
The Number of Infant Children
The Number of Preschool Children
The Number of School Age Children
The Number of Young Children
The Number of Not-Employed Adult Children
Age for Not-Employment Alternative

[17] This property assumes that if an alternative is changed, then the relative odd ratios of the other alternatives do not change. It is often characterized as a drawback of the logit models. However, it can be a natural outcome of the well-specified models (Singhal, 2021, p. 4).

Table 22: Income and Hours Interaction Variables (continued)

Age for Part-Time Employment Alternative
Age for Full-Time Employment Alternative
Age for Over-Time Employment Alternative
Quadratic Term of Age for Not-Employment Alternative
Quadratic Term of Age for Part-Time Employment Alternative
Quadratic Term of Age for Full-Time Employment Alternative
Quadratic Term of Age for Over-Time Employment Alternative

When these interaction terms are included, whether their coefficients are alternative-specific or not is controlled and tested for each type of model. We checked all individual-level variables if they have alternative-specific coefficients, and found that only the age variable has statistically significant alternative-specific coefficient. Therefore, the "age" variable is included in the model as "alternative-specific", while the other interaction variables are not.

Under these conditions, the probability of choosing H_j is then rewritten as the following:

$$\Pr\,(\mathrm{y} = H_j \mid \mathrm{X}, v) = \frac{\exp(U(I_{Hj}, H_j,\ X,\ v\,)}{\sum_{k=1}^{K} \exp(U(I_{Hk}, H_{k,},\ X,\ v\,)} \qquad \text{where } v = (v_1, v_2, v_3) \quad (5.23)$$

The unobserved heterogeneity and unobserved component of wages is integrated out as follows:

$$\iiint \prod_{j=1}^{K} d_{ij} \left(\frac{\exp(\,U(\,I_{Hj}; H_j; X}{\sum_{k=1}^{K} \exp(\,U(\,I_{Hk}; H_j; X} \right) \phi(\varepsilon).\,\phi(v).\,\phi(u) \qquad (5.24)$$

We estimated 32 models for the combinations of three types of handling the error term of the expected wage, three types of heterogeneity and two categories of women.

The Bayesian Information Criteria (BIC) and the goodness of fit (rho2) and average elasticity values for each model are shown in Table 18 and Table 19 for married women and single women, respectively.

Table 23: Simulated Labor Supply Elasticities, Married Women

Mean wage	Prediction error	Unobserved hetero.	Observed hetero.	BIC	rho2	Particip. elast.	Hours elast.
Expected	None	No	No	58485.9	0.518	1.340	1.408
Expected	None	No	Yes	53935.0	0.559	1.385	1.440
Expected	None	Yes	No	55438.8	0.543	1.388	1.384
Expected	None	Yes	Yes	51145.2	0.582	1.417	1.401
Unconditional	1 random draw	No	No	62250.1	0.487	0.636	0.671
Unconditional	1 random draw	No	Yes	57616.5	0.529	0.547	0.558
Unconditional	1 random draw	Yes	No	59009.8	0.514	0.648	0.630
Unconditional	1 random draw	Yes	Yes	54843.2	0.552	0.566	0.544
Unconditional	Integrated out	Yes	No	55599.5	0.542	1.357	1.385
Unconditional	Integrated out	Yes	Yes	51069.8	0.583	1.359	1.365
Conditional	1 random draw	No	No	64066.6	0.472	0.394	0.413
Conditional	1 random draw	No	Yes	59169.3	0.516	0.264	0.261
Conditional	1 random draw	Yes	No	60744.8	0.499	0.410	0.388
Conditional	1 random draw	Yes	Yes	56389.4	0.539	0.292	0.268
Conditional	Integrated out	Yes	No	59525.9	0.509	0.852	0.837
Conditional	**Integrated out**	**Yes**	**Yes**	**55332.7**	**0.548**	**0.749**	**0.713**

Estimation results show that, when heterogeneity is included, the BIC value decreases for each type of wage models. Especially the models containing both observed and unobserved heterogeneity have the lowest BIC value. As may be expected, as these two types of heterogeneities are taken into account, the goodness of fit (rho2) increases.

When the prediction results are evaluated within the "expected mean wage" models, it can be seen from Table 18 that when the heterogeneity is not included in the model, the BIC value is 58485.9 for married women. The model with only observed heterogeneity has a 53935.0 BIC value, and this value is 55438.8 for the model that only includes the unobserved heterogeneity. Thus, it can be claimed that the model with only observed heterogeneity is better; however, the model that includes both observed and unobserved heterogeneities takes the lowest BIC value (i.e., 51145.2) among expected mean wage models. Compared to the models' goodness of fit, the model that includes observed and unobserved heterogeneities has the highest value. In other words, as the heterogeneity is taken into account, the rho2 of the model increases. According to rho2, the model that contains both types of heterogeneity is better than the others within each other.

As for the unconditional mean wage modeling for married women, there are two types of error terms: one random draw, and fifty random draws. In the unconditional mean wage models with one random draw, when heterogeneity is included, the BIC value decreases (i.e., 62250.12 for no heterogeneity, 57616.47 for observed heterogeneity, and 59009.78 for unobserved heterogeneity). If both types of heterogeneity are taken into account, the BIC value reaches the lowest one, i.e., 54843.23. When the rho2 values of these models are compared, the model that includes both types of heterogeneities has the highest goodness of fit. In addition, in the unconditional mean wage models with fifty random draws, the lowest BIC value (which is 51069.8) and the highest rho2 value belongs to the one which includes both unobserved and observed heterogeneity.

Similarly, the inclusion of the heterogeneity decreases the BIC values of the conditional mean wage models. When both types of heterogeneities are included, the BIC value reaches the lowest one (i.e., 56389.4 for one random draw error term and 55332.7 for the fifty random draws). Furthermore, the goodness of fits' of the models with both heterogeneities are the higher than the others.

Table 24: Simulated Labor Supply Elasticities, Single Women

Mean wage	Prediction error	Unobserved hetero.	Observed hetero.	BIC	rho2	Particip. elast.	Hours elast.
Expected	None	No	No	8269.0	0.468	0.775	0.820
Expected	None	No	Yes	8081.3	0.502	0.615	0.618
Expected	None	Yes	No	7944.6	0.490	0.769	0.782
Expected	None	Yes	Yes	7747.4	0.524	0.608	0.571
Unconditional	1 random draw	No	No	8737.0	0.438	0.507	0.530
Unconditional	1 random draw	No	Yes	8396.5	0.481	0.343	0.340
Unconditional	1 random draw	Yes	No	8408.8	0.460	0.529	0.531
Unconditional	1 random draw	Yes	Yes	8081.5	0.503	0.363	0.339
Unconditional	Integrated out	Yes	No	7957.2	0.490	0.792	0.813
Unconditional	Integrated out	Yes	Yes	7690.8	0.528	0.648	0.608
Conditional	1 random draw	No	No	9014.1	0.420	0.414	0.427
Conditional	1 random draw	No	Yes	8591.6	0.469	0.216	0.204
Conditional	1 random draw	Yes	No	9602.8	0.383	0.139	0.153
Conditional	1 random draw	Yes	Yes	8279.1	0.490	0.234	0.204
Conditional	Integrated out	Yes	No	8433.5	0.459	0.640	0.644
Conditional	**Integrated out**	**Yes**	**Yes**	**8068.0**	**0.504**	**0.402**	**0.350**

When all models for married women are evaluated in this context, it is seen that expected and unconditional mean wage models have lower BIC values than the conditional mean wage model. The goodness of fit of the conditional mean wage model is approximately similar to that of expected and unconditional mean wage models. Thus, it can be asserted that the expected or unconditional mean wage models should be chosen. However, when we evaluate the elasticities of each type of model, it can be noticed that this is not the case. Indeed, both hours and participation elasticities of the conditional mean wage model are more reasonable. The elasticities of the conditional mean wage model vary between 0.394-0.749, which is a reasonable margin. The elasticities of the expected mean wage model are between 1.340 and 1.417, and the elasticities of the unconditional mean wage model are between 0.547 and 1.359. Furthermore, the conditional mean wage model is technically more powerful than the expected and unconditional mean wage models because the latter have restricted assumptions. Therefore, the most appropriate model for further analysis is the conditional mean wage model for married women, including both the unobserved and observed heterogeneities with fifty random draw error terms.

A similar assessment is valid for single women, as seen in Table 19. For each model type, as the heterogeneity is considered, the models' BIC value decreases, and the model's goodness of fit increases. When three model types (with unobserved and observed heterogeneity) are evaluated, although the BIC value of the conditional mean wage model is slightly higher than the others, it is technically better than the other models. Moreover, when comparing the elasticities of the three models, the most appropriate model is again the conditional mean wage model, including unobserved and observed heterogeneity with fifty random draw error terms for single women. Thus, these models are used for analysis and policy simulations.[18] Simulated and the actual number of people are presented in Table 20 for each labor supply outcome. It is noted that the numbers are so close to each other; thus, simulations fairly represent the real environment.

[18] In the estimation procedure, 50 and 100 random draws are examined for each marital status. For married women, the participation elasticity for 50 and 100 draws are 0.88 and 0.89, respectively. This elasticity is 0.43 for the result of each random draw for single women. Furthermore, the hour elasticity is 0.87 and 0.86 for married women, while it is 0.40 for the result of each random draw for single women. Since the results are very similar, the 50 random draws are used in the study.

Table 25: Real and Simulated Labor Market Status
(Thousands of People, 2013-2019 Average)

Status	Married women		Single women	
	Real	Simulated	Real	Simulated
Not employed	9848.6	9836.9	1129.7	1124.6
Part time	474.2	492.8	91.1	93.3
Full time	1590.5	1598.0	365.9	368.5
Over time	759.6	745.1	183.7	184.0

The estimation results of the chosen structural model for both single and married women are presented in Table C.3 in Appendix C. According to the estimation results, the income and working hour variables and cross-products are statistically significant for the base and full models. The signs of these variables are consistent with the expectations. The full-time dummy variable is also statistically significant and has a positive sign for each equation. On the other hand, in the full model, the interactions of the existence of any disabled person in the household with the income and working hours for both single and married women, the interactions of the employment status of spouse, having employer or self-employed spouse for married women, the number of children with working hours, having commercial shops, automobiles, having any liability on the house, being a tenant or living in a lodge or not paying any rent for house, age and the quadratic term of age variables with the interaction of income and hours worked variables are statistically significant. These interaction terms' signs align with the empirical literature, as expected.

Estimation results imply that having infant and preschool children have a significantly negative effect on utility through working hours, meaning that women with infant and preschool children need more time than income to be able to engage in children’s care.

Furthermore, the age variable, the only alternative-specific variable in the model, is statistically significant and has negative signs for each alternative. As the hours of work increase, the coefficient of the interaction term of age with income for married women decreases, while the interaction of it with working hours increases. For single and married women, as age increases, it negatively affects utility through hours worked and income. It can be inferred that as age increases, women do not need income and hours to work as expected.

The uncompensated (Marshallian) wage elasticities are calculated for participation and hours worked according to age, education level, income quantiles, and having children of different ages for married and single women. Also, for married women, participation and hour elasticities are calculated with respect to the spouse's employment status. These simulated elasticities are presented in Table C.4.

Estimation results show that both participation and hours elasticities of single women (i.e., 0.358 and 0.304, respectively) are less than married women (i.e., 0.740), on average (Table C.4). Indeed, this case is valid for each labor supply outcome. This result implies that married women undertake daily housework and caring duties, and therefore they have the behavior of living with their husband's income, but single women have to work.

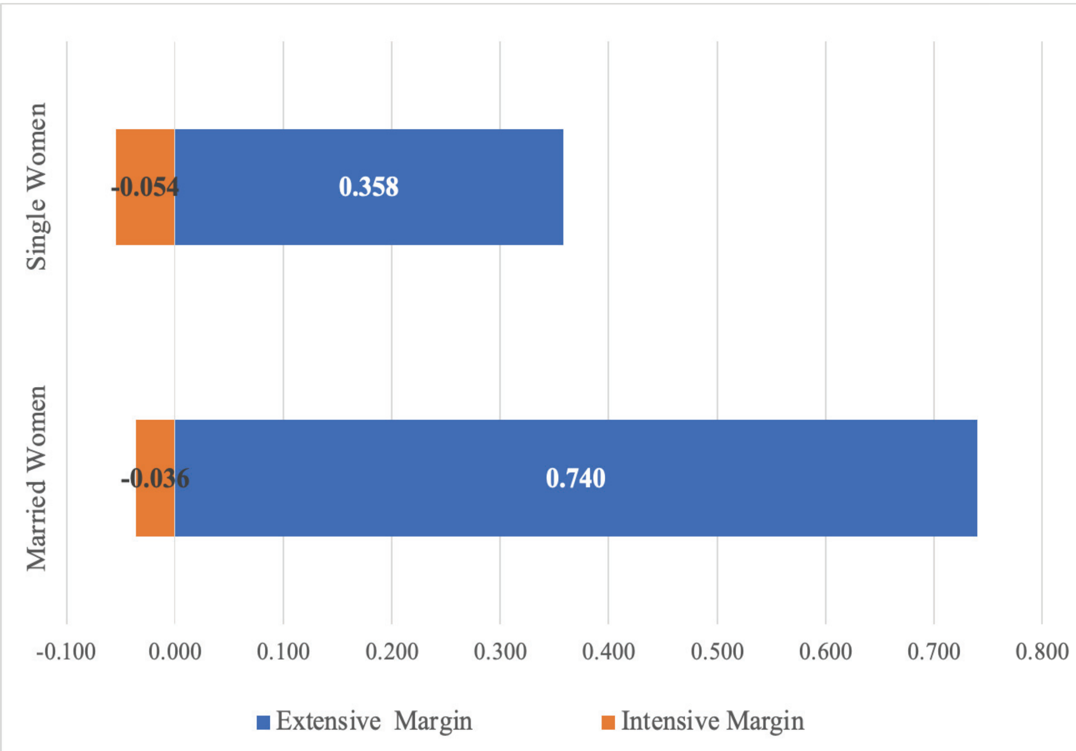


Figure 19: Intensive Margin and Extensive Margin of Female Labor Supply

The participation and hours elasticities are essential measurement tools for the labor supply decisions of individuals. The relative size of labor supply decisions at extensive and intensive margins gives important information on the effect of policy change (Blundell et al., 2011). For the sake of clearness, the average participation and hours elasticity values are compared in the Figure 19. As can be inferred from the figure, for both single and married women, the extensive margin dominates the intensive margin so that hours elasticities are positive. Additionally, as compared for age groups, educational level, incomes, having a child at a different age, and employment status of spouse, it can be seen that the extensive margin exceeds the intensive margin from Table C.4 in Appendix C.

The participation and hours elasticities for single women reveal a U-shaped relationship for age, as seen in Figure 20. The minimum elasticity value belongs to the 25-34 age group, which is in line with our expectations because this is the active working age group. On the other hand, as married women's age increases, their participation and hours elasticities decrease. In younger and older ages, the single females' elasticities are higher than married ones.

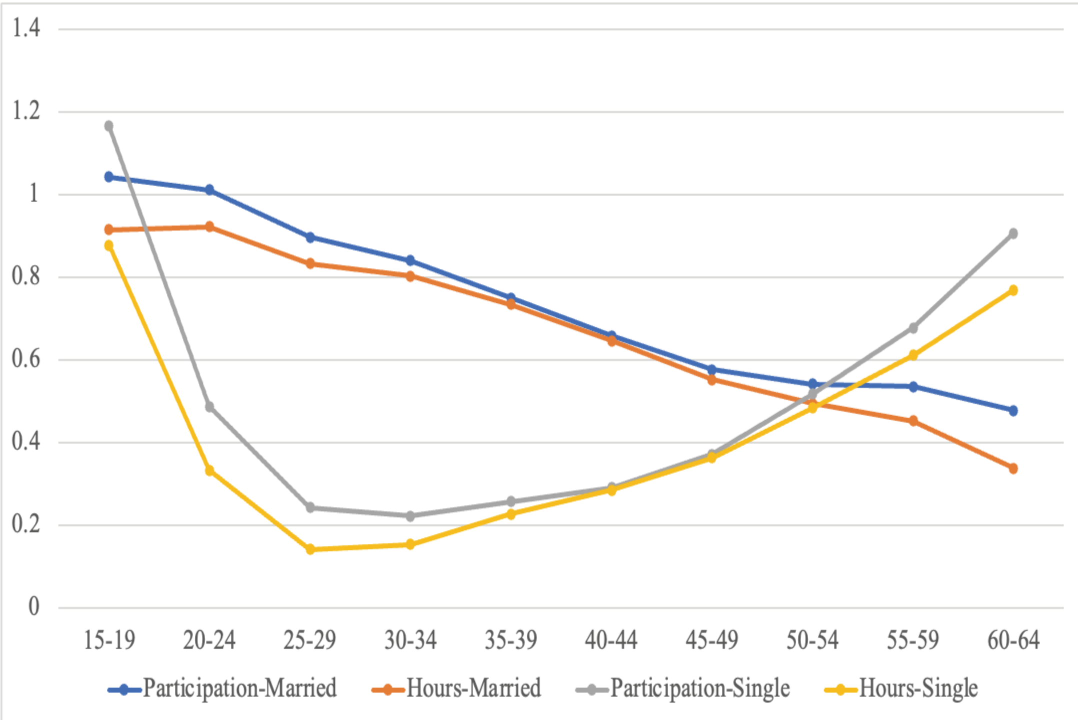


Figure 20: Labor Supply Elasticities by Age Groups

Figure 21 implies that women's participation and hours elasticities decrease as the education level increases. Married women's elasticities are higher than single women's, in line with the expectations. It can be thought that women with a high level of education have intentions to enter the workforce and invest in themselves, and therefore they perceive working life as an important part of their own lives (Dayıoğlu, 2022). For this reason, this result is in line with the expectations.

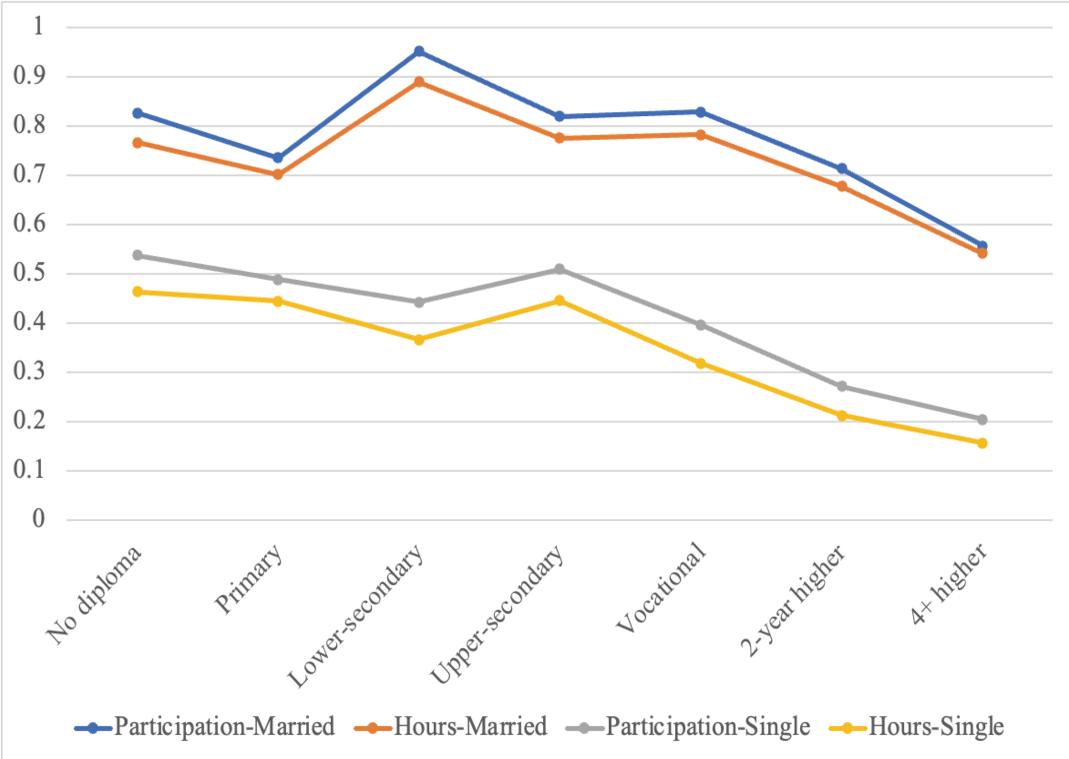


Figure 21: Labor Supply Elasticities by Educational Level

Figure 22 reveals the relationship between the elasticities for income quantiles. Each elasticity values are positive. When the income level increases, both single and married women's participation and hours elasticities decrease, as in line with the expectations. This result implies that women with high-level income need more leisure time, while women with low-level income need more wage and disposable income; thus, they increase their participation and hours of work more.

As for the relationship between having children and elasticities, it can be inferred from Figure 23 that single and married women with 0-2 years old children in each employment status have the highest participation and hours elasticities. As the age of children increases, these elasticities decrease in general. This result confirms that women in the household mainly undertake caring responsibility for underage children (namely infants and preschool).

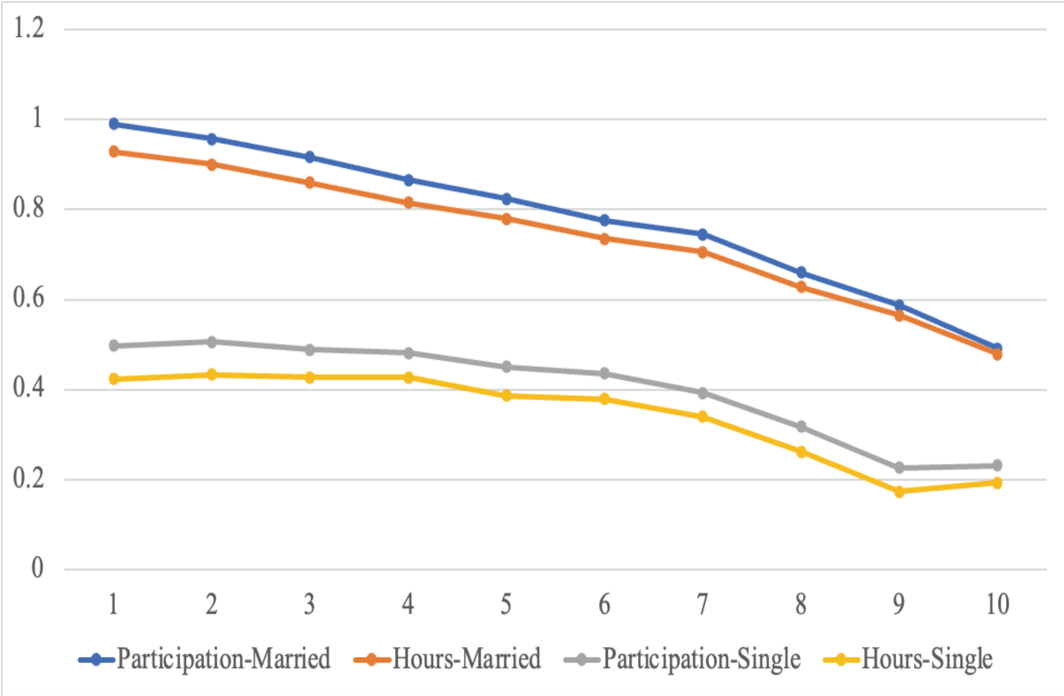


Figure 22: Labor Supply Elasticities by Income Deciles

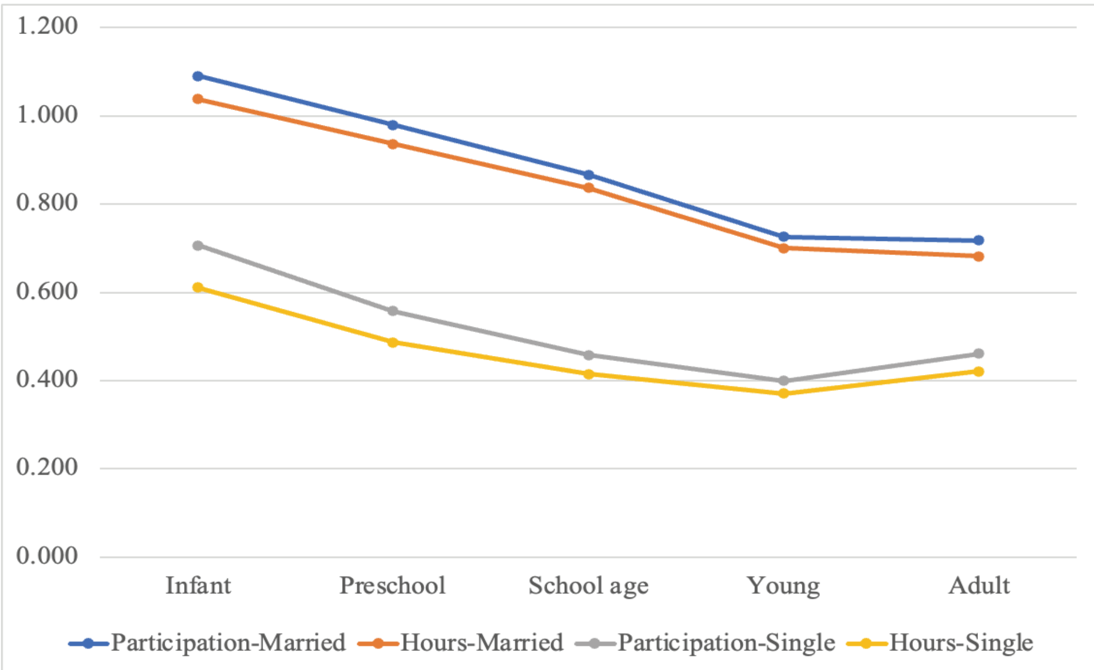


Figure 23: Labor Supply Elasticities by the Age of Children

On the other hand, the participation and hours elasticities of married women with wage-earner spouses are higher than those with an entrepreneur spouse or spouse who cannot work, as can be seen in Table 21.

Table 26: Labor Supply Elasticities of Married Women by Spouse Employment Status

	Participation elasticities				**Hours**
	Part time	Full time	Over time	Total	**elasticity**
Wage Earner	0.790	0.912	0.375	0.754	0.720
Entrepreneur	0.646	0.834	0.197	0.570	0.523
Cannot work	0.521	0.792	0.337	0.633	0.621

CHAPTER 6

THE EFFECTS OF SOCIAL AND TAX POLICIES ON FEMALE LABOR SUPPLY AND INCOME

We examine the effects of three types of policies on female labor supply and income. The first type is based on abolishing the value-added taxes on household' basic needs, namely "foods & non-alcoholic drinks", and on some services that may affect women's labor supply decisions, “transportation” and “education” so that total family income is assumed to increase by VAT payments for these products.

The second policy set is related to wages. The first scenario is to provide a wage subsidy as 10% of the gross minimum wages to all women workers. The second scenario is the application of this first scenario to only young women under 30 years old. The last scenario is the application of negative tax to the wages of individuals.

The third policy sets provide benefits to women with 3-6 years old children. First, the policy of providing free care for preschool children for women as if they do not have any children 3-6 years old children is examined. In the second and third scenarios, unconditional and conditional subsidies are given to women with 3-6 years old children.

6.1. Reduction of the VAT Rate

The current Turkish tax system consists of various types of taxes. In principle, taxes are imposed and collected because individuals earn income, have wealth, spend their income or wealth, and make transactions related to them. Thus, many taxes and similar liabilities taken from various sources and transactions are based on these sources: income, expenditure, wealth, and other sources.

The types of taxes in the Turkish tax system are listed in Figure 24. The rules of these taxes are determined by various tax laws and the Tax Procedure Law (Code: 213).

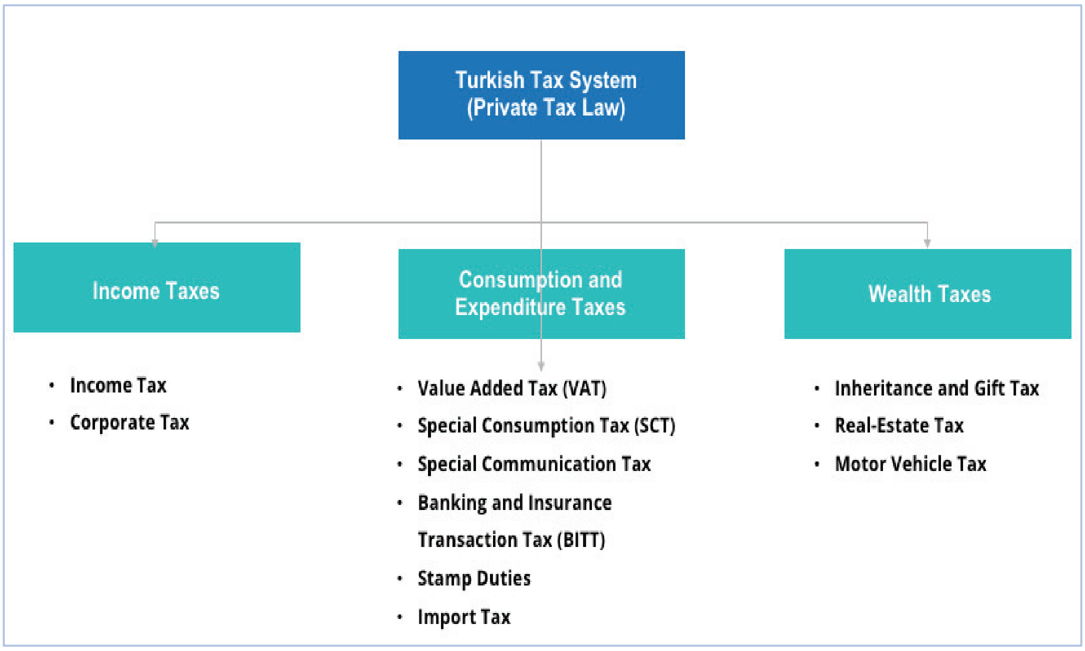


Figure 24: Turkish Tax System

The Turkish tax system is a yearly-based, unified system that covers all types of incomes of individuals and corporations. Taxes on income are considered direct taxes, and these are income tax and corporate tax. Indirect taxes, such as value-added and special consumption taxes, are collected from the consumption and expenditures of goods and services. These are reflected in the final consumer's price of goods and services, regardless of their income level.

Direct taxes have positive features, such as ensuring fairness, equality, and efficiency in taxation as they are collected on income. Since they are collected in certain periods and proportional for taxpayers, direct taxes aim to help the economy to stabilize in the conjuncture of contraction and expansion. On the other hand, they also have negative aspects that should not be ignored, such as affecting savings, costs, and the psychology of taxpayers, increasing the informal economy, having a complex structure due to complex tax legislation, and reducing labor supply (Gündoğdu, 2022, p. 162).

Income tax is a type of tax applied to the income of individuals. It is a subjective-personal tax, and it takes the personal economic situation of the taxpayer during the taxation period into account. Income tax is a progressive tax such that as the income increases, the tax rate to be applied also increases. It is a general tax and deals with all incomes of individuals. Since the legal taxpayer is also the actual bearer of the tax, the tax burden cannot be reflected on another individual. Furthermore, the wealth tax is one of the other direct taxes. The subject of taxes on wealth is various wealth elements owned or acquired.

Indirect taxes are collected from consumptions and expenditures. These taxes are not proportional to individual income and not be associated with financial power. Indirect taxes have positive aspects in terms of fiscal administration, such as being applicable to everyone, easy to collect, and having low collection costs. On the other hand, it may have a negative impact on issues such as fairness in taxation, income distribution, and economic growth, which are essential building blocks of the economy. The high share of indirect taxes in the economy shows that there is injustice in taxation. The indirect taxes can be used as a policy tool for reducing income inequalities. Tax makers are expected to set low tax rates for households' basic needs and food to minimize the adverse effects of indirect taxes on the low-income segment of society.

Value-added taxes are introduced in Turkey by the Value-Added Tax Law (Code: 3065) enacted on 25 October 1984, and the current tax rates are determined by the Decision of the Council of Ministers (BKK). According to the current legislation, the general value-added tax rate is 18%. For the essential consumption goods such as bread and olives included in List No. I, the tax rate is 1%, and for the products such as milk and cheese included in List No. II 8% (the Council of Ministers' Decision no 2007/1303). Table 22 presents the VAT rates of various goods and services in 2019. The products in the table are classified following the COICOP classification (Classification of Individual Consumption According to Purpose).

Table 27: VAT Rates, 2019

COICOP Base Group Number	Goods and Services	VAT Rate (%)
1	Food And Non-Alcoholic Beverages	8
2	Alcoholic Beverages, Tobacco and Narcotics	18
3	Clothing And Footwear [19]	8
4	Housing, Water, Electricity, Gas and Other Fuels [20]	18
5	Furnishings, Household Equipment and Routine Household Maintenance[21]	18
6	Health	8
7	Transport	18
8	Communication	18
9	Recreation and Culture[22]	8-18
10	Education	8
8	Restaurants and Hotels	8
12	Miscellaneous Goods and Services	5-8-18

In addition to VAT, the Special Consumption Tax (SCT) is another type of indirect tax extensively used in Turkey. It is imposed on consuming luxuries such as electronic products, petroleum products, automobiles, motorcycles, planes, helicopters, and other vehicles. It is also imposed on products harmful for health, which are determined by the government, such as tobacco and tobacco products, alcoholic beverages, etc. It is usually claimed that high tax rates are applied for these products to reduce their consumption. The SCT rates are determined by the Special Consumption Tax Law (Code: 4760) depending on the tariff numbers (GTİP code). There are mainly four product groups that are subject to SCT at different tax rates:

[19] Purchasing these kinds of goods is subject to 8% of VAT. Cleaning, repairing and hiring of them is subject to 18% of VAT.
[20] From the consumption of gas and other fuels the Special Consumption Tax is collected. For household, there is no VAT on the hiring of dwellings.
[21] Furnishings, Household Equipment and Routine Household Maintenance
[22] Paper, books and other cultural materials, and stationary materials are subject to 8% of VAT.

- Petroleum oil products, natural gas, lubricating oil, solvents, and derivatives of solvents.
- Automobiles and other vehicles, motorcycles, planes, helicopters, and yachts.
- Tobacco and tobacco products, alcoholic beverages.
- Luxury products.

According to the OECD statistics the ratio of tax revenues to gross domestic product (GDP) in Turkey was 25.2% in 2013, and this rate decreased to 23.1% in 2019. In the same period, the OECD average was 33.4%.

Table 28: GDP Share of Tax Revenue in Turkey and the OECD, 2013-2019 (%)

Years	OECD	Turkey
2013	32.7	25.2
2014	32.9	24.5
2015	32.9	25.0
2016	33.6	25.1
2017	33.4	24.7
2018	33.5	24.0
2019	33.4	23.1

Source: OECD Tax Revenue Statistics

Since 2013, a steady increase in the ratio of tax income to GDP in OECD countries has drawn attention. Although the average ratio for the OECD countries has increased, there has been a decrease in recent years for Turkey. Turkey took 57th place in 2019 among the countries whose data are available. The share of total tax revenue in GDP in some developing countries such as Tunisia, Brazil, Lithuania, Argentina, Uruguay, Bolivia, Vietnam, and South Africa is greater than that of Turkey.

VAT and the SCT accounts for the largest share in total tax revenue in Turkey (see Table 24). The average of the OECD countries is higher than Turkey's tax revenues for each type of tax.

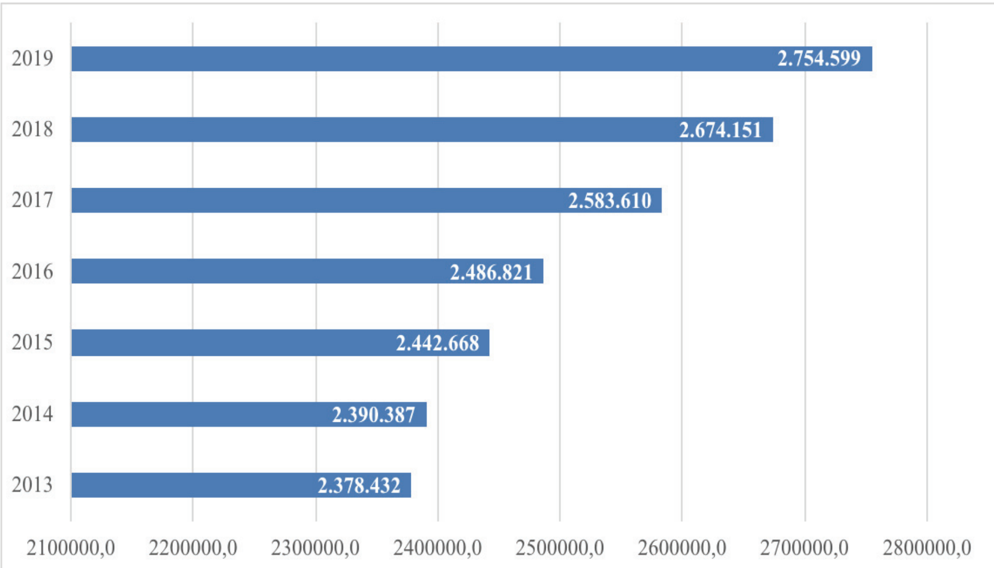
Table 29: Composition of Tax Revenue in Turkey and the OECD, 2013-2019 (% of GDP)

	Total Tax Revenue/GDP		**Taxes on Income & Profits/GDP**		**Social Security Contributions/ GDP**		**Taxes on Property/GDP**		**Taxes on Goods & Services/GDP**	
	Turkey	OECD	Turkey	OECD	Turkey	OECD	Turkey	OECD	Turkey	OECD
2013	25.2	32.6	5.1	10.7	6.9	8.8	1.2	1.8	11.6	10.7
2014	24.5	32.8	5.2	10.8	7.0	8.8	1.2	1.8	10.8	10.8
2015	25.0	32.9	5.1	10.9	7.2	8.8	1.2	1.8	11.1	10.8
2016	25.1	33.6	5.3	10.9	7.2	8.9	1.2	2.2	11.0	10.9
2017	24.7	33.3	5.3	11.2	7.2	8.9	1.1	1.9	10.7	10.9
2018	24.0	33.5	5.8	11.3	7.2	8.9	1.0	1.8	9.7	10.8
2019	23.1	33.4	5.6	11.3	7.3	8.9	1.0	1.8	9.0	10.7

Source: OECD Revenue Statistics.
Note: Other taxes are not included in the table.

The ratio of taxes on goods and services, which mainly includes the VAT, reveals a smooth pattern between 2013 and 2019. Furthermore, the share of these taxes in the total tax revenues for Turkey is higher than the ratio of other important types of taxes. Thus, the impact of any policy change of VAT could be higher than any other taxes.

Figure 25 reveals the number of VAT taxpayers in Turkey for the 2013-2019 period. As seen from the figure, the number of VAT taxpayers has gradually increased since 2013.



Source: Turkish Revenue Administration Statistics (The number of taxpayers reveals the data for December of the relevant year.)

Figure 25: Number of VAT Taxpayers in Turkey, 2013-2019

In Turkey, indirect taxes are used as a policy tool so that the government aims to compensate the loss from the income tax and import tax by using the VAT as an indirect tax. The introduction of excise taxes in addition to VAT in 2002 and the special communication tax in the following years has aimed to increase the tax revenues. Because the response of indirect taxes is limited from the taxpayer's point of view, the tax burden is reflected in the final consumer prices by spreading it in a broader base (Albayrak et al., 2016, p.251).

Considering all these data in overall, it can be concluded that Turkey comes closest to the OECD average in terms of the tax burden on goods and services. In this context, it can be asserted that indirect taxes in Turkey constitute a large part of the tax burden on households.

The means of transportation used by individuals on their way to work and the expenditures made on them are also considered as working costs and play an essential role in determining the labor supply for individuals. On the other hand, since the responsibility of taking care of children is one of the most essential factors in their decision to join the workforce, especially for women, the expenditures of women with young children for education are also effective for the labor supply decision. For this reason, reducing the VAT burden on education and transportation could be an important policy tool that affects the female labor supply.

The HBS data for the years 2013-2019 show that the most significant share of household expenditures is accounted by the expenses on food and soft drinks (Table D.2 in Appendix D). The monthly expenses of these goods and services have increased since 2013.

Expenditures for transportation accounts for about 3-4% of total expenditures, and education less than 1% (Table 25). Although the average share of education is low, its distribution is highly skewed, and its share may exceed 5% for certain families.

Table 30: Consumption Share of Foods & Soft Beverages, Education and Transportation by Family Status, 2013-2019

	Foods & Soft Drinks	Transportation	Education
Married			
2013	18.2	4.0	0.8
2014	18.7	3.9	0.7
2015	19.5	3.9	0.9
2016	18.3	3.4	0.7
2017	18.8	3.4	0.7
2018	19.3	3.4	0.6
2019	19.7	3.1	0.8
Single			
2013	17.9	4.5	0.2
2014	16.9	4.2	0.2
2015	17.5	4.4	0.1
2016	16.8	4.3	0.2
2017	17.7	4.3	0.2
2018	17.7	3.9	0.2
2019	17.5	3.6	0.1

Source: Author Calculations Based on the 2013-2019 HBS Micro-Level Data, TURKSTAT

As the households' income increases the share of food & soft beverages and transportation expenses among the total expenses decreases, while the share of education expenses increases (Table D.3 in Appendix D).

Table 26 presents the data on the ratio of VAT paid for these three goods & services to disposable income for single and married women by income deciles. It can be seen that as the income level increases, the ratio of VAT paid for food & soft beverages and transportation decreases, while the ratio for education increases. Also, the ratio for food & services, and education is generally higher for married women than for single women in each income decile.

For the microsimulation analysis, three cases are examined:

1. It is assumed that the value-added tax on food and soft drinks is decreased from 8% to 0%.
2. The VAT ratio on transportation is assumed to decrease from 18% to 0%.

3. The VAT ratio on education expenditure is assumed to decrease from 8% to 0%.

Table 31: Share of VAT Payments in Disposable Income by Family Status and Income Decile (average for 2013-2019, %)

	1th	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Food and Soft Drinks										
Married	2.70	2.07	1.86	1.72	1.57	1.45	1.35	1.22	1.02	0.65
Single	2.61	2.03	1.88	1.76	1.57	1.38	1.33	1.17	0.97	0.65
Transportation										
Married	0.89	0.84	0.83	0.79	0.72	0.69	0.65	0.59	0.52	0.36
Single	1.07	0.85	0.85	0.85	0.76	0.81	0.68	0.70	0.66	0.53
Education										
Married	0.03	0.03	0.04	0.04	0.04	0.05	0.06	0.07	0.13	0.28
Single	0.01	0.02	0.03	0.01	0.01	0.02	0.02	0.03	0.03	0.04

Source: Author Calculations Based on the 2013-2019 HBS Micro-Level Data, TURKSTAT

With the decrease in the VAT ratios, it is assumed that there is an increase in the total disposable income by the amount of tax paid by the household. Furthermore, it is assumed that the budget shares of all products remain the same after the reduction in the tax rate.

When the results of all three scenarios are evaluated together (Table 27), the policy with the highest impact on the employment change for single and married women is the first policy, which is the tax reduction on food and soft drinks (1.73% and 0.37% for married and single women, respectively). This is followed by the second and third policies, respectively. As shown in Table D.4 in Appendix D, as a result of the first policy, additional 78,033 not-employed married women and 5,722 single women participate in the labor market, while these numbers are 40,744 and 3,544 for married and single women, respectively, as a result of the second policy; and additional 7,574 married women and 150 single women, due to the third policy.

Similar results are obtained for the increase in wage and disposable income. After the first policy implementation, the disposable income increases by 0.18% and 0.11% for married and single women. The increase is 0.09% for married and 0.07% for single women in the second policy scenario and 0.03% for married women in the third policy.

Moreover, the reduction of the tax on foods and soft drinks significantly affects single and married women's wage income more than the other policies (1.96% and 0.44%).

Table 32: Change in Employment, Disposable Income and Wage Income by Family Status and VAT Policy (%)

	Food and Soft Drinks	Transportation	Education
Married			
Change in Employment (%)	1.73	0.92	0.13
Change in Disposable Income (%)	0.18	0.09	0.03
Change in Wage Income (%)	1.96	1.02	0.27
Single			
Change in Employment (%)	0.37	0.14	0.01
Change in Disposable Income (%)	0.11	0.07	0.00
Change in Wage Income (%)	0.44	0.25	0.02

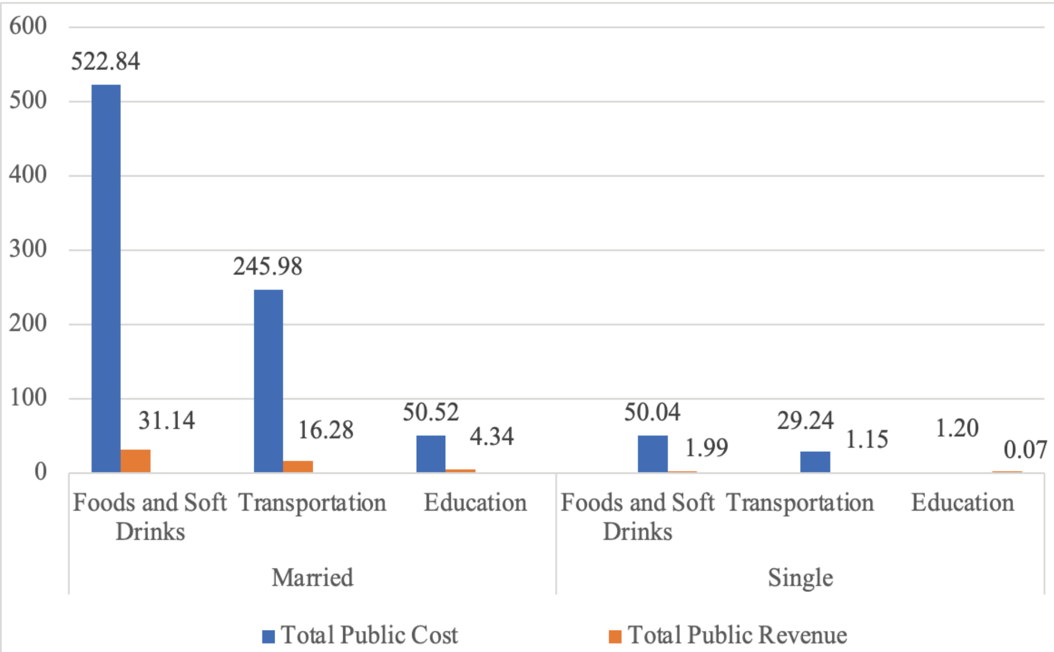


Figure 26: Cost and Revenue of VAT Reduction Policies

(Million TL, 2013 Prices)

The cost (foregone tax revenue) and benefits (the increase in income tax collected due to the increase in employment) of these policies are presented in Figure 26.[23]

[23] Total cost is calculated as the amount of total expenditure of all households on each item multiplied by the VAT rate which is reduced by the policy. Total public revenue is calculated based on SSI premium paid by employers for workers and income tax on wages, taking into account the increases in

Although the most revenue-generating policy is the reduction of VAT on foods and soft drinks, the policy of the VAT reduction on education services has the highest ratio of total public income to public expenditures.

Policy Effects by Age Groups

Figure 27 shows the data on changes in married women's labor participation according to age groups due to the implementation of VAT reduction policies. There is a positive and hump-shaped relationship between the effect of three policies by age groups for married women. As can be seen from the figure, the policy that mostly affects the employment is the reduction of VAT on food & soft drinks. This is followed by the reduction in VAT on transportation, and education, respectively. VAT reductions on food & soft drinks and education primarily affect women between the ages of 35-39, while VAT on transportation services mainly affect women between the ages of 40-44.

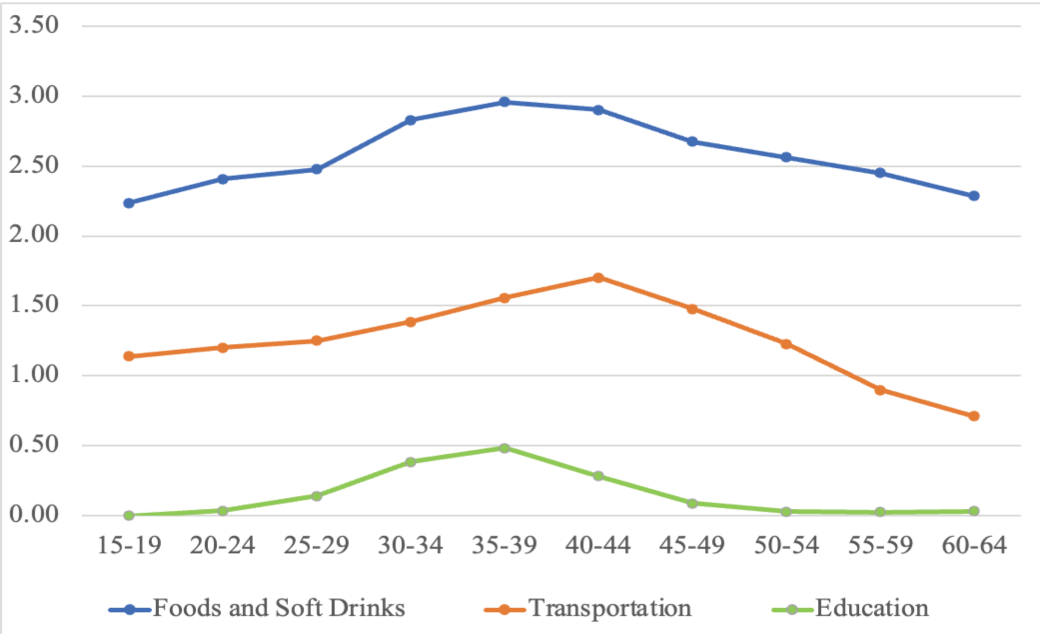


Figure 27: Change in Employment of Married Women by Age Groups (%)

wages. While making the calculation, the formality rate of women in 2013 is taken as 0.80 according to the TURKSAT Labor Force Data. This rate is multiplied by the ratio of the sum of SSI payments for employers to the net minimum wage (0.419) in 2013. On the other hand, the total tax revenue is calculated as the amount of increase in wages multiplied by the ratio of the sum of the income tax and stamp duty to the net minimum wage (0.0783) in 2013.

When we look at the impact of these policies on the employment of single women, it is observed that the removal of VAT on education has almost no effect. In contrast, the reduction of VAT on food and transportation has a U-shaped effect according to age groups. (Figure 28)

When the effect of VAT reduction policies on disposable income is analyzed, it is seen that this effect reveals a hump-shaped relationship according to age groups for married women (Figure 29). Similar to the effect of policies on employment, the VAT on food, transportation, and education, respectively, is most effective on the disposable income of married women. While the highest impact of the policy on food & soft drinks is mainly on the income of women aged 30-34, the effect of the policy on transportation services is on women aged 30-39, and the impact of the policy on education services is on women's income aged 35-39.

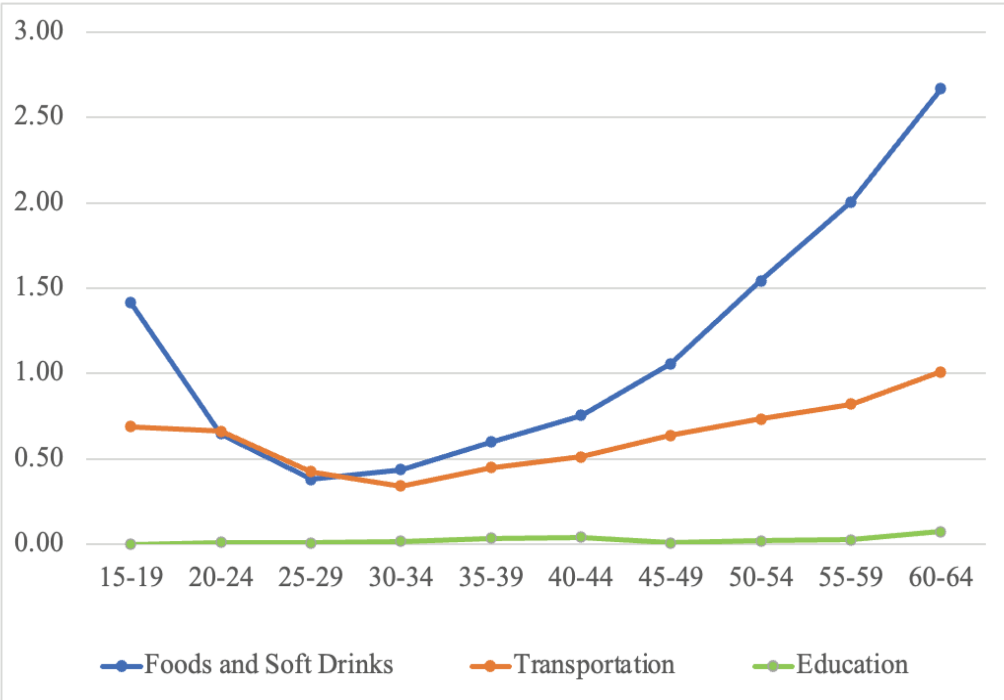


Figure 28: Change in Employment of Single Women by Age Groups (%)

For single women, the most negligible effect on disposable income comes from the reduction of VAT on education services. This policy mainly affects single women who are 35-39 aged old. As seen from Figure 30 the VAT reduction on foods & soft drinks and transportation have a positive and decreasing effect at first, and then there is a hump-shaped relationship. Both of the policies mainly primarily affect the youngest single women.

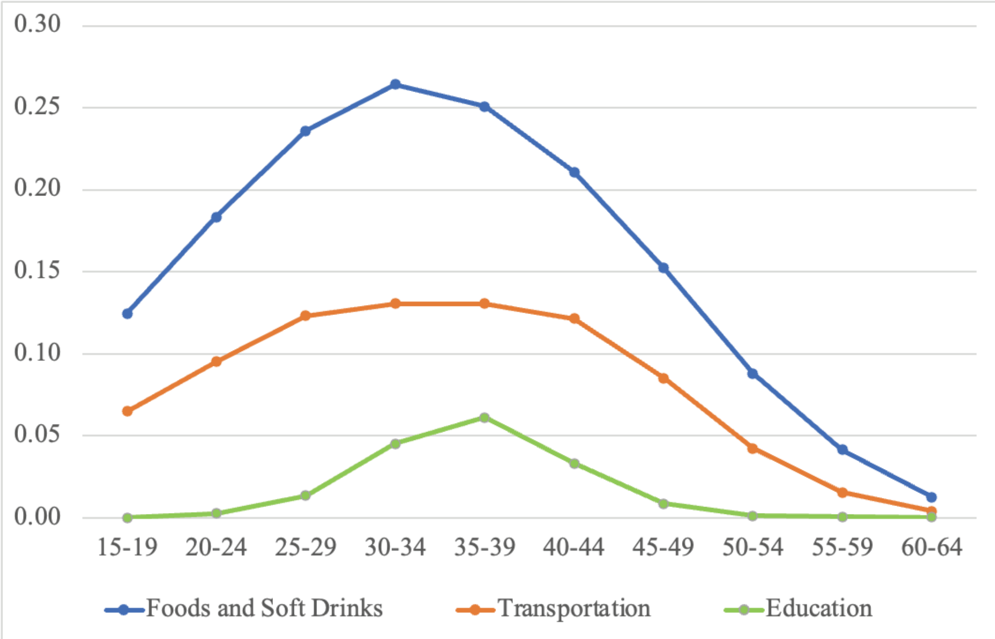


Figure 29: Change in Disposable Income of Married Women by Age Groups (%)

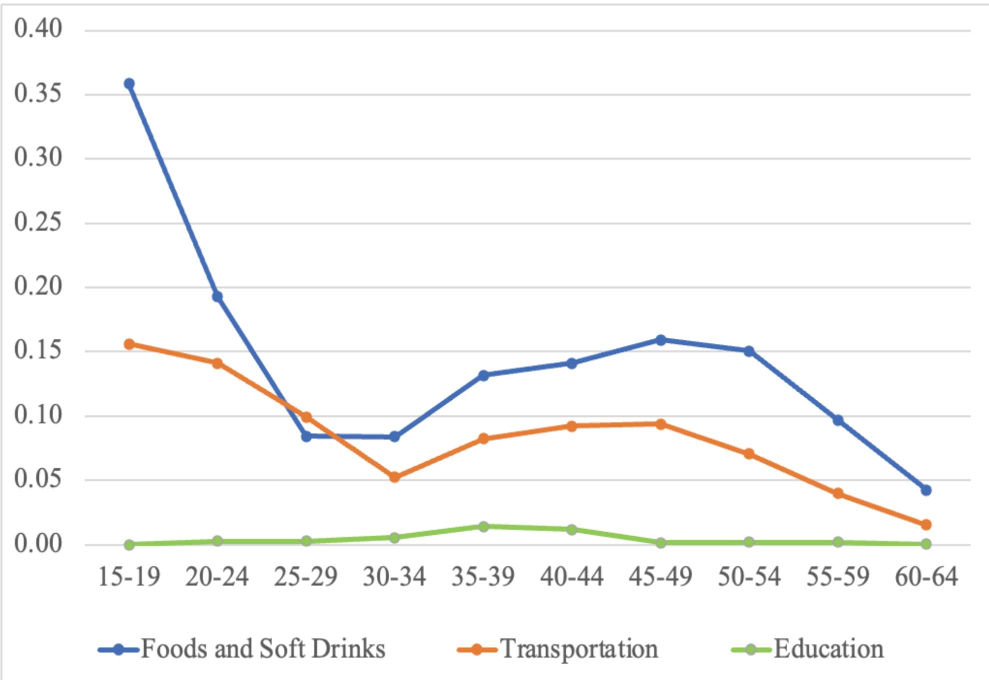


Figure 30: Change in Disposable Income of Single Women by Age Groups (%)

Policy Effects by Education Levels

As for the evaluation of the results of policy implementation on employment according to education level, it can be easily seen from Figure 31 and Figure 32 that both married and single women with the lowest education level are more likely to increase their labor supply. For married women, the impact of the reduction of VAT on education services has a negligible effect. As a result of implementing this policy, unlike other policies, the higher the education level, the higher the employment rate. On the other hand, as the education level increases, the employment effect of VAT reduction on food & services and transportation services decreases (Figure 31). A similar pattern of results is obtained for single women. Reducing VAT on education services also has nearly no effect on single women's employment (Figure 32).

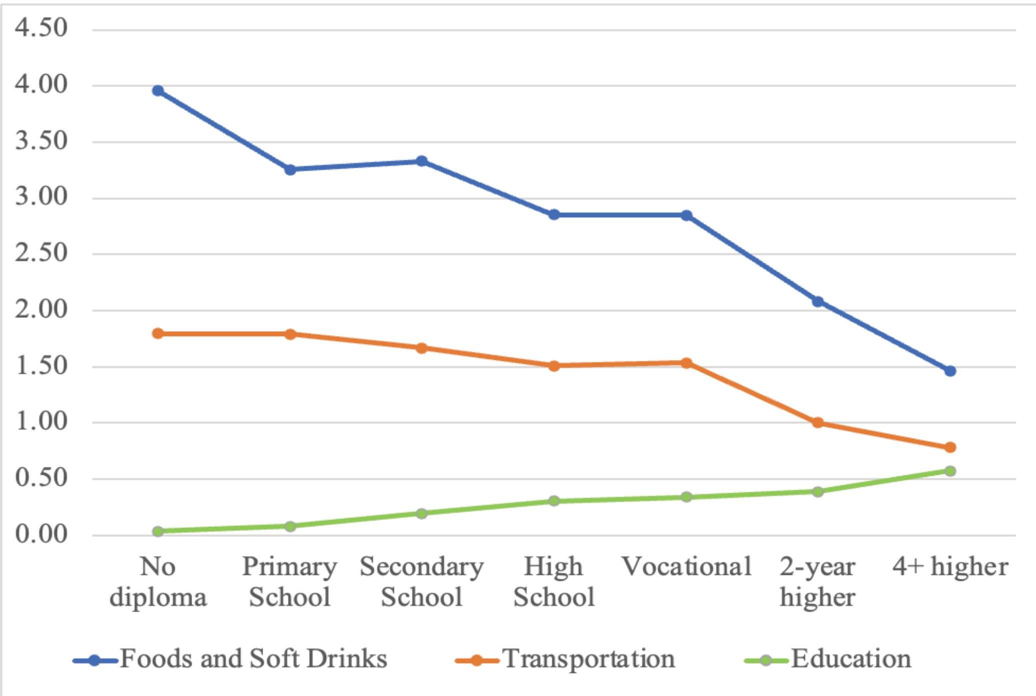


Figure 31: Change in Employment of Married Women by Age Groups (%)

The effects of policies on disposable income for married women show an increasing relationship as the level of education increases, in contrast to the impact on employment (Figure 33). The reduction of VAT on foods & soft drinks primarily affects married women with two years and a higher level of education. The policy of reducing VAT on education services increases the disposable income of married women who are university graduates the most.

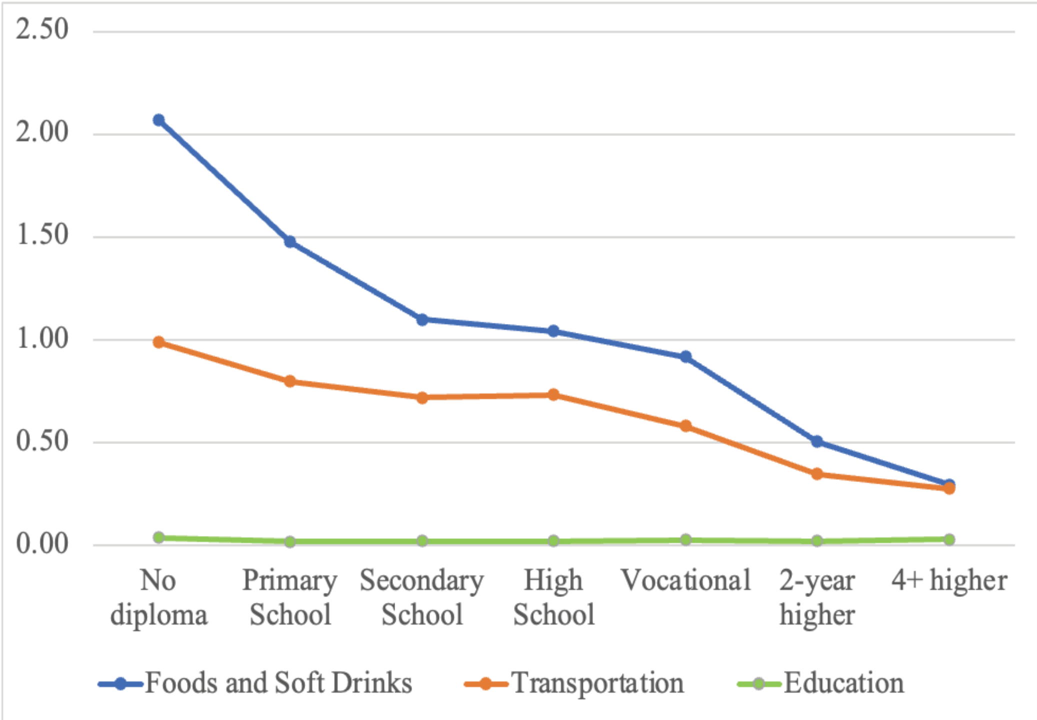


Figure 32: Change in Employment of Single Women by Age Groups (%)

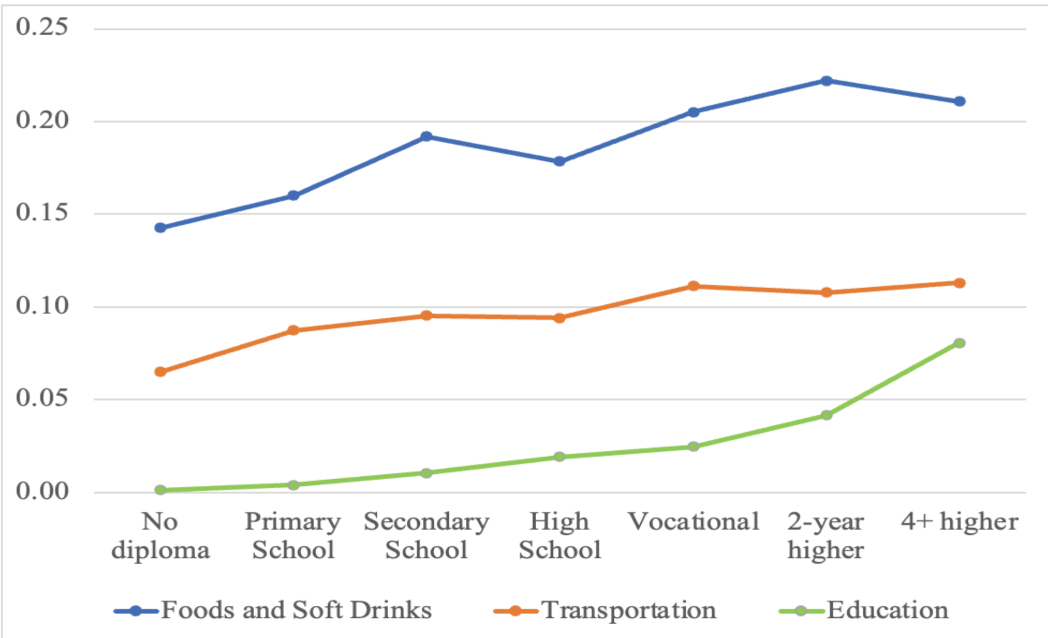


Figure 33: Change in Disposable Income of Married Women by Education Level (%)

On the other hand, the impact of polices, except the reduction of VAT on education services, are different for single women. It can be asserted that there is hump-shaped relationship between the effect of policies and education level of single women (Figure 34). While the increase in disposable income resulting from the abolition of the VAT on food & soft drinks is mostly seen in single women who are graduates of vocational high schools, those who increase their disposable income the most with the abolition of VAT in transportation are single women with high school graduates.

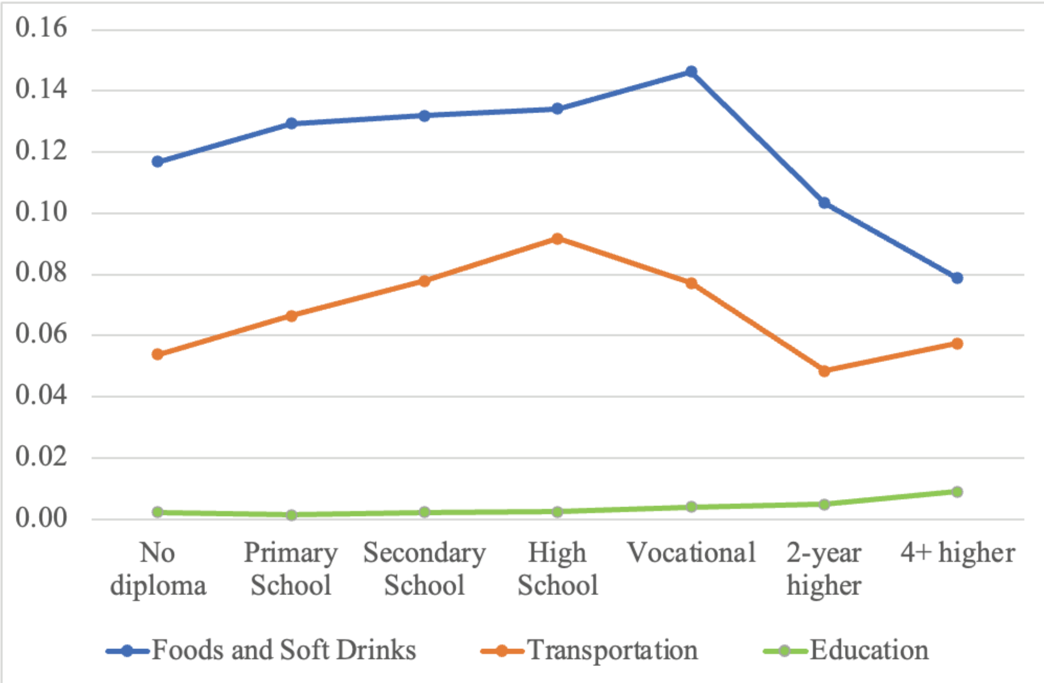


Figure 34: Change in Disposable Income of Single Women by Education Level (%)

Policy Effects by Income Deciles

When the effects of policies are analyzed by income groups, a hump-shaped relationship occurs, as can be seen in Figures 6.9 and 6.10, except for the effect of a VAT reduction on education. Married women with a low-income level increase their labor supply more than those with a high-income group due to reduced VAT on foods & soft drinks. On the other hand, the reduction of VAT on transportation leads to firstly increase in the employment rate until the 4th income quantile, and then beginning from the 7th income quantile, the employment rate starts to decrease for married women (Figure 35).

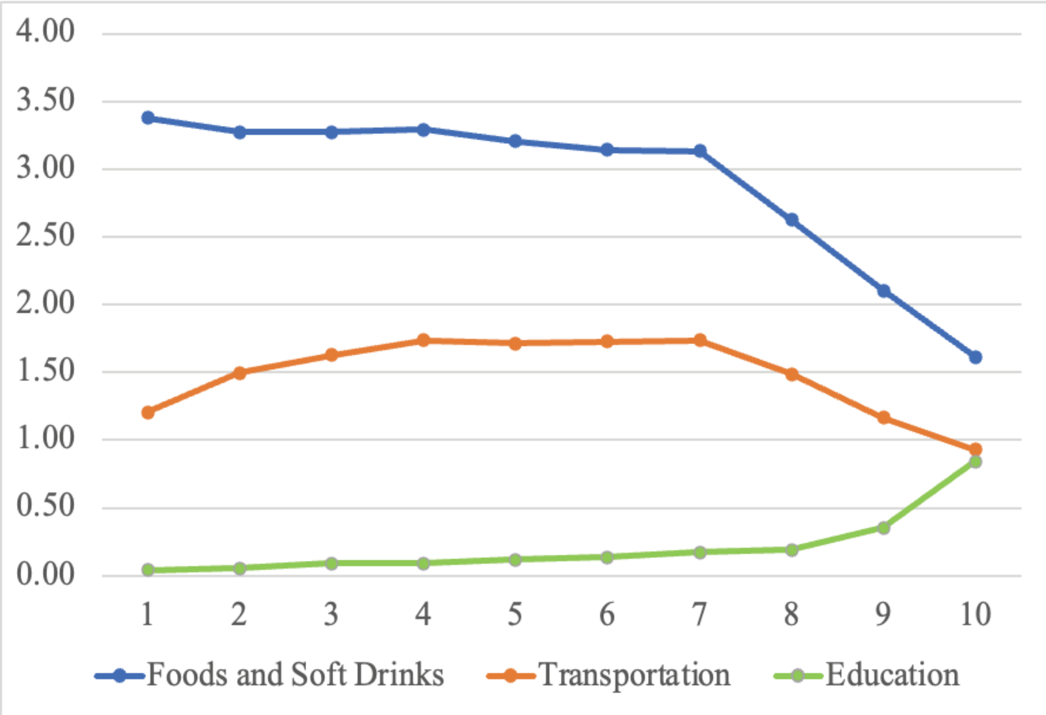


Figure 35: Change in Employment of Married Women by Income Decile (%)

There is also a hump-shaped relationship between the income levels and the employment rate for single women due to VAT reduction on foods& soft drinks, and transportation. As seen in Figure 36 the reduction of VAT on transportation services leads to the firstly increase in the employment rate until the 6th income quantile, and then starts to decrease. The policy effect reaches the minimum at the 9th income quantile. The VAT reduction on foods & soft drinks primarily affects single women in the 4th income quantile, and the effect starts to decrease.

As for the impact of policies on disposable income, it can be seen in Figure 37 and Figure 38 that the most income increase is realized in the 1st income decile for married and single women. As the income level increases, the impact of the policies (VAT on foods & soft drinks and transportation) decreases. On the other hand, the effect of VAT reduction on education services is nearly zero for married women up to the 8th income decile; after that, it starts to increase (Figure 37). As seen in Figure 38, the impact of this policy is also almost zero for single women in each income level.

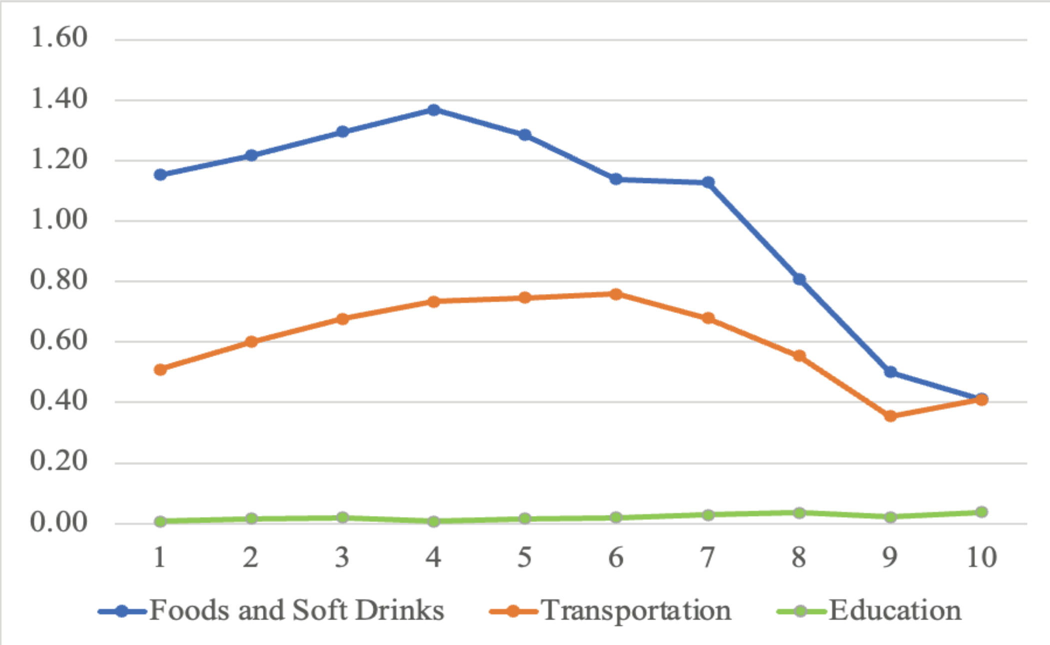


Figure 36: Change in Employment of Single Women by Income Decile (%)

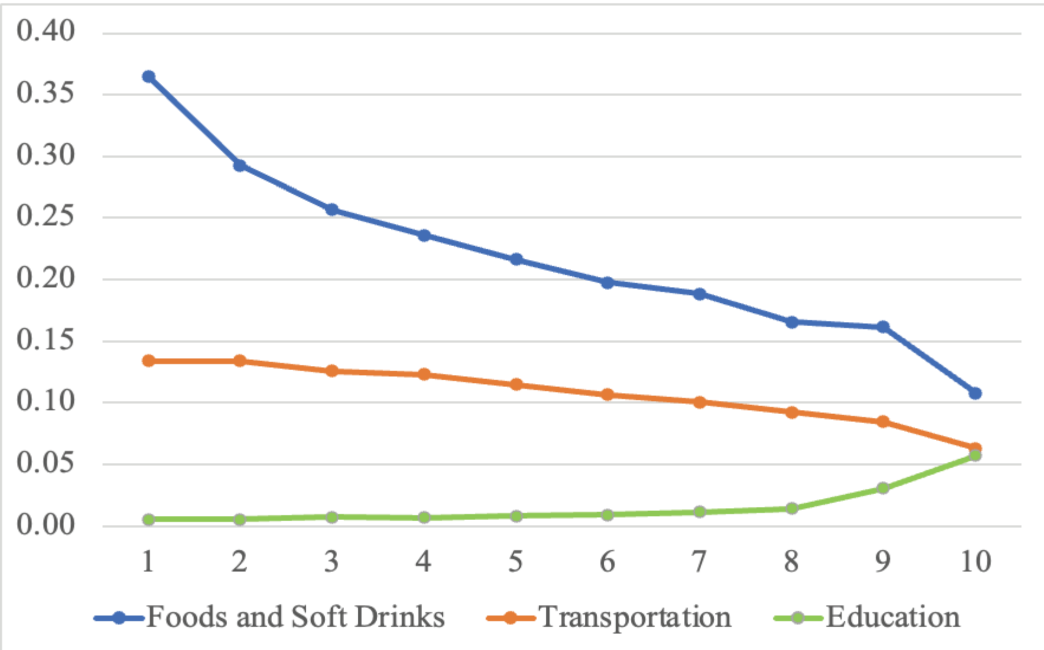


Figure 37: Change in Disposable Income of Married Women by Income Decile (%)

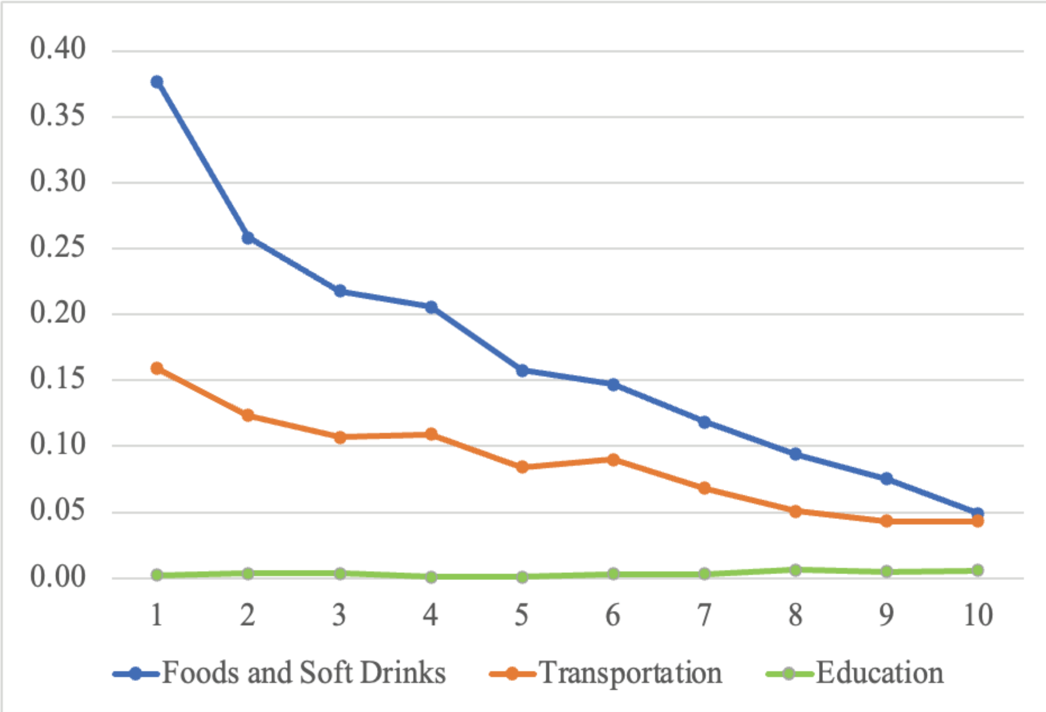


Figure 38: Change in Disposable Income of Single Women by Income Decile (%)

Policy Effects by Children

When the policy effects are analyzed according to the child status of women, it is seen that as children's age increases, the employment effect of VAT reduction on food & soft drinks and on transportation increases, and there is a hump-shaped relationship due to the VAT reduction on education services for married women (Figure 39). The VAT reduction applied on transportation services has the most impact on the labor supply of women with young children among married women. As the children's age increases, the policy effect increases up to young children. Furthermore, the impact of VAT reduction on education services has a hump-shaped relationship between children's age (Figure 39). The most significant effect of this policy appears in married women with preschool children. On the other hand, although the considerable impact comes from the VAT reduction on foods & soft drinks, employment does not change much according to the age of children for married women.

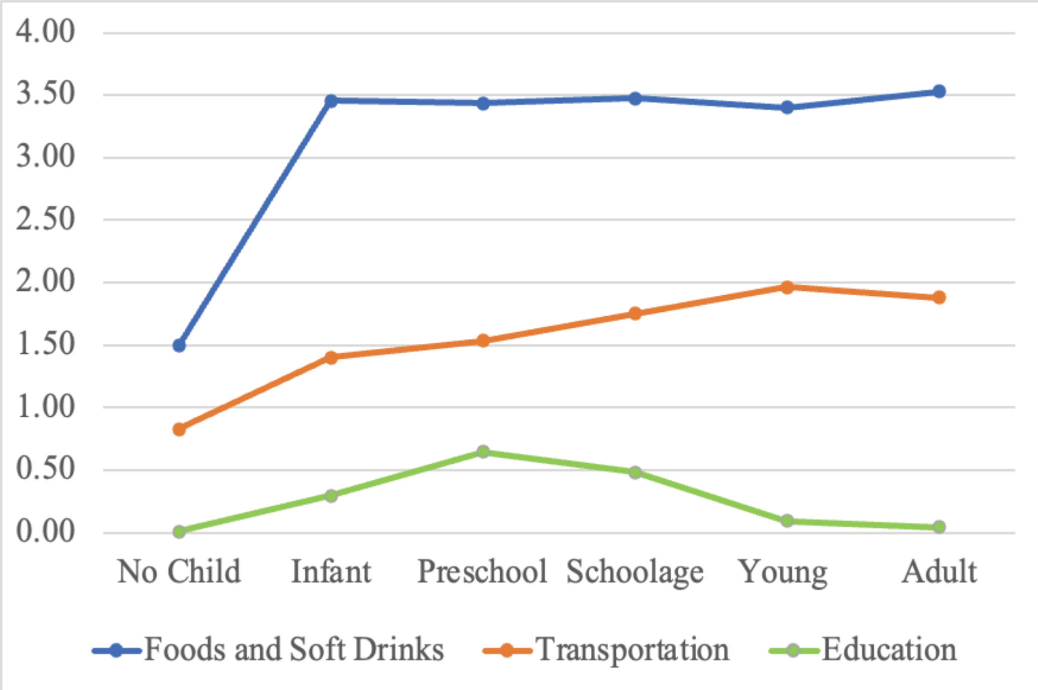


Figure 39: Change in Employment of Married Women by Age of Children (%)

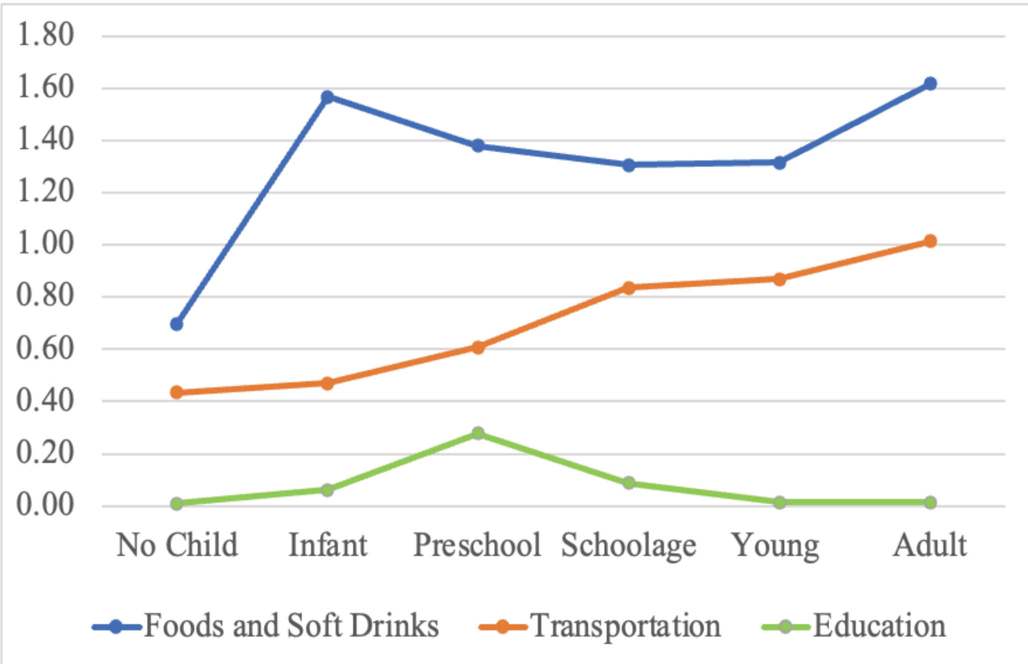


Figure 40: Change in Employment of Single Women by Age of Children (%)

Unlike married women, VAT reduction on foods & soft drinks has a U-shaped relationship for single women's employment and the age of children. It mainly affects women with adult children. Besides, the policy on transportation services is an increasing effect on single women's employment as the age of children increases. The employment result of VAT reduction on education services reveals the same pattern as that of married women (Figure 40).

VAT reduction policies generally have a more significant impact on the disposable income of women with infant, preschool, and school-age children, in a general sense. As seen in Figure 41, VAT reduction on foods & soft drinks significantly increase the disposable income of married women with infant, preschool, school-age children. On the other hand, this effect reaches the maximum level for married women with young children when it reduces the VAT on transportation services. Besides, the impact of VAT reduction on education reveals a hump-shaped relationship for married women's disposable income, similar to employment impact. The VAT reduction in education services leads to mostly change in the disposable income of women with preschool children. The effects of policy outcomes on disposable income for single women are similar to those for married women (Figure 42).

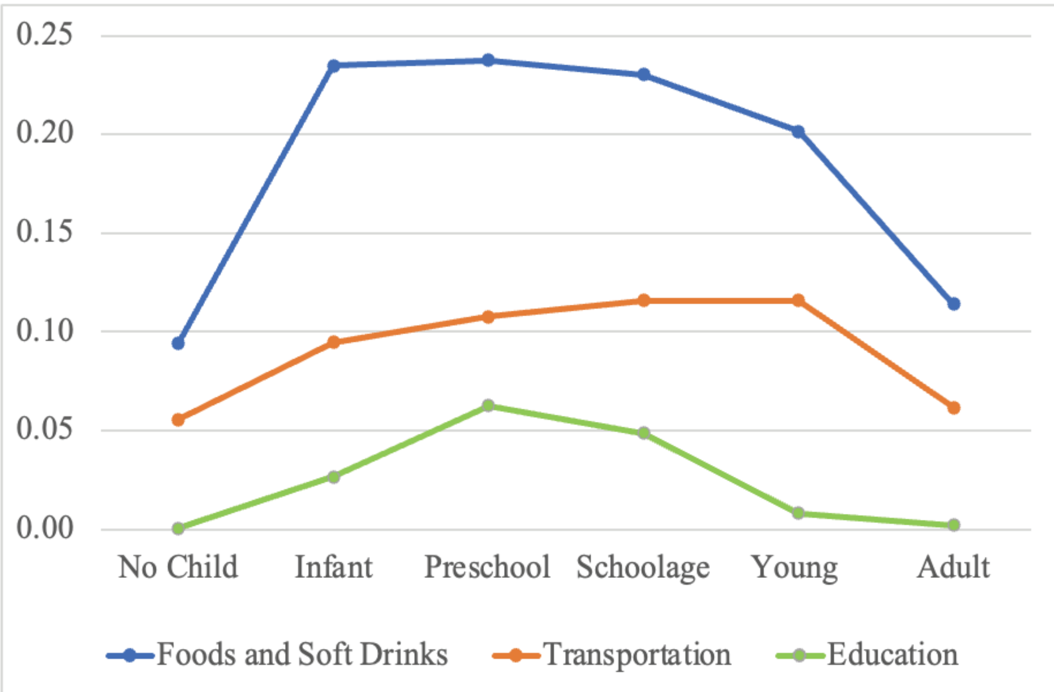


Figure 41: Change in Disposable Income of Married Women by Age of Children (%)

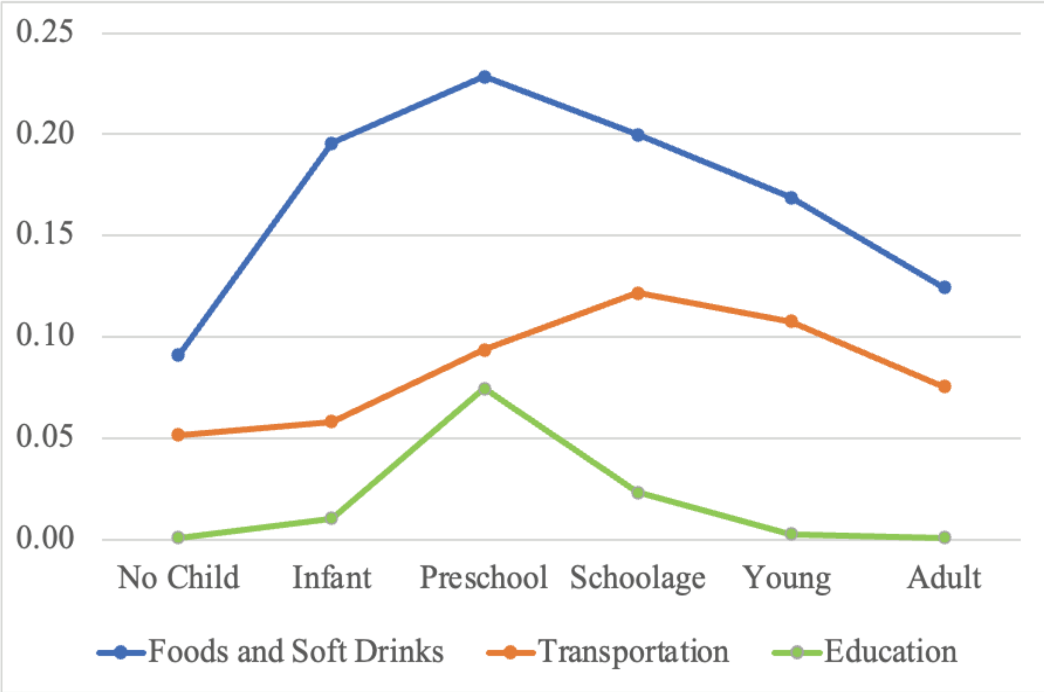


Figure 42: Change in Disposable Income of Single Women by Age of Children (%)

Policy Effects by Other Characteristics

Reducing VAT on foods & soft drinks leads to an increase in the employment of married women with employed spouses (2.78%) higher than the ones with not-employed spouses (2.56%). Similarly, the other policies also lead to more increase in the employment rate of women having employed spouses.

Due to the implementation of policies, women with not eligible spouses increase their employment more, compared to the ones with spouses who are eligible for work. In addition, women who have employer or self-employed spouses are affected (2.38%, 0.81%, and 0.27% for first, second, and third policies, respectively) less than the ones with wage worker spouse (2.80%, 1.52%, and 0.27% for first, second and third policies, respectively).

As seen in Table 29, the effect of policies on women's disposable income is similar to the effects on the employment rate. The real disposable income of married women with employed spouse, wage worker spouse, and spouse who are not eligible for work increased higher than the others.

Table 33: Change in Employment of Married Women by Employment Status of Spouse (%)

	Food and Soft Drinks	Transportation	Education
Working Spouse			
No	2.56	1.11	0.08
Yes	2.78	1.49	0.30
Spouse Eligible for Work			
No	2.77	1.45	0.28
Yes	2.25	1.08	0.05
Employer or Self-Employed Spouse			
No	2.80	1.52	0.27
Yes	2.38	0.81	0.27

Table 34: Change in Disposable Income of Married Women by Employment Status of Spouse (%)

	Food and Soft Drinks	Transportation	Education
Working Spouse			
No	0.11	0.05	0.01
Yes	0.20	0.11	0.03
Spouse Eligible for Work			
No	0.19	0.10	0.03
Yes	0.08	0.04	0.00
Employer or Self-Employed Spouse			
No	0.21	0.11	0.03
Yes	0.08	0.03	0.01

6.2. Wage Incentives

In the labor market, labor supply is a time that an employee offers to the employer in exchange for wages. In other words, the wage rate is the main factor in an individual's decision whether to participate in the labor market.

According to ILO, wages are the most prominent tangible elements that affect workers' everyday life, with the working time. In this context, governments ensure wage incentives to employers and employees to increase employment and economic growth. Wage incentives in Turkey generally aim to reduce the employer's insurance premium costs and thus increase employment. For this reason, incentive practices in Turkey are generally regulated for the benefit of employers.

As a component of living in a manner worthy of human dignity, the concept of “Minimum Wage” has been implemented by governments. To ensure the provision of adequate living conditions, ILO has set up many instruments and created regulations. The minimum wage concept is not only a mechanism that determines the lower limit but also an important economic and social policy tool. Although this concept was legalized with the 1936 Labor Law, its implementation could only be started in 1951.

Minimum wages are determined by the “Minimum Wage Determination Commission”, including workers, employers, and state representatives in Turkey. The commission has three different parties, each with one vote. A majority of votes make decisions. The monthly minimum wages[24] in Turkey between 2013- 2022 are presented in Table 30.

Table 35: Monthly Minimum Wage (TL), 2013-2022

Year	Gross	Net
2013	1,000.05	788.35
2014	1,102.50	868.52
2015	1,237.50	974.81
2016	1,647.00	1,300.99
2017	1,777.50	1,404.06
2018	2,029.50	1,603.12
2019	2,558.40	2,020.90
2020	2,943.00	2,324.71
2021	3,577.50	2,825.90
2022	5,737.50	4,876.88

Source: Ministry of Labor and Social Security (https://www.csgb.gov.tr/asgari-ucret/)

[24] It is possible to express nominal wages in real terms by multiplying the wage values of 2022 by 4.35 taking 2013 as the base year. The consumer price indexes are presented in Table B.5 in Appendix B.

In Turkey, especially in the last decades, minimum wage incentives have been gradually implemented. With the legal regulations enacted based on Law No. 5510, the state paid a certain amount of the employers' insurance premiums in order to prevent employers from dismissing workers due to the increase in the minimum wage.

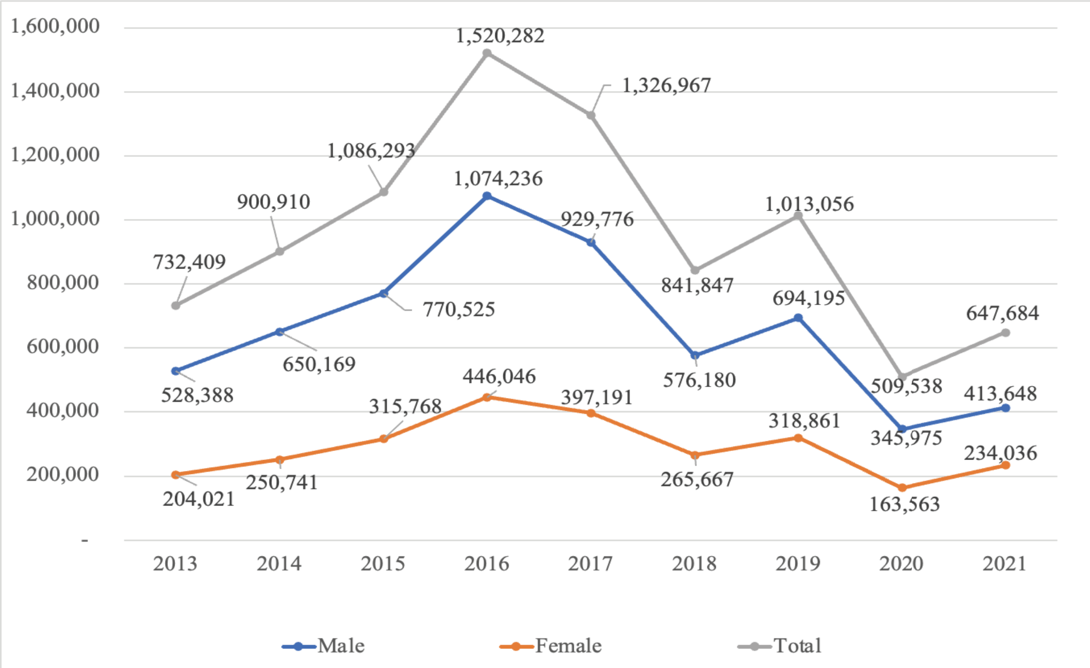
As of 2019, for the July to December period, the amount to be found by multiplying 5 TL and the total number of premium payment days for the insured persons notified from the workplaces meeting the conditions specified in the Temporary Article 78 of Law No. 5510. This amount is deducted from the insurance premiums employers will pay to the Institution. The Unemployment Insurance Fund covers the amount.

Furthermore, in Turkey, an "unemployment benefit" is paid to insured unemployed individuals by Turkish Employment Agency (İŞKUR). This benefit is paid for a certain period and as a certain amount if the required conditions are satisfied. These conditions are:

- The person must have been unemployed against his/her will
- The person must be engaged in the contract in the last 120 days, before being unemployed.

Unemployment allowance is given for 180, 240, and 360 days depending on the number of days worked three years before the end of the service contract. The unemployment benefits cannot exceed 80% of the gross amount of the monthly minimum wage. The numbers of beneficiaries of unemployment benefit are presented in Figure 43.

On the other hand, because of the COVID-19 pandemic, a "Cash Wage Benefit" has been paid for individuals on unpaid leave or unemployed. It is the payment made by the Unemployment Insurance Fund and Turkish Employment Agency to individuals under the temporary article 24 of Law No. 4447 to reduce the effects of the coronavirus (Covid-19) pandemic on economic and social life. The amount of cash wage benefit has been determined as 39.24 TL per day for 2020, 47.70 TL per day for January, February, and March 2021, and 50 TL per day for April 2021 and beyond.



Source: Turkish Employment Agency Annual Statistical Tables

Figure 43: Number of Beneficiaries of Unemployment Payment, 2013-2021

Since there are a few direct wage subsidy/benefit practices for employees in Turkey, especially for women, it is crucial to simulate policy scenarios for further studies to increase the female labor supply. In the context of wage benefit policy, three scenarios are examined in this section:

1. All women, regardless of age, are given a wage incentive of 10% of the gross minimum wage.
2. This incentive is given to young women under 30 years old.
3. A progressive negative wage tax is applied based on the wage amount earned. With this policy, it is assumed that the state returns 10% of the salary for those who earn 1.5 times the minimum wage and 5% of their salary for those who earn 1.5-2 times the minimum wage.

When all three scenarios are evaluated, the policy with the highest impact on the employment change for single and married women is the first policy, which is to provide wage subsidies to all women, regardless of their age (Table 31). Due to the implementation of this policy scenario, employment increases by 7.46% and 3.48% in total for married and single females, respectively. The number of not-employed females mainly decrease due to the first policy implementation. Additional 206,154 not-employed married women and 22,185 single women have been employed in the labor market thanks to the first policy implementation. These numbers are 43,838 and 3,109 for married and single women, respectively, as a result of the second policy, and additional 205,270 married women and 22,325 single women due to the third policy implementation (Table E.4 in Appendix E). As can be seen from these results, the second effective policy for increasing employment is the negative tax application. When examined in terms of the increase in disposable income and wage income, negative tax implementation emerges as the policy that causes the highest percentage increase in the income of women (Table 31).

Table 36: Change in Employment, Disposable Income and Wage Income by Family Status (%)

	Wage Subsidy To All	Wage Subsidy to Young	Negative Tax
Married			
Change in Employment (%)	7.46	1.61	6.87
Change in Disposable Income (%)	1.34	0.27	1.49
Change in Wage Income (%)	14.51	2.90	16.09
Single			
Change in Employment (%)	3.48	0.50	2.96
Change in Disposable Income (%)	2.36	0.46	2.89
Change in Wage Income (%)	9.11	1.77	11.17

Policy Effects by Age Groups

Figure 44 reveals the percentage change in employment of married women according to age groups due to the implementation of the three wage policy scenarios. When the policy effects are analyzed, it is seen that there is a positive but decreasing effect of three policies for the age groups of married women. Giving a wage subsidy leads to more change in the employment of young married women when compared to the negative tax policy. The highest positive effect is seen for the 15-19 age group when the wage subsidy is given only to young women.

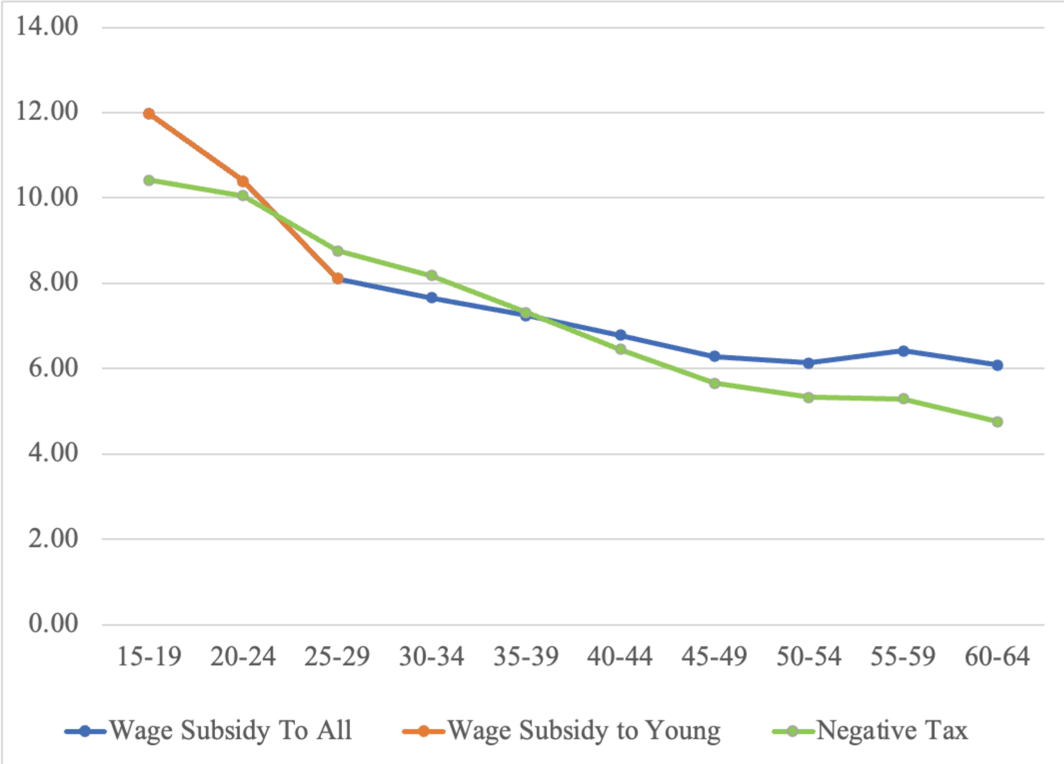


Figure 44: Change in Employment of Married Women by Age Groups (%)

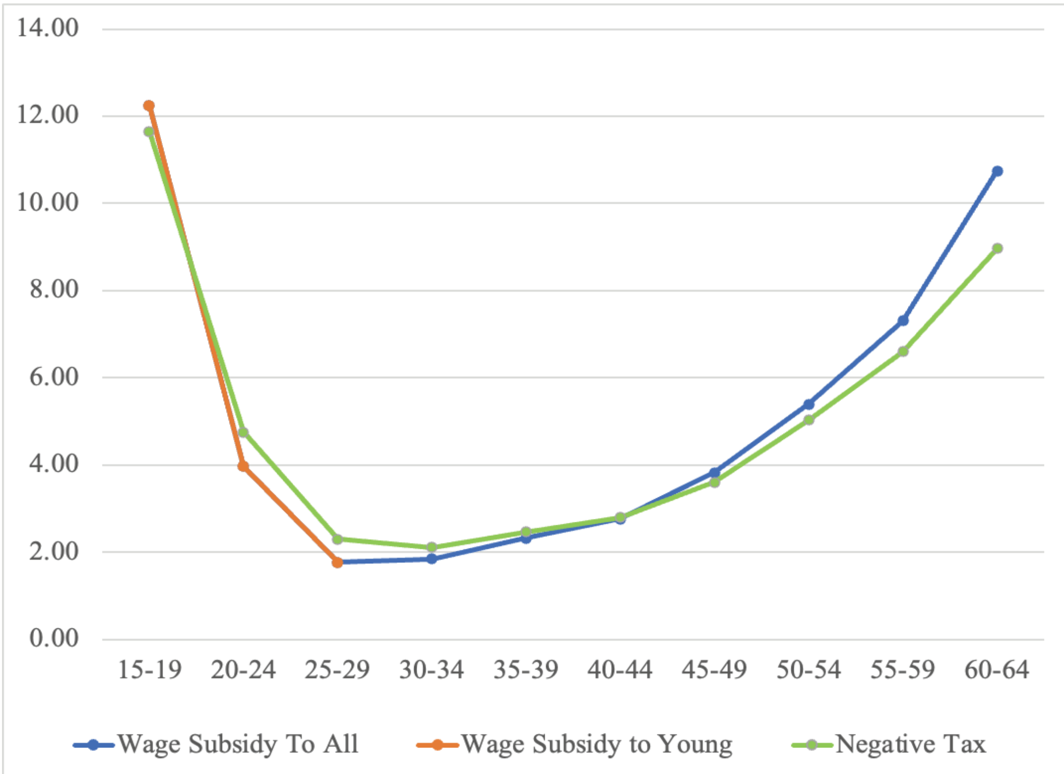


Figure 45: Change in Employment of Single Women by Age Groups (%)

On the other hand, there is a U-shaped relationship for single women with changes in employment and age groups due to three policy scenarios. As a result of all policy scenarios, the most affected group is single women aged 15-19. The minimum affected groups are 25-29 and 30-34 aged single women.

When the effect of policies on the disposable income of married women is analyzed, it is observed that there is a hump-shaped relationship according to age groups (Figure 46). The increase in disposable income mainly occurs due to negative tax policy. The group in which this policy is most effective regarding the disposable income of married women is the 25-29 age group.

As for the policy effects on the change in disposable income of single women, there is a decreasing relationship according to age groups, as seen in Figure 47. While the wage subsidy policies are most effective on the 15-19 aged single women, the negative tax policy mainly affects the 20-24 age group.

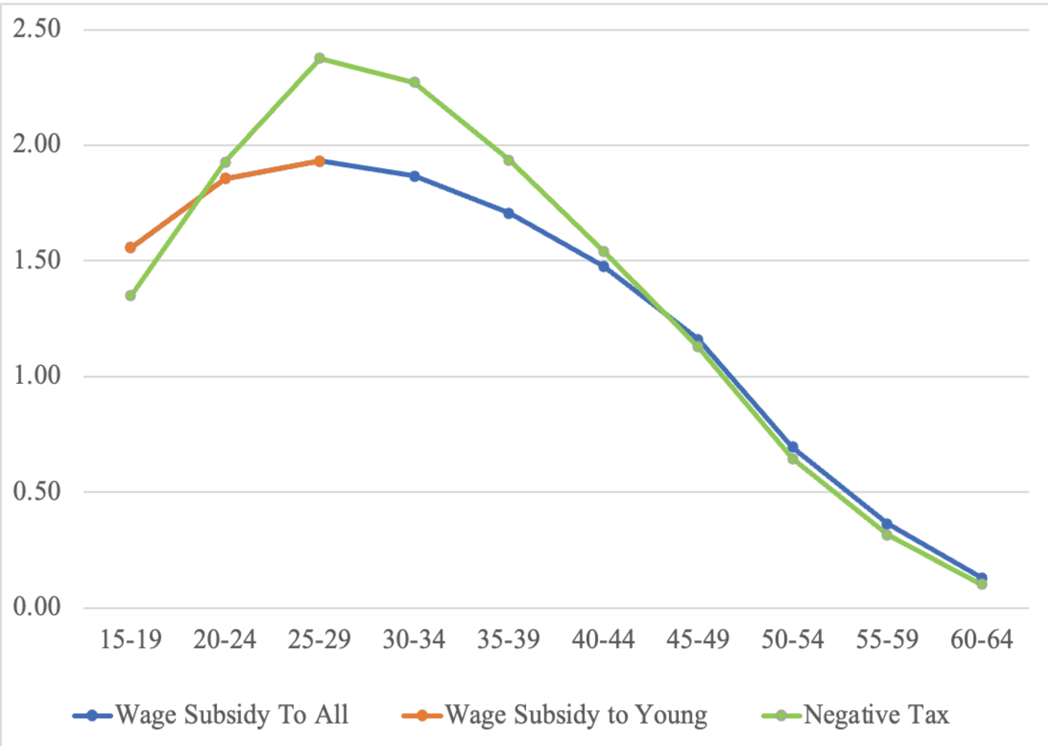


Figure 46: Change in Disposable Income of Married Women by Age Groups (%)

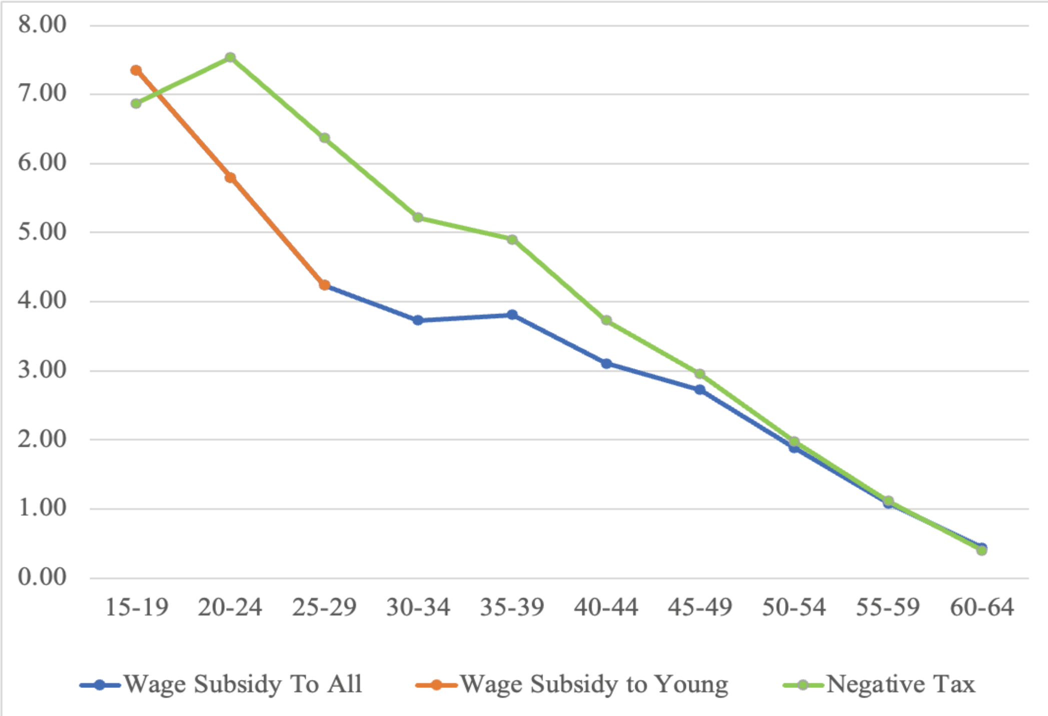


Figure 47: Change in Disposable Income of Single Women by Age Groups (%)

Policy Effects by Education Level

When evaluated the employment effects of policies by education levels for married women, the wage subsidy to all aged women is primarily effective with a low education level, namely ones with no diploma, primary and secondary school diploma. On the other hand, the negative tax policy has a significant employment effect on married women with higher education levels (Figure 48). Wage subsidy for young married women mainly affects secondary school graduates.

Similar patterns are valid for single women. Indeed, the negative tax policy is mostly effective for women with high education levels, while the wage subsidy to all aged women has primarily effect on low-level educated single women. Giving wage subsidies to young individuals mostly affects single women with high school diplomas.

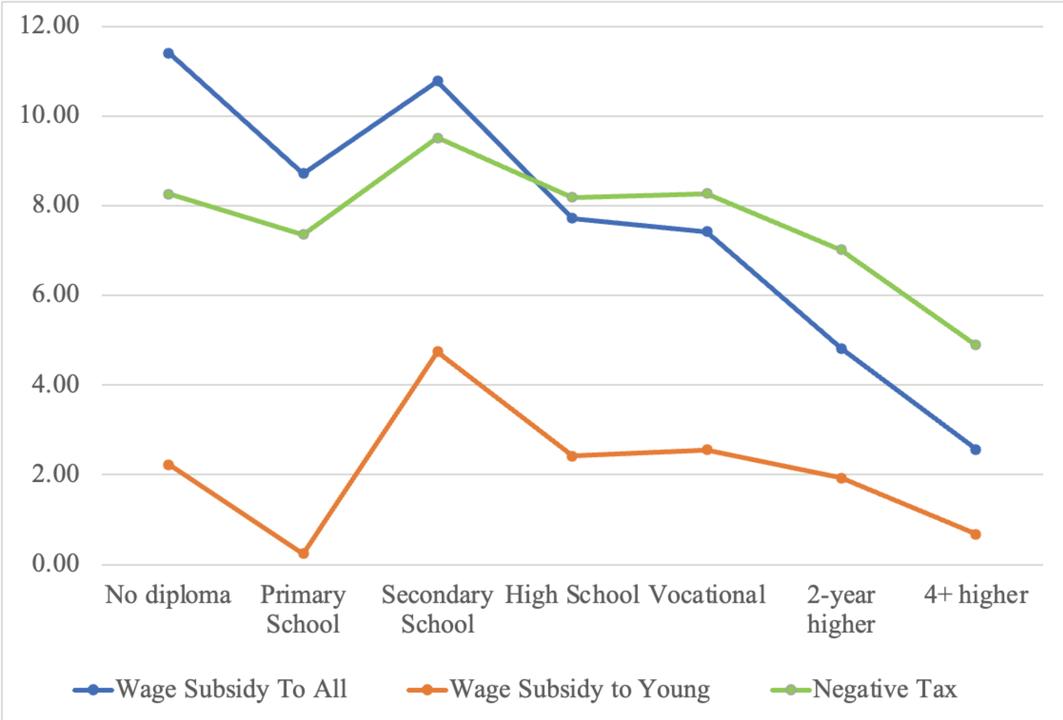


Figure 48: Change in Employment of Married Women by Education Level (%)

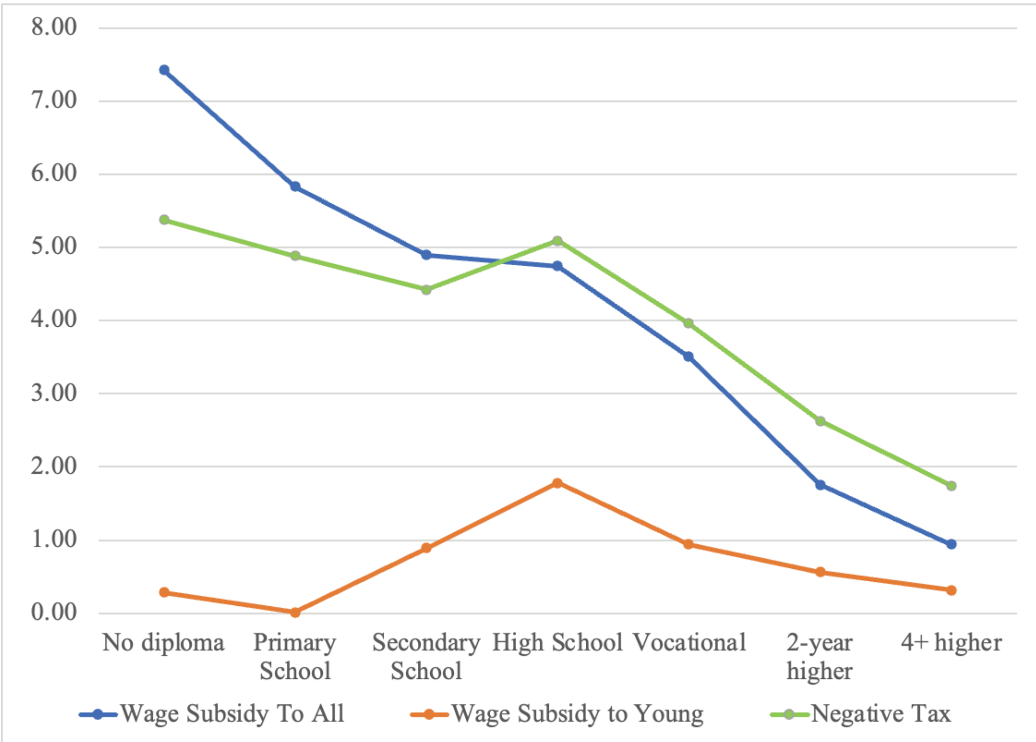


Figure 49: Change in Employment of Single Women by Education Level (%)

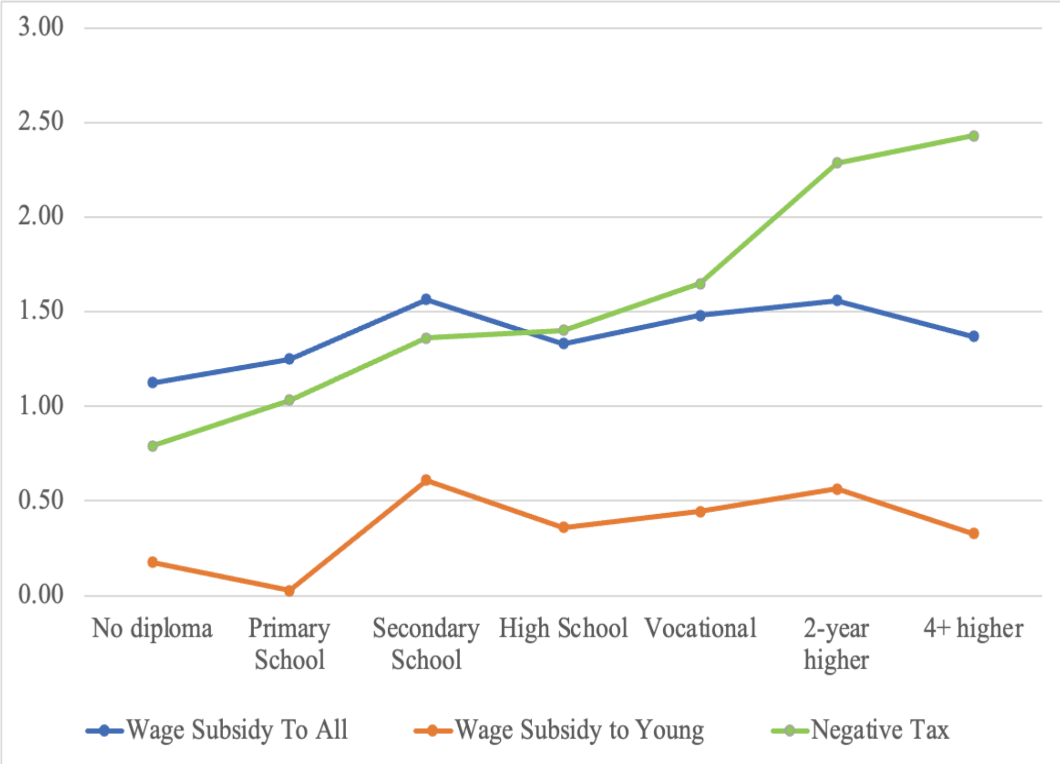


Figure 50: Change in Disposable Income of Married Women by Education Level (%)

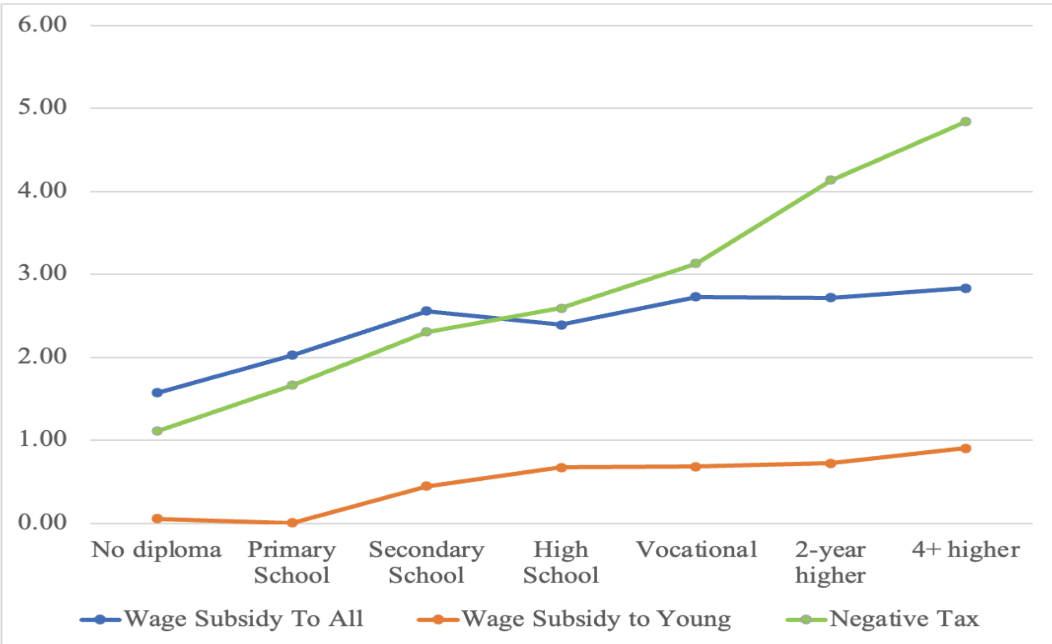


Figure 51: Change in Disposable Income of Single Women by Education Level (%)

Wage subsidy to all aged individuals primarily affects women's disposable income with low-level education. At the same time, the negative tax policy impacts the disposable income of women with higher levels of diplomas. Giving wage subsidies to just young women significantly affects the disposable income of married women who are secondary school graduates.

Although giving subsidies to young individuals has almost no effect on the disposable income of single women with no diploma and primary school diploma, it has an increasing effect on single women's disposable income with higher levels of education as seen in Figure 51.

Policy Effects by Income Decile

The effects of the three policy scenarios reveal a similar pattern in the employment of single and married women (Figure 52 and Figure 53). Indeed, these policies have a positive but decreasing impact on women’s employment. Giving wage subsidies to all aged married and single women has a greater influence on the employment of them until the 7th income decile than the impact of negative tax policy. After this income decile, the negative tax policy has more effect than the other policies. Although the wage subsidy to young women mainly affects the employment of married women in the 3rd income decile, it has the most impact on the employment of single women in the 2nd income decile.

As for the impact of these policies on disposable income, it is also seen a positive but decreasing relation by income deciles. These relationships are presented in Figure 54 and Figure 55. Until the 6th income decile for married women and 5th income decile for single women, the effect of the wage subsidy to all aged women is greater than that of the negative tax policy. After that point, the pattern is vice versa.

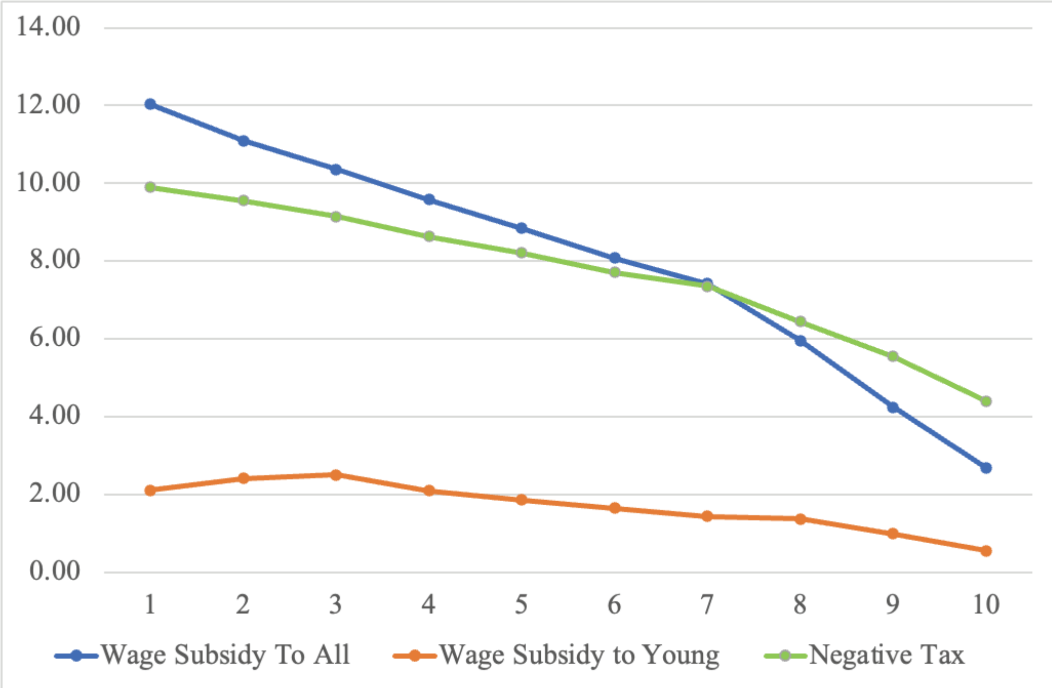


Figure 52: Change in Employment of Married Women by Income Decile (%)

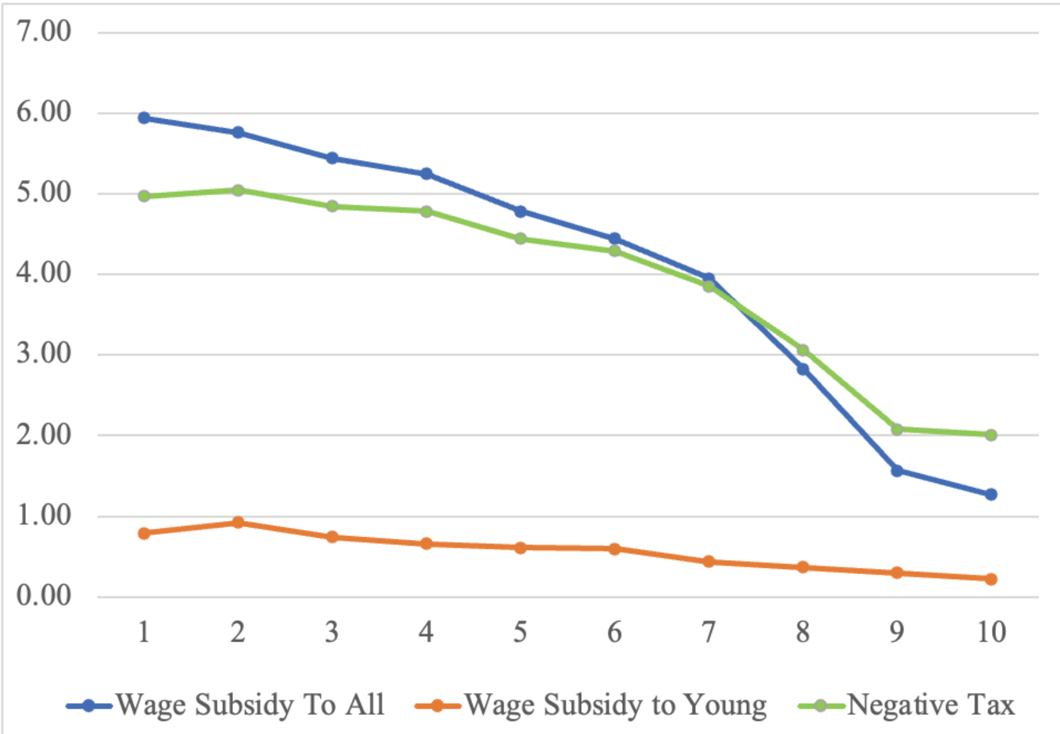


Figure 53: Change in Employment of Single Women by Income Decile (%)

Figure 54: Change in Disposable Income of Married Women by Income Decile (%)

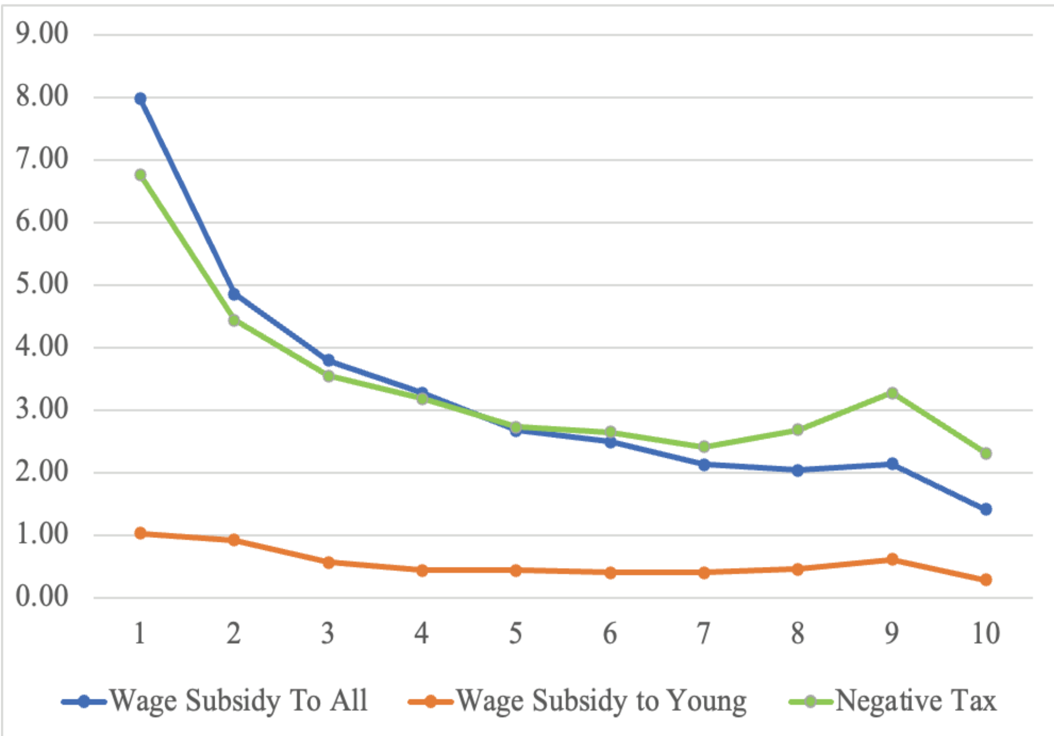


Figure 55: Change in Disposable Income of Single Women by Income Decile (%)

Policy Effects by Children

When the policy results are analyzed according to the child status of women, it is concluded that the effects of the policies on the employment of single and married women are similar, as seen in Figure 56 and Figure 57. The change in employment is positive but decreases as the children's age increases due to the three policies, except for having adult children. Furthermore, the wage subsidy given to young women does not affect women with young and adult children in line with the expectations.

For married women with infant children, the effect of negative tax policy is higher than that of the other policies. As the children's age increases, the impact of the wage subsidy for all women becomes higher than the effect of negative tax policy.

For single women with infant, preschool, school-age, and young children, the employment effects of the wage subsidy to all aged women and negative tax policies are decreasing. However, for single women with adult children, these effects increase.

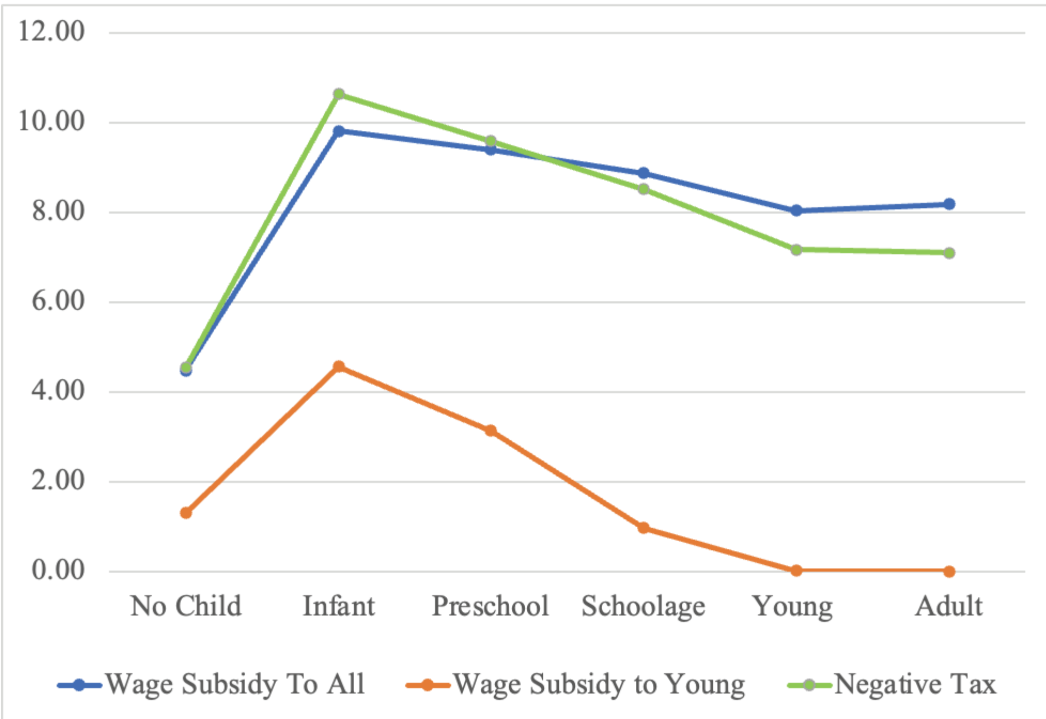


Figure 56: Change in Employment of Married Women by Age of Children (%)

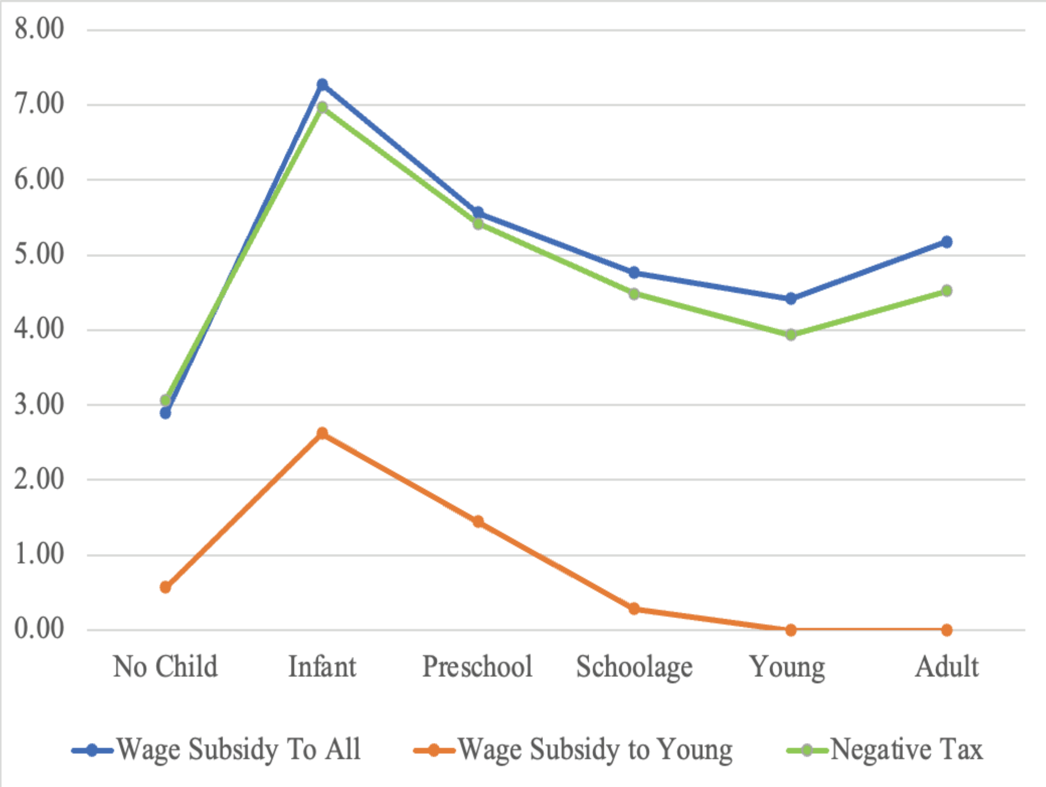


Figure 57: Change in Employment of Single Women by Age of Children (%)

The effects of the three policies on the disposable income of single and married women also reveals a similar pattern. As the children's age increases, the change in single and married women's disposable income decreases. It becomes zero for women with young and adult children due to the wage subsidy to young women.

The negative tax policy is more effective for married women with infant, preschool, and school-age children. In contrast, for ones with young and adult children, the wage subsidy given to all women has slightly more impact on the change in disposable income.

The relationship between children's age and the effect of these two policies on married and single women's disposable income are the same. The percentage change in single women's disposable income is higher than that of married women.

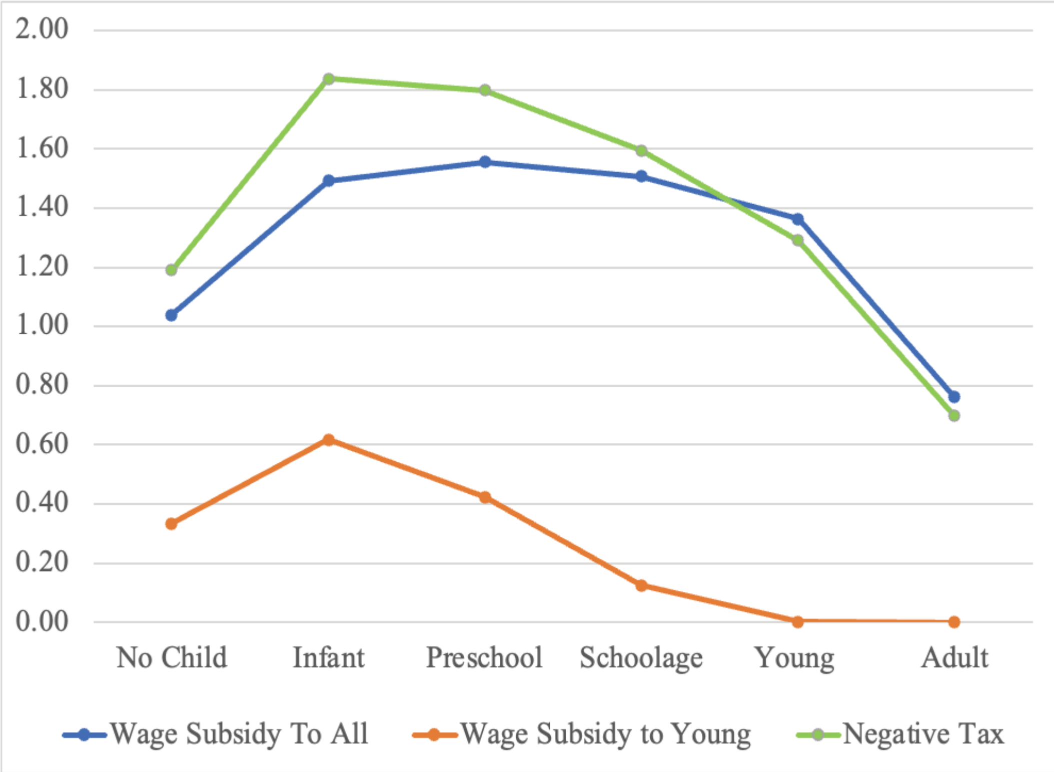


Figure 58: Change in Disposable Income of Married Women by Age of Children (%)

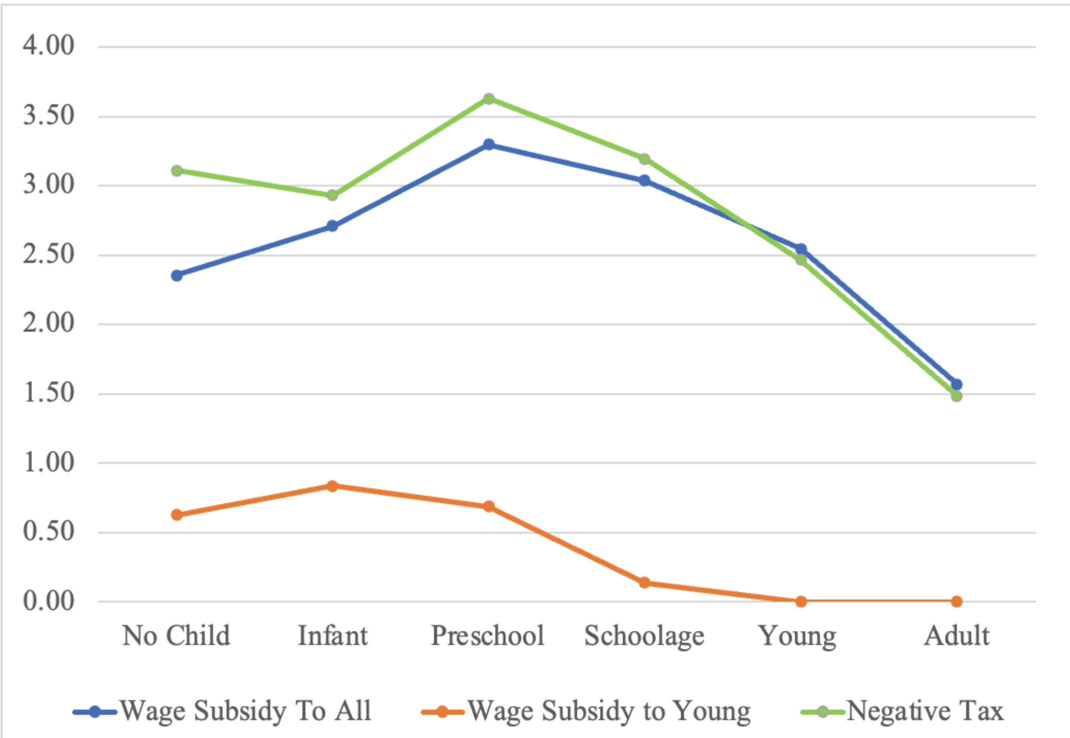


Figure 59: Change in Disposable Income of Single Women by Age of Children (%)

Policy Effects by Other Characteristics

Table 32 and Table 33 reveal the policy impacts on married women's employment and disposable income by their spouse's employment statuses. Women with employed spouses, spouses who are not eligible for work, and spouses who are wage workers increase their employment due to the three policy scenarios.

Table 37: Change in Employment of Married Women by Employment Status of Spouse (%)

	Wage Subsidy To All	Wage Subsidy to Young	Negative Tax
Working Spouse			
No	7.21	0.61	6.42
Yes	7.28	1.69	7.36
Spouse Eligible for Work			
No	7.29	1.59	7.30
Yes	6.78	0.49	5.67
Employer or Self-Employed Spouse			
No	7.39	1.59	7.37
Yes	6.33	1.23	6.18

The effects of policies on disposable income are similar to those on employment, except for the wage subsidy to young females. After providing wage subsidies to young married women, the disposable income of women with not-employed spouses increases more compared to women with employed spouses.

Table 38: Change in Disposable Income of Married Women by Employment Status of Spouse (%)

	Wage Subsidy To All	Wage Subsidy to Young	Negative Tax
Working Spouse			
No	0.90	0.31	0.86
Yes	1.44	0.06	1.63
Spouse Eligible for Work			
No	1.38	0.28	1.54
Yes	0.75	0.05	0.65
Employer or Self-Employed Spouse			
No	1.51	0.31	1.68
Yes	0.68	0.12	0.73

6.3. Early Childhood Care and Preschool Education Benefits

Labor force employment rates, especially for women, are mainly affected by having underage children because of the caring duties. In the world wide, inadequate access to free childcare services leads to lower female labor force participation rates. Thus, efficient social policies are essential for creating the opportunity to participate in the labor market and raising labor force participation, especially for women with children between 0-6 years old.

ILO states that there is a strong relationship between early childhood care and education (ECCE) services and the labor force participation of females. Furthermore, it asserts that constructing the collaboration between the service providers and developing efficient models for the ECCE services plays a crucial role in increasing women's labor force participation rate (Dedeoğlu et al.,2021, p. 17).

The "Early Childhood Care and Education Services Panel" organized by Women's Labor and Employment Initiative (KEIG) emphasized that care services lead to higher labor force participation rates with a social multiplier effect. Therefore, it is increasingly accepted worldwide that government support and facilitation of childcare services are in the public interest. In international conventions, these services are defined as separate right for all employees, women, and children. Therefore, providing and developing childcare services with the support and partnership of governments, employers, and local governments emerges as a requirement of international labor standards and as a policy that supports and improves economic and social development (KEİG, 2015, s. 14).

In Turkey, early child care and preschool education are carried out through public or private nurseries and kindergartens. According to the National Education Basic Law, preschool education covers children in the 0-6 age group. Since these services are not optional, families pay fees to benefit from these services. The fact that these services are paid affects the labor force participation decision of families with young children, especially women who take on care duties in the Turkish family system.
Preschool education in Turkey is regulated by the "MoNE Preschool Education and Primary Institutions Regulation" published in the Official Gazette dated July 26, 2014

and numbered 29072, and the "MoNE Special Education Institutions Regulation" published in the Official Gazette dated March 20, 2012 and numbered 28239. According to these regulations, kindergartens accept children aged 3-5; nurseries and daycare centers accept children under age 5, and nursery classes in primary school are for children 5 years old. The Ministry of Family and Social Services (MFSS) is responsible for opening, operating, and governing private crèches and daycare centers for children ages 0–6. Childcare providers established within the MoNE do not accept children ages 0-2 (World Bank, 2015, p. 12).

In Turkey, the rules about how nurseries and daycare centers will be established, how they will work, working methods, and the qualifications of employees are defined in the "Regulation on the Establishment and Operational Principles of Private Nursery and Day Care Centers and Private Children's Clubs" issued in 1996. The Ministry of Family and Social Services carries out the provisions of this regulation. The procedures and principles regarding the establishment, management, education, and duties of kindergartens are regulated by the "Regulation on Preschool Education Institutions" issued in 2004. According to these regulations, nurseries serve children 0–24 months old, and daycare centers serve children 25–66 months old.

On the other hand, kindergartens are independent institutions that provide preschool education to children and are not part of primary school. They operate under the Ministry of National Education, and this authority supervises them.

According to Article 67 of the MoNE Preschool Education and Primary Institutions Regulation, preschool education service is free of charge in public preschool education institutions. However, a fee is charged for children's nutrition, cleaning services, and educational materials for implementing the education program. The Fee Determination Commission will determine this fee. The school administration determines the monthly fee to be collected from the parents at most ceiling fees determined by the Commission. Since the fees are determined separately for each province, they may differ between cities. Fees for private kindergartens and day care centers are determined by the organizations themselves in line with the “Regulation on the

Establishment and Operational Principles of Private Nursery and Day Care Centers and Private Children's Clubs”.

The World Bank states that the low usage of childcare services in Turkey is not due to the low demand for these services. It is actually due to the current prices of these services and the inadequacy of the price-quality structure. According to the report issued by World Bank, the willingness to pay of families with especially 3-6 years old children, is lower than the market prices (World Bank, 2015, pp. 7-8).

In the last decade, early childhood care and education services have become remarkable policy issues for the governmental authorities in Turkey. At the end of the 2008-2009 academic year, a pilot study was initiated in 32 cities to reach 100% access to these services for the 60-72 month age group. The number of cities under the pilot scheme gradually increased to 57 in 2011 and 71 in 2012 (KEİG, 2015, p. 16).

Furthermore, the “Strengthening Preschool Education Project” was implemented in the period 12.03.2011-15.09.2013 by the collaboration of the EU and UNICEF in order to improve the enrollment and attendance of disadvantaged children and their families in kindergarten and preschool education. The Ministry of National Education conducted it. It was implemented through capacity building and increasing institutions of the Ministry of National Education, public institutions, municipalities, and NGOs.[25]

Another important step taken regarding ECCE is the provision of conditional education assistance to the 48-72 month-old children of families in need who have attended preschool education institutions since the 2014-2015 academic year. This program has been conducted by MFSS.

In order to increase female labor force participation, the “Supporting Registered Female Employment Through Institutional Child Care Services Project”[26] was conducted by the Social Security Institution (SGK) for the 01.04.2019-30.09.2022 period. The project was co-financed by the Republic of Turkey and the European

[25] For further information, see https://www.ab.gov.tr/okul-oncesi-egitimin-guclendirilmesi_52808.html
[26] The information leaflet is reached by http://sgkkurumsalcocukbakimi.org/public/a5.pdf

Union. For this project's scope, 100 Euro monthly was paid to mothers with 0- 60 month-old children during the project period, and 100 Euro was paid once for the stationery materials. The project was implemented for 10.250 mothers in Istanbul (3.250), Ankara (1.500), Izmir (1.500), Antalya (1.500), Bursa (1.250), Malatya (750), Elazig (500).

In recent years there has been an increasing level of schooling in Turkey, especially for children aged three and above. As can be seen from Table 34 that while the schooling ratio was 26.9% in 2009-2010, this ratio reached 44.05% in 2020-2021 for children who are 3-5 years old.

Table 39: Schooling Ratios of Preschool Education by Age Groups, 2009–2022 (%)

Years	**0-3**	**3-5**	**4-5**	**5**
2009-2010	-	26.92	38.55	-
2010-2011	-	29.85	43.10	-
2011-2012	-	30.87	44.04	65.69
2012-2013	-	26.63	37.36	39.72
2013-2014	-	27.71	37.46	42.54
2014-2015	-	32.68	41.57	53.78
2015-2016	-	33.26	42.96	55.48
2016-2017	-	35.52	45.7	58.79
2017-2018	-	38.52	50.42	66.88
2018-2019	-	39.11	50.79	68.30
2019-2020	-	41.78	52.41	71.22
2020-2021	-	28.35	36.79	56.89
2021-2022	-	44.05	55.87	81.63

Source: Ministry of National Education, 2009-2022 National Education Statistics: Formal Education Reports [27]

In addition to increasing the schooling rate, there is a rising trend in the number of public and private preschool institutions. In other words, the total number of pre-primary education institutions is nearly doubled since 2004 (Table 35). While the total number of preschool institutions was 16,016 in the 2004-2005 academic year, this number increased to 32,554 in 2019-2020.

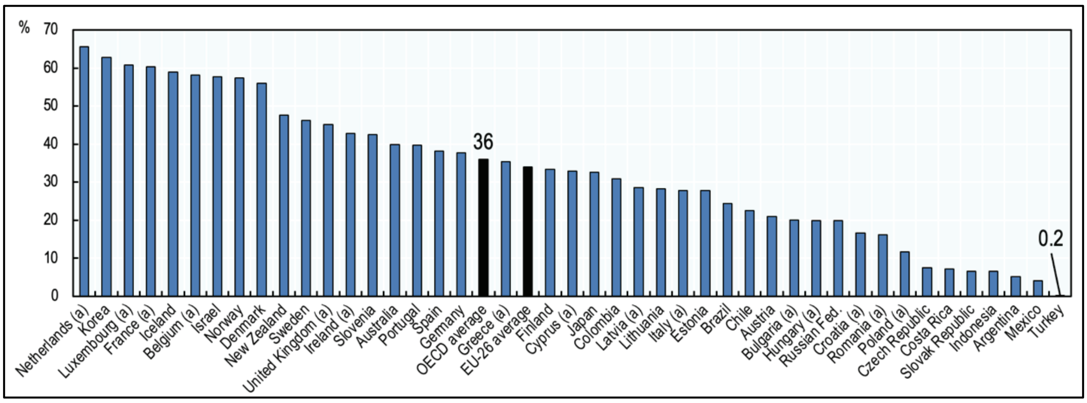
[27] The data is available for 2009 and after in the reports. In the Table net schooling rates are presented.

Table 40: Number of Institutions by School Type, 2004–2020

	Total Pre-primary Education-Public	Total Pre-primary Education-Private	Total Pre-primary Education
2004-2005	14,263	1,753	16,016
2005-2006	16,282	2,271	18,553
2006-2007	18,059	2,616	20,675
2007-2008	19,635	2,871	22,506
2008-2009	20,891	2,762	23,653
2009-2010	23,621	3,060	26,681
2010-2011	24,383	3,223	27,606
2011-2012	25,172	3,453	28,625
2012-2013	23,556	3,641	27,197
2013-2014	22,771	3,927	26,698
2014-2015	22,600	4,372	26,972
2015-2016	23,135	4,658	27,793
2016-2017	23,820	5,473	29,293
2017-2018	24,975	6,271	31,246
2018-2019	25,236	6,577	31,813
2019-2020	25,640	6,914	32,554
2020-2021	24,458	6,520	30,978
2021-2022	29,099	7,545	36,644

Source: Ministry of National Education, 2009-2020 National Education Statistics: Formal Education Reports

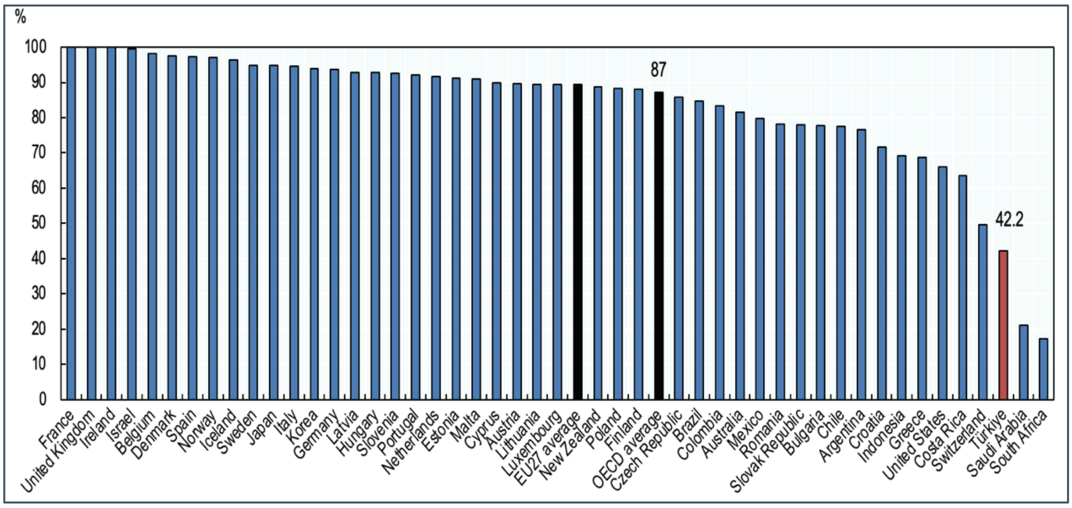
According to OECD statistics, the average enrollment rate in early childhood education and care services for children 0 to 2 years old is 36% for the OECD countries as of 2023. Although the number of preschool students also increases in recent years in Turkey, it remains well below this rate at 0.2% (Figure 60).



Source: OECD Statistics, https:// https://stats.oecd.org/, Data extracted on 08 Jan 2023 05:54 UTC (GMT) from OECD.Stat

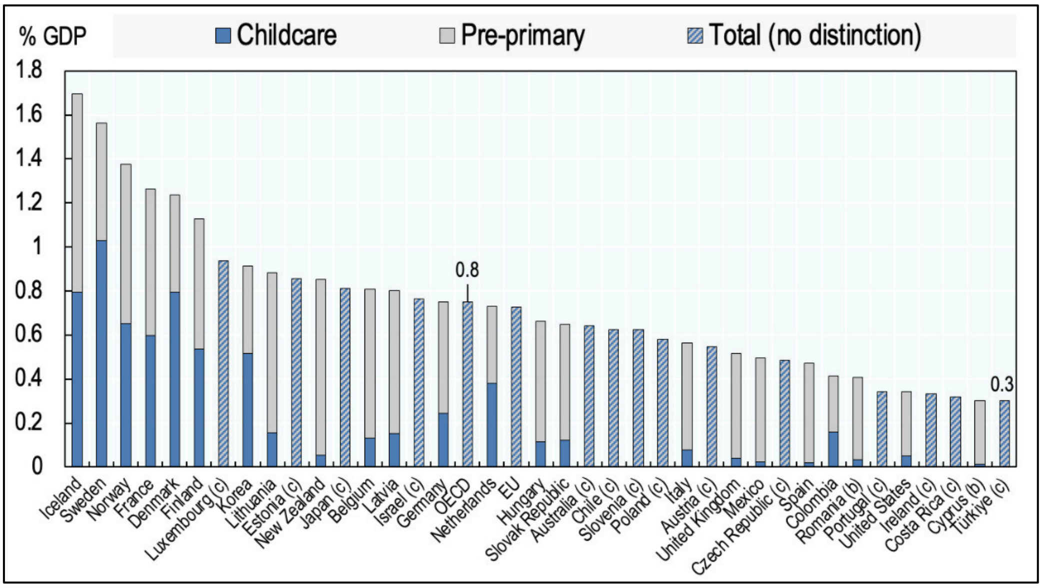
Figure 60: Enrollment Rates in Early Childhood Education and Care Services, 0- 2 Years Old, 2020 or Latest Available Year (%)

For children 3-5 years old, the average enrollment rate in early childhood education and care services for OECD countries is 87%, while it is nearly half of this (42.8%) for Turkey.



Source: OECD Statistics, https:// https://stats.oecd.org/, Data extracted on 08 Jan 2023 05:54 UTC (GMT) from OECD.Stat

Figure 61: Enrollment Rates in Early Childhood Education and Care Services and Primary Education, 3-5 Years Old (%)



Source: OECD Statistics, https:// https://stats.oecd.org/, Data extracted on 08 Jan 2023 05:54 UTC (GMT) from OECD.Stat [28]

Figure 62: Public Spending on Early Childhood Education and Care (% of GDP)

[28] The rate is calculated as a % of GDP, 2017 or the latest available by OECD.

Public expenditures on childcare and preschool education are an essential indicator of the labor force participation of caregiver females and the importance given to preschool education. According to OECD statistics, the ratio of public spending on early childhood education to GDP for the average of OECD countries is 0.7% for 2017. Turkey has the lowest rank among OECD countries, with 0.2% (Figure 62).

Table 41: Pre-Primary Education Expenditure per Student (2013-2021)

Year	Education expenditure (Million TL)	Education expenditure per student (TL)
2013	5.313	4.980
2014	6.587	5.893
2015	7.222	6.078
2016	9.035	7.062
2017	10.487	7.328
2018	13.552	8.804
2019	15.855	9.886
2020	14.306	10.311
2021	17.342	10.696

Source: TURKSTAT Education Expenditure Statistics

Female labor force participation is a crucial factor for growth. Previous studies show that there is a strong relationship between women's labor supply and affordable & good quality early childhood care and education. Therefore, three policy scenarios related to the early childhood care are examined in this chapter:

1. How women who currently have children between the ages of 3-6 would behave if they are provided free care for children as if they don't have any children aged 3-6.
2. Unconditional subsidy as the amount of preschool education fee (400 TL for in 2013) is provided to women with children aged 3-6.
3. Condition on currently working in the labor market, the subsidy as the amount of preschool education fee (400 TL for in 2013) is provided to women with children aged 3-6.

According to simulation results, after implementing three policy scenarios, it is observed that the most effective policy in terms of the percentage change in employment and disposable income is the first one. This is followed by the third and second policy scenarios (Table 37). On the other hand, the third policy has more impact on the percentage change in wage income (10.75% for married women and 1.05% for single women) than the other policy scenarios. The number of not-employed females mainly decrease due to the first policy implementation. As a result of the first policy implementation, additional 231,916 not-employed married women and 4,798 not-employed single women have been employed in the labor market (Table F.4 in Appendix F). This is followed by the second policy scenario with additional 202,538 married women and 4,178 women, and the third policy scenario with additional 158,914 married women and 3,306 single women, respectively.

Table 42: Total Change in Employment, Disposable Income and Wage Income by Family Status (%)

	No 3-6 Years Old Child	Unconditional Subsidy	Conditional Subsidy
Married			
Change in Employment (%)	9.52	3.45	5.54
Change in Disposable Income (%)	0.74	0.43	0.99
Change in Wage Income (%)	8.02	4.64	10.75
Single			
Change in Employment (%)	0.93	0.23	0.50
Change in Disposable Income (%)	0.15	0.08	0.27
Change in Wage Income (%)	0.59	0.30	1.05

For each policy scenarios, the total public revenues created as a result of the labor supply behaviors of married women and single women and the public costs are calculated. The results are shown in Figure 63[29]. The most revenue-generating (in terms of percentage change in wage and disposable income) policy is the giving conditional subsidy to women with preschool children among these policy scenarios. In addition, it creates the highest total public income to public expenditures ratio.

[29] Total cost is calculated as the amount of total subsidy that is provided to women with 3-6 years old children. Total public revenue is calculated based on SSI premium paid by employers for workers and income tax on wages, taking into account the increases in wages. While making the calculation, the formality rate of women in 2013 is taken as 0.80 according to the TURKSAT Labor Force Data. This rate is multiplied by the ratio of the sum of SSI payments for employers to the net minimum wage (0.419) in 2013. On the other hand, the total tax revenue is calculated as the amount of increase in wages multiplied by the ratio of the sum of the income tax and stamp duty to the net minimum wage (0.0783) in 2013.

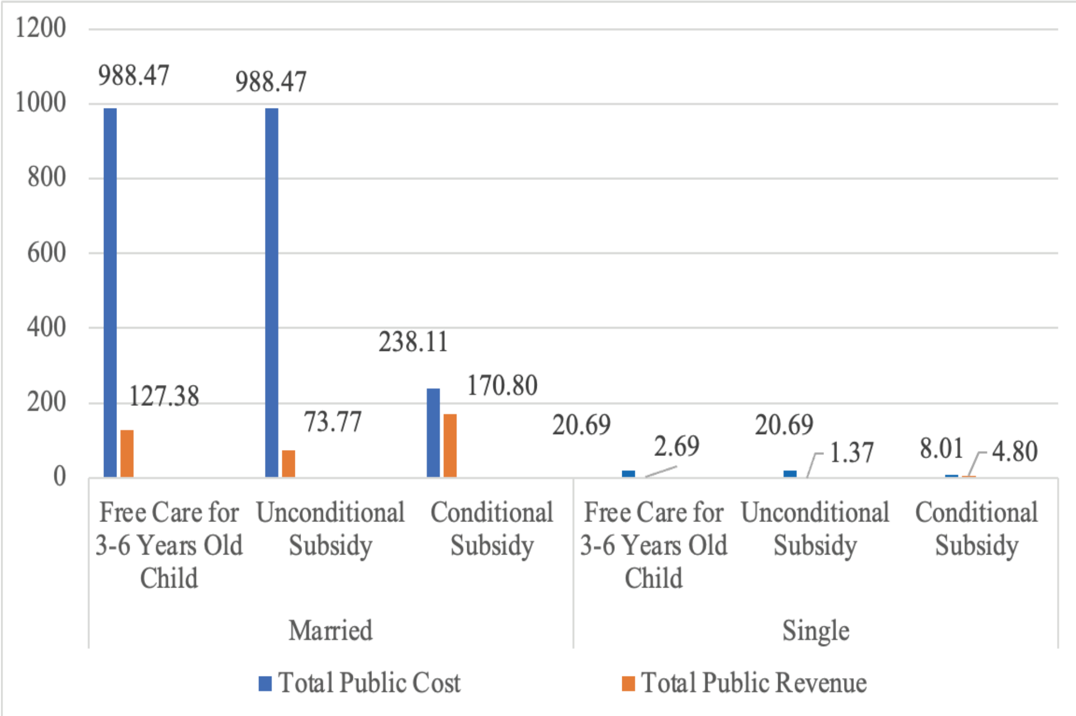


Figure 63: Cost and Revenue of Early Childhood Care and Preschool Education Benefit Policies (Million TL, 2013 Prices)

Policy Effects by Age Groups

When the policy effects are analyzed according to age groups, the hump-shaped relation between policy scenarios and the change in employment stands out, as is seen in Figure 64 and Figure 65. Regarding the positive change in employment, the first policy scenarios are significantly more effective than the other scenarios. All scenarios mostly affect women aged 25-29, among married women. While conditional and unconditional subsidies primarily affect the 30-34 age group among single women, it is noteworthy that the first policy scenario has a significant impact on the employment of single women between the ages of 35-39.

Additionally, these three policy scenarios also lead to a hump-shaped relation between the change in disposable income and age groups for married and single women as seen in Figure 66 and Figure 67. The policy that has the most significant impact on the disposable income of both single and married women is subsidies provided that they work. In these scenarios, the group whose disposable income increases the most is the active segment, which is the 30-34 age group among both single and married women. The minor effect on disposable income in these scenarios is granting unconditional subsidies. It also mainly affects 30-34 aged single and married women.

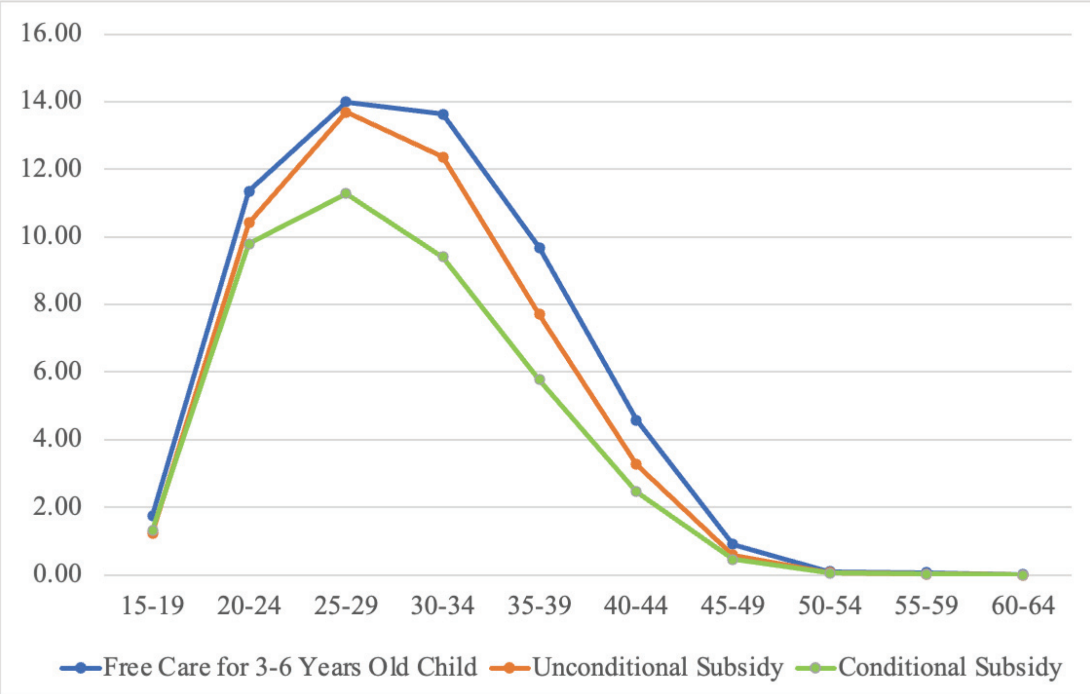


Figure 64: Change in Employment of Married Women by Age Groups (%)

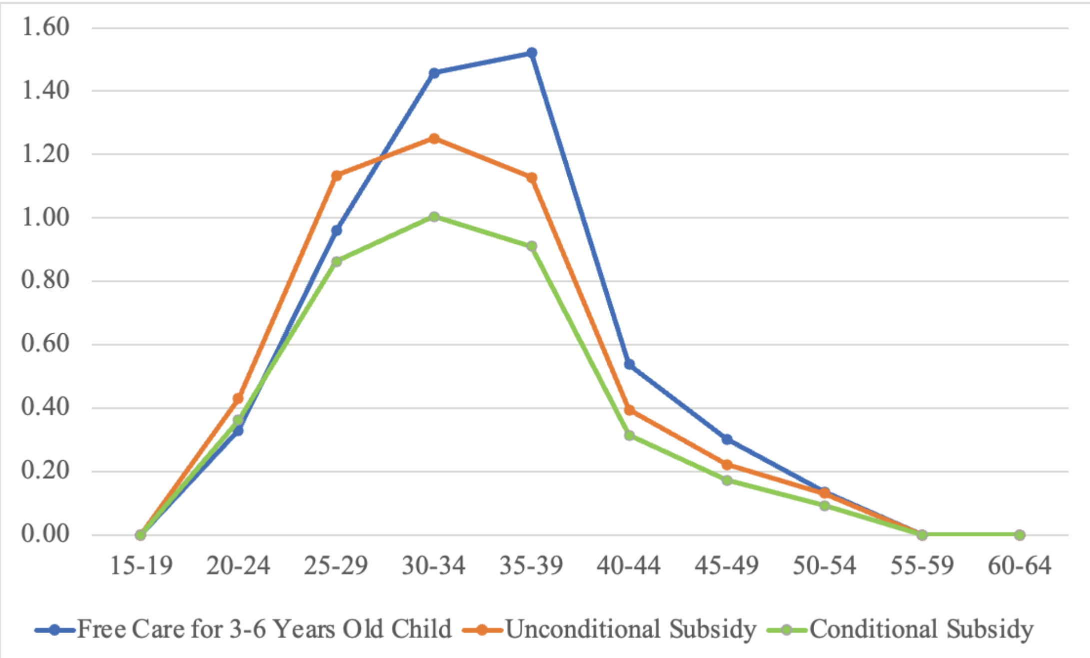


Figure 65: Change in Employment of Single Women by Age Groups (%)

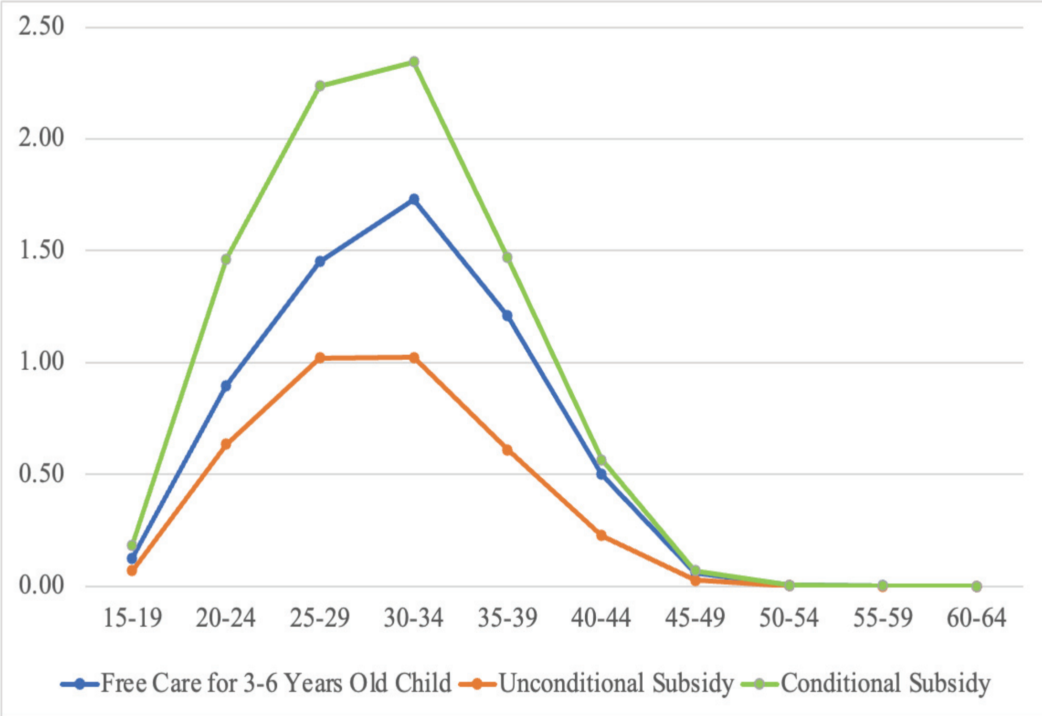


Figure 66: Change in Disposable Income of Married Women by Age Groups (%)

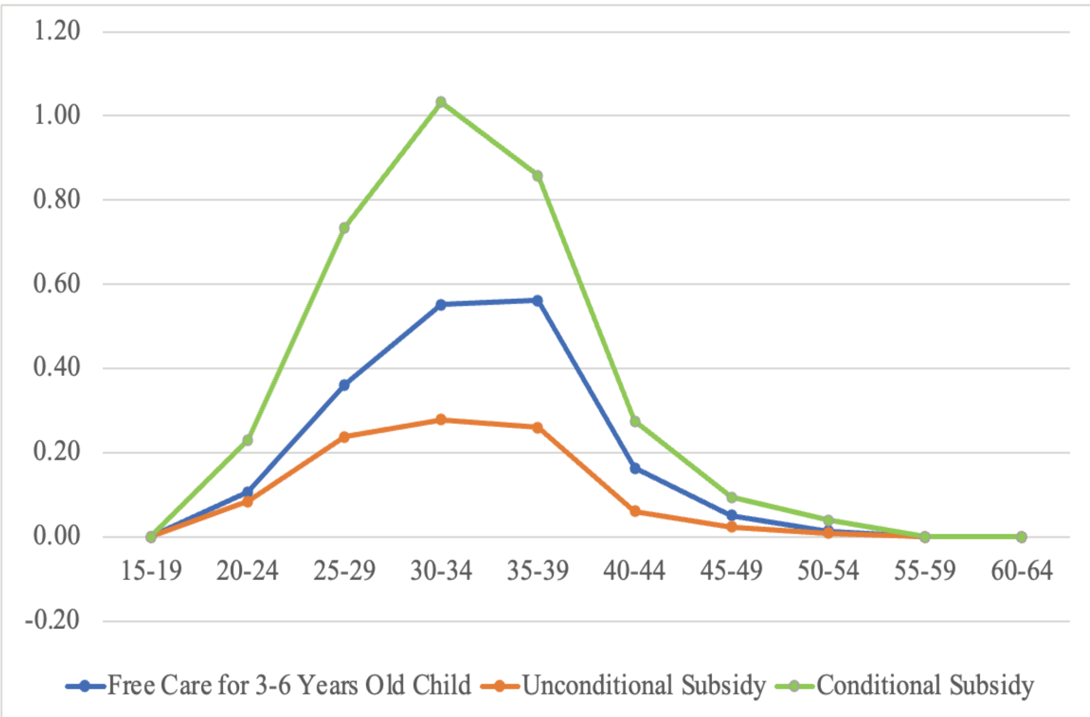


Figure 67: Change in Disposable Income of Single Women by Age Groups (%)

Policy Effects by Education Level

When evaluated the policy effects according to the education level, the employment impacts of policy scenarios are generally more remarkable on women with lower levels of education; it is observed that the effect decreases in women with high school and higher education levels. For both married and single women with primary school diploma and higher level of education, the first policy scenarios are more effective than the other scenarios. Providing unconditional subsidy policy has more effect on the change in employment for women who do not have any diploma.

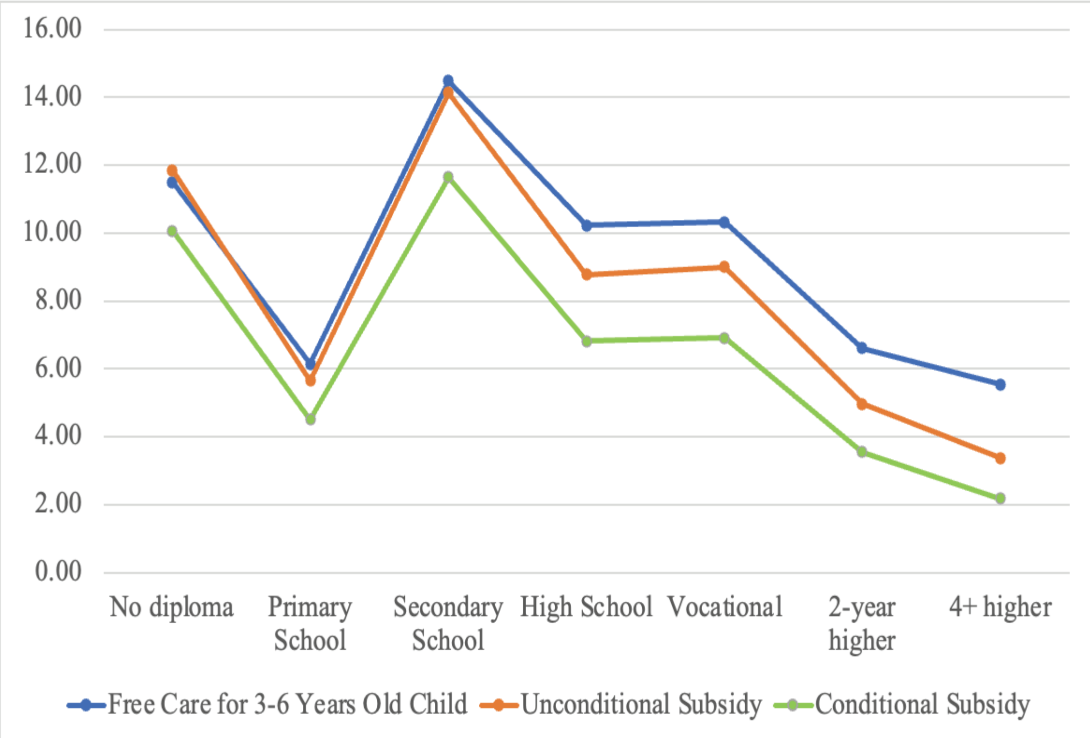


Figure 68: Change in Employment of Married Women by Education Level (%)

On the other hand, the policy scenario of assisting women with children aged 3-6, provided that they are currently working, is the policy that has the most positive impact on disposable income for both single and married women, as can be seen in Figure 70 and Figure 71. The most effective policy in terms of increasing disposable income is the conditional granting of subsidies. Both married and single women with secondary school diplomas are the group that gets this effect the most.

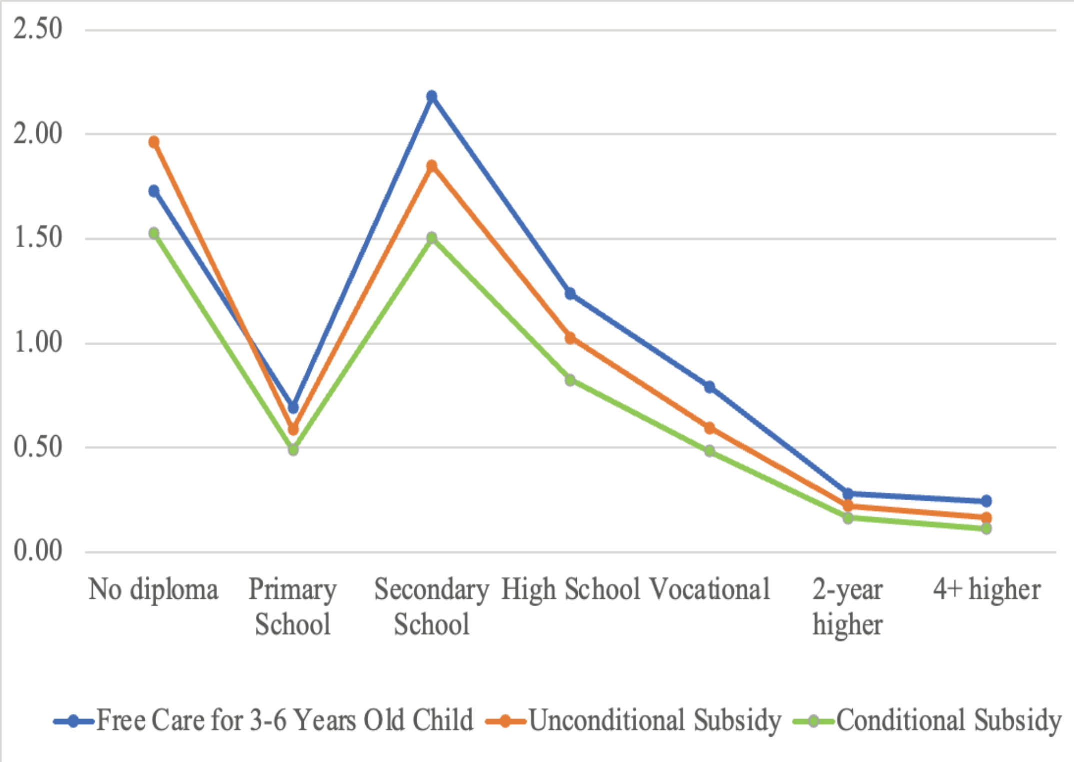
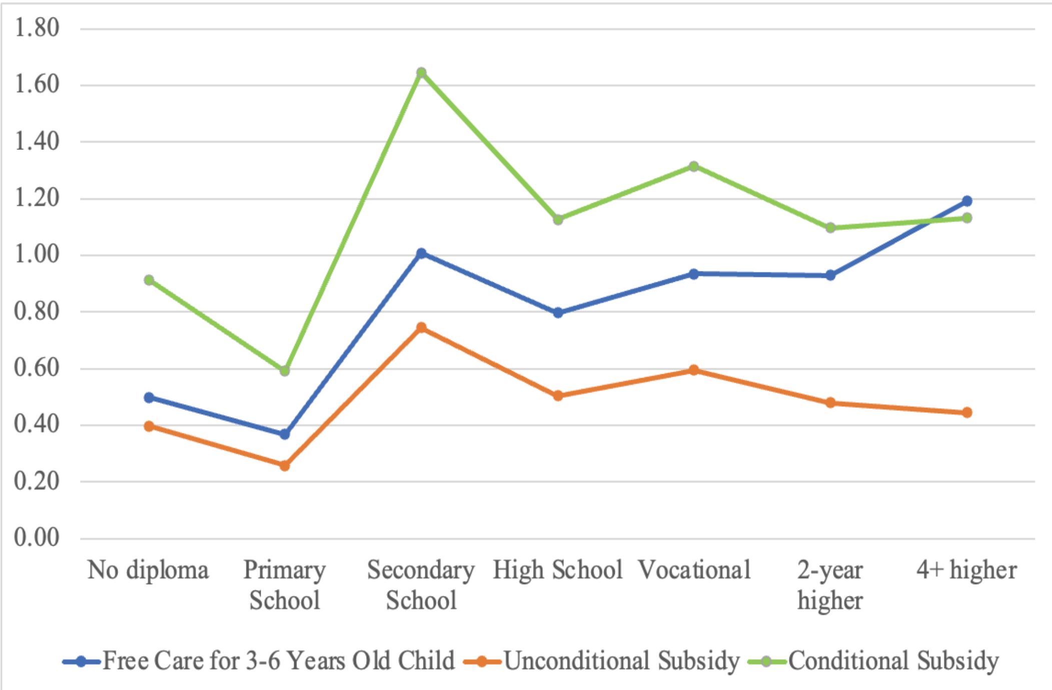


Figure 69: Change in Employment of Single Women by Education Level (%)



. Figure 70: Change in Disposable Income of Married Women by Education Level (%)

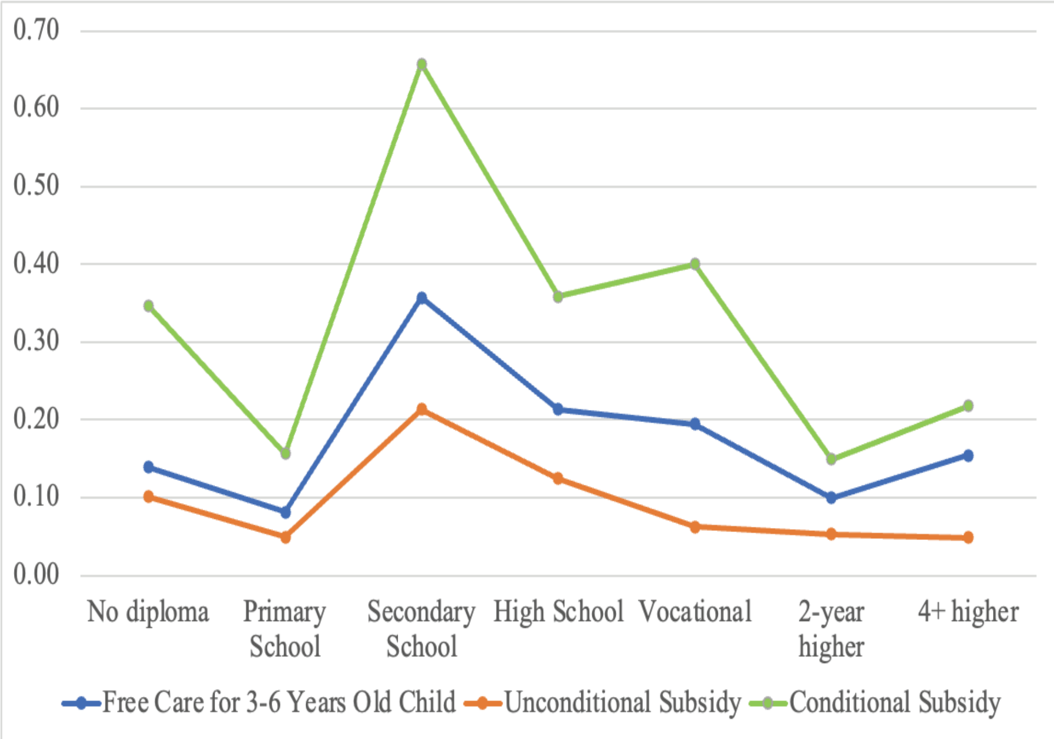


Figure 71: Change in Disposable Income of Single Women by Education Level (%)

Policy Effects by Income Decile

When all three policies are analyzed in terms of their employment effect, it is seen that the impact is intense on single and married women with low-income levels (Figure 72 and Figure 73). As the income level decreases, the employment effect of policies decreases.

Providing unconditional subsidy support creates a greater employment impact for low-income women (namely 1st income decile) than in other scenarios. It is observed that the effect of the first policy scenario is greater than the other scenarios when the income level reaches the highest levels. It is striking that the change in disposable income also has a decreasing pattern according to income level, similar to the effect of policies on employment. The third policy scenario has a remarkable effect on the disposable income of both married and single women rather than the other policies

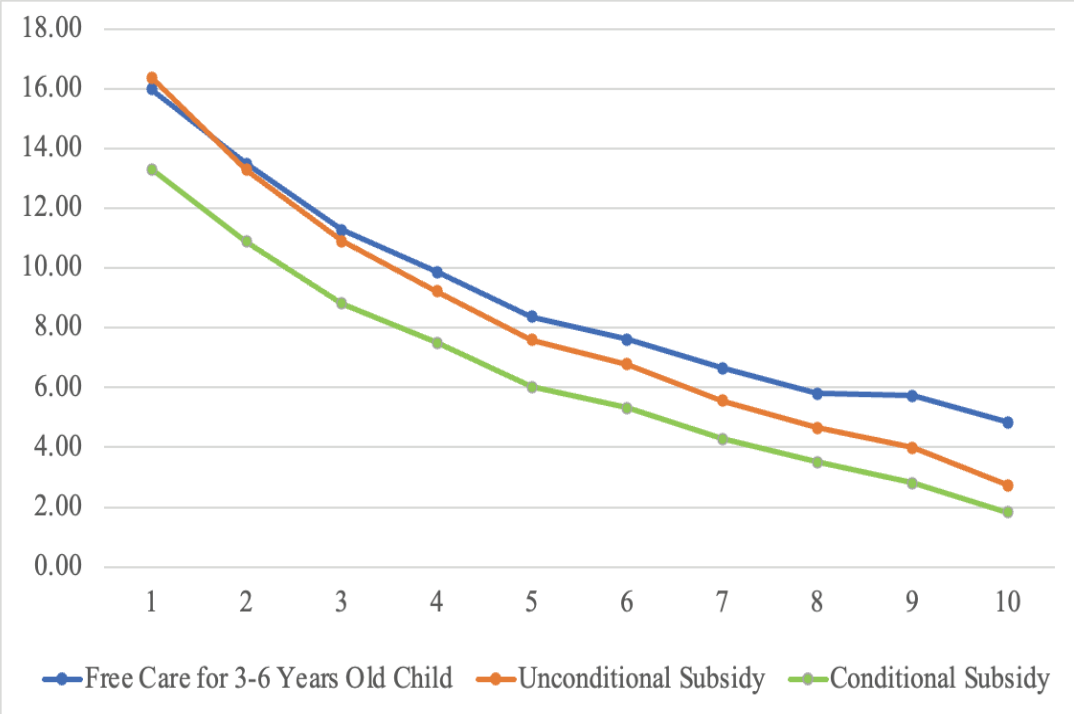


Figure 72: Change in Employment of Married Women by Income Decile (%)

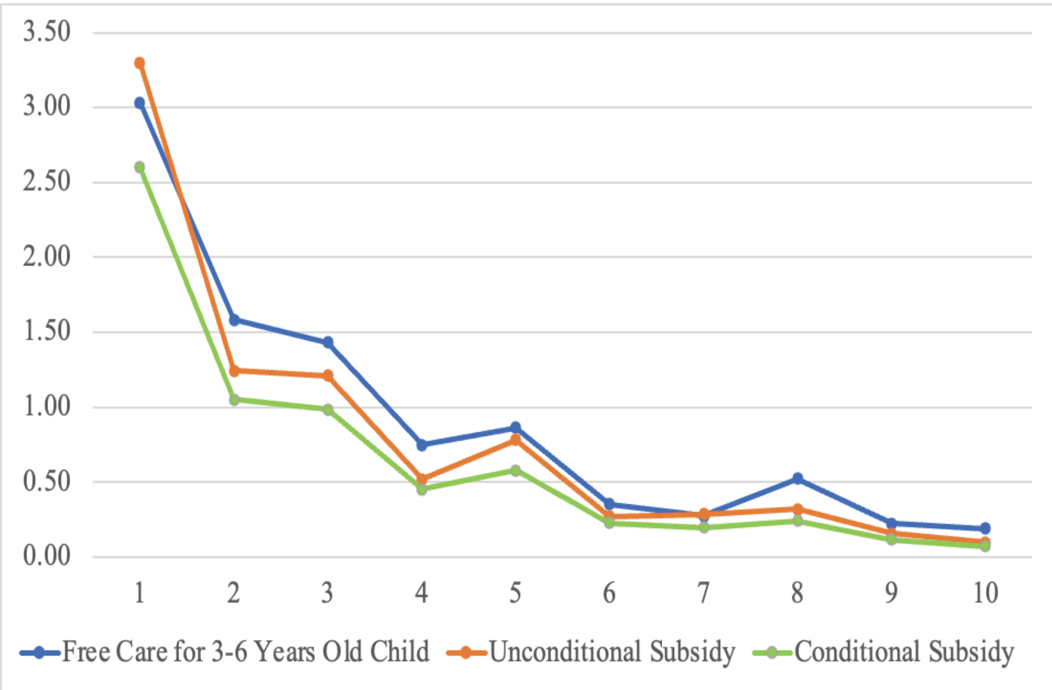


Figure 73: Change in Employment of Single Women by Income Decile (%)

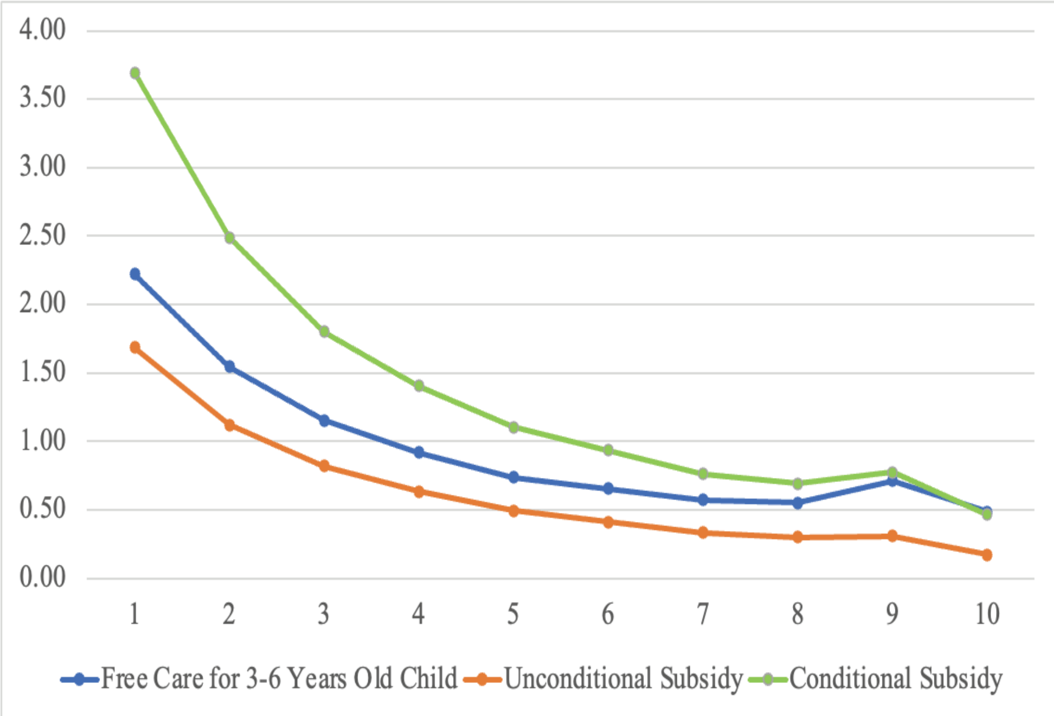


Figure 74: Change in Disposable Income of Married Women by Income Decile (%)

Figure 75: Change in Disposable Income of Single Women by Income Decile (%)

Policy Effects by Children

Since these policies target women with children between the ages of 3-6, they have significant effect on this group. Regarding the effect on the change of employment, the first policy scenario has more impact for both single and married women. This is followed by unconditional and conditional subsidy policies, respectively.

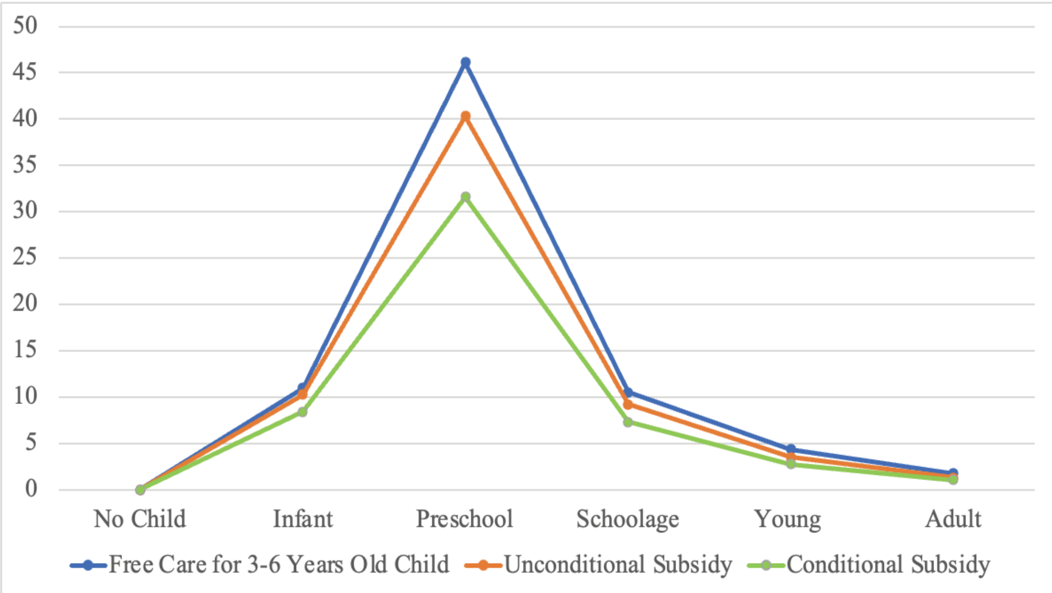


Figure 76: Change in Employment of Married Women by Age of Children (%)

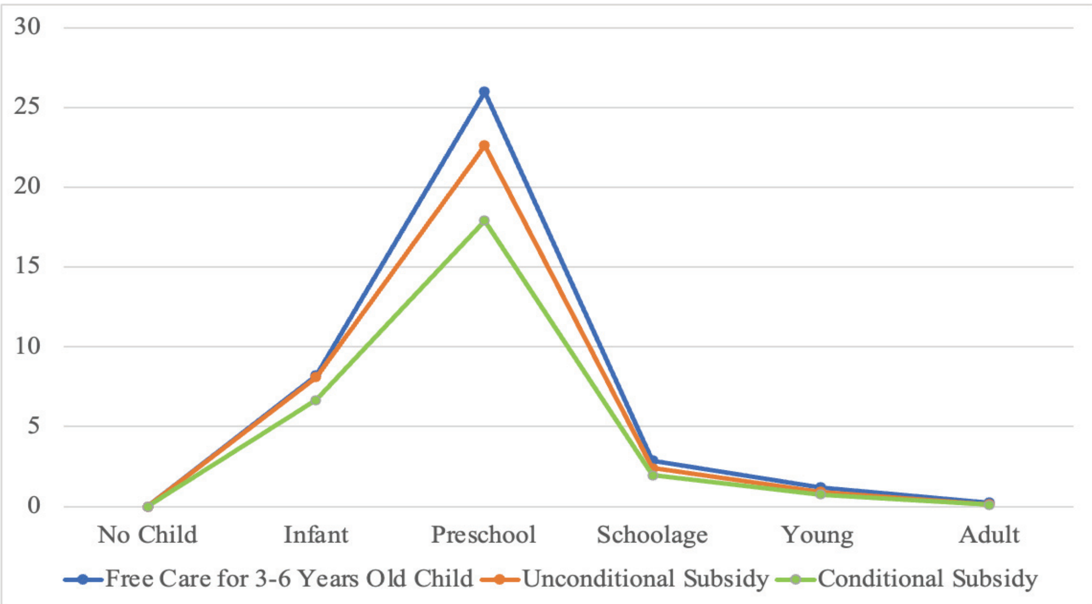


Figure 77: Change in Employment of Single Women by Age of Children (%)

The conditional subsidy policy scenario dominantly affect the disposable income of single and married women than the other policies as seen in Figure 78 and Figure 79.

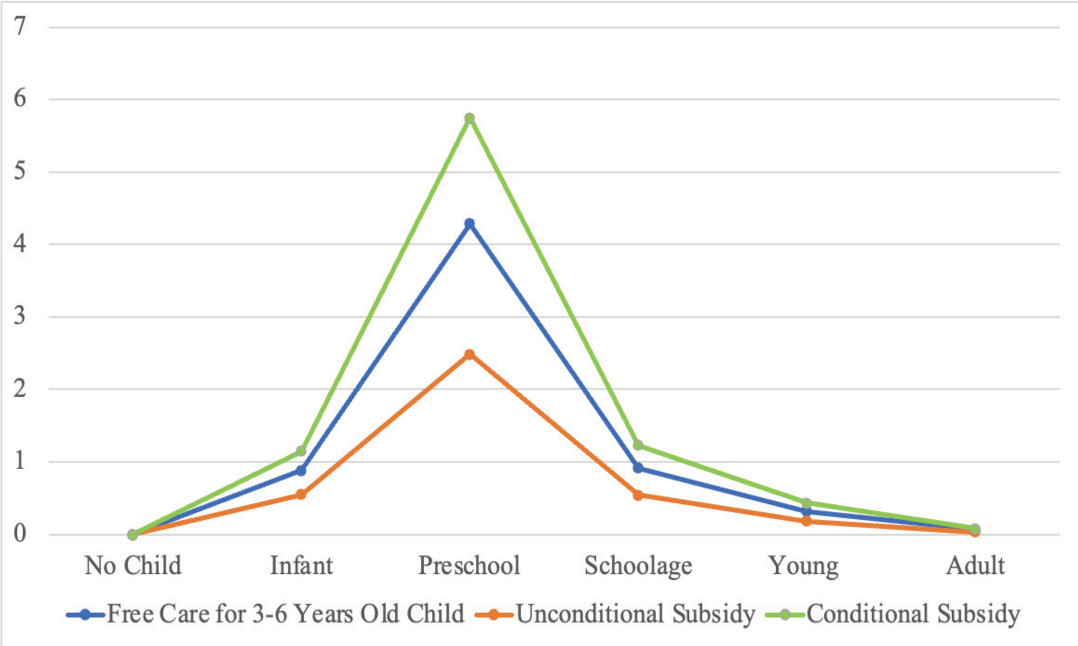


Figure 78: Change in Disposable Income of Married Women by Age of Children (%)

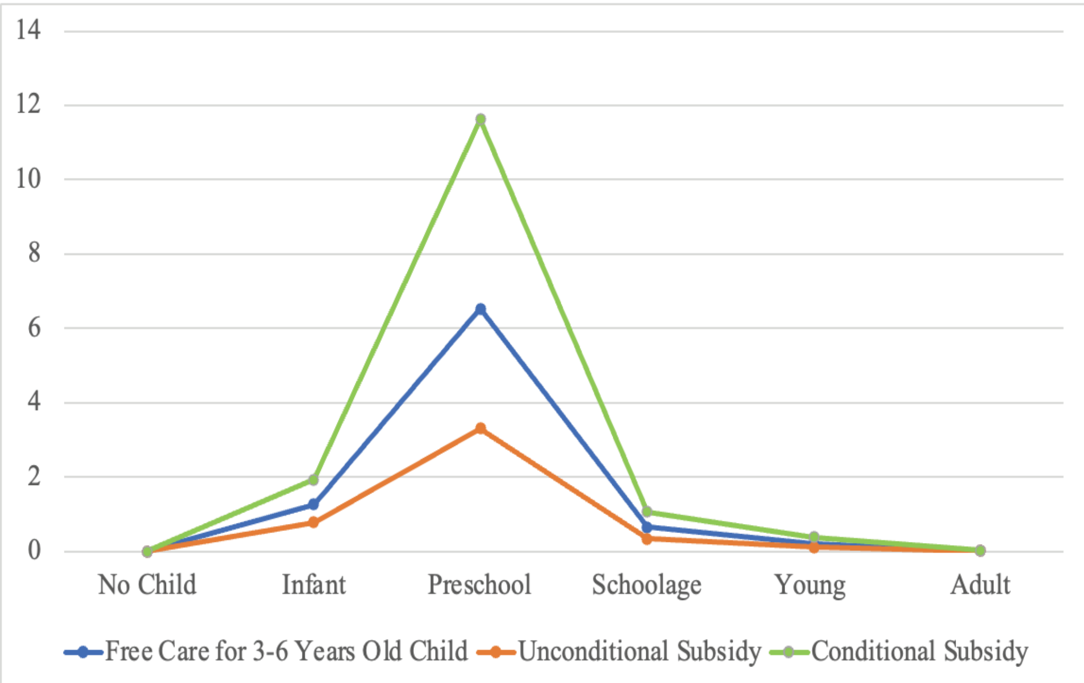


Figure 79: Change in Disposable Income of Single Women by Age of Children (%)

Policy Effects by Other Characteristics

Table 38 and Table 39 reveal the policy impacts on married women's employment and disposable income by their spouse's employment statuses. Women with employed spouses, spouses who are not eligible for work increase their employment more due to the three policy scenarios. This relationship is valid for the effect of policies on the disposable income.

Table 43: Change in Employment of Married Women by Employment Status of Spouse (%)

	Free Care for 3-6 Years Old Child	Unconditional Subsidy	Conditional Subsidy
Working Spouse			
No	4.13	3.66	2.91
Yes	8.79	7.67	6.01
Spouse Eligible for Work			
No	8.32	7.29	5.71
Yes	4.76	3.53	3.00
Employer or Self-Employed Spouse			
No	7.75	7.41	5.74
Yes	11.50	5.08	4.50

Table 44: Change in Disposable Income of Married Women by Employment Status of Spouse (%)

	Free Care for 3-6 Years Old Child	Unconditional Subsidy	Conditional Subsidy
Working Spouse			
No	0.23	0.14	0.32
Yes	0.86	0.49	1.15
Spouse Eligible for Work			
No	0.78	0.45	1.04
Yes	0.19	0.11	0.29
Employer or Self-Employed Spouse			
No	0.80	0.50	1.13
Yes	0.52	0.17	0.46

The change in employment of women with wage worker spouses is more remarkable than women with employer or self-employed spouses due to the first policy scenario, while this relation is just the reverse for the results of other policies. On the other hand, the impact on the disposable income of the three policies is higher for women with wage worker spouses than women with employer or self-employed spouses.

CHAPTER 7

CONCLUSIONS

The issue of female labor supply has gained attention from policymakers, economists, and women's organizations in various economic and social fields. Increasing the female labor supply is important for economic development and productivity as it allows economies to utilize their human capital more effectively. It is also significant for gender equality, and increasing the standard of living of families.

The female labor force participation reveals a U-shaped pattern beginning from the first years of the establishment of the Republic in Turkey. The female labor force participation declined almost continuously until the mid-2000s as a results of urbanization and industrialization. Despite there is a remarkable increase in female labor force participation and employment in Turkey since the mid-2000s, it is below that of males. According to the data provided by the TURKSTAT, the female employment rate in Turkey was only 30.4% in 2022, while it was 65% for men (TURKSTAT, 2023). Turkey has one of the lowest employment rates for females among the OECD countries (the OECD average was 60.4% in 2021) (OECD, 2023).

Turkey has introduced certain measures to improve female employment rates in the past few decades. However, there is still work to be done in order to reach the employment levels of the OECD average. Policymakers need to carefully analyze the female labor supply, using appropriate methods like structural labor supply modeling. They should also examine different policy scenarios beforehand by utilizing microsimulation models. This will help determine which policies could successfully increase female employment and participation rates.

7.1. Main Findings

This dissertation examines the impacts of various social and tax policies that aim to increase female employment by estimating a structural discrete choice labor supply model and applying the static microsimulation model. Estimation results show high labor supply elasticities of married, less educated women and women with infant and preschool children, and women in low-income households. Three main policies are simulated with three scenarios for each using the elasticities derived from the structural model. Each policy is evaluated in terms of change in employment, wage income, and disposable income of women, the additional number of women employed in the labor market, and the total cost and revenue of the government.

The most effective policy on the number of employed individuals is the policy that changes the preferences of married women with children aged 3-6 as if they do not have any children by providing free care for preschool children. Thanks to this policy, additional employment was created for 231,916 married women. The negative wage tax policy creates the most significant effect on additional employment for single women. It leads 22,325 single women to increase their labor supply. The VAT reduction is the least effective policy for increasing female employment, as seen in Table 40.

While the most crucial policy in terms of percentage change in employment is to treat married women as if they had no children between the ages of 3-6, with the 9.52% increase, the most effective policy for single women is to provide wage subsidy by 10% of the minimum wage for women in all age groups with the 3.48% increase.

The negative wage tax policy is the most effective policy on the percentage change in wage income and disposable income of married and single women. It increases married women's wage income by 16% and single women's wage income by 11%. On the other hand, a negative wage tax policy creates a 1.49% and 2.89% increase in the disposable income of married and single women, respectively.

The unconditional early childhood education subsidy policy for married women, the free care for preschool children policy (under which married women behave as if they had no children between 3-6 years), and the negative wage tax policy for single women create the highest cost for the government (988, 988, and 96 million TL per year in 2013 prices, respectively).

Our findings indicate that providing all women a wage subsidy equal to 10% of the minimum wage creates the highest public revenue (230 million in 2013 prices), while providing the unconditional subsidy to women with 3-6 years old children leads to the highest public cost (988 million TL in 2013 prices). On the other hand, a negative wage tax for single women is the policy that creates the highest public revenue (51 million TL in 2013 prices).

The most remarkable change in total wage income is created by the negative wage tax policy for married and single women, with the 618 million TL and 123 million TL wage increase, respectively.

Policies are also evaluated regarding *women's characteristics* based on the simulation results in Appendix D, E, and F. When the effect of policies by age groups is examined, it is observed that VAT reduction policies significantly affect women between 35-44 years old in terms of creating additional employment, the percentage increase in employment, and wage income. The policies affecting this age group, which can be described as the working age, are the early childhood education subsidy policies regarding the creation of additional employment. In addition, the conditional wage subsidy policy leads to the highest total wage income increase for married women in the 30-34 age group (150 million TL in 2013 prices). For married women aged 35-39, the highest increase in total wage income (145 million TL in 2013 prices) is caused by the negative tax policy.

When the policy effects are examined regarding education level, VAT reduction on food & soft drinks and transportation mainly affects married women with low education levels. In contrast, VAT reduction on education affects married women with higher education levels more. VAT policies affect single women with higher education levels more than women with lower education levels. Wage subsidy policies and early childhood education subsidies generally lead to additional employment for married women with low education levels.

Early childhood education subsidy policies for married and single women generally affect women with low education (secondary school diploma and below), leading to additional employment and increasing the percentage change in labor supply statuses, i.e., non-employment, part-time, full-time, and over-time employment.

Wage subsidy policies (especially wage subsidy to all and negative tax scenarios) are effective in creating additional employment for married women with low education levels. In this group, the increase in total wage income is primarily due to the wage subsidy policy implemented for all women (175 million TL in 2013 prices).

When we analyze the most effective policies for women with higher education levels, it is seen that the negative tax and free care for preschool children policies lead to the highest impact on employment (32,022 and 36,230 additional employment, respectively). The negative tax policy creates the highest increase in total wage income for women with higher education levels (203 million TL). Single women with low and high education levels are affected mainly by wage subsidy policies.

Early childhood education and wage subsidy policies mainly affect married women in the low-income group in terms of creating additional employment and the percentage change in labor supply choices. These policies create the highest public cost and revenue for married women with high-income levels (7th decile and above) and cause the highest increase in total wage income. The unconditional subsidy given to married women resulted in a tremendous rise in the total wage income for women in the low-income decile. The conditional subsidy policy significantly impacts married women in low (1&2) and high (9 &10) income deciles.

Table 45: Comparison of Policies

	Additional Emp.	Change in Emp. (%)	Change in Wage Income (%)	Change in Disp. Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	The Ratio of Public Revenue to Public Cost	Change in Total Wage Income (1000 TL)
Married								
VAT Reduction on Food and Soft Drinks	78,033	1.73	1.96	0.18	522,844	31,143	0.06	75,317
VAT Reduction on Transportation	40,744	0.92	1.02	0.09	245,985	16,285	0.07	39,383
VAT Reduction on Education	7,574	0.13	0.27	0.03	50,523	4,341	0.09	10,498
Wage Subsidy To All Women	206,154	7.46	14.51	1.34	329,997	230,618	0.70	557,723
Wage Subsidy To Young Women	43,838	1.61	2.90	0.27	60,224	41,663	0.69	111,268
Negative Wage Tax	205,270	6.87	16.09	1.49	374,792	8,079	0.02	618,348
Free Care for 3-6 Years Old Child	231,916	9.52	8.02	0.74	988,474	127,378	0.13	308,048
Unconditional Subsidy	202,538	3.45	4.64	0.43	988,474	73,771	0.07	178,406
Conditional Subsidy	158,914	5.54	10.75	0.99	238,107	170,796	0.72	413,049
Single								
VAT Reduction on Food and Soft Drinks	5,722	0.37	0.44	0.11	50,045	1,994	0.04	4,822
VAT Reduction on Transportation	3,544	0.14	0.25	0.07	29,241	1,152	0.04	2,785
VAT Reduction on Education	150	0.01	0.02	0.00	1,198	75	0.06	181
Wage Subsidy To All Women	22,185	3.48	9.11	2.36	74,795	41,663	0.56	100,757
Wage Subsidy To Young Women	3,109	0.50	1.77	0.46	14,909	7,717	0.52	19,539
Negative Wage Tax	22,325	2.96	11.17	2.89	96,982	51,099	0.53	123,576
Free Care for 3-6 Years Old Child	4,798	0.93	0.59	0.15	20,693	2,693	0.13	6,514
Unconditional Subsidy	4,178	0.23	0.30	0.08	20,693	1,365	0.07	3,302
Conditional Subsidy	3,306	0.50	1.05	0.27	8,008	4,800	0.60	11,608

Early childhood education subsidy policies are the most influential policy group for married women at low-income levels based on the creation of the number of additional employment. The policy that caused the most significant change in total wage income is the wage subsidy policy for all women and the negative tax policy (76 million TL and 124 million TL, respectively).

All policies (except VAT reduction on Transportation and Education) generally affect single women with low-income levels in terms of the number of persons and percentage change in labor supply status. The highest total cost and revenue and the change in total wage income are caused due to wage subsidies and VAT reduction policies for single women at high-income levels.

VAT reduction and wage subsidy policies significantly affect married women with school-age children in terms of creating additional employment. In addition, it is seen that the early childhood education subsidy policies primarily affect married women with preschool children regarding the additional employment creation and the percentage change in labor supply status, as in line with our expectations.

Each policy impacts single women with children in various age groups differently. For example, VAT reduction on food & soft drinks and transportation mainly affects women with young children, while VAT reduction on education primarily affects those with school-age children. While the wage subsidy to all women and negative tax policies affect single women with school-age children, the wage subsidy to young policy affects those with infant children more.

7.2. Main Limitations

This dissertation uses the TURKSTAT's Household Budget Survey micro-level data for the 2013-2019 period. The dataset does not include information on some crucial labor market indicators for the period under investigation. The main shortcoming of the dataset is the lack of information on formal/informal and private/public employment. Employment decisions and dynamics are likely to be quite different in the informal and public sectors than in the formal private sector, but the data do not allow us to consider these factors that play an important role in the Turkish case. We believe that this is one of the main limitations of our study.

There are some changes in the survey questionnaire over time. For example, the survey in 2012 did not include the question on the number of months worked in the last year. The missing survey questions make it difficult to estimate the models for a long time and analyze changes over time.

Since our analysis is based on a static microsimulation model, it allows us to identify the short-run effects of social and tax policies. The model does not capture the so-called "general equilibrium effects," i.e., we ignore the feedback effects. For example, an increase in female employment may increase the demand for certain products that will, in turn, increase the demand for labor. Moreover, the model excludes dynamic, long-run effects. For example, an increase in female employment and income will have an effect on the education level of future generations. However, despite these limitations, our analysis shows that static microsimulation models could provide valuable information on the order of magnitude of the effects of social and tax policies on employment and income distribution.

7.3. Main Policy Implications

This study shows that no single policy has the best effect in all aspects. Each policy has varying degrees of impact on various groups with different individual characteristics. A set of complementary policies should be adopted because one specific policy could not cause the best results in all dimensions and for all vulnerable groups. Policymakers should consider this fact and implement policies by thoroughly considering the target groups and the effects of the policies on them.

We have shown that the microsimulation model can be effectively used for *ex-ante* policy analysis. Microsimulation helps us to find the most effective policy for target groups by changing parameters and rules. For this reason, it is highly recommended for policymakers to use the microsimulation model in policy design. The best policy bundle could be reached via the microsimulation model. For instance, the implication of a wage subsidy policy and the free care for preschool children for married women will provide additional employment and an increase in the ratio of total public revenue to total public cost. A percentage increase in employment, wage income, and disposable income can be achieved, as well as an increase in the ratio of public revenue to public cost, with the negative wage tax policy and giving the conditional subsidy to single women.

In light of the concluding points of this study, if policymakers mainly focus on married women with 3-6 years old children, the female labor supply can be increased substantially. Providing early childcare is crucial for women to improve their work-life balance. Our findings support that the expansion of early childcare services (through free childcare centers or reimbursement for these services) to women can create additional employment. The expansion of the childcare sector will, in turn, create additional employment (hiring more caregivers, teachers, pedagogues, psychologists, and servants) as well.

Furthermore, since wage incentive policies create the highest public revenue (and also the highest second and third ratio of total revenue to total cost, which are 0.70 and 0.69) and the highest percentage change in wage and disposable income in this study, the extended policies related to wage subsidies would create more revenue for the government.

7.4. Main Topics for Future Research

Future research is necessary to validate the conclusions drawn from our study. As mentioned above, future research could be conducted by collecting the data on formal/informal employment. Moreover, future studies could extend the data set and scope of the research by analyzing the differences in private and public employment.

The female labor supply decision is modeled in this study by assuming that the decisions of other household members (most importantly, husbands of married women) are exogenous. In other words, their decisions are assumed not to affect the decisions of females. This assumption could be relaxed, and joint decisions of household members can be modeled in future research. Future studies could construct the model by adding the male decision-making process to the utility function. The simulated movements in hours and employment for males and females could be modeled as a joint labor supply decision.

Static microsimulation models ignore the behavioral responses of individuals. We use a static microsimulation model that applies the change in household budget constraints due to social and tax policies. It does not consider the dynamics of demographic and economic variables, such as aging, births, deaths, marriage, divorce, retirement, etc. Dynamic microsimulation models can incorporate all these effects.

Furthermore, new models that include all major sectors of the economy (the public sector, and other related sectors like childcare and eldercare, education, etc.) should be developed so that the so-called General Equilibrium effects can also be analyzed.

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APPENDIX A

DETAILS OF THE LITERATURE SURVEY

Table A. 1: Some Prominent Static and Dynamic Microsimulation Models in Economic Literature Measuring Labor Supply Decision

MSMs	References	Country	Policy	Type of Modeling	Behavior	Data	Number of Individuals/ Household	Calculation of Policy Effect
STATS	Bridges & Johnston (1976) Wixon, Bridges, Pattison (1987)	USA	Social Security Policy	Static	Social Security Benefit Participation	1985- Current Population Survey (CPS)	More than 50.000 Household and 100.000 Individuals	They recalculate the taxes and cash benefits for each case by using information on individuals. Microsimulation has two major steps: 1- Taxes and benefits are estimated for individuals within each family. 2- Summarizing the effects of all proposed or real programs on family groups. When simulating Social Security benefits, the model considers covered ones and their dependent family members. The proposal is to increase the Social Security benefits included in the tax base from 50% to 85%.

KGB	Betson et.al. (1982) O'Reilly (1977)	USA	Tax-Transfer Policy	Static	Labor supply, program participation	Current Population Survey (CPS) 1975- Survey of Income and Education (SIE)	200.000 household	They simulate the alternative policies on existing tax and transfer system in four major steps. 1- Pre-reform economic status of household is characterized as the following: Some characteristics are directly read form data such as hours, earnings, and unearned income; some characteristics are derived from schedules such as taxes paid and tax rates; and some others are determined from estimated equations such as tax rates in current transfer program and amount of unemployment compensation 2- The values of net wage rates and disposable incomes are computed for 3 cases which are pure strategy (if workers leaves the conventional labor market to take public employment), mixed strategy (worker stays in conventional labor market but accepts public employment only when he is employed), private strategy (worker does not participate in public employment). 3- The value of post-reform variables is adjusted to get the effect of labor supply responses to changes in the net wage rates and disposable income. They compute the disposable income for each public employment strategy by using the tax and transfer system. 4-They determine whether an individual prefer public service job under 3 strategies.
MICSIM	Jongeni Boer,	NL	Tax-Benefit Policy	Dynamic	Labor supply	Arbeidsmarkt panel (Labour Market Panel)	More than 150.000 individuals	By using the Labor Market Panel data, they estimate preferences over income, leisure, and formal childcare

	Dekker (2014)					of Statistics Netherlands, 2012 (including years 1999-2009) Inkomenspanelonderzoek (Income Panel) of Statistics Netherlands.		for young persons. They get the estimated labor supply elasticities for large subgroups. Then, they applied these estimated preferences to another dataset, which is Income Panel data. Using the available information in both datasets they impute education, age, and the use of formal childcare in the Income Panel. After that, they use `static ageing' to make a projection for 2014. They adjust the weights to target the age and household composition in 2014, also adjust gross incomes for inflation, and update the parameters of the tax-benefit system to 2014. Therefore, they simulate tax-benefit reforms using the enriched Income Panel.
POLIMOD	Redmond, Sutherland & Wilson (1995)	UK	Tax-Benefit Policy (Focuses on Income Tax)	Static	Labor supply	1991 Family Expenditure Survey (FES) is used by adjusting the data 1996-7 price and income levels.	8.724 records in the family level 17.089 records in the individual level	In this model, the household is used as a unit, and assumed that in each individual in the household enjoys the same income. The income change is assessed over the whole household. In the model, the effect because of policy change is measured as the net effect in the household in case there are individuals who gains or loose. As policy parameters they use the child benefit, income tax, national insurance contributions, means-tested benefits, and indirect taxes. They isolate the first round policy effects in the sense of the effects of taxes and benefits between 1978-9 and 1996-7. They seek an answer to the question, which is what would be the effect of 1978-9 tax and benefit system if it were reintroduced to 1996-7 system.

STINMOD	Brown & Harding (2002)- NATSEM (National Center for Social and Economic Modelling)	Australia	Tax-Benefit Policy	Static	Income distibution and individual impacts	ABS Income Survey (SIHCs) micro level data	23.263 individuals	There are three elements in the STINMOD: They first calculate the weight attached to each income unit, because, in the model each of the individuals in an income unit must be assigned weight, which represents the likelihood of finding with a similar set of characteristics. Secondly, they uprate the private incomes with respect to individuals' job characteristics and other non-wage incomes. Since transfer payments are directly included in STINMOD, these are not uprated. Thirdly, they impute several information into the model because ABS Microdata set do not include all the necessary information about cash transfer and income tax rules of the government.
EUROMOD	Sutherland & Figari (2013)	EU 28 Countries	Tax-Benefit Policy	Static	Labor supply, Income distribution	European Union Statistics on Income and Living Conditions (EU-SILC) except UK, and Family Resources Survey (FRS) for UK	Cross-sectional data include about 130 000 household and 270 000 individuals aged 16 and more Longitudinal data include about 100 000 household and 200 000 individuals aged 16 and more	
LABORsim	Leombruni and Richiardi, 2006	Italy	Retirement Policy	Dynamic	Educational choice of young people, Labor supply of women	1993-2003 of the Rilevazione Trimestrale delle Forze Lavoro (RTFL), the Quarterly Labour Force Survey	50.000 individuals	*Replicates Istat central demographic projections up to 2050. *Assumes that average unemployment rate is set to 8% of the work force for all simulated years. *Assumes that the trend towards increasing labor market participation stops for individuals born after 1980.

						delivered by the Italian Central Statistical Office (Istat)		
DYNAMOD	King et al. (1999), Kelly et al. (2001)	Australia	In Superannuation Module Compulsory Superannuation	Dynamic	Individuals' Labor Supply	1986 Census	150.000 individuals	*It takes the base population 150.000 synthetic individuals with 80 characteristics and simulates the policy changes from 1986 onwards month by month. *The effects of policy changes on individuals' life are measured by some life events which are covered by data namely, death, fertility, disability, couple formation and dissolution, emigration, and immigration; education; labor force changes earning income etc.
TAXBEN	Giles and McCrae (1995)	UK	Tax-Benefit Policy	Static	Individuals' Labor Supply	1989-1993 Family Expenditure Survey	7.000 household	By using the Institute for Fiscal Studies (IFS) Labor supply program, namely SPAIN, TAXBEN produces budget constraints. It analyses policy reforms comparing the first round (non-behavioral) effect and second round effects that is the effect after predicted labor supply response.

Table A. 2: Empirical Studies on Discrete Choice Labor Supply

Study	Form of Utility Function	Variables of Utility Function	Budget Constraints	Discrete Choices of Labor Supply	Econometric Model & Estimation Procedure	Elasticities
Berger, Islam, and Liegeois, 2011	Quadratic	●Net Disposable Household's Income ●Working Hour / Leisure Time ●Household' Characteristics	● Gross Wage Rate ●Nonlabor Family Income ●Tax& Benefits	●Non-Employment (0 Hour a year- (0)) ●Part-Time Employment (1040 Hours a year (0+-1500)) ●Full-Time Employment (2080 Hours a year (1500+))	Multinomial Logit Model- Maximum Likelihood Estimation	Wage Elasticity of Labor Supply: 0.32 (single females) and -0.28 (females in couples)
Labeaga, Oliver and Spadaro, 2008	Quadratic	● Household Income ● Leisure Time ● Individual Characteristics	● Gross Wage Rate ● Nonlabor Family Income ● Tax &Benefit Function	For Singles: ● 0-4 hours of working ● 5-34 hours of working ● 35-44 hours of working ● More than 44 hours of working For Couples' Household Head: ● 0-4 hours of working ● 5-44 hours of working ● More than 44 hours of working For Couples' Other Spouse: ● 0-4 hours of working ● 5-34 hours of working ● More than 35 hours of working	Multinomial Logit Model	Elasticities of Hours Worked ●Wage Elasticity: 0.0 (Single), 0.01 (Head of Couple), 0.29 (Spouse) Elasticities of Participation ● Wage Elasticity: 0.0 (Single), 0.11 (Head of Couple), 0.26 (Spouse)

Wrohlich, 2011	Quadratic	● Mother's Leisure, ●Disposable Household Income, ● Child Quality (depends on the hours of maternal care, hours of paid child care, hours of unpaid child care), ●Demographic Characteristics (Age, the number of children etc.)	●Wage Rate, ● Nonlabor Income, ●Tax&Transfer Function	For Mother: ● Non-employment & No Child Care ● Marginal Employment (8 Hours) & No Child Care ● Part-Time employment (20 hours) & No Child Care ● Full-Time Employment (37 hours) & No Child Care ● Non-employment & Part-Time Child Care (20 hours) ● Marginal Employment (8 Hours) & Part-Time Child Care (20 hours) ● Part-Time employment (20 hours) & Part-Time Child Care (20 hours) ● Full-Time Employment (37 hours) & Part-Time Child Care (20 hours) ● Non-employment & Full-Time Child Care (37 hours) ● Marginal Employment (8 Hours) & Full-Time Child Care (37 hours) ● Part-Time employment (20 hours) & Full-Time Child Care (37 hours)	Tobit and Bivariate Probit Models-Maximum Likelihood Estimation	● Elasticities of Labor Supply with 1% increase in Gross Hourly Wage <u>Change in Participation Rates:</u> 0.13 for all mothers 0.12 for mothers with children under 3 years of age 0.14 for mothers with children equal and above 3 years of age. <u>Change in Working Hours:</u> 0.49 for all mothers 0.51 for mothers with children under 3 years of age 0.47 for mothers with children equal and above 3 years of age. ● Elasticities of Labor Supply with 1% increase in Expected Childcare Costs <u>Change in Participation Rates:</u> -0.04 for all mothers -0.03 for mothers with children under 3 years of age -0.04 for mothers with children equal and above 3 years of age. <u>Change in Working Hours:</u> -0.13 for all mothers

				● Full-Time Employment (37 hours) & Full-Time Child Care (37 hours)		-0.16 for mothers with children under 3 years of age -0.08 for mothers with children equal and above 3 years of age.
Keane & Moffitt, 1998	Quadratic	●Working Hour ●Disposable Income ●Dummies for Welfare Program	●Wage Rate ●Nontransfer-Nonlabor Income ●Tax Benefit Function	●Non-Employment (0 Hour) ●Part-time Employment (20 Hours / Per Week) ●Full-Time Employment (40 Hours / Per Week)	Multinomial Logit Model- Simulated Maximum Likelihood Estimation	● Uncompensated Wage Elasticity: 1.82 ● Total Income Elasticity: -0.21
Bargain et al., 2014	Quadratic	●Household Consumption ● Quadratic Term of Household Consumption ● Working Hour ● Spouse's Working Hour ● Quadratic Terms of Working Hour ● Cross-Products of Consumption and Working Hour ● Fixed Costs of Work ● Individual Characteristics	● Female/Male Earnings ● Non-Labor Income ● Household Characteristics ● Tax Benefit Function	● 0: Non-Employment ● 10: 1-10 Hours Per Week ● 20: 11-20 Hours Per Week ● 30: 21-30 Hours Per Week ● 40: 31-40 Hours Per Week ● 50: 41-50 Hours Per Week ● 60: 51-60 Hours Per Week	Structural Discrete Choice Labor Supply-Simulated Maximum Likelihood Estimation	<u>Own-Wage Elasticities:</u> For Married Women ranges between 0.01-0.06 For Married Men ranges between 0.05 and 0.15 For Single Women ranges between 0.1 and 0.5 For Single Men ranges between 0 and 0.4
Singhal, 2021	Quadratic and Quasi-Linear	● Household's Net Income ● Husband's Working Hour,	●Wage Rate, ● Nonlabor Income, ●Tax Benefit Function	●Non-Employment (0 Hour) ●Working Fewer Than 35 Hours / Per Week	Multinomial Logit Model- Maximum Likelihood Estimation	<u>Change in Participation Rates:</u> ● For Quasi-Linear Model with no Heterogeneity - 0.13 for all individuals - 0.18 Single Women

		● Wife's Working Hour, ● Fixed Cost (The number of Children under 5 years old)		● Working Between 35 and 45 Hours / Per Week ● Working More Than 45 Hours / Per Week		- 0.12 Single Men - 0.26 Married Women - 0. 02 Married Men ● For Quasi-Linear Model with Heterogeneity - 0.13 for all individuals - 0.17 Single Women - 0.11 Single Men - 0.025 Married Women - 0. 03 Married Men ● For Quadratic Model with no Heterogeneity - 0.08 for all individuals - 0.11 Single Women - 0.10 Single Men - 0.12 Married Women - 0. 02 Married Men ● For Quadratic Model with Heterogeneity - 0.07 for all individuals - 0.10 Single Women - 0.09 Single Men - 0.11 Married Women - 0. 02 Married Men <u>Change in Working Hours:</u> ● For Quasi-Linear Model with no Heterogeneity - 0.10 for all individuals - 0.11 Single Women - 0.12 Single Men - 0.10 Married Women - 0. 09 Married Men ● For Quasi-Linear Model with Heterogeneity - 0.11 for all individuals - 0.12 Single Women - 0.12 Single Men - 0.10 Married Women

						- 0. 09 Married Men ● For Quadratic Model with no Heterogeneity - 0.02 for all individuals - 0.03 Single Women - 0.04 Single Men - 0.01 Married Women - 0. 02 Married Men ● For Quadratic Model with Heterogeneity - 0.02 for all individuals - 0.03 Single Women - 0.03 Single Men - 0.01 Married Women - 0.01 Married Men
Van Soest, 1995	Translog	● Husband's Leisure, ● Wife's Leisure, ● Household's Income	●Wage Rate, ● Nonlabor Income, ●Tax & Benefit Function		Multinomial Logit Model- Simulated Maximum Likelihood Estimation	0.11 for males 0.40 for females
Steiner and Wrohlich, 2004	Translog	● Husband's Leisure ● Wife's Leisure, ● Net Household's Income, ● Their quadratic, cross section terms, ● Individual characteristics (age, health status of both spouses, the number and age of children)		For men: ● Non-employment ● 1-40 hours of working ● More than 40 hours (overtime) For Women: ● Non-employment ● 1- 15 hours of working ● 16-34 hours of working ● 35-40 hours of working ● More than 40 hours (overtime)	Conditional Logit Model-Maximum Likelihood Estimation	Change In Participation Rates ●Caused by 1% increase in males' gross wage rate: 0.15 for all men in married couples 0.00 for all women in married couples ●Caused by 1% increase in females' gross wage rate: 0.02 for all men in married couples 0.16 for all women in married couples Change In Hours ●Caused by 1% increase in males' gross wage rate: 0.24 for all men in married couples

						-0.03 for all women in married couples ●Caused by 1% increase in females' gross wage rate: 0.02 for all men in married couples 0.41 for all women in married couples
Wrohlich, 2004	Translog	● Husband's Leisure, ● Wife's Leisure, ● Household's Income ● Their quadratic, cross section terms	●Wage Rate, ● Nonlabor Income, ●Tax Benefit Function	For men: ● Non-employment ● 1-40 hours of working ● More than 40 hours (overtime) For Women: ● Non-employment ● 1- 12 hours of working (part-time) ● 13-20 hours of working (part-time) ● 21-34 hours of working (part-time) ● 35-40 hours of working (full time) ● More than 40 hours (overtime)	Conditional Logit Model-Maximum Likelihood Estimation and Heckman (1979)' s Two Stage Estimation for Non-Working Individuals	<u>Elasticities of Labor Force Participation</u> ● Wage elasticity: 0.12 (East) & 0.13 (West) ● Cost of Childcare: -0.02 (East) & 0.03 (West) Elasticities of Hours Worked ● Wage elasticity: 0.32 (East) & 0.45 (West) ● Cost of Childcare: -0.04 (East) & 0.09 (West)
Euwals and Van Soest (1999)	Translog	For Single individuals ● Log of Leisure ● Log of Gross Wages ● Log of Age ● Quadratic Term of Log of Age ● Number of Children	● Gross Income ● Tax Benefit Function	8 different hours of working interval per week: ● h1=0 (0-3 hours of working) ● h2=8 (4-11hours of working)	Structural Discrete Choice labor Supply and Multinomial Logit Model - Simulated Maximum Likelihood Estimation and Heckman's Two Step Procedure	<u>Elasticities For Labor Supply Without Restrictions (Actual Hours Only)</u> ● Wage and Income elasticities for men: Children:0.107; -0.190 Single :0.154; -0.276 Lone Parents: 0.180; -0.281

		● Fixed costs for Part-Time and Full Time		● h3=16 (12-19 hours of working) ● h4=24 (20-27 hours of working) ● h5=32 (28-35 hours of working) ● h6=40 (36-43 hours of working) ● h7=48 (44-51 hours of working) ● h8=56 (52 hours of working and above)		● Wage and Income elasticities for women: Children:0.108; -0.171 Single :0.192; -0.288 Lone Parents: 0.424; -0.580 Elasticities For Labor Supply With Restrictions (Actual and Desired Hours Only) ● Wage and Income elasticities for men: Children:0.026; -0.085 Single :0.054; -0.149 Lone Parents: 0.047; -0.106 ● Wage and Income elasticities for women: Children:0.044; -0.090 Single :0.143; -0.241 Lone Parents: 0.407; -0.615
Flood et al. (2007)	Translog	● Log of Household's Disposable Income ● Log of Leisure ● Quadratic Term of Log of Disposable Income ● Quadratic Term of Log of Leisure	● Household's Disposable Income ● Gross Hourly Wage ● Hours of Market Work (yearly) ● Taxable & Untaxable unearned income ● Income Tax	5 different hours of work: ● h1=0 ● h2=750 ● h3=1500 ● h4=2250 ● h5=3000	Structural Discrete Choice labor Supply - Simulated Maximum Likelihood Estimation	Elasticity of Hours Worked (1% increase in wages):0.62

		● Interaction Term of Leisure and Disposable Income ● Cost of Participation	● Household specific means-tested subsidies (social assistance, housing allowances, childcare fees)			
Haan (2006)	Translog	● Household's Leisure, ● Household's Income ● Quadratic Term of Log of Income ● Quadratic Term of Log of Leisure ● Interaction Terms of Leisure and Income in Log Forms ● Interaction Terms of Log of Leisure and Individual Characteristics (Age, Quadratic Term of Age, Disability, The number of child, being in the East-Germany and having German nationality) ● Interaction Terms of Log of Income and Individual	●Tax & Benefit Function ●Household Disposable Income	Dummy variables for discrete working hours (d2-d17=1 for part time working) For men: no work, full time, and overtime. For women: no work, full time, and overtime, and two additional part-time alternatives.	Conditional Logit Model and Random Coefficient Model- Simulated Maximum Likelihood Estimation	<u>Change in Participation Rates (in percentage points) (Wage + 1%)</u> All: 0.12 for males; 0.13 for females West Germany: 0.13 for males; 0.15 for females East Germany: 0.07 for males; 0.07 for females <u>Change in Hours (in percentage points) (Wage + 1%)</u> All: 0.19 for males; 0.39 for females West Germany: 0.21 for males; 0.45 for females East Germany: 0.11 for males; 0.19 for females

		Characteristics (Age, Quadratic Term of Age, Disability, The number of child, being in the East-Germany and having German nationality) ● Dummy Variables for the Working Hours				
Flood et al. (2003)	Translog	● Leisure- (for husband and wife, separately) ● Quadratic Terms of Leisure ● Net Income of Household ● Quadratic Term of Net Income of Household ● Participation in Welfare Programs (Social Assistance and Housing Allowance)	● Net Income of Wife ● Net Income of Husband ● Tax-Benefit Functions	7 Categories for Hours of Work: ● h1=0 ● h2= 500 ● h3= 1000 ● h4= 1500 ● h5= 2000 ● h6= 2500 ● h7= 3000	Structural Discrete Choice labor Supply - Simulated Maximum Likelihood Estimation	10% increase in Wages: ● Increase in Hours of Work for Husbands is 0.5% ● Increase in Hours of Work for Wife is 1%
Van Soest et. al (2002)	Polynomial	● Leisure- Hours Worked per week (for husband and wife, separately) ● Individual's Own Earnings	●Gross Hourly Wage Rate, ● Nonlabor Income, ●Tax Benefit Function ● Fixed Cost of Working (depending	● Non-participation ● Working hours per week that are multiples of 10 minutes. Thus, there are 361 decision points for everyone.	Simulated Maximum Likelihood Estimation	Husband's Wage ● Change in Participation (% points) All: -0.107 Low Educated: -0.119 High Educated: - 0.061 ● Elasticity of Hours Worked (% points)

		● Total Net Income of Family (Spouse's Earnings, Asset Income, Child Allowances, etc.) ● Taste Shifters (Education, Age, the number of children with respect to ages)	on the individual and household characteristics.)			All: -0.173 Low Educated: -0.215 High Educated: - 0.058 <u>Own Wage</u> ● Change in Participation (% points) All: 0.483 Low Educated: 0.507 High Educated: 0.383 ● Elasticity of Hours Worked (% points) All: 1.155 Low Educated: 1.232 High Educated: 0.945
Michalopoulos, Robins and Garfinkel,1992	Stone-Geary	●Consumption (Other Than Child Care) ●Market Time ●Average Quality of Childcare	●Net Wage Rate ●Nanlabor Family Income ●Price of Consumption Goods ●Cost of Childcare	Work and Purchace Child Care Work and Use the Available Free Care Not Work and Provide Home Child Care	Bivariate Probit Model	<u>Elasticities of Hours Worked</u> ● Wage elasticity: 0.035 (Married), -0.003 (Single) ● Non-Labor Income:-0.013 (Married), -0.019 (Single) ● Subsidy Rate: 0.0018 (Married), 0.001 (Single) <u>Elasticities of Child Care Quality</u> ● Wage elasticity: 0.209 (Married), 0.53 (Single) ● Non-Labor Income: 0.269 (Married) 0.17 (Single) ● Subsidy Rate: 0.204 (Married), 0.29 (Single) <u>Elasticities of Child Care Expenditures</u>

						● Wage elasticity: 0.167 (Married), 0.51 (Single) ● Non-Labor Income: 0.294 (Married), 0.22 (Single) ● Subsidy Rate: 0.204 (Married), 0.29 (Single)
Dagsvik and Strom (2006)	Stone-Geary	●Consumption ●Leisure ● Interaction of consumption and leisure ● Log of Age ● Exponential term of log age ● Number of children who are 0-6 years old ● Number of children who are 7-17 years old ● Education	● Gross Wage Rate ● Non-Labor Income ● Tax & Transfer Function	For Private and Public Sector (The median of the Intervals of Annual Hours of Work) ● 0 (non-employment) ● 315 ● 780 ● 1040 (refers to peak point of part-time work) ● 1560 ● 1976 (refers to peak point of full-time work) ● 2340 ● 2600	Structural Discrete Choice labor Supply - Simulated Maximum Likelihood Estimation	Aggregate Uncompensated Wage Elasticities <u>Participation Probabilities</u> ● Working : 0.15 for Public .; 0.16 for Private; 0.28 for both sectors ● Working in Public Sector: 1.52 for public; -1.40 private; 0.09 for both sectors ● Working in Private Sector: -1.29 for public; 1.80 for private, 0.48 for both sectors <u>Mean Annual Hours of Work, Conditional on Sector</u> ● Public Sector: 0.36 for public; 0.03 for private; 0.37 for both sectors. ● Private Sector: -0.09 for public sector; 0.17 for private sector; 0.34 for both sectors. <u>Mean Total Annual Hours of Work</u>

						● Unconditional: 0.34 for public sector; 0.37 for private sector; 0.65 for both sectors.
Kornstad and Thoresen, 2007	Box-Cox	●Consumption ●Mother's Leisure ●Net Household's Income ●Number of Children	●Wage Rate, ●Family Income, ●Price of Non-Maternal Childcare, ●Tax & Benefit Function	For Jobs: ● Non-employment ● 1-16 hours of working (part-time) ● 17- 24 (part-time) ● 25-32 (part-time) ● More than 32 hours of working (full-time) For Childcare: ● Care at Centers ● Care by Other Paid Providers ● Own / Parental Care	Nested Logit Model-Maximum Likelihood Estimation and Heckman's (1979) Selection Model for Wage Estimation	Elasticities of Labor Force Participation ● Wage elasticity: 0.35 ● Non-Labor Income:-0.06 ● Cost of Childcare: -0.12 Elasticities of Hours Worked ● Wage elasticity: 0.49 ● Non-Labor Income:-0.07 ● Cost of Childcare: -0.17
Aaberge et al (1995)	Box-Cox	*Preferences:* ●Consumption ●Male Leisure ● Female Leisure ● Leisure Interaction Term *Opportunities for Male and Female, and the interactions:* ● Education ● Experience	● Non-Labor Income ●Tax & Benefit Function ● Wage Income	● Market Opportunities ● Non-Market Opportunities	Structural Discrete Choice labor Supply-Simulated Maximum Likelihood Estimation	<u>Elasticities of the Probability of Participation (All household, Slutsky Elasticities)</u> Male Own Wage Elasticities: 0.22 Male Cross Wage Elasticities: -0.08 Female Own Wage Elasticities: 0.73 Female Cross Wage Elasticities: -0.16 <u>Elasticities of the Conditional Expectation f-of Total Supply of Hours (All household, Slutsky Elasticities)</u> Male Own Wage Elasticities: 0.10

		● Quadratic term of Experience *Opportunity Densities of Hours:* ● Full-time peak for males ● Full-time peak for females ● Part-time peak for females				Male Cross Wage Elasticities: -0.02 Female Own Wage Elasticities: 0.80 Female Cross Wage Elasticities: -0.12 <u>Elasticities of the Unconditional Expectation f-of Total Supply of Hours (All household, Slutsky Elasticities)</u> Male Own Wage Elasticities: 0.33 Male Cross Wage Elasticities: -0.11 Female Own Wage Elasticities: 1.59 Female Cross Wage Elasticities: -0.28
Blundell and Shephard (2012)	Box-Cox	●Consumption ●Single Mother's Leisure ● Age ● Education ●Number of Children (defined as considering age groups 0-4, 5-10, 11-18)	● Gross Wage Rate ● Nonlabor Family Income 8such as child maintenance payments) ● Tax & Transfer Function ● Fixed Cost of Work ● Childcare Expenditure	● 0 hours for 0 ● 10 hours for 1-15 ● 19 hours for 16-22 ● 26 hours for 23-29 ● 33 hours for 30-36 ● 40 hours for 37+	Structural Discrete Choice labor Supply - Simulated Maximum Likelihood Estimation	<u>Elasticities of Labor Force Participation (For Single Parents)</u> ● All: 0.770 for uncomp. and comp. ● 0-4 years old child: 0.663 for uncomp. and comp. ● 5-10 years old child: 0.897 for uncomp. and comp. ● 11-18 years old child: 0.745 for uncomp. and comp. <u>Elasticities of Intensive Margin (For Single Parents)</u> ● All: 0.042 for uncomp. and 0.123 for comp. ● 0-4 years old child: 0.032 for uncomp. and for 0.094 comp. ● 5-10 years old child: 0.043 for uncomp. and 0.128 for comp.

						● 11-18 years old child: 0.047 for uncomp. and 0.136 for comp. Elasticities of Total Hours (For Single Parents) ● All: 1.534 for uncomp. and 1.616 for comp. ● 0-4 years old child: 2.253 for uncomp. and 2.317 for comp. ● 5-10 years old child: 1.590 for uncomp. and 1.676 for comp. ● 11-18 years old child: 1.007 for uncomp. and 1.097 for comp.

Table A. 3: Studies on Employment Decision and Wages in Turkey

Study	**Data**	**Wage Form**	**Explanatory Variables**	**Estimation Procedure**	**Results**
Tansel (1992)	1987-Household Income and Consumption Expenditures Survey	Log Monthly Wage (includes both cash and in-kind payments for wage employment.)	<u>For Wage Equation:</u> *Experience (age minus the number of schooling minus 7) *Quadratic Term of Experience *Education (non-graduate, primary, middle, high, vocational high, university) *Age (under 25, 25-44 and over 44) * Age*Education (for each age groups) * Age* Experience (for each age groups) *Unearned Income *Unearned Household Income *Cities (Ankara, Istanbul, Izmir) *Regions (Aegean-Marmara, Mediterranean, Central-Anatolia, East-South East, Black Sea)	MLE for labor force participation with Probit model and OLS for wages including corrected terms.	*Returns to education are found to increase with the level of schooling for both men and women. *Experience, Quadratic terms of experience, and interaction variables of these are significantly positive. An marginal increase in experience leads to increase in the probability of being a wage earner by approximately 8%. This probability reaches its maximum value at age 33 for the 25-44 age group. *The returns to education has increasing effect on being wage earner for both men and women. However, the return to vocational high school education is higher than that of general high school for men. *Individual unearned income and household unearned income are significantly negative, which implies that these leads to lower the probability of being wage earner for both men and women. *Males in Ankara have about 16% higher probability of being wage earner as compared to men in the rest of the country. This probability is approximately 4% for men in Istanbul and 13% for men in Izmir.

Dayıoglu & Kasnakoglu (1997)	1987- Household Income and Expenditure Survey	Log Hourly Wage (It includes both cash and in-kind payments from primary and secondary jobs)	For Participation: *Age (9 dummy variables between ages 12-65 *Education *Marital Status *Being Household Head (dummy variable) *Child Number (there two dummies such that the number of 0-6 years old children, and the number of 7-11 years old children) *Household Size *Other Household Member's Income * Individual's Unpaid Income *Education Level of Household Head *Regions (4 dummies: Aegean-Marmara, Mediterranean, Central Anatolia, Black Sea) For Wage Equation: *Education *Experience (Age- Years of Education- 7) *Quadratic Term of Experience *Reginal Dummies *Occupational Dummies *Employment Type (Wage Earner, Self-Employed, Employee) *Selectivity Correction Terms	Heckman's 2-Step Estimation Procedure (MLE for sectoral choice as Probit Participation Model and OLS for wages including corrected terms)	*Returns to education differs for men and women in a way that it is higher for women than for men. Annual return of it is 12.54% for women, while it is 9.98% for men in the model that only includes education and experience. *In expanded model, as the education level increases, the return of it also increases, especially for women. The highest return belongs to university graduates. For women, the return of education is higher in the Aegean-Marmara Region than other regions. *The model also includes the occupational dummies, the difference of the return of education between men and women decreases from 26% to 16%. In this model, the returns of occupations also differs for men and women. The occupations with the lowest returns for women is personal services while it is agriculture for men. On the other hand, the highest return of occupation is Science-Technical Positions and Management for both men and women. In this group, the returns to men is higher than women. For all occupations, the returns of it is lower for women than men.

Tansel (1998)	1994-Household Expenditure Survey	Log Hourly Wage (the sum of cash earnings, bonuses, and the value of income in kind)	For Wage and MNL Choice Functions: *Education * Years of Experience (as age minus years of schooling minus 6) *Quadratic term of experience *Living in Urban Area (as dummy variable) *Selectivity correction terms For multinomial logit choice equation *Unearned income of individual * Unearned income of the other household members *Amount of land owned	Heckman's 2-Step Estimation Procedure (MLE for sectoral choice and OLS for wages including corrected terms)	*The experience and quadratic experience variables are statistically significant, with the positive and negative signs, respectively. *For men, wages reaches the peak at 36 years of experience in formal sector and 30 years of experience in the informal sector. For women, these numbers are 33 and 32, respectively. *The educational level has positive effects on wages for both covered and uncovered sector wage equations. The coefficients are highly larger in covered sector than uncovered sector for women. It is same in both sectors for men. *For men, urban wages are higher than rural wages in both the covered and uncovered sectors. However, for women urban and rural wages are about the same in the covered sector and urban wages are higher than rural wages in the uncovered sector.
Tunalı & Başlevent (2002)	1988- Household Labor Force Survey	Log Hourly Wage	For Married Women on Prime Age (20-54) with Employed Husbands: *Experience *Quadratic Term of Experience *Educational level (as dummies) *Region (Aegean, South, Central, North West, East, South East, North East) *Share of textiles *Share of agriculture *Share of finance *Migration rate *Population 200,000 or more	MLE for labor force participation and OLS for wages including corrected terms.	*Experience has significantly positive effect on wages. *As the education level increases the wages also significantly increase. *Being in Aegean and South has significant effect on wages. *Do not detect substitution behavior in response to a change in husband's wages, or sensitivity to unearned income.

Tansel (2005)	1994-Household Expenditure Survey	Log Hourly Wage (the sum of cash earnings, bonuses, and the value of income in kind)	For Wage and MNL Choice Functions: *Education * Years of Experience (as age minus years of schooling minus 6) *Quadratic term of experience *Living in Urban Area (as dummy variable) For MNL Choice Function: *Unearned income of individual * Unearned income of the other household members *Amount of land owned *Dummy for Sectors (Private, State-Owned Enterprises, Public)	Heckman's 2-Step Estimation Procedure (MLE for sectoral choice and OLS for wages including corrected terms)	*Education has significant and positive effect on increasing the probability of joining public sector, state-owned enterprises, and private sector. * For men, unearned income of individual and of the other household members has significant but negative effect on the participation. (except for the SOE sector). These are statistically insignificant for women in general. *Selectivity-corrected estimates of the sectoral wage equations for men and women are significant. * For both males and females the education is statistically significant in all sectors. *The experience and quadratic experience variables are statistically significant, with the positive and negative signs, respectively for all sectors. The quadratic term is statistically insignificant for women in public sector. * For men, wages reaches highest level at 48, 35, and 30 years of experience, respectively, in public administration, the SOEs, and the covered private sector. For women, these are 20, 28, and 24 years of experience, respectively, in public administration, the SOEs, and the covered private sector. * Wages are higher in urban areas than in rural areas in all sectors for men, while for women urban wages are not statistically significantly different from rural wages in all sectors.
Hisarcıklılar & Ercan (2005)	1988- Household Labor Force Survey	Log Hourly Wage (calculated using the info on the sum of total monthly earnings, the total weekly hours of work in the first and the second jobs, and	*Educational level (as dummy variables) *Experience *Quadratic Term of Experience *Region (West, North, East, South, Urban) *Full Time/Part Time *Vocational Education *Firm Size (as dummy variables) *Tenure *Being Household Head *Occupation (9 Occupational Dummies)	Ordinary Least Squares (OLS)	* People with any level of schooling earn more than the ones with no degree. As the level of education increases, wages also increase. However, the return of education is higher for men than for women. * Besides general education, vocational education also has positive effect on wages. The effect of it is higher for men than for women. *Experience has also significantly positive effect on wages. But its effect decreases as an individual is getting older.

		the amount of days worked in a month.)			*People living in urban area gets higher wages. * Part-time working has positive effect on wages.
Ilkkaracan & Selim (2007)	1994- Employment and Wage Structure Survey	Log Monthly Wage (includes monthly payments of wages, bonus, and social payments.)	<u>For Basic Version of Wage Equation:</u> *Education *Job Tenure *Experience (Age-The Number of Years of Schooling- 7) *Quadratic Term of Experience *Gender dummies *Regional dummies <u>For Extended Version of Wage Equation:</u> *Education *Job Tenure *Experience (Age-The Number of Years of Schooling- 7) *Quadratic Term of Experience *Gender dummies *Regional dummies *Occupational dummies *Industry *Firm-Size Dummies (Small-Medium-Large Size) *Coverage of Workplace under a Collective Labor Agreement *Private Sector Dummy	OLS Estimation for Oaxaca Decomposition	*Men's wages are higher than women's wages; i.e the female to male average monthly wage ratio is 70.6% *Men have higher years of experience and job tenure than women. However, women have higher level of education *If the human capital variables are controlled the gender wage gap is reduced to 85.2%. Moreover, if all other variables are controlled it will be 91.2%.

Taymaz (2009)	2005-2006- Household Labor Force Survey	Log Monthly Wage	For multinomial logit choice equation: *Age groups (as dummy variables) * Educational level *Marital Status *Child (as dummy variable; it takes 1 if individual is daughter/son, daughter/son-in-law, granddaughter/son, or other relative/non relative aged less than 30) *Parent (as dummy variable that Child dummy takes 0) *Child*family size *Parent*family size * Any registered person in household *Unemployed Household Head For Wage Equation: *Age groups (as dummy variables) *Firm-Size (As dummy variables) *Educational level *Working Time *Full Time/Part-Time Employment (as dummy variable) *Selection Correction Terms	Heckman's 2-Step Estimation Procedure (MLE for sectoral choice and OLS for wages including corrected terms)	* There is a significant wage gap between informal and formal workers. * Educational level and firm size has significantly positive effects on wages for both males and females. These two factors have also effect on wage differentials. *More educated employees prefer formal sector.

Cudeville & Gurbuzer (2010)	2003-Household Budget Survey	Log Monthly Wage	For Participation: *Age Categories *Education *Family status * Household size * Individual non-earned income * Non-earned income of other household members * The number of others employed in the household * Regional Dummies (Marmara, Aegean, Mediterranean, Central Anatolia, South East Anatolia, Eastern Anatolia, Black Sea) For Wage Equation: *Age categories *Experience *Quadratic Term of Experience *Job tenure *Quadratic term of job tenure *Years of schooling *Educational attainment *Marital Status * The number of children (dummies for 0-3 children) * Household size *Individual non-earned income *Other members income *Ownership of house *Weekly worked hours *Part-time work *Public sector *Permanent contract *Fixed-term contract *Other contract *Social insurance *Unionized *Occupation *Sector *Firm Size (Small, Medium, Big, Very Big) *Regional Dummies (Marmara, Aegean, Mediterranean, Central Anatolia, South East Anatolia, Eastern Anatolia, Black Sea)	Heckman's 2-Step Estimation Procedure (MLE for sectoral choice as Probit Participation Model and OLS for wages including corrected terms)	*The probability of females participation increases at age 35-44; but it decreases significantly at an increasing rate after that age group. *The probability of females participation is increasing with the level of education. * Single-women are more likely to be participate in employment than married women. *Having children reduce the women's probability of being employment. Furthermore, as the number of children increases this probability also decreases. *The probability of participation for women decreases with the household wealth. * The education level, experience and job tenure have significantly positive effect on wages for both men and women. The returns to education is higher for men than women. *Quadratic term of experience and quadratic term of job tenure have a negative impact on wages for both men and women. This shows us that wages increase at a decreasing rate with experience and job tenure. *The number of worked hours has positive impact on wages for men and women. *According to effect of occupation, the wages increase monotonically along the job ladder. As the status of positions increases the wage of women also increases.

Akhmedjonov (2012)	2009-Household Budget Survey	Log Annual Wage	*Age *Quadratic Term of Age *Marital status *Educational Level *Size of Firm *Public/Private sector * Economic Sectors as dummy variables (Agriculture, Mining, Manufacturing, Health, and Services etc.)	Ordinary Least Squares (OLS)	*Many of the independent variables included in the regressions are statistically significant in explaining annual wages for both men and women. *As educational level increases the wages also increase. *Age and annual wage reveal concave relationship. Age has diminishing marginal effect on annual wages.
Aktaş & Uysal (2012)	2006-Wage Structure Survey	Log Gross Monthly Wage	*Age *Quadratic Term of Age *Tenure *Quadratic Term of Tenure *Educational Level (High School, Vocational High School, College)	Quantile Regression Machado-Mata Decomposition	*All variables are significant. *At a given quantile of the wage distribution, the education level of women is higher than that of males. However, after controlling the education, it is reached that women earn lower wages. *After controlling the occupation, firm size and industry, there is also wage gap; but it reduce the gender wage gap. *Estimating separate quantile regressions for men and women, the returns to labor market characteristics are found to be different.
Akay & Uyar (2016)	2013-Household Labor Force Survey	Log Hourly Wage	*Non-Parametric Explanatory Variables* * Experience (2013 minus year of starting to work) *Quadratic Term of Experience *Age *Quadratic Term of Age *Working Hours *Corrdinate Variables (Longitude- Latitude) *Parametric Explanatory Variables* *Education (as dummy variable) *Social Insurance *Marital Status *Permanancy of Job * Full Time Job *Sector *Gender for full data set	For parametric model Ordinary Least Squares (OLS); For Semi-Parametric Model, Penalized Iteratively Reweighted Least Squares (P-IRLS)	* Experience variable should be added as linearly based on private sector for male employees. However, it should be in cubic form for female employees and be in linear form for male and private sector employees. *There is no quadratic relationship between wage and age for public employees. The females' wages increase until 30 years of age and the rate of increase is getting slower in the range of 30-60 years of age. * The wages in public sector can be one of the reason of maximum wages in some provinces of eastern Anatolia region. The minimum wages belongs to Malatya, Adiyaman and Gaziantep because of the growing population of Syrian refugees for private sector. *Wages are maximum in Istanbul and nearby cities. The wages are maximum in Ankara and nearby cities, Kars, Van-Ercis and Agri for public sector.

Balkan & Başkaya & Tümen (2016)	2004-2012-Household Labor Force Survey	Log Monthly Wage	*Education *Age *Quadratic Term of Age *Marital Status	OLS Estimation for Separate Mincerian Wage Regressions with year-region-gender combinations	*There is no employment effect of subsidy program for the individuals within the first quartile of the predicted wages. *The older women who have no diploma, primary school diploma and college diploma appear to have significant employment gains because of subsidy program, when compared to the males of age 30 and above within these education groups. *Women who are less than 30 years old with high school diploma or vocational school diploma have experienced employment gains because of subsidy program.
Akay & Uyar (2017)	2013-Household Labor Force Survey	Log Hourly Wage	*Education * Years of Experience (as 2013 minus year of starting to work) *Quadratic term of experience * Working Hours *Age *Quadratic term of age *Coordinate Variables (Longitude- Latitude) *Social Insurance *Marital Status *Permanency of Job * Full Time Job *Sector *Gender for full data set	Penalized Iteratively Reweighted Least Squares (P-IRLS)	*There is no quadratic relationship between wage and experience for private sector. However, there is linear relationship for this sector. *There is no quadratic relationship between wage and age for public employees. * Wages are maximum in Istanbul and nearby cities with some provinces from east of Turkey for private sector. The minimum wages belongs to Malatya, Adiyaman and Gaziantep because of the growing population of Syrian refugees for private sector.

Paolo & Tansel (2017)	2009-2015-Household Labor Force Survey	Log Hourly Wage (the sum of cash earnings, bonuses, and the value of income in kind)	For Tertiary-Educated Male Wage-Earners for 3 Age Groups (23-30; 31-40; 41-65) *Education *Graduated Fields *Graduated Year (reference is 2009) *Previous experience *Quadratic term of previous experience *Marital status *Number of Children *Firm Size *Quadratic term of Firm Size *Employment Sector *Cities *Regions	Heckman's 2-Step Estimation Procedure (MLE for sectoral choice and OLS for wages including corrected terms) Wage Differential; Oaxaca-Blinder (OB) decomposition	*Educational level has significantly positive effect on wages. *Previous experience and quadratic term of previous experience are statistically significant. Quadratic term has negative sign, that is previous experience decreasingly positive effect on wages. *Each marital status has significantly positive effect on wages. However, being married has greater effect than being in other marital statuses. *Firm size and quadratic term of firm size has significantly positive and negative effect on wages, respectively.
Acun (2018)	2015-Household Labor Force Survey	Log Monthly Wage	*Age *Quadratic Term of Age *Educational level *Marital Status * Formal/Informal Employment * Employment in Public/Private Sector * Full Time Employment * Log of Working Hours * Work as Continuous/Seasonal Employment * Administrative Responsibility in Job * Professional Job *Working in Industry *Number of Employees in the Job	Ordinary Least Squares (OLS)	* For women, education, working in continuous job, formal sector employment, working hours and having administrative duties have an statistically significant effect on wages. *As the age increases, the wages of women also increases till 44 years of age; after that the wages are decreasing * For women, the education has also positive effect on wages. Furthermore, education has much more impact on wages for women than for men.
Çınar & Öz (2018)	A questionnaire developed by Researchers. (It was applied to a total of 2000 employees residing in the central districts of Bursa and, working in 10 basic sectors)	Log Wage	*Education *Age *Experience *Quadratic Term of Experince * Knowledge of Foreign Language *Driving License *Gender	Ordinary Least Squares (OLS)	*Education and experience has positive effect on wages. This effect is higher for men than for women. *Having driving license and the knowledge of foreign language has significantly positive effects on wages. On the other hand, the employee while having a license in the service sector does not have a significant effect for women, men with a license earn 20.30% more wage income than those without having a driving license. *While Age is statistically significant for women, it is not significant for men. *In the service industry men earn higher wages than women.

Alcan & Özsoy (2018)	2007-2010- Turkish Income and Living Conditions Survey	Log Hourly Wage	*Health Variables (perceived health status, physical or mental health obstacle, adequate nutrition) *Education *Experience *Quadratic term of Experience *Occupation *Sector *Firm Size *Having Social Insurance *Marital Status *Type of Work (permanent, temporary with contract, temporary with no contract)	Pooled OLS Fixed Effect Method Random Effect Method	* For women and men, perceived health status statistically significant and has a positive effect on wages. This effect is much more for women's wages than that of men. On the other hand, having physical or mental health obstacle has significantly negative effect at the 1% significance level for men. *Married men and women has more wages than single ones. *Having vocational high school diploma and university diploma have significantly positive effect on men's and women's wages. Also, experience and quadratic term of experience are statistically significant and have positive signs. for women, after 22 years of experience, the wages are decreasing. *Manufacturing, construction and commercial sectoral dummy variables have negative coefficients. Furthermore, firm size has significant and positive effect on men's wages. *The returns to education is higher for women than that of men. The reason for women's higher education returns is because women who enter the labor market are more educated and more qualified compared to men. This issue is a choice in women's labor force participation reveals that.
Arabacı & Arabacı (2020)	2018- Household Labor Force Survey	Log Wage	*Education *Experience *Quadratic Term of Experience *Gender	Ordinary Least Squares (OLS) Oaxaca-Blinder Decomposition (OB)	* Female workers earn less wages on average than males * In occupational groups, the effect of education on wage income increases as the level of professionalism and qualification increases; the effect of experience on wage income decreases. * The disadvantage experienced by female employees in terms of wage income decreases as the professionalism and qualification level of the profession increases

Toksöz & Memiş (2020)	2004-2016- Household Labor Force Surveys	Log Hourly Wage (Net wage and not include bonuses and other pecuniary benefits)	*Regular workplace *Full-Time *Employment Size *Age *Quadratic term of Age *Education *Marital Status	Ordinary Least Squares (OLS)	*As age increases, the wage also increases for both men and women; however, it starts to decreases for older ages. *While married men's wages are higher than that of single-men, married women's wages are less than single-women's wages. *As the education level increases, both men's and women's wages increase. *Import share in total manufacturing imports has negatively affect women's wages whereas it has opposite impact on men's wages.

APPENDIX B

DESCRIPTIVE ANALYSIS

Table B. 1: The Number of Household in HBS, 2002-2019

Years	Number of Households
2002	9,600
2003	25,920
2004	8,640
2005	8,640
2006	8,640
2007	8,640
2008	8,640
2009	12,600
2010	13,248
2011	13,248
2012	13,248
2013	13,248
2014	13,248
2015	15,264
2016	15,552
2017	15,552
2018	15,552
2019	15,552

Table B. 2: Number of Observations by Samples

Sample1	Number of Men		Number of Women	
years	Sample	Weighted Sample	Sample	Weighted Sample
2002	19,895	33,281,761	20,780	35,111,271
2003	52,552	33,846,160	55,062	35,349,406
2004	17,122	34,031,623	18,266	36,242,016
2005	17,239	34,832,319	18,259	36,778,850
2006	16,912	35,239,850	18,027	37,365,951
2007	16,640	34,178,363	17,971	34,722,395
2008	16,046	34,588,270	17,241	35,135,455
2009	18,738	35,000,338	19,715	35,541,422
2010	18,643	35,401,294	19,563	35,941,455
2011	18,055	35,909,301	19,066	36,466,932
2012	17,711	36,586,585	18,632	37,016,964
2013	17,960	37,026,076	18,852	37,430,475
2014	17,851	37,744,602	18,993	37,948,679
2015	20,353	38,071,395	20,603	38,297,577
2016	21,193	38,463,972	21,432	38,645,484
2017	20,792	39,384,841	21,463	39,477,351
2018	20,066	39,813,781	20,622	39,948,164
2019	19,155	40,245,427	19,589	40,463,551
Total	**366,923**	**653,645,958**	**384,136**	**667,883,398**
Sample2				
2004	13,112	25,424,517	13,855	26,910,065
2005	13,052	25,625,864	13,613	26,731,146
2006	13,044	27,203,260	13,787	28,558,165
2007	12,920	27,393,950	13,863	27,381,606
2008	12,672	27,864,170	13,464	27,924,000
2009	13,964	26,881,029	14,483	26,788,944
2010	14,419	28,112,565	15,020	28,266,434
2011	14,010	28,211,622	14,538	27,977,013
2012	13,550	28,493,462	14,146	28,449,736
2013	13,723	28,929,265	14,256	28,982,500
2014	13,754	30,724,781	14,483	30,197,924
2015	15,512	31,420,475	15,461	31,002,520
2016	15,998	31,440,285	16,005	31,038,383
2017	15,797	32,268,546	16,070	31,674,274
2018	15,520	33,236,383	15,733	32,733,673
2019	14,815	33,640,011	15,039	33,203,439
Total	**225,862**	**466,870,185**	**233,816**	**467,819,822**
Sample3				
2004	5,909	11,573,668	6,400	12,501,470

2005	5,868	11,642,478	6,338	12,589,435
2006	5,985	12,306,833	6,463	13,335,757
2007	5,963	12,414,452	6,442	13,254,398
2008	5,959	12,707,570	6,452	13,621,766
2009	6,429	12,222,185	6,980	13,146,179
2010	6,702	12,985,200	7,344	13,951,677
2011	6,668	13,130,821	7,152	14,004,887
2012	6,647	13,636,829	7,147	14,500,462
2013	6,663	13,917,011	7,208	14,958,331
2014	6,655	14,518,536	7,203	15,339,271
2015	7,385	14,955,699	7,927	15,665,254
2016	7,745	15,291,687	8,222	15,914,388
2017	7,680	15,537,479	8,295	16,309,706
2018	7,555	16,046,734	8,184	16,865,168
2019	7,123	16,082,214	7,887	17,139,500
Total	**106,936**	**218,969,396**	**115,644**	**233,097,649**
Sample4				
2004	4,213	8,238,666	6,052	11,792,766
2005	4,179	8,227,398	5,953	11,778,763
2006	4,450	9,115,386	6,088	12,598,522
2007	4,402	9,266,582	6,035	12,386,002
2008	4,348	9,380,211	6,002	12,538,625
2009	4,648	8,917,712	6,278	11,835,080
2010	4,966	9,703,360	6,663	12,665,576
2011	4,955	9,862,820	6,495	12,724,184
2012	4,911	10,168,162	6,472	13,183,574
2013	4,898	10,338,584	6,466	13,443,847
2014	4,883	10,808,101	6,509	13,923,714
2015	5,407	11,133,096	7,110	14,077,925
2016	5,684	11,429,868	7,384	14,389,732
2017	5,625	11,585,954	7,461	14,780,768
2018	5,598	12,021,478	7,350	15,149,224
2019	5,336	12,238,729	6,987	15,337,166
Total	**78,503**	**162,436,107**	**105,305**	**212,605,468**

Notes: Sample-1 refers to the initial dataset containing the 2004-2019 period. Sample-2 refers to the dataset, which includes individuals 15-64 years old, not limited to work, not employed in the agricultural sector, and with no multi-spouses. Sample-3 refers to the dataset, which includes the constructed three types of families: couple families, single-male families, and single-female families. Sample-4 refers to the dataset which excludes the “employer” and “self-employed” individuals and considers “unpaid family workers” as “not-employed”.

Table B. 3: Number of Observations by Age Groups

Age Group	Men			Women		
Couple Family	**2. Sample**	**3. Sample**	**4.Sample**	**2. Sample**	**3. Sample**	**4. Sample**
15-19	16889	10	9	16768	408	406
20-24	10766	766	679	14517	4757	4696
25-29	13207	6538	5635	16044	11444	11208
30-34	15137	12402	10259	16533	14397	13954
35-39	15535	14343	11511	15858	14692	14218
40-44	14274	13784	10867	14044	13421	12935
45-49	13028	12768	10068	11734	11285	1098
50-54	10916	10759	8629	9521	9072	8881
55-59	8199	8039	6719	7151	6697	6598
60-64	6173	6028	5268	5215	4588	4536
Single-Male Family						
15-19	529	61	59	391	NA	-
20-24	1061	428	413	394	NA	-
25-29	1111	696	631	292	1	-
30-34	806	551	476	253	1	-
35-39	637	458	391	215	1	-
40-44	529	405	330	229	1	-
45-49	482	389	310	178	1	-
50-54	446	374	301	181	NA	-
55-59	425	371	303	158	NA	-
60-64	377	350	309	126	NA	-
Single-Female Family						
15-19	1917	-	-	2155	44	44
20-24	1577	-	-	2017	306	303
25-29	1300	-	-	1645	568	551
30-34	819	-	-	1617	824	780
35-39	507	-	-	1763	1187	1105
40-44	371	-	-	1836	1395	1293
45-49	191	-	-	1790	1483	1390
50-54	131	-	-	1789	1578	1510
55-59	80	-	-	1667	1533	1488
60-64	55	-	-	1592	1473	1442

Table B. 4: Mean of Experience by Gender and Family Status, 2004-2019

	Years	Males	Females
Couple Family	2004	7.19	0.79
	2005	6.87	0.82
	2006	7.19	0.74
	2007	6.83	0.74
	2008	7.11	1.00
	2009	7.13	1.18
	2010	7.17	1.33
	2011	7.58	1.28
	2012	7.43	1.55
	2013	7.43	1.43
	2014	7.53	1.47
	2015	7.45	1.49
	2016	7.45	1.65
	2017	7.38	1.63
	2018	7.01	1.42
	2019	7.15	1.77
Single Family			
	2004	2.91	1.30
	2005	3.57	1.41
	2006	4.89	1.24
	2007	3.58	1.23
	2008	3.36	1.26
	2009	5.13	2.10
	2010	4.21	1.80
	2011	4.29	1.92
	2012	4.36	2.46
	2013	4.66	2.26
	2014	3.23	2.06
	2015	4.55	2.44
	2016	5.01	2.46
	2017	4.72	2.43
	2018	4.96	2.53
	2019	4.54	2.19

Table B. 5: Consumer Price Index (2013=100)

Year	CPI
2013	1.00
2014	1.09
2015	1.17
2016	1.26
2017	1.40
2018	1.63
2019	1.88
2020	2.11
2021	2.53
2022	4.35

Table B. 6: "Other Household Income" Items

Non-Wage Income	targ_yl	Annual net agricultural income
	ozemek_yl	Annual income from Individual Private Pension System (bank, fund etc.)
	ortakcin_yl	Annual income in cash from renting out land (field, building plot, garden, vineyard etc.) to others
	ortakcia_yl	Annual income in kind from renting out land (field, building plot, garden, vineyard etc.) to others
	hasta_yl	Annual sickness benefit (cash)
	ydemk_yl	Annual pension from abroad (cash)
	dgnfk_yl	Annual other transfer income like alimony, allowance, scholarship, alms etc. from persons or other private institutions (in cash)
	emekl_yl	Annual pension income (in cash)
	gazi_yl	Annual veteran pension and disability pay and sickness benefits (cash)
	yddov_yl	Annual income as foreign currency, benefit or scholarship etc. from abroad (in cash)
	dgayn_yl	Annual other transfers in-kind from persons or other private institutions
	yasli_yl	Annual elderly pay (in cash)
	burs_yl	Annual scholarship income (in cash)
	ydayn_yl	Annual in-kind income from abroad
	ddestek_yl	Annual direct income support and fuel and milk support paid to farmers (in cash)
Entrepreneur Income	mutsn_yl	Annual entrepreneurial income in cash
	mutsa_yl	Annual entrepreneurial income in-kind
Capital Income	gmkn_yl	Annual real estate (rental) income in cash
	gmka_yl	Annual real estate (rental) income in kind
	banka_yl	Annual interest on bank deposits

Table B. 7: “Household Social Income” Items

sosy_yl	Benefits from social assistance fund and other family allowances (in cash)
dayni_yl	Annual in-kind income received from State
issiz_yl	Annual unemployment pay (in cash)
dul_yl	Annual widow, orphan pension (cash)

Table B. 8: Distribution of Total Household Income, 2004-2019 (%)

Years	Household Wage Income	Household Other Income	Household Social Income
2004	46.11	51.70	2.18
2005	51.60	44.95	3.44
2006	51.12	46.95	1.93
2007	66.59	27.54	5.87
2008	47.07	50.80	2.13
2009	50.11	47.30	2.59
2010	51.89	45.66	2.45
2011	52.73	44.89	2.39
2013	51.79	45.96	2.25
2014	50.75	38.30	10.95
2015	51.69	46.03	2.28
2016	55.28	42.33	2.39
2017	53.92	43.45	2.63
2018	52.74	44.62	2.64
2019	53.62	41.95	4.43

APPENDIX C

ESTIMATION RESULTS and ELASTICITIES

Table C. 1: Determinants of Employment: Estimation Results of the Probit Model

	Estimate	Std. Error	t-value	Pr(>|t|)	
(Intercept)	-0.345	0.005	-68.87	0.000	***
Age Group					
20-24	0.898	0.005	179.06	0.000	***
25-29	1.426	0.005	288.52	0.000	***
30-34	1.550	0.005	313.90	0.000	***
35-39	1.522	0.005	308.50	0.000	***
40-44	1.446	0.005	293.15	0.000	***
45-49	1.194	0.005	242.19	0.000	***
50-54	0.800	0.005	162.52	0.000	***
55-59	0.403	0.005	81.74	0.000	***
60-64	-0.036	0.005	-7.38	0.000	***
Education Level					
Primary School	0.326	0.001	340.33	0.000	***
Secondary School	0.426	0.001	412.62	0.000	***
High School	0.412	0.001	381.35	0.000	***
Vocational	0.517	0.001	460.19	0.000	***
2-year Higher	0.630	0.001	503.97	0.000	***
4+ Higher	0.781	0.001	702.89	0.000	***
Disability					
Disability in Daily Activity	0.022	0.002	9.84	0.000	***
Any Disabled Person in HH	0.058	0.001	70.56	0.000	***
Number of Children					
1 Infant	0.066	0.001	92.68	0.000	***
2+ Infant	0.092	0.002	45.87	0.000	***
1 Preschool	-0.020	0.001	-30.19	0.000	***
2+ Preschool	-0.025	0.002	-14.02	0.000	***
1 Schoolage	0.081	0.001	143.20	0.000	***
2+ Schoolage	0.000	0.001	0.30	0.758	
1+ Young	0.032	0.001	61.71	0.000	***
1+ Adult	-0.029	0.001	-49.71	0.000	***
Having Commercial Shops	-0.245	0.001	-236.33	0.000	***
Ownership Status of the House					

Tenant	0.179	0.001	357.68	0.000	***
Lodging	1.211	0.002	540.83	0.000	***
Not the owner but also not paying rent	0.058	0.001	94.34	0.000	***
Liability on House	0.325	0.001	474.10	0.000	***
Having Automobiles	0.140	0.000	331.77	0.000	***
Log of Other Household Income	-0.151	0.000	-2131.30	0.000	***
Log of Household Social Income	-0.092	0.000	-845.44	0.000	***
The Number of Other Household Members	-0.002	0.001	-3.92	0.000	***
Being in Couple Family	0.167	0.001	228.18	0.000	***
Employer or Self-Employed Spouse	0.166	0.001	157.08	0.000	***
Spouse Not Eligible for Work	-0.062	0.001	-45.75	0.000	***
Years					
2014	0.050	0.001	66.17	0.000	***
2015	0.041	0.001	55.74	0.000	***
2016	0.075	0.001	101.64	0.000	***
2017	0.130	0.001	174.67	0.000	***
2018	0.142	0.001	193.03	0.000	***
2019	-0.003	0.001	-3.85	0.000	***

Note: Signif. Codes: 0 '***' 0.001'**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table C. 2: Determinants of Male Wages: Estimation Results of the Monthly Wage Model

	Estimate	Std. Error	t-value	Pr(>|t|)	
(Intercept)	6.564	0.052	125.97	0.000	***
Education Level					
Primary School	0.085	0.015	5.76	0.000	***
Secondary School	0.071	0.017	4.22	0.000	***
High School	0.184	0.017	10.54	0.000	***
Vocational	0.221	0.018	12.51	0.000	***
2-year Higher	0.409	0.019	21.72	0.000	***
4+ Higher	0.718	0.018	40.65	0.000	***
Disability in Daily Activity	-0.053	0.032	-1.67	0.094	.
Age	0.015	0.013	1.13	0.256	
Quadratic Term of Age	0.000	0.001	-0.12	0.898	
Full-Time Employment	0.400	0.012	34.35	0.000	***
Over-Time Employment	0.398	0.012	33.70	0.000	***
Not Employed Spouse	0.014	0.006	2.43	0.015	*
The Number of Children	-0.001	0.003	-0.34	0.728	
Years					
2014	0.081	0.010	8.52	0.000	***
2015	0.177	0.009	19.05	0.000	***
2016	0.323	0.009	35.09	0.000	***
2017	0.428	0.009	46.35	0.000	***

2018	0.555	0.009	59.96	0.000	***
2019	0.723	0.009	76.78	0.000	***
Interaction of Experience and Education Levels					
Experience*Low Level Education	0.012	0.001	8.802	0.000	***
Experience*High Level Education	0.023	0.001	21.45	0.000	***
Quadratic Term of Exp.*Low Level Edu.	0.000	0.000	-3.88	0.000	***
Quadratic Term of Exp.*High Level Edu.	0.000	0.000	-8.40	0.000	***
Multiple R-Squared: 0.5123, Adjusted R-Squared: 0.5119					
Error terms:					
	Estimate	Std. Error	t-value	Pr(>|t|)	
invMillsRatio	-0.346	0.013	-26.09	0.000	***
sigma	0.451	NA	NA	NA	
rho	-0.768	NA	NA	NA	

Signif.codes: 0 ‘***’ 0.001‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Table C. 3: Discrete Choice Model Estimation Results

	Married Women				**Single Women**			
	Coef	**p-val**	**Coef**	**p-val**	**Coef**	**p-val**	**Coef**	**p-val**
Income	2.68	0.00	2.49	0.00	4.23	0.00	3.74	0.00
Quadratic Term of Income	0.30	0.00	0.282	0.00	0.42	0.00	0.29	0.00
Hours	-0.29	0.00	-0.22	0.00	-0.30	0.00	-0.25	0.00
Quadratic Term	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00
Hours*Income	0.04	0.00	0.04	0.00	0.01	0.00	0.00	0.94
Full time	2.31	0.00	2.28	0.00	2.76	0.00	2.89	0.00
SIGMA_i	-0.01	0.52	-0.19	0.00	0.01	0.89	0.71	0.02
SIGMA_h	0.10	0.00	-0.11	0.00	0.07	0.00	-0.08	0.00
Income interactions								
Any Disabled Pers. in HH			-0.33	0.00			-0.76	0.01
Not Employed Spouse			0.14	0.00				
Spouse Not Elig. for Work			0.11	0.43				
Emp. or Self-Employed Sp.			0.92	0.00				
Disability in Daily Activity			-0.07	0.63			-1.04	0.12
Having Commercial Shops			0.24	0.03			-0.82	0.48
Liability on House			0.11	0.00			0.08	0.76
Tenant			-0.01	0.64			0.19	0.46
Lodging			-0.02	0.49			-0.19	0.47
Having Automobiles			0.22	0.00			0.76	0.14
Infant			-0.04	0.16			-0.25	0.60
Preschool			0.00	0.98			0.16	0.60
School age			-0.08	0.00			-0.24	0.20
Young			-0.07	0.01			-0.41	0.01
Adult			-0.10	0.02			-0.42	0.04
Age-Not Employed			-0.03	0.03			-0.20	0.00
Age-Part Time			-0.33	0.00			-0.46	0.00
Age-Full Time			-0.48	0.00			-0.38	0.01
Age-Over Time			-0.63	0.00			-0.20	0.25
Qu. Term of Age-Not Empl			-0.01	0.06			-0.01	0.64

Qu. Term of Part Time		0.04	0.06		0.08	0.05
Qu. Term of Full Time		0.07	0.01		0.14	0.04
Qu. Term of Over Time		-0.18	0.00		-0.15	0.01
Hours interactions						
Any Disabled Pers. in HH		0.08	0.00		0.06	0.00
Not Employed Spouse		-0.02	0.00			
Spouse Not Elig. for Work		-0.02	0.00			
Emp.or Self-Employed Sp.		-0.04	0.00			
Disability in Daily Activity		-0.01	0.42		0.01	0.51
Having Commercial Shops		-0.03	0.00		-0.01	0.67
Liability on House		0.03	0.00		0.03	0.00
Tenant		0.03	0.00		0.03	0.00
Lodging		0.01	0.00		0.01	0.06
Having Automobiles		0.00	0.05		0.00	0.42
Infant		-0.07	0.00		-0.05	0.00
Preschool		-0.04	0.00		-0.03	0.00
School age		-0.03	0.00		-0.02	0.00
Young		-0.00	0.02		0.00	0.59
Adult		-0.02	0.00		0.00	0.16
Age-Part Time		-0.00	0.00		0.00	0.48
Age-Full Time		-0.00	0.00		-0.00	0.63
Age-Over Time		-0.00	0.02		-0.00	0.04
Qu. Term of Part Time		-0.00	0.00		-0.00	0.00
Qu. Term of Full Time		-0.00	0.00		-0.00	0.00
Qu. Term of Over Time		-0.00	0.00		-0.00	0.00
n	43693	43693		5574	5574	
LL	-2972	-2738		-4182	-3835	
BIC	59525	55332		8433.5	8068	
rho2	0.509	0.548		0.459	0.504	
Hours elasticity	0.837	0.713		0.644	0.350	
Participation elasticity	0.852	0.749		0.640	0.402	
Part time	0.883	0.797		0.525	0.469	
Full time	0.914	0.913		0.696	0.660	
Over time	0.696	0.368		0.592	-0.110	

Table C. 4: Simulated Participation and Hours Elasticities

	Participation elasticities				Hours
	Part time	Full time	Over time	Total	elasticity
Average elasticities					
Married women	0.781	0.907	0.354	0.740	0.704
Single women	0.418	0.622	-0.201	0.358	0.304
Age group					
Married women					
15-19	0.975	2.029	-0.041	1.042	0.915
20-24	1.041	1.520	0.121	1.012	0.923
25-29	0.958	1.197	0.153	0.897	0.833
30-34	0.882	1.009	0.383	0.841	0.802
35-39	0.773	0.816	0.566	0.750	0.734
40-44	0.692	0.703	0.540	0.659	0.646
45-49	0.622	0.688	0.358	0.577	0.552
50-54	0.611	0.779	0.138	0.542	0.494
55-59	0.689	0.942	-0.094	0.536	0.453
60-64	0.828	1.179	-0.326	0.478	0.338
Single women					
15-19	2.133	2.447	-0.656	1.165	0.877
20-24	0.709	1.178	-1.141	0.487	0.334
25-29	0.320	0.694	-1.112	0.243	0.142
30-34	0.311	0.536	-0.552	0.223	0.154
35-39	0.306	0.401	-0.047	0.258	0.227
40-44	0.264	0.348	0.202	0.292	0.285
45-49	0.283	0.483	0.223	0.372	0.364
50-54	0.419	0.813	0.081	0.517	0.484
55-59	0.622	1.189	-0.137	0.678	0.611
60-64	0.992	1.786	-0.321	0.907	0.769
Education level					
Married women					
No Diploma	0.979	1.087	0.379	0.826	0.766
Primary School	0.805	0.883	0.425	0.735	0.701
Secondary School	1.061	1.238	0.399	0.951	0.889
High School	0.881	1.018	0.358	0.819	0.775
Vocational	0.889	1.034	0.334	0.828	0.782
2-year higher	0.712	0.890	0.216	0.713	0.677
4+ higher	0.495	0.676	0.204	0.557	0.541
Single women					
No Diploma	0.692	0.927	0.042	0.537	0.463
Primary School	0.536	0.745	0.116	0.489	0.444
Secondary School	0.612	0.827	-0.128	0.442	0.367
High School	0.584	0.824	-0.119	0.509	0.445
Vocational	0.542	0.768	-0.292	0.397	0.319
2-year higher	0.284	0.571	-0.413	0.271	0.213
4+ higher	0.142	0.455	-0.587	0.204	0.156
Income decile					
Married women					
1th decile	1.174	1.193	0.501	0.990	0.928
2nd decile	1.097	1.172	0.481	0.957	0.901
3rd decile	1.044	1.146	0.435	0.916	0.860

4th decile	0.967	1.082	0.410	0.866	0.816
5th decile	0.896	1.029	0.392	0.824	0.779
6th decile	0.834	0.970	0.365	0.776	0.735
7th decile	0.786	0.930	0.339	0.745	0.706
8th decile	0.655	0.835	0.282	0.659	0.628
9th decile	0.548	0.731	0.242	0.587	0.565
10th decile	0.416	0.599	0.223	0.491	0.479
Single women					
1th decile	0.721	0.819	-0.034	0.497	0.423
2nd decile	0.682	0.853	-0.052	0.506	0.433
3rd decile	0.596	0.791	-0.012	0.488	0.427
4th decile	0.560	0.766	0.003	0.482	0.426
5th decile	0.534	0.786	-0.110	0.450	0.386
6th decile	0.497	0.739	-0.083	0.435	0.378
7th decile	0.438	0.659	-0.144	0.392	0.340
8th decile	0.346	0.599	-0.325	0.317	0.261
9th decile	0.216	0.493	-0.483	0.226	0.173
10th decile	0.161	0.449	-0.383	0.231	0.192
Has child					
Married women					
Infant	1.157	1.305	0.437	1.091	1.038
Preschool	1.042	1.152	0.484	0.980	0.937
School age	0.921	0.984	0.548	0.867	0.837
Young	0.783	0.821	0.495	0.726	0.701
Adult	0.790	0.861	0.397	0.718	0.682
Single women					
Infant	0.973	1.017	-0.143	0.707	0.611
Preschool	0.731	0.826	-0.126	0.558	0.486
School age	0.555	0.646	0.076	0.458	0.415
Young	0.430	0.563	0.146	0.400	0.371
Adult	0.473	0.711	0.104	0.461	0.421
Spouse employment status					
Married women					
Wage earner	0.790	0.912	0.375	0.754	0.720
Entrepreneur	0.646	0.834	0.197	0.570	0.523
Cannot work	0.521	0.792	0.337	0.633	0.621

APPENDIX D

DESCRIPTIVE STATISTICS AND MICROSIMULATION RESULTS FOR VAT REDUCTION

Table D. 1: Monthly Real Income by Income Decile, 2013-2019 Average (2013 Prices)

Deciles	Married	Single
1	1,011.75	686.52
2	1,476.24	1,068.93
3	1,751.86	1,285.38
4	2,043.14	1,511.37
5	2,339.86	1,687.99
6	2,690.83	1,923.78
7	3,101.62	2,239.72
8	3,629.70	2,671.17
9	4,613.37	3,203.89
10	7,677.05	4,925.16

Table D. 2: Monthly Real Expenses by Family Status and Types of Goods, 2013-2019 (2013 Prices)

	Food and Soft Drinks	Fuel and Automobile Spare Parts	Transportation	Others
Married				
2013	6,435,272	1,639,964	1,415,427	25,958,033
2014	6,852,699	1,636,349	1,440,526	26,702,393
2015	7,070,494	1,466,367	1,414,118	26,243,480
2016	7,154,580	1,553,015	1,323,924	28,994,533
2017	7,619,763	1,759,356	1,382,799	29,737,456
2018	7,817,959	1,774,265	1,378,223	29,639,678
2019	7,714,307	1,749,590	1,211,063	28,435,106
Single				
2013	504,111	65,503	127,300	2,116,227
2014	592,544	87,575	148,640	2,682,030
2015	657,337	69,773	165,311	2,865,795
2016	670,404	79,893	170,667	3,069,020
2017	665,800	65,748	162,683	2,872,084
2018	777,094	92,274	172,334	3,341,517
2019	929,056	111,734	190,216	4,076,872

Table D. 3: Share of Foods and Soft Drinks Among Total Expenses by Family Status and Income Decile (%)

	Food and Soft Drinks	Transportation	Education
Married			
1	30.4	3.8	0.1
2	25.8	4.0	0.1
3	24.0	4.1	0.2
4	23.4	4.2	0.2
5	22.0	4.0	0.2
6	20.5	3.9	0.3
7	19.3	3.8	0.4
8	18.4	3.7	0.4
9	15.4	3.2	0.8
10	11.8	2.7	2.1
Single			
1	29.5	4.6	0.1
2	26.5	4.3	0.1
3	23.6	4.2	0.1
4	23.6	4.6	0.0
5	22.8	4.4	0.1
6	19.9	4.7	0.1
7	18.5	3.8	0.1
8	17.1	4.2	0.2
9	15.0	4.3	0.2
10	10.5	3.7	0.2

Table D. 4: Change in Employment Status and Income (% and Number)

	Not-Emp.	Part-Time	Full-Time	Over-Time	Emp (PT, FT, OT)	Wage Inc.	Disp. Inc.
Foods and Soft Drinks							
Married							
Percentage	-0.79	7.63	2.05	1.04	1.73	1.96	0.18
The Number of Females	-78033	37581	32694	7757	-	-	-
Single							
Percentage	-0.51	3.93	0.71	-0.30	0.37	0.44	0.11
The Number of Females	-5722	3664	2619	-561	-	-	-
Transportation							
Married							
Percentage	-0.41	3.88	1.08	0.58	0.92	1.02	0.09
The Number of Females	-40744	19100	17329	4314	-	-	-
Single							
Percentage	-0.32	3.00	0.46	-0.52	0.14	0.25	0.07
The Number of Females	-3544	2795	1698	-949	-	-	-
Education							
Married							
Percentage	-0.08	0.93	0.15	0.08	0.13	0.27	0.03
The Number of Females	-7574	4598	2388	587	-	-	-
Single							
Percentage	-0.01	0.11	0.01	0.00	0.01	0.02	0.00
The Number of Females	-150	105	52	-8	-	-	-

Table D. 5: Simulation Results by Age Groups, Married Women

	Additional Employment	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
15-19	145	-0.32	5.19	2.95	0.29	2.24	1.99	0.12	1,230	48	117
20-24	2,468	-0.50	6.17	2.34	0.76	2.41	1.90	0.18	17,328	965	2,334
25-29	9,894	-0.81	7.25	2.01	0.63	2.48	1.74	0.24	55,193	4,351	10,522
30-34	16,330	-1.10	8.11	1.96	0.99	2.83	1.92	0.26	76,869	7,005	16,940
35-39	18,003	-1.23	8.25	1.90	1.49	2.96	2.04	0.25	86,239	7333	17,733
40-44	14,662	-1.15	8.07	1.89	1.56	2.90	2.07	0.21	77,481	5,592	13,524
45-49	9,382	-0.81	7.09	2.09	1.18	2.67	1.99	0.15	68,223	3,395	8,211
50-54	4,950	-0.45	6.23	2.60	0.51	2.56	2.05	0.09	61,358	1,754	4,241
55-59	1,785	-0.20	5.78	3.15	-0.37	2.45	2.02	0.04	45,386	583	1,409
60-64	413	-0.06	6.37	4.18	-1.53	2.29	1.87	0.01	33,537	118	285
Transportation											
15-19	74	-0.16	2.60	1.62	0.03	1.14	1.04	0.06	568	25	61
20-24	1,233	-0.25	2.91	1.24	0.33	1.20	0.98	0.10	8,119	501	1,211
25-29	4,995	-0.41	3.49	1.07	0.30	1.25	0.91	0.12	26,751	2268	5,485
30-34	8,005	-0.54	3.81	0.99	0.52	1.39	0.95	0.13	36,541	3,462	8,372
35-39	9,489	-0.65	4.21	1.03	0.83	1.56	1.06	0.13	42,564	3,813	9,220
40-44	8,598	-0.67	4.62	1.13	0.94	1.70	1.19	0.12	43,370	3,223	7,795

45-49	5,188	-0.45	3.92	1.15	0.66	1.48	1.11	0.08	35,318	1,896	4,584
50-54	2,377	-0.22	3.03	1.23	0.25	1.23	0.99	0.04	27,103	843	2,038
55-59	656	-0.07	2.13	1.15	-0.13	0.90	0.75	0.02	16,112	217	525
60-64	129	-0.02	2.13	1.29	-0.54	0.71	0.60	0.00	9,538	38	91
Education											
15-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-24	38	-0.01	0.09	0.03	0.03	0.04	0.03	0.00	256	14	33
25-29	563	-0.05	0.43	0.11	0.03	0.14	0.10	0.01	3,443	246	595
30-34	2,228	-0.15	1.31	0.23	0.07	0.39	0.33	0.05	11,716	1197	2,895
35-39	2,935	-0.20	1.67	0.23	0.19	0.48	0.50	0.06	19,196	1790	4,328
40-44	1,420	-0.11	1.02	0.12	0.12	0.28	0.32	0.03	11,084	875	2,116
45-49	311	-0.03	0.30	0.06	0.03	0.09	0.11	0.01	3,101	191	462
50-54	54	0.00	0.08	0.03	0.00	0.03	0.02	0.00	688	21	51
55-59	19	0.00	0.07	0.03	0.00	0.03	0.02	0.00	393	6	14
60-64	6	0.00	0.07	0.06	-0.01	0.03	0.03	0.00	645	2	5

Table D. 6: Simulation Results by Age Groups, Single Women

	Additional Employment	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
15-19	15	-0.42	5.22	1.89	-0.58	1.41	1.16	0.36	73	6	14
20-24	225	-0.74	3.87	0.82	-1.46	0.65	0.35	0.19	1,152	82	198
25-29	342	-0.99	3.43	0.48	-1.49	0.38	0.14	0.08	2,490	109	264
30-34	409	-0.88	3.69	0.43	-0.86	0.44	0.16	0.08	3,094	123	298
35-39	595	-0.97	3.74	0.36	-0.12	0.60	0.27	0.13	3,803	206	499
40-44	796	-0.89	3.72	0.38	0.29	0.76	0.39	0.14	5,394	295	713
45-49	973	-0.79	3.90	0.68	0.38	1.06	0.61	0.16	6,437	352	850
50-54	1110	-0.58	3.85	1.49	0.18	1.54	1.01	0.15	8,400	411	994
55-59	834	-0.34	4.55	2.07	-0.53	2.01	1.30	0.10	9,092	286	691
60-64	422	-0.14	5.21	3.21	-1.17	2.67	2.07	0.04	10,110	125	303
Transportation											
15-19	8	-0.20	3.24	1.08	-0.72	0.69	0.51	0.16	37	2	6
20-24	230	-0.75	5.13	0.95	-2.37	0.66	0.25	0.14	1,327	60	145
25-29	384	-1.11	4.39	0.55	-2.01	0.43	0.17	0.10	3,056	129	311
30-34	320	-0.68	3.91	0.36	-1.13	0.34	0.10	0.05	3,003	77	186

35-39	447	-0.73	3.46	0.22	-0.23	0.45	0.17	0.08	3,283	129	312
40-44	540	-0.60	2.72	0.23	0.18	0.51	0.26	0.09	3,458	193	466
45-49	587	-0.48	2.45	0.40	0.20	0.64	0.36	0.09	3,699	207	500
50-54	528	-0.27	1.97	0.70	0.01	0.73	0.47	0.07	4,166	192	465
55-59	341	-0.14	2.04	0.89	-0.45	0.82	0.54	0.04	3,812	118	284
60-64	160	-0.05	2.16	1.27	-0.75	1.01	0.75	0.02	3,398	45	110
Education											
15-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-24	3	-0.01	0.03	0.01	0.00	0.01	0.01	0.00	22	1	3
25-29	8	-0.02	0.05	0.01	-0.01	0.01	0.00	0.00	37	3	8
30-34	17	-0.04	0.15	0.01	-0.02	0.02	0.01	0.01	101	8	20
35-39	34	-0.06	0.20	0.02	0.00	0.03	0.03	0.01	259	22	54
40-44	43	-0.05	0.20	0.02	0.01	0.04	0.03	0.01	341	25	59
45-49	8	-0.01	0.02	0.01	0.00	0.01	0.01	0.00	87	3	8
50-54	14	-0.01	0.05	0.02	0.00	0.02	0.01	0.00	97	5	13
55-59	11	0.00	0.08	0.02	-0.01	0.03	0.02	0.00	83	5	13
60-64	12	0.00	0.30	-0.04	-0.07	0.07	0.03	0.00	170	2	4

Table D. 7: Simulation Results by Education Level, Married Women

	Additional Employment	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
No diploma	9,691	-0.56	9.98	3.55	1.42	3.95	3.42	0.14	80,217	2,660	6,433
Primary School	29,270	-0.73	8.49	2.63	1.36	3.25	2.79	0.16	200,520	9,279	22,440
Secondary School	10,673	-0.74	8.67	2.82	1.28	3.33	2.86	0.19	63,768	3,670	8,875
High School	8,560	-0.87	7.83	2.20	0.99	2.85	2.40	0.18	52,544	3,415	8,260
Vocational	5,860	-0.95	8.13	2.13	0.88	2.85	2.35	0.21	34,393	2,428	5,871
2-year higher	4,395	-1.11	6.54	1.40	0.41	2.08	1.67	0.22	25,957	2,402	5,809
4+ higher	9,584	-1.40	5.26	0.75	0.23	1.46	1.10	0.21	65,446	7,290	17,629
Transportation											
No diploma	4,394	-0.26	4.39	1.62	0.71	1.79	1.55	0.06	30,999	1,209	2,924
Primary School	16,098	-0.40	4.59	1.44	0.80	1.79	1.52	0.09	94,070	5,059	12,236
Secondary School	5,344	-0.37	4.27	1.41	0.68	1.67	1.42	0.10	29,222	1,824	4,410
High School	4,526	-0.46	4.07	1.18	0.52	1.51	1.27	0.09	25,369	1,802	4,357
Vocational	3,158	-0.51	4.20	1.18	0.52	1.53	1.28	0.11	16,843	1,316	3,183
2-year higher	2,110	-0.53	3.01	0.70	0.21	1.00	0.81	0.11	12,502	1,166	2,819
4+ higher	5,113	-0.75	2.66	0.44	0.12	0.78	0.59	0.11	36,980	3,909	9,454
Education											

No diploma	82	0.00	0.08	0.03	0.01	0.03	0.03	0.00	712	22	54
Primary School	714	-0.02	0.21	0.06	0.03	0.08	0.07	0.00	4,780	223	540
Secondary School	615	-0.04	0.56	0.15	0.07	0.19	0.16	0.01	3,545	200	484
High School	914	-0.09	0.87	0.23	0.11	0.30	0.26	0.02	5,828	364	881
Vocational	700	-0.11	1.02	0.24	0.11	0.34	0.28	0.02	3,775	292	707
2-year higher	814	-0.21	1.32	0.21	0.12	0.39	0.31	0.04	4,981	450	1,087
4+ higher	3,735	-0.54	2.25	0.21	0.18	0.57	0.42	0.08	26,901	2,789	6,745

Table D. 8: Simulation Results by Education Level, Single Women

	Additional Employment	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
No diploma	1,106	-0.43	6.07	2.14	-0.04	2.07	1.65	0.12	9,538	279	674
Primary School	2,122	-0.47	4.63	1.29	0.16	1.47	1.19	0.13	17,122	638	1,543
Secondary School	539	-0.51	4.47	1.20	-0.29	1.10	0.84	0.13	3,918	175	424
High School	636	-0.53	4.00	0.93	-0.22	1.04	0.80	0.13	4,950	249	602
Vocational	346	-0.60	4.11	0.90	-0.45	0.92	0.66	0.15	2,689	136	328
2-year higher	234	-0.58	3.19	0.45	-0.69	0.50	0.29	0.10	2,407	108	261
4+ higher	740	-0.78	2.59	0.20	-0.77	0.29	0.15	0.08	9,421	409	990
Transportation											

No diploma	527	-0.21	3.14	1.04	-0.17	0.98	0.76	0.05	4,036	128	310
Primary School	1,145	-0.25	2.72	0.67	0.01	0.80	0.61	0.07	7,987	329	795
Secondary School	353	-0.34	3.65	0.81	-0.49	0.72	0.49	0.08	2,317	104	250
High School	446	-0.37	2.92	0.68	-0.26	0.73	0.55	0.09	3,026	170	412
Vocational	218	-0.38	3.51	0.54	-0.64	0.58	0.35	0.08	1,661	72	173
2-year higher	160	-0.40	3.25	0.32	-0.99	0.34	0.14	0.05	1,711	51	122
4+ higher	695	-0.73	2.91	0.22	-1.12	0.27	0.11	0.06	8,504	298	722
Education											
No diploma	19	-0.01	0.10	0.04	0.00	0.04	0.03	0.00	115	5	13
Primary School	23	-0.01	0.05	0.02	0.00	0.02	0.01	0.00	198	7	17
Secondary School	9	-0.01	0.06	0.02	0.00	0.02	0.01	0.00	66	3	7
High School	12	-0.01	0.06	0.02	0.00	0.02	0.01	0.00	71	5	11
Vocational	9	-0.02	0.12	0.02	0.00	0.02	0.02	0.00	74	4	9
2-year higher	9	-0.02	0.10	0.01	-0.01	0.02	0.01	0.00	61	5	12
4+ higher	68	-0.07	0.20	0.01	-0.01	0.03	0.02	0.01	612	46	112

Table D. 9: Simulation Results by Income Decile, Married Women

	Additional Employment	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
1	6,067	-0.67	8.68	2.59	1.34	3.38	2.74	0.37	33,111	1,848	4,470
2	7,480	-0.71	8.53	2.60	1.34	3.27	2.67	0.29	41,950	2,456	5,939
3	7,635	-0.73	8.62	2.64	1.31	3.27	2.70	0.26	44,757	2,552	6,172
4	8,005	-0.77	8.76	2.64	1.28	3.29	2.65	0.24	47,943	2,726	6,592
5	7,987	-0.79	8.58	2.56	1.26	3.20	2.56	0.22	49,540	2,818	6,816
6	8,407	-0.81	8.49	2.48	1.19	3.14	2.45	0.20	54,186	3,045	7,365
7	8,921	-0.86	8.52	2.43	1.16	3.13	2.38	0.19	58,055	3,355	8,113
8	8,191	-0.83	7.44	1.98	0.90	2.62	1.93	0.17	60,039	3,383	8,181
9	7,871	-0.87	6.28	1.41	0.61	2.10	1.51	0.16	62,349	4,078	9,861
10	7,468	-0.93	5.37	0.96	0.41	1.61	1.19	0.11	70,913	4,882	11,808
Transportation											
1	2,169	-0.24	3.01	0.94	0.51	1.21	1.00	0.13	10,876	678	1,640
2	3,416	-0.32	3.80	1.19	0.66	1.49	1.22	0.13	17,081	1,122	2,714
3	3,797	-0.36	4.19	1.32	0.69	1.63	1.32	0.13	19,870	1,252	3,028
4	4,218	-0.41	4.56	1.39	0.72	1.73	1.38	0.12	22,141	1,421	3,437
5	4,276	-0.42	4.44	1.38	0.74	1.71	1.36	0.11	22,711	1,496	3,618

6	4,622	-0.45	4.57	1.37	0.72	1.73	1.32	0.11	25,806	1,643	3,972
7	4,942	-0.48	4.60	1.35	0.71	1.73	1.27	0.10	27,806	1,792	4,333
8	4,645	-0.47	4.06	1.14	0.56	1.49	1.08	0.09	29,385	1,889	4,569
9	4,364	-0.48	3.27	0.83	0.37	1.17	0.79	0.08	31,492	2,140	5,175
10	4,295	-0.53	3.01	0.58	0.23	0.93	0.69	0.06	38,818	2,852	6,897
Education											
1	69	-0.01	0.11	0.03	0.01	0.04	0.04	0.01	344	27	66
2	118	-0.01	0.13	0.04	0.02	0.05	0.05	0.01	601	45	108
3	210	-0.02	0.24	0.07	0.03	0.09	0.08	0.01	1,011	73	178
4	221	-0.02	0.24	0.07	0.04	0.09	0.08	0.01	1,111	81	195
5	288	-0.03	0.33	0.09	0.04	0.12	0.10	0.01	1,412	107	260
6	360	-0.03	0.39	0.10	0.05	0.13	0.12	0.01	1,907	143	345
7	495	-0.05	0.52	0.12	0.06	0.17	0.15	0.01	2,634	206	498
8	597	-0.06	0.60	0.13	0.07	0.19	0.17	0.01	3,389	292	706
9	1,327	-0.15	1.21	0.19	0.10	0.35	0.29	0.03	7,806	775	1,875
10	3,889	-0.48	3.25	0.35	0.28	0.84	0.63	0.06	30,308	2,591	6,267

Table D. 10: Simulation Results by Income Decile, Single Women

	Additional Employment	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
1	598	-0.67	4.43	1.04	-0.07	1.15	0.83	0.38	2,892	173	418
2	539	-0.57	4.43	1.16	-0.06	1.22	0.88	0.26	3,194	168	407
3	511	-0.55	4.57	1.16	-0.03	1.29	0.89	0.22	3,321	159	385
4	645	-0.60	4.81	1.22	-0.05	1.37	0.93	0.21	4,299	208	503
5	630	-0.52	4.81	1.11	-0.23	1.28	0.79	0.16	4,761	198	479
6	548	-0.47	4.11	1.06	-0.20	1.14	0.76	0.15	4,398	194	470
7	581	-0.48	4.60	0.86	-0.24	1.13	0.61	0.12	5,167	190	460
8	557	-0.43	3.70	0.67	-0.46	0.81	0.39	0.09	6,080	201	487
9	595	-0.45	3.19	0.39	-0.68	0.50	0.22	0.08	7,716	246	596
10	518	-0.43	2.79	0.27	-0.54	0.41	0.20	0.05	8,216	256	619
Transportation											
1	264	-0.29	2.06	0.44	-0.05	0.51	0.35	0.16	1,185	73	176
2	266	-0.28	2.42	0.58	-0.14	0.60	0.42	0.12	1,340	80	194
3	268	-0.29	2.69	0.62	-0.18	0.68	0.44	0.11	1,510	78	188
4	346	-0.32	2.89	0.67	-0.20	0.73	0.49	0.11	2,089	110	266
5	366	-0.30	3.52	0.62	-0.46	0.75	0.42	0.08	2,306	106	256
6	365	-0.31	3.20	0.71	-0.38	0.76	0.47	0.09	2,598	119	288
7	349	-0.29	2.94	0.56	-0.32	0.68	0.35	0.07	2,635	110	265

8	381	-0.30	3.48	0.51	-0.94	0.55	0.21	0.05	3,617	109	264
9	422	-0.32	2.71	0.30	-0.79	0.35	0.12	0.04	5,240	141	342
10	516	-0.43	3.49	0.30	-1.04	0.41	0.17	0.04	6,722	226	547
Education											
1	4	0.00	0.03	0.01	0.00	0.01	0.01	0.00	15	1	3
2	7	-0.01	0.06	0.02	0.00	0.02	0.01	0.00	31	2	6
3	7	-0.01	0.05	0.02	0.00	0.02	0.01	0.00	45	3	6
4	3	0.00	0.02	0.00	0.00	0.01	0.00	0.00	21	1	2
5	8	-0.01	0.09	0.01	-0.01	0.02	0.00	0.00	42	1	3
6	9	-0.01	0.06	0.02	0.00	0.02	0.02	0.00	59	4	10
7	14	-0.01	0.10	0.02	0.00	0.03	0.01	0.00	84	5	11
8	24	-0.02	0.17	0.02	-0.01	0.04	0.02	0.01	180	13	31
9	25	-0.02	0.11	0.01	0.00	0.02	0.01	0.00	276	16	38
10	48	-0.04	0.25	0.01	-0.01	0.04	0.02	0.01	445	30	72

Table D. 11: Simulation Results by Having Children, Married Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
No Child	10,858	-0.40	4.01	1.51	0.29	1.50	1.10	0.09	140,690	4,580	11,077
Infant	15,210	-0.76	8.76	2.28	1.23	3.46	2.41	0.23	93,265	6,690	16,178
Preschool	17,279	-0.88	8.91	2.27	1.36	3.44	2.33	0.24	97,051	7,051	17,052
Schoolage	40,043	-1.00	9.07	2.39	1.61	3.47	2.47	0.23	215,733	15,304	37,012
Young	23,186	-1.00	9.14	2.48	1.61	3.40	2.58	0.20	133,816	8,135	19,674
Adult	7,531	-0.59	8.65	2.82	1.39	3.53	2.74	0.11	71,814	2,569	6,212
Transportation											
No Child	6,018	-0.22	2.15	0.85	0.18	0.83	0.65	0.06	62,417	2,707	6,547
Infant	6,156	-0.31	3.47	0.93	0.54	1.40	0.97	0.09	35,438	2,693	6,513
Preschool	7,710	-0.39	3.86	1.03	0.66	1.53	1.06	0.11	40,372	3,198	7,735
Schoolage	20,211	-0.50	4.48	1.22	0.85	1.75	1.24	0.12	101,585	7,704	18,632
Young	13,384	-0.58	5.18	1.45	0.96	1.96	1.48	0.12	70,746	4,673	11,302
Adult	4,010	-0.31	4.57	1.50	0.77	1.88	1.48	0.06	33,553	1,389	3,358
Education											
No Child	57	0.00	0.03	0.01	0.00	0.01	0.00	0.00	1,263	20	49
Infant	1,292	-0.06	0.89	0.15	0.07	0.29	0.27	0.03	8,892	757	1,831
Preschool	3,256	-0.17	1.97	0.35	0.17	0.65	0.62	0.06	21,173	1,861	4,501
Schoolage	5,570	-0.14	1.53	0.27	0.17	0.48	0.52	0.05	38,795	3,232	7,817
Young	645	-0.03	0.28	0.06	0.04	0.09	0.11	0.01	6,053	332	802
Adult	98	-0.01	0.14	0.03	0.01	0.05	0.05	0.00	1,098	49	119

Table D. 12: Simulation Results by Having Children, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
No Child	3,117	-0.42	3.54	0.57	-0.51	0.70	0.31	0.09	31,725	1,085	2,625
Infant	126	-0.49	5.04	1.24	-0.29	1.57	1.04	0.20	867	45	109
Preschool	255	-0.77	5.14	1.09	-0.26	1.38	0.84	0.23	1,439	94	228
Schoolage	1,152	-0.79	4.98	1.00	0.08	1.30	0.81	0.20	6,950	398	964
Young	1,181	-0.77	4.82	1.10	0.26	1.31	0.88	0.17	7,688	395	956
Adult	901	-0.54	5.09	1.48	0.08	1.62	1.14	0.12	7,785	304	735
Transportation											
No Child	1,936	-0.26	2.87	0.39	-0.76	0.43	0.18	0.05	18,843	614	1,484
Infant	38	-0.15	1.52	0.35	-0.05	0.47	0.31	0.06	285	13	32
Preschool	112	-0.34	2.64	0.45	-0.28	0.61	0.35	0.09	654	39	93
Schoolage	738	-0.51	3.62	0.62	-0.11	0.84	0.49	0.12	4,213	242	586
Young	780	-0.51	3.57	0.68	0.09	0.87	0.56	0.11	4,655	252	610
Adult	565	-0.34	3.39	0.91	-0.02	1.01	0.69	0.08	4,148	184	445
Education											
No Child	37	-0.01	0.05	0.00	0.00	0.01	0.00	0.00	279	12	28
Infant	5	-0.02	0.19	0.05	0.00	0.06	0.06	0.01	37	2	6
Preschool	51	-0.15	1.22	0.18	-0.08	0.28	0.28	0.07	350	31	74
Schoolage	77	-0.05	0.35	0.06	0.00	0.09	0.09	0.02	652	47	113
Young	11	-0.01	0.04	0.01	0.01	0.01	0.01	0.00	131	6	14
Adult	7	0.00	0.04	0.01	0.00	0.01	0.01	0.00	85	2	5

Table D. 13: Simulation Results by Employment Status of Spouse

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Food and Soft Drinks											
Working Spouse											
Yes	68,427	-0.92	7.81	2.01	1.11	2.78	1.96	0.20	403,037	27,776	67,174
No	9,606	-0.4	6.49	2.32	0.66	2.56	1.98	0.11	119,807	3,367	8,143
Spouse Eligible for Work											
No	75,485	-0.84	7.68	2.03	1.07	2.77	1.96	0.19	481,237	30,295	73,266
Yes	2,548	-0.3	6.08	2.39	0.54	2.25	1.86	0.08	41,607	848	2,051
Employer or Self-Employed Spouse											
No	70,379	-0.87	7.99	2.05	1.05	2.8	1.97	0.21	426,096	28,128	68,025
Yes	7,653	-0.43	5.1	2.04	1	2.38	1.85	0.08	96,748	3,015	7,292
Transportation											
Working Spouse											
Yes	36,589	-0.49	4.05	1.10	0.63	1.49	1.05	0.11	202,677	14,830	35,864
No	4,155	-0.17	2.81	0.98	0.32	1.11	0.86	0.05	43,308	1,455	3,519
Spouse Eligible for Work											
No	39,525	-0.44	3.91	1.08	0.59	1.45	1.03	0.10	232,014	15,872	38,385

Yes	1,218	-0.14	2.88	1.11	0.32	1.08	0.90	0.04	13,971	413	998
Employer or Self-Employed Spouse											
No	38,137	-0.47	4.19	1.13	0.60	1.52	1.07	0.11	213,493	15,196	36,751
Yes	2,606	-0.15	1.68	0.70	0.38	0.81	0.67	0.03	32,492	1,088	2,632
Education											
Working Spouse											
Yes	7,290	-0.10	1.05	0.16	0.09	0.30	0.29	0.03	48,020	4,181	10,110
No	283	-0.01	0.21	0.06	0.02	0.08	0.09	0.01	2,502	160	388
Spouse Eligible for Work											
No	7,514	-0.08	0.96	0.15	0.08	0.28	0.28	0.03	49,933	4,308	10,418
Yes	60	-0.01	0.18	0.04	0.01	0.05	0.07	0.00	589	33	80
Employer or Self-Employed Spouse											
No	6,692	-0.08	0.99	0.14	0.07	0.27	0.27	0.03	35,061	3,844	9,297
Yes	882	-0.05	0.55	0.24	0.12	0.27	0.30	0.01	15,462	497	1,201

APPENDIX E

DESCRIPTIVE STATISTICS AND MICROSIMULATION RESULTS FOR WAGE INCENTIVES

Table E. 1: Average Monthly Real Wages for Full-Time Workers, (2013 Prices, TL)

	Married	Single
Wage Subsidy To All		
1 th Decile	1,036.00	1,058.96
2 nd Decile	1,083.04	1,094.67
3 rd Decile	1,099.26	1,113.11
4 th Decile	1,116.93	1,138.93
5 th Decile	1,134.17	1,153.48
6 th Decile	1,156.85	1,204.13
7 th Decile	1,191.66	1,241.48
8 th Decile	1,277.75	1,399.70
9 th Decile	1,531.87	1,770.57
10 th Decile	1,966.63	2,095.50
Wage Subsidy to Young		
1 th Decile	936.64	949.15
2 nd Decile	985.38	981.90
3 rd Decile	1001.39	997.50
4 th Decile	1016.12	1022.40
5 th Decile	1030.51	1035.54
6 th Decile	1052.50	1087.61
7 th Decile	1084.45	1121.37
8 th Decile	1169.35	1278.90
9 th Decile	1420.25	1653.84
10 th Decile	1852.43	1978.43
Negative Tax		
1 th Decile	1008.38	1032.56
2 nd Decile	1059.48	1070.65
3 rd Decile	1077.89	1090.25
4 th Decile	1097.02	1117.88
5 th Decile	1115.50	1132.79
6 th Decile	1140.10	1187.75
7 th Decile	1177.17	1225.73
8 th Decile	1268.79	1393.25
9 th Decile	1537.52	1786.06
10 th Decile	1999.23	2133.51

Table E. 2: Average Monthly Real Wage Subsidy by Income Decile (2013 Prices, TL)

Income Deciles	Married	Single
1	117.97	118.45
2	118.19	118.69
3	117.61	118.91
4	117.39	119.00
5	117.51	118.87
6	117.09	118.70
7	117.05	119.22
8	117.01	119.44
9	116.71	117.90
10	116.46	117.20

Table E. 3: Total Monthly Real Wage Subsidy by Income Decile (2013 Prices, TL)

Income Deciles	Married	Single
1	90,962,84	1,346,102
2	9,823,088	1,174,319
3	9,689,456	1,068,942
4	9,486,070	1,170,725
5	9,382,786	1,145,802
6	9,486,570	1,057,035
7	9,601,766	1,080,386
8	9,363,075	1,198,448
9	9,028,399	1,396,067
10	8,673,862	1,245,586

Table E. 4: Changes in Employment Status and Income (% and number)

	Not-Emp.	Part-Time	Full-Time	Over-Time	Emp (PT, FT, OT)	Wage Inc.	Disp. Inc.
Wage Subsidy To All							
Married							
Percentage	-2.10	6.35	9.27	3.59	7.46	14.51	1.34
The Number of Females	-206154	31307	148113	26734	-	-	-
Single							
Percentage	-1.97	3.19	5.80	-1.17	3.48	9.11	2.36
The Number of Females	-22185	2976	21370	-2161	-	-	-
Wage Subsidy to Young							
Married							
Percentage	-0.45	1.22	2.21	0.33	1.61	2.90	0.27
The Number of Females	-43838	6029	35343	2466	-	-	-
Single							
Percentage	-0.28	0.39	1.38	-1.26	0.50	1.77	0.46
The Number of Females	-3109	362	5070	-2322	-	-	-
Negative Tax							
Married							
Percentage	-2.09	8.99	8.51	3.36	6.87	16.09	1.49
The Number of Females	-205270	44291	135967	25013	-	-	-
Single							
Percentage	-1.99	6.40	5.39	-1.90	2.96	11.17	2.89
The Number of Females	-22325	5967	19847	-3489	-	-	-

Table E. 5: Simulation Results by Age Groups, Married Women

	Additional Emp.	Not-Emp. (%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
15-19	775	-1.71	9.35	23.92	-0.42	11.98	24.89	1.56	753	604	1,461
20-24	10,668	-2.17	9.18	15.82	1.62	10.40	19.22	1.86	12,347	9,781	23,653
25-29	32,394	-2.67	7.40	10.90	1.94	8.11	14.23	1.93	47,124	35,625	86,154
30-34	44,258	-2.99	6.57	9.56	3.71	7.66	13.58	1.87	67,088	49,480	119,662
35-39	44,117	-3.00	5.94	8.40	5.38	7.24	13.87	1.71	70,849	49,874	120,614
40-44	34,278	-2.68	5.69	7.75	5.42	6.78	14.51	1.48	58,560	39,165	94,717
45-49	22,038	-1.90	5.56	7.89	3.90	6.28	15.19	1.16	40,630	25,890	62,612
50-54	11,847	-1.08	6.01	9.09	1.62	6.13	16.20	0.69	22,265	13,859	33,516
55-59	4,678	-0.51	7.51	11.66	-1.21	6.42	17.79	0.36	8,340	5,140	12,430
60-64	1,100	-0.16	10.14	15.77	-4.63	6.08	19.05	0.13	2,042	1,201	2,904
Wage Subsidy to Young											
15-19	775	-1.71	9.35	23.92	-0.42	11.98	24.89	1.56	753	604	1,461
20-24	10,668	-2.17	9.18	15.82	1.62	10.40	19.22	1.86	12,347	9,781	23,653
25-29	32,394	-2.67	7.40	10.90	1.94	8.11	14.23	1.93	47,124	35,625	86,154
30-34	-	-	-	-	-	-	-	-	-	-	-
35-39	-	-	-	-	-	-	-	-	-	-	-
40-44	-	-	-	-	-	-	-	-	-	-	-
45-49	-	-	-	-	-	-	-	-	-	-	-

50-54	-	-	-	-	-	-	-	-	-	-	-
55-59	-	-	-	-	-	-	-	-	-	-	-
60-64	-	-	-	-	-	-	-	-	-	-	-
Negative Tax											
15-19	675	-1.48	9.75	20.29	0.41	10.42	21.54	1.35	648	523	1,264
20-24	10,312	-2.10	10.68	15.00	1.23	10.05	19.96	1.93	13,136	10,157	24,563
25-29	35,018	-2.88	10.79	11.31	1.52	8.76	17.49	2.37	60,540	43,805	105,937
30-34	47,265	-3.19	10.57	9.28	3.60	8.18	16.53	2.27	85,411	60,231	145,660
35-39	44,569	-3.03	9.25	7.53	5.29	7.32	15.75	1.94	83,353	56,641	136,979
40-44	32,586	-2.55	8.01	6.58	5.09	6.45	15.15	1.54	62,519	40,906	98,925
45-49	19,830	-1.71	6.93	6.50	3.45	5.65	14.76	1.13	39,839	25,162	60,850
50-54	10,300	-0.93	6.42	7.51	1.36	5.33	15.04	0.64	20,643	12,867	31,118
55-59	3,854	-0.42	7.04	9.20	-0.93	5.29	15.38	0.31	7,119	4,444	10,747
60-64	860	-0.12	8.31	11.71	-3.26	4.76	15.12	0.10	1,582	953	2,305

Table E. 6: Simulation Results by Age Groups, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
15-19	134	-3.60	18.80	27.28	-7.25	12.25	23.77	7.35	141	116	280
20-24	1,384	-4.52	4.09	9.79	-8.81	3.97	10.43	5.80	4,069	2,466	5,964
25-29	1,591	-4.60	1.19	4.94	-7.19	1.76	7.09	4.24	10,699	5,498	13,295
30-34	1,728	-3.70	1.40	4.31	-3.79	1.84	7.03	3.73	10,851	5,471	13,230
35-39	2,303	-3.76	1.59	3.72	-0.19	2.32	7.83	3.81	11,521	5,973	14,444
40-44	2,909	-3.25	1.47	3.55	1.86	2.76	8.63	3.10	12,133	6,477	15,664
45-49	3,514	-2.87	2.00	5.20	2.31	3.83	10.36	2.73	10,643	6,013	14,542
50-54	3,885	-2.01	3.62	8.64	1.05	5.40	12.71	1.89	8,298	5,152	12,459
55-59	3,039	-1.25	6.42	12.90	-1.35	7.31	14.60	1.09	4,709	3,198	7,734
60-64	1,697	-0.57	11.61	21.64	-4.23	10.74	21.55	0.44	1,731	1,301	3,146
Wage Subsidy to Young											
15-19	134	-3.60	18.80	27.28	-7.25	12.25	23.77	7.35	141	116	280
20-24	1,384	-4.52	4.09	9.79	-8.81	3.97	10.43	5.80	4,069	2,466	5,964
25-29	1,591	-4.60	1.19	4.94	-7.19	1.76	7.09	4.24	10,699	5,498	13,295
30-34	-	-	-	-	-	-	-	-	-	-	-
35-39	-	-	-	-	-	-	-	-	-	-	-
40-44	-	-	-	-	-	-	-	-	-	-	-

45-49	-	-	-	-	-	-	-	-	-	-	-
50-54	-	-	-	-	-	-	-	-	-	-	-
55-59	-	-	-	-	-	-	-	-	-	-	-
60-64	-	-	-	-	-	-	-	-	-	-	-
Negative Tax											
15-19	128	-3.43	21.33	24.47	-6.56	11.65	22.22	6.87	131	108	262
20-24	1,656	-5.41	9.40	10.81	-10.98	4.75	13.55	7.53	5,528	3,202	7,743
25-29	2,076	-6.00	7.05	5.76	-10.25	2.30	10.64	6.37	16,845	8,253	19,959
30-34	1,985	-4.24	7.13	4.29	-5.03	2.11	9.85	5.22	16,029	7,660	18,525
35-39	2,443	-3.98	6.09	3.26	-0.52	2.46	10.08	4.90	15,606	7,683	18,581
40-44	2,947	-3.29	5.04	2.90	1.76	2.80	10.37	3.73	15,276	7,785	18,828
45-49	3,314	-2.70	4.50	4.26	2.06	3.61	11.23	2.96	12,063	6,521	15,770
50-54	3,617	-1.87	5.30	7.42	0.82	5.03	13.35	1.98	8,969	5,411	13,087
55-59	2,744	-1.12	7.18	10.90	-1.27	6.60	15.08	1.12	4,997	3,303	7,988
60-64	1,417	-0.47	10.18	17.33	-3.19	8.97	19.41	0.40	1,536	1,172	2,833

Table E. 7: Simulation Results by Education Level, Married Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
No diploma	27,928	-1.63	11.66	15.85	4.95	11.39	26.95	1.13	29,341	20,987	50,754
Primary School	78,331	-1.97	7.92	11.08	4.86	8.71	21.79	1.25	105,079	72,462	175,241
Secondary School	34,534	-2.38	10.01	14.80	4.30	10.78	23.31	1.57	39,120	29,938	72,401
High School	23,155	-2.34	6.70	10.17	3.20	7.72	17.90	1.33	35,058	25,455	61,559
Vocational	15,269	-2.47	6.37	9.84	2.82	7.42	16.98	1.48	23,954	17,508	42,341
2year higher	10,159	-2.57	3.55	6.46	1.23	4.81	11.71	1.56	24,195	16,885	40,834
4+ higher	16,777	-2.45	1.42	3.41	0.76	2.56	7.17	1.37	73,250	47,384	114,592
Wage Subsidy to Young											
No diploma	5,456	-0.32	2.04	3.10	1.09	2.23	4.23	0.18	3,817.58	3,298	7,976
Primary School	2,160	-0.05	0.22	0.32	0.10	0.24	0.45	0.03	1,747.21	1,485	3,591
Secondary School	15,194	-1.05	4.34	6.82	1.39	4.74	9.08	0.61	13,868.46	11,663	28,207
High School	7,268	-0.74	2.00	3.53	0.36	2.42	4.86	0.36	8,670.14	6,907	16,703
Vocational	5,270	-0.85	2.09	3.77	0.23	2.56	5.11	0.45	6,611.38	5,266	12,735
2year higher	4,076	-1.03	1.17	2.96	-0.32	1.93	4.23	0.56	8,381.93	6,102	14,757
4+ higher	4,414	-0.64	0.21	1.08	-0.28	0.67	1.71	0.33	17,127.02	11,289	27,300
Negative Tax											
No diploma	20,249	-1.18	9.79	10.87	3.79	8.26	18.94	0.79	20,366	14,754	35,681
Primary School	66,127	-1.66	8.05	8.83	4.25	7.35	17.99	1.03	86,261	59,832	144,697

Secondary School	30,475	-2.1	10.61	12.38	3.99	9.51	20.27	1.36	33,957	26,030	62,951
High School	24,561	-2.49	8.81	10.17	3.58	8.19	18.86	1.40	37,153	26,826	64,875
Vocational	17,024	-2.75	8.91	10.33	3.33	8.27	18.91	1.65	26,923	19,501	47,160
2year higher	14,813	-3.75	7.71	8.63	1.94	7.02	17.15	2.28	36,115	24,727	59,798
4+ higher	32,022	-4.67	9.67	4.67	0.97	4.89	12.72	2.43	134,017	84,017	203,186

Table E. 8: Simulation Results by Education Level, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp. (%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
No diploma	3,974	-1.55	8.26	13.62	0.35	7.42	22.18	1.57	6,099	3,749	9,067
Primary School	8,387	-1.86	5.10	9.52	1.17	5.83	18.58	2.02	16,579	9,988	24,156
Secondary School	2,405	-2.3	5.15	9.73	-1.58	4.89	16.21	2.56	5,825	3,398	8,218
High School	2,895	-2.42	4.04	8.12	-1.25	4.74	14.19	2.39	7,228	4,436	10,727
Vocational	1,322	-2.3	3.33	7.32	-2.84	3.50	12.24	2.73	4,452	2,533	6,126
2year higher	819	-2.04	0.71	4.13	-3.12	1.75	7.71	2.72	5,410	2,842	6,872
4+ higher	2,384	-2.51	0.32	2.37	-3.04	0.94	5.31	2.83	29,202	14,717	35,591
Wage Subsidy to Young											
No diploma	153	-0.06	0.39	0.68	-0.19	0.29	0.77	0.05	201	130	315
Primary School	19	0	0.02	0.04	-0.02	0.01	0.04	0.00	33	20	50
Secondary School	437	-0.42	1.57	2.66	-1.70	0.89	2.83	0.45	1,043	594	1,436
High School	1,089	-0.91	1.90	3.48	-1.45	1.78	3.99	0.67	1,723	1,247	3,016
Vocational	354	-0.62	1.34	2.91	-2.55	0.94	3.06	0.68	1,099	632	1,529
2year higher	261	-0.65	0.46	1.90	-2.43	0.56	2.05	0.72	1,412	757	1,831
4+ higher	796	-0.84	0.19	1.14	-2.10	0.31	1.70	0.90	9,397	4,698	11,363
Negative Tax											
No diploma	2,876	-1.12	6.91	9.26	0.42	5.37	15.69	1.11	4,300	2,652	6,415

Primary School	7,029	-1.56	5.36	7.45	1.16	4.89	15.29	1.66	13,624	8,219	19,876
Secondary School	2,174	-2.08	6.12	8.27	-1.28	4.42	14.62	2.31	5,281	3,065	7,412
High School	3,107	-2.59	5.85	8.24	-1.19	5.09	15.38	2.59	7,923	4,806	11,623
Vocational	1,496	-2.6	5.49	7.66	-2.93	3.96	14.03	3.13	5,168	2,903	7,022
2year higher	1,227	-3.05	4.43	5.29	-4.27	2.63	11.74	4.13	8,436	4,326	10,461
4+ higher	4,416	-4.65	7.83	2.83	-5.44	1.74	9.07	4.83	52,249	25,128	60,768

Table E. 9: Simulation Results by Income Decile, Married Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
1	21,634	-2.39	12.24	15.34	5.90	12.04	24.87	3.32	21,752	16,791	40,608
2	25,359	-2.41	10.73	14.30	5.46	11.09	23.07	2.53	27,752	21,228	51,338
3	24,143	-2.30	9.83	13.62	4.85	10.35	22.28	2.12	27,996	21,071	50,959
4	23,288	-2.25	8.85	12.56	4.50	9.57	20.83	1.86	29,064	21,423	51,809
5	22,052	-2.17	7.93	11.54	4.24	8.84	19.46	1.65	29,594	21,438	51,846
6	21,618	-2.08	7.09	10.58	3.84	8.08	17.95	1.45	31,431	22,274	53,867
7	21,141	-2.04	6.31	9.69	3.49	7.42	16.50	1.30	33,179	23,203	56,113
8	18,588	-1.88	4.64	7.85	2.69	5.95	13.79	1.18	35,878	24,116	58,321
9	15,890	-1.75	2.86	5.58	1.84	4.25	10.14	1.09	42,165	27,447	66,378
10	12,441	-1.55	1.49	3.54	1.13	2.69	7.69	0.70	51,185	31,626	76,484

Wage Subsidy to Young											
1	3,781	-0.42	2.01	2.82	0.86	2.10	3.82	0.51	2,851	2,577	6,231
2	5,516	-0.52	2.27	3.29	0.90	2.41	4.44	0.49	4,597	4,087	9,884
3	5,847	-0.56	2.31	3.52	0.82	2.51	4.80	0.46	5,191	4,544	10,990
4	5,101	-0.49	1.91	3.00	0.54	2.10	4.23	0.38	5,192	4,356	10,534
5	4,622	-0.45	1.58	2.71	0.37	1.85	3.95	0.33	5,366	4,348	10,515
6	4,391	-0.42	1.32	2.44	0.29	1.64	3.41	0.27	5,352	4,235	10,242
7	4,069	-0.39	1.07	2.15	0.19	1.43	3.15	0.25	5,737	4,424	10,698
8	4,292	-0.43	0.92	2.12	0.06	1.37	3.13	0.27	7,502	5,468	13,225
9	3,671	-0.40	0.48	1.54	-0.09	0.98	2.19	0.23	8,689	5,924	14,327
10	2,547	-0.32	0.14	0.89	-0.15	0.55	1.47	0.13	9,745	6,047	14,623
Negative Tax											
1	17,781	-1.96	11.80	11.90	5.00	9.89	20.45	2.73	17,790	13,809	33,395
2	21,833	-2.07	11.09	11.65	4.79	9.55	20.06	2.20	24,076	18,463	44,650
3	21,332	-2.03	10.52	11.41	4.34	9.15	19.82	1.89	24,780	18,751	45,348
4	21,009	-2.03	9.83	10.73	4.08	8.64	19.15	1.71	26,654	19,692	47,624
5	20,459	-2.01	9.18	10.16	3.89	8.21	18.60	1.57	28,257	20,497	49,570
6	20,611	-1.99	8.69	9.52	3.60	7.71	17.89	1.44	31,393	22,203	53,695
7	20,964	-2.02	8.44	9.00	3.32	7.36	17.33	1.37	34,970	24,369	58,934
8	20,139	-2.03	7.56	7.85	2.69	6.45	16.04	1.37	41,992	28,059	67,857
9	20,767	-2.28	7.96	6.18	1.98	5.55	14.20	1.52	59,967	38,417	92,907
10	20,374	-2.54	7.75	4.45	1.43	4.40	12.50	1.14	84,913	51,427	124,370

Table E. 10: Simulation Results by Income Decile, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
1	3,082	-3.43	7.00	10.25	-0.39	5.94	17.60	7.98	6,082	3,655	8,840
2	2,553	-2.70	6.42	10.05	-0.53	5.76	16.46	4.85	5,206	3,162	7,648
3	2,149	-2.33	5.36	9.05	0.13	5.44	15.57	3.79	4,594	2,770	6,700
4	2,473	-2.30	4.90	8.58	0.25	5.25	14.79	3.27	5,510	3,309	8,003
5	2,345	-1.92	4.53	8.49	-0.81	4.78	13.41	2.67	5,690	3,356	8,116
6	2,139	-1.83	4.07	7.82	-0.82	4.44	12.89	2.49	5,639	3,288	7,951
7	2,034	-1.68	3.42	6.58	-0.80	3.95	10.86	2.12	5,983	3,410	8,246
8	1,947	-1.51	2.19	5.13	-1.94	2.83	8.41	2.03	8,035	4,359	10,541
9	1,864	-1.42	0.73	3.35	-2.75	1.57	6.18	2.13	13,713	6,985	16,893
10	1,599	-1.32	0.13	2.58	-2.01	1.27	5.65	1.41	14,343	7,368	17,819
Wage Subsidy to Young											
1	411	-0.46	1.21	1.79	-0.74	0.79	2.26	1.03	720	470	1,137
2	409	-0.43	1.00	2.32	-1.07	0.92	3.11	0.92	933	597	1,445
3	293	-0.32	0.69	1.77	-0.76	0.74	2.31	0.56	627	412	995
4	308	-0.29	0.64	1.46	-0.59	0.65	1.97	0.44	652	441	1,066
5	298	-0.24	0.57	1.62	-0.93	0.61	2.18	0.43	886	547	1,322
6	286	-0.24	0.51	1.71	-1.15	0.59	2.07	0.40	907	528	1,277

7	223	-0.18	0.27	1.33	-1.20	0.43	2.05	0.40	1,174	642	1,552
8	251	-0.20	0.19	1.42	-1.88	0.36	1.87	0.45	1,947	969	2,343
9	353	-0.27	-0.03	1.30	-2.20	0.30	1.76	0.61	4,132	1,995	4,825
10	277	-0.23	-0.07	0.77	-1.27	0.22	1.13	0.28	2,930	1,479	3,576
Negative Tax											
1	2,577	-2.87	7.35	8.11	-0.32	4.97	14.92	6.76	5,183	3,099	7,495
2	2,235	-2.36	7.05	8.40	-0.51	5.04	15.02	4.43	4,782	2,887	6,983
3	1,913	-2.07	6.41	7.69	-0.10	4.84	14.53	3.54	4,341	2,585	6,252
4	2,252	-2.10	6.01	7.44	0.06	4.78	14.35	3.18	5,440	3,212	7,767
5	2,179	-1.79	6.15	7.41	-1.00	4.44	13.67	2.72	5,924	3,421	8,272
6	2,065	-1.76	5.51	7.11	-0.85	4.29	13.69	2.64	6,101	3,491	8,443
7	1,982	-1.63	5.58	6.09	-1.38	3.85	12.32	2.41	7,085	3,865	9,347
8	2,106	-1.64	5.73	5.16	-3.05	3.06	11.07	2.68	11,161	5,735	13,870
9	2,477	-1.89	6.53	3.63	-4.52	2.08	9.47	3.27	22,221	10,713	25,909
10	2,538	-2.10	7.10	2.93	-3.66	2.01	9.28	2.31	24,744	12,090	29,237

Table E. 11: Simulation Results by Having Children, Married Women

	Additional Emp.	Not-Emp. (%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
No Child	32,499	-1.21	3.11	6.64	1.04	4.48	12.11	1.04	83,678	50,407	121,904
Infant	43,191	-2.17	8.76	12.19	4.39	9.81	15.33	1.49	51,523	42,496	102,772
Preschool	47,243	-2.40	8.35	11.57	4.80	9.40	15.28	1.55	58,920	46,183	111,688
Schoolage	102,288	-2.55	7.76	10.66	5.55	8.87	16.14	1.51	134,962	100,159	242,222
Young	54,846	-2.37	7.15	9.64	5.35	8.04	17.49	1.36	79,775	55,035	133,096
Adult	17,455	-1.36	7.71	10.31	4.46	8.18	18.26	0.76	24,966	17,132	41,432
Wage Subsidy to Young											
No Child	9,512	-0.35	0.38	2.37	-0.24	1.31	3.91	0.33	25,718	16,256	39,312
Infant	20,082	-1.01	3.74	5.90	1.74	4.56	6.35	0.62	19,881	17,604	42,573
Preschool	15,797	-0.80	2.70	4.02	1.31	3.14	4.16	0.42	14,354	12,581	30,426
Schoolage	11,212	-0.28	0.86	1.23	0.45	0.97	1.34	0.13	9,470	8,334	20,155
Young	112	0.00	0.02	0.02	0.01	0.02	0.03	0.00	108	91	219
Adult	13	0.00	0.01	0.01	0.00	0.01	0.01	0.00	11	10	23
Negative Tax											
No Child	32,954	-1.23	4.25	6.50	0.98	4.54	13.87	1.19	96,605	57,736	139,629
Infant	46,816	2.35	13.38	12.00	4.09	10.64	18.87	1.84	66,785	52,335	126,566
Preschool	48,206	2.45	12.08	10.67	4.53	9.59	17.67	1.80	71,626	53,418	129,186

Schoolage	98,199	2.45	10.40	9.29	5.21	8.52	17.07	1.59	147,364	105,938	256,199
Young	48,964	2.12	8.38	7.96	4.83	7.18	16.55	1.29	76,476	52,085	125,961
Adult	15,148	1.18	8.28	8.36	3.90	7.10	16.72	0.70	23,011	15,692	37,949

Table E. 12: Simulation Results by Having Children, Single Women

	Additional Employment	Not-Emp. (%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
No Child	12,914	-1.76	2.73	5.26	-2.23	2.89	8.07	2.36	51,698	28,099	67,955
Infant	588	-2.29	8.38	10.97	-1.35	7.28	14.44	2.71	920	623	1,507
Preschool	1,027	-3.09	5.82	8.53	-1.00	5.56	12.17	3.30	2,167	1,361	3,292
Schoolage	4,206	-2.89	4.45	7.08	0.79	4.77	12.26	3.04	10,233	6,060	14,656
Young	3,968	-2.60	3.60	6.56	1.55	4.42	13.27	2.55	10,439	5,964	14,424
Adult	2,888	-1.72	4.50	8.33	1.09	5.18	14.38	1.57	6,446	3,835	9,273
Wage Subsidy to Young											
No Child	2,557	-0.35	0.37	1.71	-1.81	0.57	2.14	0.63	13,984	7,461	18,045
Infant	212	-0.82	3.97	4.34	-1.99	2.62	4.45	0.84	270	192	465
Preschool	267	-0.80	2.15	2.45	-1.14	1.45	2.54	0.69	410	284	686
Schoolage	252	-0.17	0.44	0.54	-0.25	0.29	0.55	0.14	407	273	659

Young	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adult	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Negative Tax											
No Child	13,708	-1.86	6.53	5.12	-3.29	3.07	10.65	3.11	72,466	37,090	89,698
Infant	562	-2.19	10.71	9.65	-1.46	6.96	15.62	2.93	1,043	674	1,631
Preschool	1,002	-3.01	9.37	7.43	-1.28	5.42	13.40	3.63	2,485	1,499	3,624
Schoolage	3,960	-2.72	6.75	6.00	0.69	4.49	12.88	3.19	11,111	6,368	15,401
Young	3,537	-2.31	5.00	5.35	1.41	3.93	12.86	2.47	10,294	5,778	13,973
Adult	2,521	-1.50	5.29	6.74	1.01	4.52	13.61	1.48	6,167	3,629	8,777

Table E. 13: Simulation Results by Employment Status of Spouse

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Wage Subsidy To All											
Working Spouse											
Yes	179,154	-2.41	6.25	9.16	3.78	7.28	14.22	1.44	286,457	201,783	487,989
No	27,000	-1.12	6.99	10.10	2.56	7.21	16.98	0.90	43,540	28,835	69,734
Spouse Eligible for Work											
No	198,494	-2.21	6.34	9.23	3.68	7.29	14.40	1.38	316,757	222,254	537,495
Yes	7,660	-0.90	6.67	10.39	2.13	6.78	18.30	0.75	13,240	8,364	20,228
Employer or SelfEmployed Spouse											
No	185,847	-2.30	6.62	9.41	3.61	7.39	14.48	1.51	293,602	206,430	499,227
Yes	20,307	-1.15	4.46	8.16	3.39	6.33	14.85	0.68	36,395	24,188	58,496
Wage Subsidy to Young											
Working Spouse											
Yes	41,569	-0.56	1.33	2.39	0.37	1.69	3.10	0.31	57,871	44,036	106,496
No	2,269	-0.09	0.58	0.89	0.14	0.61	1.16	0.06	2,353	1,973	4,772
Spouse Eligible for Work											
No	43,285	-0.48	1.25	2.26	0.34	1.59	2.95	0.28	59,559	45,508	110,056
Yes	553	-0.06	0.33	0.81	0.13	0.49	1.10	0.05	664	501	1,213

Employer or SelfEmployed Spouse											
No	39,894	-0.49	1.27	2.26	0.36	1.59	2.93	0.31	54,288	41,715	100,884
Yes	3,944	-0.22	0.87	1.83	0.07	1.23	2.64	0.12	5,936	4,294	10,385
Negative Tax											
Working Spouse											
Yes	181,230	-2.44	9.19	8.52	3.54	7.36	16.09	1.63	333,337	228,298	552,111
No	24,040	-1.00	7.71	8.43	2.34	6.42	16.13	0.86	41,455	27,389	66,237
Spouse Eligible for Work											
No	198,861	-2.21	9.07	8.52	3.44	7.30	16.10	1.54	363,413	248,485	600,932
Yes	6,409	-0.75	6.62	8.24	1.95	5.67	15.76	0.65	11,379	7,202	17,416
Employer or SelfEmployed Spouse											
No	185,424	-2.30	9.47	8.63	3.37	7.37	16.11	1.68	335,626	229,799	555,742
Yes	19,846	-1.12	5.61	7.59	3.23	6.18	15.90	0.73	39,166	25,888	62,606

APPENDIX F

DESCRIPTIVE STATISTICS AND MICROSIMULATION RESULTS FOR EARLY CHILDHOOD BENEFITS

Table F. 1: Number of Students Enrolled in Preschool Education, 2004-2020

	Total Pre-Primary Education-Public	Total Pre-Primary Education-Private	Total Pre-Primary Education
2004-2005	389,143	38,058	427,201
2005-2006	492,262	49,102	541,364
2006-2007	580,336	60,513	640,849
2007-2008	634,994	66,768	701,762
2008-2009	733,775	70,990	804,765
2009-2010	892,735	87,919	980,654
2010-2011	1,015,391	100,427	1,115,818
2011-2012	1,058,904	110,652	1,169,556
2012-2013	953,209	124,724	1,077,933
2013-2014	923,599	135,905	1,059,495
2014-2015	985,013	171,648	1,156,661
2015-2016	1,011,789	191,670	1,209,106
2016-2017	1,124,727	201,396	1,326,123
2017-2018	1,264,733	236,355	1,501,088
2018-2019	1,306,139	258,674	1,564,813
2019-2020	1,340,507	289,213	1,629,720

Source: Ministry of National Education, 2009-2020 National Education Statistics: Formal Education Reports

Table F. 2: Share of Families with Preschool Age Children by Income Deciles

Deciles	Married	Single
1	34.43	12.18
2	29.00	4.64
3	24.02	4.21
4	20.81	2.21
5	17.41	2.50
6	15.81	1.32
7	13.94	1.43
8	12.63	2.42
9	14.59	1.17
10	14.92	1.00

Table F. 3: Share of Families with Preschool Age Children by Age Groups

Age Group	Married	Single
15-19	3.65	0.00
20-24	30.71	2.94
25-29	40.72	7.92
30-34	38.80	11.35
35-39	27.14	9.06
40-44	12.66	3.01
45-49	2.36	1.26
50-54	0.25	0.32
55-59	0.19	0.00
60-64	0.07	0.00

Table F. 4: Changes in Employment Status and Income (% and number)

	Not-Emp.	Part-Time	Full-Time	Over-Time	Emp (PT, FT, OT)	Wage Income	Disp. Income
Free Care for 3-6 Years Old Child							
Married							
Percentage	-2.36	1.81	7.64	13.54	9.52	8.02	0.74
The Number of Females	-231916	8944	122110	100861	-	-	-
Single							
Percentage	-0.43	-0.38	0.59	1.63	0.93	0.59	0.15
The Number of Females	-4798	-353	2159	2991	-	-	-
Unconditional Subsidy							
Married							
Percentage	-2.06	24.68	4.28	1.69	3.45	4.64	0.43
The Number of Females	-202538	121615	68339	12584	-	-	-
Single							
Percentage	-0.37	3.13	0.45	-0.22	0.23	0.30	0.08
The Number of Females	-4178	2917	1666	-405	-	-	-
Conditional Subsidy							
Married							
Percentage	-1.62	5.89	7.15	2.11	5.54	10.75	0.99
The Number of Females	-158914	29023	114201	15691	-	-	-
Single							
Percentage	-0.29	0.60	0.80	-0.10	0.50	1.05	0.27
The Number of Females	-3306	560	2938	-191	-	-	-

Table F. 5: Simulation Results by Age Groups, Married Women

	Additional Emp.	Not-Emp. (%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
15-19	114	-0.25	0.10	0.87	3.40	1.76	2.01	0.13	758	49	118
20-24	11,651	-2.37	4.65	6.67	22.56	11.36	9.28	0.90	72,995	4,721	11,417
25-29	55,930	-4.61	4.79	10.53	27.81	13.99	10.68	1.45	262,855	26,749	64,690
30-34	78,694	-5.32	2.05	12.81	24.51	13.62	12.58	1.73	319,404	45,842	110,863
35-39	58,952	-4.01	1.62	9.72	15.81	9.68	9.83	1.21	225,587	35,335	85,454
40-44	23,163	-1.81	1.19	4.73	6.59	4.58	4.92	0.50	90,395	13,272	32,098
45-49	3,176	-0.27	0.50	0.89	1.17	0.91	0.78	0.06	14,243	1,331	3,218
50-54	184	-0.02	0.08	0.08	0.13	0.09	0.07	0.00	1,293	63	152
55-59	50	-0.01	0.06	0.06	0.09	0.07	0.05	0.00	734	15	37
60-64	1	0.00	0.01	0.01	0.00	0.01	0.01	0.00	211	0	1
Unconditional Subsidy											
15-19	80	-0.18	3.58	1.25	0.32	1.24	1.12	0.07	758	27	66
20-24	10,679	-2.17	37.34	7.43	3.02	10.41	6.56	0.63	72,995	3,339	8,074
25-29	54,730	-4.51	50.72	8.86	2.39	13.69	7.52	1.02	262,855	18,840	45,562
30-34	71,399	-4.82	42.69	6.99	2.78	12.36	7.44	1.02	319,404	27,099	65,536
35-39	46,922	-3.19	26.43	3.92	2.65	7.70	4.95	0.61	225,587	17,804	43,058
40-44	16,521	-1.29	11.51	1.65	1.14	3.27	2.23	0.23	90,395	6,021	14,562
45-49	2,067	-0.18	2.02	0.37	0.17	0.59	0.36	0.03	14,243	605	1,464

50-54	123	-0.01	0.23	0.04	0.01	0.06	0.04	0.00	1,293	31	76
55-59	15	0.00	0.07	0.02	-0.01	0.02	0.01	0.00	734	4	9
60-64	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	211	0	0
Conditional Subsidy											
15-19	86	-0.19	0.92	2.64	0.01	1.33	2.95	0.18	89	72	173
20-24	10,048	-2.04	11.58	13.64	2.33	9.80	15.14	1.46	9,489	7,705	18,634
25-29	45,076	-3.71	12.97	14.45	2.75	11.28	16.46	2.24	53,530	41,231	99,712
30-34	54,334	-3.67	9.42	11.65	3.73	9.41	17.07	2.34	87,242	62,185	150,388
35-39	35,210	-2.40	5.98	6.65	3.47	5.78	11.95	1.47	62,829	42,974	103,928
40-44	12,408	-0.97	2.88	2.76	1.49	2.46	5.55	0.56	22,428	14,974	36,212
45-49	1,635	-0.14	0.63	0.56	0.22	0.47	0.92	0.07	2,372	1,567	3,788
50-54	100	-0.01	0.10	0.06	0.01	0.05	0.09	0.00	104	74	178
55-59	16	0.00	0.03	0.04	0.00	0.02	0.05	0.00	23	14	34
60-64	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	1

Table F. 6: Simulation Results by Age Groups, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
15-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-24	115	-0.37	0.09	0.21	0.71	0.33	0.19	0.11	769	45	109
25-29	866	-2.50	-0.65	0.67	2.64	0.96	0.60	0.36	3,954	469	1,134
30-34	1,369	-2.93	-1.23	1.07	3.45	1.46	1.04	0.55	6,382	810	1,959
35-39	1,509	-2.46	-0.55	1.16	3.02	1.52	1.15	0.56	5,816	879	2,127
40-44	565	-0.63	-0.59	0.44	1.14	0.54	0.45	0.16	2,347	340	823
45-49	278	-0.23	-0.14	0.25	0.59	0.30	0.19	0.05	1,085	113	272
50-54	97	-0.05	-0.08	0.05	0.42	0.14	0.09	0.01	340	37	90
55-59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60-64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unconditional Subsidy											
15-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-24	150	-0.49	2.54	0.26	-0.33	0.43	0.15	0.08	769	36	86
25-29	1,023	-2.96	7.85	0.73	-1.17	1.13	0.40	0.24	3,954	309	747
30-34	1,174	-2.51	8.30	0.91	-0.78	1.25	0.53	0.28	6,382	410	990
35-39	1,119	-1.82	5.85	0.75	0.10	1.13	0.53	0.26	5,816	407	984
40-44	415	-0.46	2.24	0.17	0.10	0.39	0.17	0.06	2,347	126	305
45-49	203	-0.17	0.99	0.11	0.05	0.22	0.09	0.02	1,085	54	130
50-54	94	-0.05	0.42	0.14	-0.07	0.13	0.06	0.01	340	24	59
55-59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60-64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Conditional Subsidy											
15-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-24	126	-0.41	0.81	0.53	-0.24	0.36	0.41	0.23	136	98	237
25-29	779	-2.25	1.63	1.31	-0.82	0.86	1.23	0.73	1,481	952	2,301
30-34	944	-2.02	1.43	1.58	-0.52	1.01	1.95	1.03	2,560	1,515	3,663
35-39	903	-1.47	1.16	1.21	0.22	0.91	1.76	0.86	2,224	1,344	3,251
40-44	330	-0.37	0.33	0.40	0.16	0.31	0.76	0.28	1,031	574	1,389
45-49	158	-0.13	0.18	0.23	0.08	0.17	0.36	0.09	371	209	506
50-54	67	-0.03	0.06	0.19	-0.05	0.09	0.27	0.04	205	107	260
55-59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60-64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table F. 7: Simulation Results by Age Groups, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
No diploma	28,192	-1.64	6.27	11.09	14.78	11.50	11.95	0.50	170,410	9,303	22,499
Primary School	55,219	-1.39	2.85	6.13	8.06	6.14	6.41	0.37	238,401	21,301	51,513
Secondary School	46,399	-3.20	5.70	12.67	22.42	14.48	15.00	1.01	215,859	19,265	46,589
High School	30,679	-3.11	3.06	9.52	16.40	10.23	10.72	0.80	117,462	15,239	36,854
Vocational	21,238	-3.43	2.75	9.49	17.22	10.32	10.73	0.93	77,998	11,063	26,755
2-year higher	13,959	-3.54	0.03	6.25	12.95	6.62	6.97	0.93	46,437	10,055	24,317

4+ higher	36,230	-5.29	-3.21	5.52	14.17	5.54	6.23	1.19	121,906	41,152	99,521
Unconditional Subsidy											
No diploma	29,036	-1.69	37.82	8.51	3.22	11.85	9.51	0.40	170,410	7,410	17,919
Primary School	50,846	-1.28	18.88	3.66	1.61	5.65	4.49	0.26	238,401	14,926	36,098
Secondary School	45,247	-3.12	47.62	9.84	3.02	14.12	11.08	0.74	215,859	14,229	34,411
High School	26,303	-2.66	30.13	5.53	1.66	8.77	6.78	0.50	117,462	9,637	23,306
Vocational	18,501	-2.99	31.32	5.67	1.29	8.99	6.83	0.59	77,998	7,040	17,026
2-year higher	10,491	-2.66	18.87	2.56	0.53	4.97	3.60	0.48	46,437	5,190	12,552
4+ higher	22,114	-3.23	14.32	1.16	0.34	3.38	2.32	0.44	121,906	15,339	37,095
Conditional Subsidy											
No diploma	24,690	-1.44	11.73	13.94	3.75	10.07	21.87	0.91	22,648	17,035	41,196
Primary School	40,497	-1.02	5.06	5.70	2.00	4.50	10.29	0.59	47,279	34,212	82,738
Secondary School	37,308	-2.57	12.70	16.13	3.36	11.64	24.51	1.65	41,065	31,481	76,132
High School	20,446	-2.07	7.06	8.97	2.09	6.82	15.16	1.13	29,302	21,555	52,128
Vocational	14,221	-2.30	7.14	9.19	1.77	6.91	15.07	1.31	20,993	15,544	37,591
2-year higher	7,490	-1.90	3.37	4.53	0.95	3.55	8.23	1.10	16,799	11,859	28,679
4+ higher	14,262	-2.08	1.60	2.75	0.76	2.18	5.92	1.13	60,022	39,111	94,585

Table F. 8: Simulation Results by Subsidy Type, Single Women

	Additional Emp.	Not-Emp. (%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
No diploma	926	-0.36	-0.55	1.48	3.14	1.73	1.96	0.14	4,249	331	801
Primary School	997	-0.22	-0.08	0.64	1.15	0.69	0.75	0.08	4,119	403	975
Secondary School	1,071	-1.02	-0.10	1.86	3.45	2.18	2.26	0.36	4,229	474	1,147
High School	754	-0.63	-0.10	1.05	2.25	1.24	1.27	0.21	2,928	397	959
Vocational	299	-0.52	-1.05	0.65	1.84	0.79	0.87	0.19	1,474	180	436
2-year higher	131	-0.33	-0.17	0.23	0.60	0.28	0.28	0.10	492	104	252
4+ higher	620	-0.65	-0.63	0.23	0.81	0.24	0.29	0.15	3,202	804	1,944
Unconditional Subsidy											
No diploma	1,050	-0.41	7.19	1.57	-0.25	1.96	1.43	0.10	4,249	241	583
Primary School	844	-0.19	1.95	0.52	0.00	0.59	0.45	0.05	4,119	244	590
Secondary School	909	-0.87	8.52	1.73	-0.46	1.85	1.35	0.21	4,229	283	685
High School	627	-0.52	4.41	0.89	-0.39	1.03	0.74	0.12	2,928	231	559
Vocational	225	-0.39	4.38	0.51	-0.91	0.60	0.28	0.06	1,474	58	141
2-year higher	104	-0.26	1.09	0.21	-0.16	0.22	0.15	0.05	492	55	134
4+ higher	421	-0.44	1.32	0.05	-0.13	0.17	0.09	0.05	3,202	252	610
Conditional Subsidy											
No diploma	816	-0.32	1.67	2.93	-0.05	1.52	4.89	0.35	1,391	826	1,998
Primary School	704	-0.16	0.44	0.82	0.06	0.49	1.44	0.16	1,252	774	1,873
Secondary School	739	-0.71	2.02	2.66	-0.21	1.50	4.17	0.66	1,395	873	2,112

High School	504	-0.42	0.95	1.37	-0.25	0.83	2.13	0.36	1,032	666	1,610
Vocational	182	-0.32	0.38	1.15	-0.60	0.48	1.80	0.40	678	372	899
2-year higher	76	-0.19	0.16	0.29	-0.12	0.16	0.42	0.15	247	156	378
4+ higher	285	-0.30	0.08	0.18	-0.07	0.11	0.41	0.22	2,014	1,132	2,738

Table F. 9: Simulation Results by Income Decile, Married Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
1	28,712	-3.17	7.33	15.36	22.74	15.97	16.65	2.22	149,447	11,242	27,187
2	30,836	-2.93	5.36	12.58	20.02	13.49	14.08	1.54	148,782	12,952	31,323
3	26,265	-2.50	4.34	10.56	16.52	11.26	12.13	1.15	123,177	11,473	27,746
4	24,007	-2.32	3.63	9.31	14.54	9.87	10.32	0.92	106,533	10,618	25,678
5	20,843	-2.05	2.83	7.71	12.86	8.36	8.74	0.74	88,128	9,630	23,290
6	20,363	-1.96	2.32	7.15	11.71	7.61	8.11	0.65	82,523	10,065	24,341
7	18,930	-1.83	1.66	6.43	10.22	6.64	7.26	0.57	73,686	10,218	24,710
8	18,129	-1.83	0.68	5.45	9.89	5.80	6.46	0.55	65,764	11,298	27,322
9	21,419	-2.35	-1.33	5.72	11.32	5.72	6.66	0.71	74,907	18,011	43,557
10	22,410	-2.79	-1.83	4.74	10.82	4.84	5.32	0.48	75,527	21,872	52,894
Unconditional Subsidy											
1	29,407	-3.25	51.09	10.48	4.32	16.36	12.63	1.68	149,447	8,529	20,627
2	30,347	-2.88	43.40	8.78	3.35	13.27	10.20	1.12	148,782	9,389	22,705

3	25,396	-2.42	36.70	7.19	2.54	10.89	8.60	0.82	123,177	8,131	19,665
4	22,432	-2.16	30.58	6.20	2.30	9.22	7.10	0.63	106,533	7,304	17,663
5	18,940	-1.86	26.00	4.99	1.71	7.60	5.85	0.49	88,128	6,443	15,581
6	18,121	-1.75	23.37	4.36	1.45	6.77	5.13	0.41	82,523	6,368	15,401
7	15,826	-1.53	19.39	3.42	1.15	5.55	4.23	0.33	73,686	5,949	14,386
8	14,522	-1.47	16.70	2.83	0.81	4.65	3.48	0.30	65,764	6,093	14,734
9	14,928	-1.64	15.33	1.88	0.53	3.99	2.90	0.31	74,907	7,842	18,964
10	12,618	-1.57	11.47	1.05	0.40	2.73	1.88	0.17	75,527	7,724	18,680
Conditional Subsidy											
1	23,912	-2.64	15.10	17.13	5.18	13.30	27.68	3.69	24,560	18,692	45,204
2	24,878	-2.36	12.05	14.26	4.01	10.88	22.67	2.49	27,549	20,866	50,461
3	20,558	-1.96	9.79	11.75	3.03	8.82	18.94	1.80	23,639	17,913	43,319
4	18,243	-1.76	8.03	9.93	2.72	7.50	15.76	1.41	21,525	16,214	39,211
5	15,017	-1.48	6.40	7.98	2.07	6.02	13.06	1.10	19,484	14,388	34,796
6	14,237	-1.37	5.62	7.05	1.80	5.32	11.60	0.93	19,755	14,399	34,822
7	12,224	-1.18	4.38	5.64	1.48	4.29	9.65	0.76	18,849	13,574	32,827
8	10,952	-1.11	3.34	4.68	1.07	3.51	8.08	0.69	20,042	14,127	34,165
9	10,477	-1.15	2.32	3.68	0.88	2.80	7.24	0.78	29,445	19,602	47,404
10	8,415	-1.05	1.34	2.32	0.72	1.82	5.11	0.47	33,257	21,022	50,840

Table F. 10: Simulation Results by Income Decile, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
1	1,574	-1.75	-0.78	2.35	5.55	3.03	3.06	1.39	6,900	635	1,537
2	702	-0.74	-0.09	1.44	2.49	1.58	1.67	0.49	2,580	321	777
3	566	-0.61	-0.23	1.24	2.49	1.43	1.48	0.36	2,219	263	636
4	352	-0.33	0.22	0.73	1.03	0.75	0.66	0.14	1,365	147	355
5	424	-0.35	-0.73	0.61	2.07	0.86	0.92	0.18	1,708	230	556
6	170	-0.14	-0.19	0.37	0.59	0.35	0.44	0.08	872	111	269
7	142	-0.12	-0.88	0.23	0.99	0.28	0.38	0.07	990	118	285
8	361	-0.28	-0.67	0.51	1.21	0.52	0.59	0.14	1,907	305	738
9	267	-0.20	-0.31	0.20	0.58	0.22	0.23	0.08	1,165	263	637
10	242	-0.20	-0.18	0.19	0.41	0.19	0.23	0.06	985	299	724
Unconditional Subsidy											
1	1,713	-1.91	14.86	2.57	-0.51	3.30	2.21	1.00	6,900	459	1,110
2	551	-0.58	4.59	1.24	-0.15	1.24	0.96	0.28	2,580	184	444
3	478	-0.52	4.85	1.00	-0.17	1.21	0.85	0.21	2,219	152	368
4	244	-0.23	1.54	0.50	0.05	0.52	0.36	0.08	1,365	81	197
5	383	-0.31	3.80	0.66	-0.56	0.78	0.46	0.09	1,708	114	277
6	130	-0.11	1.54	0.22	-0.27	0.27	0.18	0.03	872	46	112
7	148	-0.12	2.25	0.08	-0.38	0.29	0.12	0.02	990	39	95
8	220	-0.17	2.05	0.14	-0.22	0.32	0.18	0.04	1,907	92	223

9	188	-0.14	0.93	0.10	-0.12	0.16	0.09	0.03	1,165	102	247
10	123	-0.10	0.54	0.05	-0.03	0.10	0.07	0.02	985	95	231
Conditional Subsidy											
1	1,350	-1.51	3.61	4.31	-0.15	2.60	6.83	3.10	2,290	1,419	3,432
2	466	-0.49	1.12	1.81	-0.03	1.05	2.85	0.84	862	547	1,323
3	388	-0.42	0.96	1.65	0.00	0.98	2.76	0.67	795	492	1,189
4	213	-0.20	0.46	0.69	0.08	0.45	0.96	0.21	316	215	519
5	284	-0.23	0.55	1.19	-0.35	0.58	1.91	0.38	846	478	1,157
6	109	-0.09	0.22	0.49	-0.19	0.23	0.76	0.15	322	193	466
7	101	-0.08	0.10	0.46	-0.25	0.20	0.94	0.18	568	295	713
8	166	-0.13	0.20	0.41	-0.11	0.24	0.91	0.22	855	472	1,141
9	138	-0.11	0.08	0.20	-0.08	0.12	0.35	0.12	674	394	953
10	89	-0.07	0.07	0.10	-0.01	0.07	0.23	0.06	480	295	714

Table F. 11: Simulation Results by Having Children, Married Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
No Child	-	-	-	-	-	-	-	-	-	-	-
Infant	48,120	-2.42	4.53	10.51	18.67	10.93	9.07	0.88	292,682	25,160	60,847
Preschool	231,916	-11.78	8.62	42.59	89.88	46.13	42.13	4.29	988,474	127,378	308,048
Schoolage	121,366	-3.03	3.48	10.18	16.90	10.53	9.83	0.92	548,311	60,977	147,465
Young	29,811	-1.29	2.01	4.40	5.81	4.37	4.07	0.32	128,051	12,823	31,010
Adult	3,711	-0.29	1.01	1.85	2.02	1.74	1.53	0.06	19,396	1,436	3,473
Unconditional Subsidy											
No Child	-	-	-	-	-	-	-	-	-	-	-
Infant	45,138	-2.27	30.42	5.51	2.52	10.26	5.66	0.55	292,682	15,692	37,950
Preschool	202,538	-10.29	117.15	23.83	11.21	40.28	24.40	2.48	988,474	73,771	178,406
Schoolage	106,119	-2.65	28.89	5.40	2.64	9.21	5.82	0.54	548,311	36,099	87,300
Young	23,814	-1.03	11.45	2.13	1.18	3.49	2.36	0.18	128,051	7,414	17,929
Adult	2,739	-0.2	3.9	0.8	0.4	1.3	0.9	0.0	19,396	806	1,949
Conditional Subsidy											
No Child	-	-	-	-	-	-	-	-	-	-	-
Infant	36,961	-1.86	9.24	10.01	3.11	8.40	11.78	1.15	40,582	32,656	78,975
Preschool	158,914	-8.07	27.96	39.83	13.98	31.61	56.49	5.75	238,107	170,796	413,049
Schoolage	84,096	-2.10	7.59	8.88	3.33	7.30	13.15	1.23	111,542	81,611	197,367
Young	18,843	-0.81	3.12	3.27	1.49	2.76	5.59	0.44	25,135	17,589	42,536
Adult	2,206	-0.17	1.23	1.23	0.52	1.03	1.99	0.08	2,607	1,864	4,508

Table F. 12: Simulation Results by Having Children, Single Women

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp. (%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
No Child	-	-	-	-	-	-	-	-	-	-	-
Infant	662	-2.58	2.09	7.02	15.15	8.20	6.73	1.26	3,606	291	703
Preschool	4,798	-14.42	-11.95	20.36	60.86	25.98	24.09	6.52	20,693	2,693	6,514
Schoolage	2,555	-1.76	-0.47	2.53	5.17	2.90	2.63	0.65	10,847	1,302	3,148
Young	1,090	-0.71	-0.34	1.00	2.13	1.21	1.06	0.20	4,256	476	1,152
Adult	132	-0.08	0.01	0.20	0.40	0.24	0.17	0.02	449	46	111
Unconditional Subsidy											
No Child	-	-	-	-	-	-	-	-	-	-	-
Infant	653	-2.54	28.49	5.29	-0.90	8.09	4.16	0.78	3,606	180	434
Preschool	4,178	-12.56	98.82	15.71	-8.24	22.62	12.21	3.31	20,693	1,365	3,302
Schoolage	2,116	-1.46	10.14	1.78	-0.23	2.40	1.38	0.34	10,847	683	1,651
Young	836	-0.55	4.05	0.67	0.09	0.93	0.56	0.11	4,256	250	605
Adult	72	-0.04	0.35	0.11	0.05	0.13	0.07	0.01	449	19	46
Conditional Subsidy											
No Child	-	-	-	-	-	-	-	-	-	-	-
Infant	539	-2.10	9.48	8.89	-0.09	6.67	10.30	1.93	622	445	1,075
Preschool	3,306	-9.94	18.97	27.71	-3.89	17.90	42.93	11.62	8,008	4,800	11,608
Schoolage	1,731	-1.19	2.38	2.93	0.03	1.96	4.28	1.06	3,368	2,114	5,113
Young	684	-0.45	0.80	1.13	0.20	0.76	1.96	0.38	1,500	881	2,130
Adult	60	-0.04	0.08	0.15	0.06	0.11	0.27	0.03	129	72	175

Table F. 13: Simulation Results by Employment Status of Spouse

	Additional Emp.	Not-Emp.(%)	Part-Time Emp. (%)	Full-Time Emp.(%)	Over-Time Emp.(%)	Change in Emp. (%)	Change in Wage Income (%)	Change in Disposable Income (%)	Total Public Cost (1000 TL)	Total Public Revenue (1000 TL)	Change in Total Wage Income (1000 TL)
Free Care for 3-6 Years Old Child											
Working Spouse											
Yes	216,444	-2.92	1.84	8.09	15.07	8.79	8.45	0.86	916,160	119,940	290,060
No	15,472	-0.64	1.64	4.34	5.23	4.13	4.38	0.23	72,313	7,438	17,988
Spouse Eligible for Work											
No	226,536	-2.52	1.82	7.75	13.97	8.32	8.12	0.78	967,236	125,227	302,845
Yes	5,380	-0.63	1.81	4.56	6.21	4.76	4.71	0.19	21,237	2,151	5,203
Employer or Self-Employed Spouse											
No	195,004	-2.42	1.05	7.10	13.44	7.75	7.63	0.80	815,118	108,801	263,123
Yes	36,912	-2.09	7.12	11.78	14.42	11.50	11.41	0.52	173,355	18,577	44,925
Unconditional Subsidy											
Working Spouse											
Yes	188,829	-2.54	26.67	4.54	1.86	7.67	4.88	0.49	916,160	69,309	167,615
No	13,709	-0.57	12.22	2.36	0.77	3.66	2.63	0.14	72,313	4,462	10,791
Spouse Eligible for Work											
No	198,553	-2.21	25.17	4.32	1.72	7.29	4.70	0.45	967,236	72,512	175,361
Yes	3,985	-0.47	10.78	3.11	1.14	3.53	2.76	0.11	21,237	1,259	3,046

Employer or Self-Employed Spouse											
No	186,245	-2.31	26.37	4.31	1.74	7.41	4.75	0.50	815,118	67,678	163,672
Yes	16,292	-0.92	12.93	4.01	1.21	5.08	3.74	0.17	173,355	6,093	14,735
Conditional Subsidy											
Working Spouse											
Yes	148,009	-1.99	6.29	7.59	2.31	6.01	11.32	1.15	224,201	160,640	388,488
No	10,905	-0.45	3.39	3.91	0.98	2.91	5.98	0.32	13,906	10,156	24,561
Spouse Eligible for Work											
No	155,521	-1.73	6.00	7.24	2.16	5.71	10.86	1.04	233,347	167,557	405,216
Yes	3,393	-0.40	2.63	4.45	1.27	3.00	7.09	0.29	4,760	3,239	7,833
Employer or Self-Employed Spouse											
No	144,466	-1.79	6.19	7.30	2.16	5.74	10.82	1.13	213,617	154,239	373,007
Yes	14,448	-0.82	3.76	5.94	1.59	4.50	10.17	0.46	24,490	16,557	40,042

APPENDIX G

CURRICULUM VITAE

SİNE TUÇ

E-mail:

RESEARCH INTEREST

Microeconomics, Microeconometrics, Microsimulation, Labor Economics, Social Policies, Agent-Based Models, Economic Policy Analysis.

EDUCATION

B.S., Anadolu University, Economics, 2020.
M.S., Middle East Technical University, Economics, 2011.
B.S., Ankara University, Faculty of Political Science, Public Administration, 2005.

PROFESSIONAL EXPERIENCE

Assistant Manager, T. Vakıflar Bankası T.A.O, 2017 -Present
Specialist, T. Vakıflar Bankası T.A.O, 2013-2017
Associate Specialist, T. Vakıflar Bankası T.A.O, September 2010-2013
Research Assistant, TEPAV- 2010.

COMPUTER SKILLS

Eviews, Microsoft Office, MiniTab, Power BI, R Programming, RStudio, SPSS, STATA, Tableau

LINGUISTIC

Turkish: Native
English: Fluent

REFERENCES

Available upon request

APPENDIX H

TURKISH SUMMARY / TÜRKÇE ÖZET

Giriş

Kadın işgücü arzı, ekonomik ve sosyal alanda çeşitli açılardan politika yapıcıların, iktisatçıların ve kadın örgütlerinin ilgisini giderek daha fazla çeken önemli bir konu haline gelmiştir. "Kadın işgücü arzı", kadınların işgücü piyasasına sunmaya istekli oldukları ve sunabilecekleri toplam çalışma saatini veya miktarını ifade eden geniş bir kavramdır. Bu kavram, kadınların işgücüne katılım ve çalışma saatleri konusundaki kararlarını etkileyen eğitim, beceriler, sosyal ve ekonomik koşullar, bakım ve diğer ev sorumlulukları gibi faktörleri göz önünde bulundurur.

Kadın işgücü arzı, ekonomik kalkınmanın önemli belirleyicilerinden biridir. Kadın işgücü arzı arttıkça, ekonomiler beşeri sermaye kapasitelerini daha fazla kullanabilecek ve bu da verimliliğin ve ekonomik kalkınmanın artmasına yol açacaktır. Kadınlar daha fazla çalıştıkça veya işgücüne katıldıkça hane içinde ekonomik bağımsızlıklarına kavuşacaklar ve böylece aile içindeki gelir eşitsizliği azalmış olacaktır. Artan kadın işgücü arzı ile, hanehalkının yoksulluğu azalmakta ve ailelerin yaşam koşulları standardı artmaktadır. Öte yandan, kadın işgücü arzı, işyerinde toplumsal cinsiyet eşitliği ve toplumda kadına yüklenen sosyal engellerin yıkılması için elzemdir. Diğer bir yandan, kadınların daha fazla iş hayatında olması ve işgücü arzını arttırmaları, kadınların bakım ve ev işlerinden sorumlu olduğunun varsayıldığı toplumsal ve geleneksel normların değişmesinde de önemli bir rol oynamaktadır. Tüm bu faktörler düşünüldüğünde, özellikle Türkiye gibi ülkeler için kadının işgücü arzının artırılması önemli bir konu haline gelmektedir.

Kadın işgücü arzı, yukarıda sayılan bu etmenler dolayısıyla, Dünya Bankası (WB), Birleşmiş Milletler (BM) ve Uluslararası Çalışma Örgütü (ILO) gibi hükümetler ve hükümetler arası kuruluşların gündeminde yer almaktadır. Kadın işgücü arzını artırmaya yönelik sosyal politikalar, Türkiye'de ekonomik kalkınma ve sosyal refahın ve toplumsal cinsiyet eşitliğinin iyileştirilmesi için önceliklerden biri olması nedeniyle, son yirmi yılda Türk hükümetinin ekonomi politikası gündeminin öne çıkan konularından biri olmuştur. Bu nedenle, hangi politikaların kadın istihdamını ve katılım oranlarını etkili bir şekilde artırabileceğini anlamak için, politika yapıcılar tarafından yapısal işgücü arzı modellemesi gibi uygun yöntemler kullanılarak ve potansiyel politika senaryolarının mikrosimülasyon modeli ile test edilerek *ex-ante* olarak kadın işgücü arzı iyi analiz edilmelidir.

Bu tez, istihdam esnekliklerini yapısal kesikli işgücü arzı kullanarak tahmin eden ve Türkiye için mikrosimülasyon modellerini kullanarak sosyal ve vergi politikalarının kadınların işgücü arzı kararları ve geliri üzerindeki etkisini inceleyen ilk çalışmadır. Bu esnekliklerin gerçeğe yakınsayacak şekilde tahmin edilmesi, politikaları birçok açıdan değerlendirmek için gerekli ve önemlidir. Bu sebeple, çalışmanın literatür için önemli katkı sağladığını söylemek doğru olacaktır. Çalışmada, kadınların işgücü arzı durumlarını (çalışmama, yarı zamanlı çalışma, tam zamanlı çalışma ve fazla mesai çalışma) nasıl seçtiklerine ilişkin KDV indirimi, ücret teşviki ve 3-6 yaş küçük çocuğu olan kadınlara uygulanan teşvik politikaları olmak üzere üç ana sosyal ve vergi politikası incelenmektedir.

Mikrosimülasyon

Mevcut sosyo-ekonomik sistem modellemesine ilişkin çalışmalar statik ekonometrik tahminleme yöntemlerine dayanmaktadır. Bu çalışmalar, gerçekleşen veriyi kullanarak açıklayıcı ve bağımlı değişken arasındaki ilişkiyi tahmin edilen parametreleri kullanarak sistemi açıklamaya çalışmaktadır. Standart ekonometrik tahmin yöntemleri, gerçekleşen veriler ile tahmin edilen parametrelerin büyüklüğü ve işaretlerini kullanarak bir politika değişikliğine bağlı olarak bir bireyin işgücü arzının ne kadar etkilendiğini *ex-post* olarak anlamaya çalışmaktadır.

Yazılım ve programlama olanaklarının gelişmesiyle birlikte, mühendislik alanında yaygın olarak kullanılan simülasyon teknikleri, sosyal bilimlerde uygulanmaya başlamış ve son otuz yılda, İktisat alanında mikro birimler yani bireyler, firmalar, hane halkı vb. üzerindeki politika etki analizinde Mikrosimülasyon modelleri (MSM) kullanılarak *ex-ante* analizler yapılmaya başlanmıştır. Bu teknik sosyal bilimlerde 1950'de Guy Orcutt öncülüğünde kullanılmıştır. Orcutt ve meslektaşları bu yöntemi, mikro birimlerin özelliklerini ve davranışlarını dikkate alarak sosyal ve ekonomik politika uygulamalarının ileriye dönük etkilerini analiz etmek için geliştirmiştir (Figari vd., 2014). Ekonomide politika analizi için ilk mikrosimülasyon tohumları 1957'de Orcutt tarafından atılmış olsa da, çoğunlukla 1980'lerin başından beri kullanılmaktadır (Bourguignon & Spadaro, 2006). Mikrosimülasyon modelleme külfetli görüldüğü için birçok araştırmacı bu yöntemi kullanmayı tercih etmemiştir. Ancak 1990 yılında "Politika Geliştirme ve Karar Vermede Mikro Simülasyon Yöntemlerinin Kullanımı" adlı bir Panel yardımıyla bu yöntemin kullanımı hızlanmıştır (Anderson ve Hicks, 2011). Bazı kamu veya sosyal politikaların uygulanmadan önce etkilerini değerlendirmek için kullanılmaya başlanmıştır. Rasyonel politika analizinin geliştirilmesinde önemli bir rol oynamıştır. Bu aynı zamanda alternatif ve varsayımsal politikaların önceden incelenebileceği ve belirlenen amaç doğrultusunda hangi politikanın en iyi sonucu verebileceğinin önceden değerlendirilebileceği anlamına gelmektedir. Mikrosimülasyon modellemesi ile gerçek politikayı tanımlayan bir dizi parametre değiştirilerek politika değişikliği yapılabilir ve farklı politikaların sonuçları karşılaştırılabilir (Redmond ve diğerleri, 1998). Bu sebeple Mikrosimülasyon modelleri kullanılarak politika etki analizi yapılması son derece önemli hale gelmiştir.

Mikrosimülasyon modellerinin iki çeşidi vardır: statik ve dinamik mikrosimülasyon modelleri. Statik mikrosimülasyon modelleri temel olarak iki durum arasındaki farkı anlamaya yardımcı olur. Bu modellere "aritmetik" modeller de denmektedir. Bu modellerle, politika değişikliği sonucunda "ertesi sabah" etkileri izlenebilmektedir. Statik mikrosimülasyon modelleri, büyük ölçekli bir kesitsel veri setine dayanmaktadır. Creedy ve Duncan'da (2002) belirtildiği gibi, böyle bir veri seti kullanmanın avantajı, heterojenliğin birey ve hane düzeyinde kolayca elde edilebilmesidir. Dinamik mikrosimülasyon modelleri ise eğitim, evlilik, boşanma, çocuk sahibi olma, işgücü arzına katılım, emeklilik gibi önemli yaşam olaylarını değiştirerek bireylerin kişisel ve sosyo- ekonomik değişikliklerini hesaba katması bakımından statik modellerden farklıdırlar (Brown & Harding, 2002). Bu nedenle, dinamik mikrosimülasyon modellerinde, bireylerin yaşam olaylarındaki yıldan yıla değişiklikleri ortaya koyan büyük geçiş matrisleri hesaplanır. Dinamik mikrosimülasyon modelleri politika değişikliklerinin uzun dönemli etkilerini analiz etmek bakımından oldukça önemlidir.

Veri Seti

Bu çalışmada Türkiye İstatistik Kurumu (TÜİK)'nun 2004-2019 yılları arasındaki Hanehalkı Bütçe Anketi (HBA) mikro düzey verileri kullanılmıştır. Hanehalkı Bütçe Anketi, TÜİK tarafından 2002 yılından itibaren yıllık olarak yapılmaktadır. Yaş, eğitim, iş durumu, çalışma koşulları gibi sosyo-ekonomik özellikler hakkında bilgi içeren en önemli veri kaynağıdır. Ayrıca hanehalkının tüketim harcamaları ve detayları, hanehalkının gelir düzeyleri ve detayları, oturdukları evin özellikleri hakkında da bilgi verebilmektedir. Anket, hanehalkının özellikleri, çalışma durumu gibi koşullar ile hanenin çalışma saatleri, ücretler, toplam geliri ve kaynağı gibi koşulları takip edilerek tüketim alışkanlıkları, tüketim tercihleri ve kalıpları hakkında bilgi üretilmesi amaçlamaktadır. Ayrıca temel yıl ağırlıklarını elde eden tüketici fiyat endeksleri için kalemlerin belirlenmesini de amaçlamaktadır. Gerekli verileri derleyerek asgari ücret belirleme çalışmalarına yardımcı olmaktadır (TÜİK, Hanehalkı Bütçe Anketi Tüketim Harcamaları Birleşik Mikro Veri Seti-2017-2018-2019, 2020).

HBA, ülkedeki hanehalkı yapısını temsil edebilecek bir veri seti olduğundan, çalışma saatleri, tüketim, ücretler, diğer kazançlar ve gelir kaynakları hakkında birey ve hane bazında detaylı bilgileri içeren zengin bir veri seti olduğundan bu çalışmada tercih edilmiştir.

Çalışmaya en az bir tane 15-64 yaşında ve sağlık ya da zihinsel bir problem nedeniyle çalışma engeli olmayan birey içeren haneler dahil edilmiştir. Aynı zamanda, ücret karşılığında işgücü arzını değiştirme kabiliyetine sahip olacağı düşünülen tarım dışı sektörde çalışan haneler çalışmada yer almıştır. Eğer hanede en az bir tane tarım sektöründe çalışan birey var ise, bunların politika değişimi sonucu işgücü arzını değiştirmesi zor olacağı varsayıldığından, bu haneler çalışma kapsamına dahil edilmemiştir. Çalışma, farklı hane tiplerindeki kesikli seçim işgücü arzı davranışını incelemeyi amaçladığından “çift aile”, “hane reisi bekar kadın olan aile” ve “hane reisi bekar erkek olan aile” olmak üzere üç farklı aile tipi oluşturulmuştur. Bunun yanı sıra, politika değişikliklerinin ücretler ve işgücü arzı tercihleri üzerindeki etkisini netleştirebilmek için örneklem istihdam edilme durumuna göre örneklem “düzenli ücretli” ve “yevmiyeli” bireyleri içerecek şekilde sınırlandırılmıştır. Bu nedenle “işveren” ve “serbest meslek sahibi” gözlemleri örneklem dışında tutulmuştur. Ayrıca, “ücretsiz aile işçileri” “işsiz” olarak değerlendirilmiştir. Tüm bu düzenlemeler sonucunda örneklem 78,503’ü erkek ve 105,305’i kadın olmak üzere toplam 183,808 bireyden oluşmaktadır. Tahminlemeler ve analizler için, mikro veri setinde yer alan “FAKTOR” değişkenin sunduğu ağırlıklar kullanılmıştır. Bu ağırlık katsayıları Adrese Dayalı Nüfus Kayıt Sistemine göre revize edilen 2012 nüfus projeksiyonları esas alınarak hesaplanmaktadır.

Çalışmada kadınların sosyal ve vergi politikası değişiklikleri sonucundaki işgücü arzına ilişkin karar incelendiği için, haftalık çalışma saatleri dikkate alınarak dört işgücü arzı kategorisi belirlenmiştir: “Çalışmıyor”, “Yarı Zamanlı İstihdam”, “Tam Zamanlı İstihdam” ve “Fazla Zamanlı İstihdam”. HBA'da haftalık çalışma süresini ölçen değişken, bireyin asıl işindeki bir haftalık normal çalışma saatini belirtmektedir. Bu değişken, kişinin kendi "normal çalışma süresi" ifadesine göre ölçülmektedir. Kişinin belirli bir süre verememesi durumunda son dört haftalık fiili çalışma saatleri dikkate alınmaktadır. Çalışmaya uygun bir birey (15-64 yaş arasındaki çalışma engeli olmayan), haftada “0” saat çalışıyorsa o kişinin çalışmadığı varsayılmıştır. Haftada “1-30” saat arasında çalışanlar “kısmi zamanlı istihdam”; haftada “31-49” saat çalışanlar “tam zamanlı istihdam”, 50 saat ve üzeri çalışanlar “fazla zamanlı istihdam” kapsamında değerlendirilmiştir.

Vergi ve sosyal politikalar hanehalkının net gelirini etkilemektedir. Bireyler, politika uygulamalarının bir sonucu olarak hangi tür işgücü arzı durumlarında yer alacaklarına karar vermektedir. Politikaların işgücü arzı kararı üzerindeki etkilerini incelemek için, hanehalkı bireylerinin ücretlerinin bulunması önem taşımaktadır. Bu tezde kadınların işgücü arzı durumlarını, yani istihdam dışı, yarı zamanlı istihdam, tam zamanlı istihdam ve fazla mesai istihdamını sosyal veya vergi politikası nedeniyle nasıl seçtikleri incelenmektedir. Bunu inceleyebilmemiz için öncelikle tüm bireylerin ücretlerini tahmin etmemiz gerekmektedir.

Ücretleri bulmak için Heckman'ın (1979) “seçimi düzeltilmiş iki aşamalı ücret tahmin yöntemi” kullanılmıştır. Seçim kısmı, “işsiz” veya “iş piyasasında olmak” arasındaki seçimden oluşur. Bu nedenle, katılım kısmını tahmin etmek için probit modeli kullanılmış ve seçim düzeltmesi dikkate alınarak Mincer tipi ücret denkleminin genişletilmiş versiyonu tahmin edilmiştir.

Başlangıçta ücret modeli 2012 sonrası, 2004-2019 arası (2012 hariç), 2012 öncesi olmak üzere üç dönem için tahmin edilmiştir. Bu üç model genel anlamda birbirine çok benzemektedir. Tek fark, “bebek çocuk sayısı” ve “yıl” kukla değişkenlerinden kaynaklanmaktadır. “Bebek çocuk” kukla değişkeni, çocukların tam olarak tamamladıkları yaş olan 0-2 yaş kullanılarak oluşturulmuştur. 2006-2010 yılları arası için HBA mikro veri setinde tam olarak tamamlanma yaşı bilgisi bulunmadığından bu kukla değişken sadece 2013-2019 yılları için çalıştırılan modelde kullanılmıştır. Tahmin sonuçları ile üç modelin R^2 değerleri karşılaştırıldığında, 2012 sonrası için çalıştırılan model istatistiksel ve teorik olarak en iyi model olduğu sonucuna varılmıştır. Bu model, kadınların kazançlarındaki değişimin %62'sini açıklamaktadır. Bu nedenle çalışmanın devamında 2013-2019 yılları için oluşturulan model kullanılmıştır.

HBA veri seti, hanehalkı üyelerinin net gelirleri hakkında bilgi sağlamaktadır. Çalışmada 2013-2019 yıllarına ait verileri bir araya getirdikten sonra tüm parasal değerleri reel değere dönüştürmek amacıyla Tüketici Fiyat Endeksi (TÜFE, 2013 = 1) kullanılmıştır.

Yöntem

Bu çalışmada, fayda fonksiyonu yukarıda bahsedilen dört işgücü arzı kategorisi için oluşturulmuş, “Çalışmıyor” kategorisi baz kategori olarak tanımlanmıştır. Fayda fonksiyonu, bekar ve evli kadınlar olmak üzere iki demografik grup için ayrı ayrı tahmin edilmiştir. Fayda fonksiyonu olarak
Van Soest (1995) önerdiği şekilde “translog” formu kullanılmıştır; böylece ikinci dereceden değişkenler aracılığıyla azalan verimler hesaba katılmıştır.

Kesikli Seçim İşgücü Arzı modellemesi için "Multinomial Logit Modeli" kullanılmıştır. Multinomial Logit Modeli (MNLM), ikiden fazla sıralı ve niteliksel seçenek varsa, kesikli seçim modellemesi için tercih edilen bir modeldir. Her gözlem için her sonucun bir olasılık fonksiyonu olduğundan, model Maksimum Olabilirlik Tahmini (MLE) yöntemi kullanılarak tahmin edilebilir.

Kullanılan verilerden, farklı çalışma durumları için ücretler gözlemlenemediğinden, her bir birey için ücretlerin tahmin edilmesi gerekmektedir. Löffler ve diğ. (2018), ücret oranının nasıl tahmin edildiğinin, ayrık seçim işgücü arzı modelinden hesaplanan esnekliklerin değerini önemli ölçüde etkilediğini göstermektedir. Bu nedenle, bu çalışmada, ücret tahmin yönteminin işgücü arzı esneklikleri üzerindeki etkisini kontrol etmek için üç şekilde ücret oranı tahmini yapılmıştır: *"Beklenen Değere Sahip Ücret (Expected Wage*)", *"Koşulsuz Ücret (Unconditional Wage)", "Koşullu Ücret (Conditional Wage)".* Beklenen ücret için ücret denkleminden tahmin edilen değerler kullanılmıştır. Koşulsuz ve koşullu ücretler için, yapısal kesikli seçimli işgücü arzı modelleri iki kez tahmin edilmiştir. İlk durumda rassal tahmin hatası, ortalaması sıfır olan ve standart sapması ücret denkleminin hata teriminin standart sapmasına eşit olan bir normal dağılımdan çekilmiş ve seçim olasılıklarının hesaplanmasında integrali alınmıştır. Karşılaştırma yapabilmek adına her model için saat ve işgücü katılım esneklikleri hesaplanmıştır.

Tüm bireylerin ücretleri tahmin edildikten sonra "Yapısal Kesikli Seçim Modeli" kullanılarak kadınlar için işgücü arzı kararları incelenmiştir. Bekar ve evli kadınlar için ayrı ayrı tüm işgücü arzı kategorileri (Yarı Zamanlı İstihdam, Tam Zamanlı İstihdam ve Fazla Zamanlı İstihdam) için yaş, eğitim düzeyi, gelir düzeyi, çocuk durumu ve evli kadınların eşlerinin çalışma durumlarına göre *telafi edilmemiş çalışma saati ve işgücüne katılım* esneklikleri hesaplanmıştır.

Fayda fonksiyonu olarak yine üç farklı tipte fonksiyon denenmiştir: "Temel Model", "Gözlemlenmeyen Heterojenlik (Unobserved Heterogeneity)" ve "Gözlemlenen Heterojenlik (Observed Heterogeneity)" modelleri. Temel model, hanehalkının gelirini (I), ikinci dereceden terimini (I^2), çalışma saatlerini (H, boş zaman eşittir 24 eksi çalışılan saat) ve ikinci dereceden terimini (H^2), gelir ve çalışma saatinin çapraz çarpımını (I*H) ve Tam Zamanlı İstihdam (FT) kukla değişkenini içermektedir. Tam zamanlı kukla değişkeni, kişi tam zamanlı veya fazla zamanlı çalışıyorsa 1'e eşit kabul edilmiştir. Bu değişken tam zamanlı çalışmanın maliyetini kontrol etmek için kullanılmıştır. Gözlemlenmeyen Heterojenlik modeli, gelir ve boş zaman için rassal bir bileşen içermektedir. Böylece aynı gelire ve boş zamana sahip bireylerin, gözlemlenmemiş heterojenlik nedeniyle farklı tercihlere sahip olabileceği hesaba katılmıştır. "Gözlemlenen Heterojenlik" modeli ise faydayı etkileyen bir dizi bireysel özelliklerini temsil eden (hanede engelli bireyin olması, eşin çalışma durumu, günlük aktiviteye etki eden engellilik durumunun varlığı, oturulan evin mülkiyet durumu, eve ilişkin borcun olup olmaması, otomobil sayısı, çocuk sayısı (bebek, okul öncesi, okul çağı, genç ve yetişkin), yaş ve yaşın ikinci dereceden terimi) değişken ile gelir ve boş zaman değişkenlerinin ortak etkisini içermektedir. Bu modelde, her birey için gelir ve boş zaman, yani tercihler, bireyler arasında gözlenen ve gözlemlenmeyen heterojenliğe bağlıdır. Yukarıda bahsedilen etkileşim terimler modele dahil edildiğinde, katsayılarının alternatife özgü olup olmadığı her bir model türü için test edilmiştir. Yalnızca yaş değişkeninin istatistiksel olarak anlamlı şekilde alternatife özgü katsayıya sahip olduğu sonucuna varılmıştır. Bu nedenle "yaş" değişkeni "alternatife özgü" olarak modele dahil edilirken, diğer etkileşim değişkenleri modele alternatife özgü olarak dahil edilmemiştir

Bekar ve evli kadınlar için, yukarıda bahsedilen farklı türden hata terimlerine dayanan üç tür ücret modeli için üç farklı heterojenliğin hesaba katan 32 adet model tahmin edilmiştir. Modeller evli ve bekar kadınlar için ayrı ayrı Bayes Bilgi Kriteri (Bayesian Information Criteria- BIC), Uyum İyiliği (rho2) değeri ve tahmin edilen esneklik değerlerine göre karşılaştırılmıştır. Tahmin sonuçları, heterojenlik dahil edildiğinde, her bir ücret modeli türü için BIC değerinin düştüğünü göstermektedir. Özellikle hem gözlenen hem de gözlenmeyen heterojenliği içeren modeller en düşük BIC değerine sahiptir. Tahmin edilebileceği gibi bu iki tür heterojenlik dikkate alındığında uyum iyiliği (rho2) değeri artmaktadır.

"Beklenen ortalama ücret" modelleri kapsamında tahmin sonuçları değerlendirildiğinde, heterojenlik modele dahil edilmediğinde evli kadınlar için BIC değeri 58.486 olmakta ve sadece gözlemlenen heterojenliğin olduğu modelin BIC değeri 53.935 olmaktadır. Sadece gözlemlenmemiş heterojenliğin olduğu model için bu değer 55.439'dir. Dolayısıyla sadece gözlenen heterojenliğe sahip modelin daha iyi olduğu söylenebilir; ancak hem gözlemlenen hem de gözlemlenmeyen heterojenlikleri içeren model, beklenen ortalama ücret modelleri arasında en düşük BIC değerini (yani 51.145) almaktadır. Modellerin uyum iyiliği değerleri karşılaştırıldığında, gözlenen ve gözlenmeyen heterojenlikleri içeren model en yüksek değere sahip olduğu sonucuna varılır. Diğer bir deyişle, heterojenlik dikkate alındığında modelin rho2 değeri artmaktadır. rho2'ye göre her iki heterojenliği içeren modelin diğerlerinden daha iyi olduğunu söylemek mümkündür.

Evli kadınlar için "koşulsuz ortalama ücret" modellemesine gelince, bu modelde iki tür hata terimi vardır: bir tane rassal kura çekimi ve elli defa rassal kura çekimi. Bir tane rassal çekilişin olduğu koşulsuz ortalama ücret modellerinde heterojenlik dahil edildiğinde, BIC değeri azalır (yani, heterojenlik yoksa 62250,12, gözlemlenen heterojenlik olduğunda 57616,47 ve gözlemlenmemiş heterojenlik olduğunda 59009,78). Her iki heterojenlik türü dahil edildiğinde, BIC değeri en düşük olana, yani 54843,23'e ulaşır. Bu modellerin rho2 değerleri karşılaştırıldığında, her iki heterojenliği içeren model en yüksek uyum iyiliğine sahip olduğu gözlemlenmektedir. Ayrıca, elli rassal çekilişli koşulsuz ortalama ücret modellerinde, en düşük BIC değeri (51069,8) ve en yüksek rho2 değeri hem gözlemlenmemiş hem de gözlenen heterojenliği içeren modele aittir.
Benzer şekilde, heterojenliğin dahil edilmesi, "koşullu ortalama ücret" modellerinin BIC değerlerini azaltır. Her iki heterojenlik türü dahil edildiğinde, BIC değeri en düşük değere ulaşır (yani, bir rassal çekme hata terimi için 56389.4 ve elli rassal çekme için 55332.7). Ayrıca, her iki heterojenliğe sahip modellerin uyum iyiliği değeri (rho2) diğerlerinden daha yüksektir.

Evli kadınlara yönelik tüm modeller bu kapsamda değerlendirildiğinde, beklenen ve koşulsuz ortalama ücret modellerinin, koşullu ortalama ücret modeline göre daha düşük BIC değerlerine sahip olduğu görülmektedir. Koşullu ortalama ücret modelinin uyum iyiliği, beklenen ve koşulsuz ortalama ücret modellerininkine yaklaşık olarak benzerdir. Bu nedenle, beklenen veya koşulsuz ortalama ücret modellerinin seçilmesi gerektiği söylenebilir. Ancak her bir modelin esnekliklerini değerlendirdiğimizde durumun böyle olmadığı görülmektedir. Nitekim koşullu ortalama ücret modelinin hem çalışma saatleri hem de katılım esneklikleri daha makul değerlerdedir. Koşullu ortalama ücret modelinin esneklikleri 0,394-0,749 arasında değişmektedir ve bu makul bir marjdır. Beklenen ortalama ücret modelinin esneklikleri 1,340 ile 1,417 arasında, koşulsuz ortalama ücret modelinin esneklikleri ise 0,547 ile 1,359 arasındadır. Ayrıca, koşullu ortalama ücret modeli teknik olarak beklenen ve koşulsuz ortalama ücret modellerinden daha güçlüdür; çünkü bunlar sınırlı varsayımlara sahiptir. Bu nedenle, daha fazla analiz için en uygun model, evli kadınlar için hem gözlemlenmemiş hem de gözlenen heterojenlikleri elli rassal kura çekme hata terimi ile içeren koşullu ortalama ücret modelidir.

Benzer bir değerlendirme bekar kadınlar için de geçerlidir. Her model türü için heterojenlik dikkate alındığında modellerin BIC değeri düşmekte ve modelin uyum iyiliği değeri artmaktadır. Üç model türü (gözlemlenmemiş ve gözlenen heterojenlikleri de içeren) değerlendirildiğinde, koşullu ortalama ücret modelinin BIC değeri diğerlerinden biraz yüksek olmasına rağmen, teknik olarak bu model diğer modellerden daha iyidir. Ayrıca, üç modelin esnekliklerini karşılaştırırken, en uygun model yine, bekar kadınlar için elli rassal kura çekme hata terimi ile gözlemlenmemiş ve gözlemlenmiş heterojenliği içeren koşullu ortalama ücret modelidir. Bu nedenle, bu modeller analiz ve politika simülasyonları için kullanılmıştır. Her bir işgücü arzı sonucu için simüle edilmiş ve gerçek verideki birey sayısı hesaplanmıştır. Rakamların birbirine çok yakın olması dikkat çekmektedir. Bu nedenle, çalışmadaki simülasyonların gerçek ortamı doğru bir şekilde temsil ettiğini söylemek doğru olur.

Tahmin sonuçlarına göre, gelir ve çalışma saati değişkenleri ile çapraz çarpımlar, temel ve tam modeller için istatistiksel olarak anlamlıdır. Bu değişkenlerin işaretleri beklentilerle uyumludur. Tam zamanlı çalışma (FT) kukla değişken de istatistiksel olarak anlamlıdır ve her denklem için pozitif bir işarete sahiptir. Öte yandan, tam modelde (*full model*), hanede herhangi bir engellinin varlığının hem bekar hem de evli kadınlar için gelir ve çalışma saatleri ile etkileşimi, eşin çalışma durumu, eşin işveren olması veya serbest meslek sahibi olması arasındaki etkileşimler ve evli kadın için eş, çalışma saati olan çocuk sayısı, ticari dükkân, otomobil sahibi olma, ev üzerinde herhangi bir sorumluluğu bulunma, kiracı olma veya lojmanda yaşama veya eve kira ödememe durumu, yaş ve ikinci dereceden yaş değişkenleri gelir ve çalışılan saat değişkenlerinin etkileşimi ile istatistiksel olarak anlamlıdır. Bu etkileşim terimlerinin işaretleri, beklendiği gibi ampirik literatürle uyumludur.

Tahmin sonuçları, bebek ve okul öncesi çocuk sahibi olmanın çalışma saatleri aracılığıyla fayda üzerinde önemli ölçüde olumsuz bir etkiye sahip olduğunu, yani bebek ve okul öncesi çocuğu olan kadınların çocuk bakımıyla ilgilenebilmek için gelirden daha fazla zamana ihtiyacı olduğunu göstermektedir.

Ayrıca modelde alternatife özgü tek değişken olan yaş değişkeni istatistiksel olarak anlamlıdır ve her alternatif için negatif işaretlidir. Çalışma süresi arttıkça evli kadınlar için yaş ile gelir arasındaki etkileşim süresinin katsayısı azalırken, çalışma süresi ile olan etkileşimi arttığı söylenebilir. Bekar ve evli kadınlar için yaş artması, çalışılan saat ve gelir üzerinden faydayı olumsuz etkilemektedir. Bu doğrultuda, yaş arttıkça kadınların, beklendiği gibi, çalışmak için gelire ve zamana ihtiyaç duymadıkları sonucuna varılabilir.

Bireysel özellikler açısında esneklikler incelendiğinde, bekar kadınlar için yaşa göre U-şeklinde bir ilişki tespit edilmiştir. Çok genç bekar kadınların eğitimlerinin devam etmesi ve çok yaşlı bekar kadınların ise emeklilikten dolayı işgücüne katılım ve çalışma saati esnekliklerinin yüksek olması ve aktif çalışma çağında olan bekar kadınlarının çalışma eğilimlerinin yüksek olması sebebiyle esnekliklerinin düşük çıkması beklenen bir sonuçtur. Dayıoğlu (2022) da bunu destekler nitelikte sonuca varmıştır. Evli kadınlar için her iki esneklik de yaşa göre azalan seyir izlemektedir.

Hem evli hem de bekar kadınlar için eğitim seviyesi arttıkça işgücüne katılım ve çalışma saati esneklikleri azalmaktadır. Nitelikli bir işte çalışmak için eğitim seviyesini yükselterek kendine yatırım yapan kadınlar, çalışma hayatını kendi hayatlarının bir parçası olarak görebilmektedir (Dayıoğlu, 2022). Bu sebeple, eğitim seviyesi arttıkça işgücüne katılım ve çalışma saati esnekliklerinin düşmesi, beklenen bir sonuçtur.

Gelir seviyesi açısından sonuçlar incelendiğinde hem bekar hem de evli kadınlar için gelir seviyesi arttıkça esnekliklerin azaldığı görülmektedir. Ampirik literatür ve beklentilerle uyumlu olan bu sonuç, gelir seviyesi yüksek kadınların daha fazla boş zamana ihtiyaç duyduğunu, gelir seviyesi düşük kadınların gelirlerini artırabilmek adına daha fazla işgücüne katılım ve çalışma saatini artırabileceğini ima etmektedir.

Çocukların yaşına göre esneklikler incelendiğinde yine azalan bir eğilim görülmektedir. 0-2 yaşında bebeği olan bekar ve evli kadınların esneklikleri yüksekken, çocuğun yaşı arttıkça hem işgücüne katılım hem de çalışma saati esneklikleri düşmektedir. Bu sonuç, küçük çocuğu olan kadınların çocuk bakımını birincil sorumlu olarak üstlendikleri argümanını doğruladığını göstermektedir. Diğer bir yandan, ücretli çalışan eşi olan kadınların esneklikleri, girişimci eşi olan veya çalışmayacak durumda eşi olan evli kadınlardan daha yüksek çıkmıştır.

Politika Simülasyonları

Çalışmada statik mikrosimülasyon yöntemi ile belirli vergi ve sosyal politikaların kadınların işgücü arzına ilişkin kararlarına etkisini analiz edilmiştir. Politikalar üç ana başlıkta toplanmıştır. Politikaların etkileri işgücündeki yüzdesel değişim, işgücüne katılan birey sayısı, kullanılabilir gelirdeki yüzdesel değişim, ücret oranındaki yüzdesel değişim, politikanın toplam kamu maliyeti ve yarattığı kamu geliri açısından incelenmiştir.

Birinci politika grubu, hanehalkının temel ihtiyaçları olan “yiyecek ve alkolsüz içecekler” ile kadınların işgücü arzı kararlarını etkileyebilecek “ulaşım” ve “eğitim” hizmetleri üzerindeki Katma Değer Vergilerinin (KDV) kaldırılmasına dayanmaktadır. Bu ürünler için KDV ödemeleri ile aile gelirinin artacağı varsayılmaktadır.

Bilindiği üzere dolaylı vergi yoluyla kamu gelir yaratmanın en etkin yolu nihai tüketicilerin tüketim harcamalarına uygulana KDV’dir. Türkiye’de çeşitli mal ve hizmetlere uygulanan KDV oranları %1, %8 ve %18 olmak üzere üç çeşittir. 2019 yılı itibariyle KDV oranlarına baktığımızda, hanehalklarının en büyük harcama kalemini oluşturan yiyecek ve alkolsüz içeceklere %8 KDV oranı uygulanmakta; kadınların işgücüne kararını etkilediği düşünülen ulaşım ve eğitim (özellikle küçük çocuklar için olan eğitim hizmetleri) hizmetlerine, sırasıyla, %18 ve %8 oranında KDV uygulanmaktadır. Bu politika grubunda öz konusu mal ve hizmetlere uygulanan bu KDV oranlarının %0 olduğu varsayılarak statik mikrosimülasyon yöntemi ile politika etkileri ölçülmüştür. KDV oranlarındaki düşüşle birlikte hanehalkının ödediği vergi miktarı kadar toplam harcanabilir gelirde bir artış olduğu varsayılmaktadır. Ayrıca, vergi oranındaki indirimden sonra tüm ürünlerin bütçe paylarının aynı kaldığı varsayılmıştır.

Bu üç politika değişikliğinin sonuçları birlikte değerlendirildiğinde bekar ve evli kadınlar için istihdam değişikliğine en fazla etki eden uygulamanın gıda ve alkolsüz içecek grubuna uygulanan vergi indirimi olduğu gözlemlenmiştir (evli kadınlar için %1,73 ve bekar kadınlar için %0,37). Bunu sırasıyla ulaşım hizmetleri ve eğitim hizmetlerine uygulanan KDV indirimi politikaları olduğu görülmektedir. Gıda ve alkolsüz içkiye uygulana KDV indirimi sonucunda ek olarak 78.033 çalışmayan evli kadın ve 5.722 bekar kadın işgücü piyasasına katılırken, bu sayılar ulaşıma uygulanan KDV indirimi sonucunda evli ve bekar kadınlar için sırasıyla 40.744 ve 3.544'tür. Eğitimi hizmetinde uygulanan KDV indirimi sonucunda ise ek olarak 7.574 evli kadın ve 150 bekar kadının işgücü piyasasına girdiği ölçülmüştür.

Ücret ve harcanabilir gelirdeki yüzdesel artış için de benzer sonuçlar elde edilmiştir. İlk politika uygulamasından sonra harcanabilir gelir evli ve bekar kadınlar için %0,18 ve %0,11 oranında artmıştır. Söz konusu yüzdesel artış, ikinci politika senaryosunda evli kadınlar için %0,09, bekar kadınlar için %0,07 ve üçüncü politika senaryosunda evli kadınlar için %0,03 olarak ortaya çıkmıştır. Ayrıca, yiyecek ve içecek vergilerindeki indirim, bekar ve evli kadınların ücret gelirlerini diğer politikalara göre anlamlı düzeyde (%1,96 ve %0,44) daha fazla etkilemiştir. Bu politika grubunda en çok kamu geliri yaratan politika gıda ve meşrubatta uygulanan KDV indirimi olmakla birlikte, eğitim hizmetlerinde KDV indirimi politikası toplam kamu gelirlerinin kamu harcamalarına oranı en yüksek olan politika olmuştur.

İkinci politika grubu kadınların ücretlerine yapılan teşviklerle ilgilidir. Türkiye'de çalışanlara, özellikle kadınlara yönelik az sayıda doğrudan ücret sübvansiyonu/yardımı uygulaması bulunduğundan, kadın işgücü arzını artırmaya yönelik daha sonraki çalışmalar için politika senaryolarının simüle edilmesi çok önemlidir. Ücret teşviki politika grubu kapsamında üç senaryo incelenmiştir: İlk senaryo, tüm kadınlara (herhangi bir yaş kısıtlaması olmaksızın) brüt asgari ücretin %10'u oranında ücret sübvansiyonu sağlamaktır. İkinci senaryo, birinci senaryonun sadece 30 yaş altı genç kadınlara uygulanmasıdır. Son senaryo ise bireylerin ücretlerine "Negatif Vergi" uygulanmasıdır. Negatif Vergi uygulaması iki kademeli oluşturulmuştur. Bu politikada, asgari ücretin 1,5 katını kazananlara ortalama ücretlerinin %10'u kadar ve asgari ücretin 1,5-2 katını kazananlara ücretlerinin %5'i kadar geri iade yapıldığı varsayılmıştır.

Her üç senaryo değerlendirildiğinde, bekar ve evli kadınların istihdam değişikliğine en fazla etki eden politika, ilk politika olan yaş gözetmeksizin tüm kadınlara ücret sübvansiyonu sağlanmasıdır. Bu politika sonucunda istihdamın evli ve bekar kadınlarda sırasıyla %7,46 ve %3,48 oranında arttığı gözlemlenmiştir. İlk politika sonucunda, mevcutta çalışmayan kadın sayısı büyük ölçüde azalmış olup mevcutta 206.154 çalışmayan evli kadının ve 22.185 çalışmayan bekar kadının, işgücü piyasasında istihdam edildiği gözlemlenmiştir. Bu rakamlar, ikinci politika senaryosu sonucunda evli ve bekar kadınlar için sırasıyla 43.838 ve 3.109 olarak gerçekleşmiştir. Üçüncü politika senaryosuna bağlı olarak ise 205.270 evli kadın ve 22.325 bekar kadın işgücüne katılmıştır. Bu sonuçlardan da anlaşılacağı üzere istihdamı artırmada en etkili ikinci politika ücretlere negatif vergi uygulaması olmuştur.

Bu gruptaki politika senaryolarının sonuçları harcanabilir gelir ve ücret gelirindeki artış açısından incelendiğinde, negatif vergi uygulamasının kadınların gelirinde en fazla yüzdesel artışa neden olan politika olduğunu söylemek mümkün.

Çalışmada kadınların işgücü arzına en çok etkisi olabileceği tahmin edilen politika grubu 3-6 yaş arası çocuğu olan kadınları hedeflemektedir. Bilindiği üzere, Türk aile yapısında küçük çocuk bakımı öncelikli olarak kadının sorumluluğunda sayılmaktadır. Yukarıda da belirtilen esneklik ölçümlerine ilişkin analizlerimizle de desteklendiği üzere, kadınların işgücü arzı kararları küçük çocuk için yapılacak olan teşviklerden etkilenebilmektedir.

Bu politika setinde ilk olarak, kadınlara okul öncesi çocukları için ücretsiz bakım sağlama politikası (sanki 3-6 yaş arası çocukları yokmuş gibi) uygulanmıştır. Daha sonra bu gruptaki kadınlara sırasıyla kreş yardımı kadar bir tutarın (2013 yılı fiyatıyla 400 TL) koşulsuz olarak ve mevcutta çalışıyor olması koşulu ile destek olarak verildiği varsayılmıştır.

Simülasyon sonuçlarına göre, istihdam ve harcanabilir gelirdeki yüzde değişim açısından en etkili politikanın birinci senaryo sonucu ortaya çıktığı görülmektedir. Bunu sırasıyla koşullu ve koşulsuz kreş yardımı politikaları izlemektedir. Öte yandan, koşullu kreş yardımı politikasının uygulanması sonucu ücret gelirindeki yüzde değişimi (evli kadınlar için %10,75 ve bekar kadınlar için %1,05) diğer politika senaryolarına göre daha fazla gerçekleşmiştir. Bu politika grubu içindeki birinci senaryo sonucunda mevcutta çalışmayan kadın sayısı büyük ölçüde azalmış olup 231.916 çalışmayan evli kadın ve 4.798 çalışmayan bekar kadın işgücü piyasasında istihdam edilmeye başlamıştır. Bunu sırasıyla koşulsuz kreş yardımı (202.538 evli kadın ve 4.178 ilave kadın) ve koşullu kreş yardımı politikaları (158.914 evli kadın ve 3.306 bekar kadın) izlemiştir.

Her bir politika senaryosu için, evli ve bekar kadınların işgücü arz davranışları sonucunda yaratılan toplam kamu gelirleri ve kamu maliyetleri hesaplanmıştır. Bu senaryolar arasında kamu geliri yaratma konusunda en başarılı politika, okul öncesi çocuğu olan kadınlara şartlı kreş yardımı yapılması olmuştur. Ayrıca en yüksek toplam kamu geliri ve kamu maliyeti oranı, bu senaryo ile oluşmuştur.

Sonuç

Bu tezin temel amacı, çeşitli sosyal ve vergi politikaları sonucunda kadınların işgücü arzı tercihlerinin nasıl değiştiğini *ex-ante* olarak analiz etmektir. Bu kapsamda, statik mikrosimülasyon yöntemi kullanılarak analizler gerçekleştirilmiştir. Önce "Yapısal Kesikli Seçim Modeli" tahminlemesi yapılmış ve evli ve bekar kadınlar için ayrı ayrı işgücü arzı ve çalışma saati esneklikleri hesaplanmıştır. Elde edilen sonuçlar ile politika simülasyonları gerçekleştirilmiştir. Mikrosimülasyon, *ex-ante* analiz için etkin şekilde kullanılabilecek bir yöntemdir. Türkiye'de iktisat alanında mikrosimülasyon yöntemiyle politika analizine yönelik ampirik çalışma sayısı çok azdır. Özellikle, vergi ve sosyal politikaların kadın işgücü arzı üzerindeki etkisini "Yapısal Kesikli Seçim Modeli" tahminlerinden elden edilen esneklik parametrelerini kullanarak mikrosimülasyon yöntemiyle inceleyen çalışma bulunmamaktadır. Bu anlamda, çalışmamızın Türkiye literatürüne önemli katkısı olduğu düşünülmektedir.

Beklentilerimizle uyumlu olarak, "Kesikli Seçim İşgücü Arzı Modeline" ait tahmin sonuçları evli, düşük eğitim düzeyine sahip, bebek veya okul öncesi küçük çocuğu olan, düşük gelir düzeyine sahip hanelerdeki kadınların işgücü arzı ve çalışma saati esnekliklerinin, diğerlerine göre daha yüksek olduğunu göstermektedir.

Çalışmada simüle edilen tüm politikaların çeşitli etkileri birbirileri ile karşılaştırılmıştır. İstihdam edilen kişi sayısı bakımından en etkili politikanın, 3-6 yaş arasında çocuğu olan kadınlara sanki bu yaşta hiç çocuğu yokmuş gibi ücretsiz bakım sağlanması politikası olduğu görülmüştür. Bu politika sayesinde 231.916 evli kadın için istihdam yaratıldığı sonucuna ulaşılmıştır. Bekar kadınlar için ek istihdam yaratma anlamında en önemli etkiye sahip politika, (22.325 bekar kadın için ek istihdam yaratmıştır) negatif ücret vergisi politikası olmuştur. KDV indirimi politika grubu ise bu anlamda kadın istihdamını artırmada en az etkili politika olarak gözlemlenmiştir.

Evli kadınlar için, istihdamdaki yüzdesel değişim açısından en önemli politika %9,52'lik artışla 3-6 yaş arası çocuklar için ücretsiz bakım sağlanmasına yönelik politika olurken, bekar kadınlar için en etkili politika, %3,48 artışla asgari ücretin %10 kadar ücret teşviki verilmesi politikası olmuştur.

Negatif ücret vergisi politikası, evli ve bekar kadınların ücret gelirlerindeki ve harcanabilir gelirlerindeki yüzde değişim üzerinde en etkili politika olarak gözlemlenmiştir. Bu politika, evli kadınların ücret gelirlerini %16, bekar kadınların ücret gelirlerini %11 oranında artırmaktadır. Öte yandan, negatif ücret vergisi politikası, evli ve bekar kadınların harcanabilir gelirinde sırasıyla %1,49 ve %2,89 artış yaratmıştır.

Politikaların kamuya toplam maliyetleri açısından karşılaştırma yapıldığında evli kadınlara 3-6 yaş arası çocuklar için ücretsiz bakım sağlanmasına yönelik ve koşulsuz kreş ücreti desteği sağlanmasına yönelik politikaların ve bekar kadınlar için negatif ücret vergisi politikasının en yüksek maliyeti oluşturan politikalar (2013 fiyatlarıyla yıllık sırasıyla 988, 988 ve 96 milyon TL) olduğu sonucuna varılmıştır.

Bulgularımız, tüm kadınlara asgari ücretin %10'una eşit bir ücret sübvansiyonu sağlamanın en yüksek kamu gelirini (2013 fiyatlarıyla 230 milyon) yaratan politika iken, 3-6 yaş arası çocuğu olan kadınlara koşulsuz sübvansiyon sağlamanın ise en yüksek kamu maliyetine yol açan politika (2013 fiyatlarıyla 988 milyon TL) olduğunu ortaya koymaktadır. Öte yandan, bekar kadınlara uygulanan politikalar arasında negatif ücret vergisi politikasının en yüksek kamu geliri yaratan politika potansiyeline (2013 fiyatlarıyla 51 milyon TL) sahip olduğu sonucuna varılmıştır.

Toplam ücret gelirlerinde en dikkat çekici değişikliği evli ve bekar kadınlar için sırasıyla 618 milyon TL ve 123 milyon TL ücret artışı ile negatif ücret vergisi politikası yaratmıştır.

Bu çalışmanın vardığı sonuçlar ışığında, politika yapıcılar ağırlıklı olarak 3-6 yaş arası çocuğu olan evli kadınlara odaklanırsa, kadın işgücü arzının önemli ölçüde artırılabileceği düşünülmektedir. Kadınlara okul öncesi küçük çocuk bakımı sağlamak veya onları sübvanse etmek, kadınların iş-yaşam dengesini iyileştirmeleri için çok önemlidir. Bulgularımız, okul öncesi küçük çocuk bakım hizmetlerinin (ücretsiz çocuk bakım merkezleri veya bu hizmetlerin geri ödenmesi yoluyla) kadınlara genişletilmesinin ek istihdam yaratabileceğini desteklemektedir. Bu sayede çocuk bakımı sektörünün daha fazla bakıcı, öğretmen, psikolog, pedagog ve hizmetli istihdam etmek suretiyle genişlemesi de ek istihdam yaratacaktır.

Bu çalışma, tek bir politikanın tüm açılardan en iyi etkiye sahip olmadığını her politikanın, farklı bireysel özelliklere sahip çeşitli gruplar üzerinde değişen derecelerde etkisi olduğunu göstermektedir. Politika yapıcılar açısından, hedef grup için bir dizi tamamlayıcı politikanın benimsenmesinin en etkili sonucu doğuracağı düşünülmektedir. Bu çalışma sonucunda, tek bir politikanın tüm boyutlarda ve tüm hassas gruplar için en iyi sonuca ulaştırmasının çok zor olduğu aşikardır. Politika yapıcıların bu gerçeği göz önünde bulundurarak hedef kitleler için farklı politikalar tasarlaması iktisadi açıdan en iyi sonucu yaratacaktır.

Bu çalışmada, mikrosimülasyon yönteminin *ex-ante* politika analizi için etkin bir şekilde kullanılabileceğini gösterdik. Mikrosimülasyon yöntemi, parametreleri ve kuralları değiştirerek hedef gruplar için en etkili politikayı bulmamıza yardımcı olmaktadır. Bu nedenle politika yapıcılara politika tasarımında mikrosimülasyon yöntemini kullanmaları önemle tavsiye edilmektedir.

Bu çalışmada kadınların işgücü arzı kararı, diğer hanehalkı üyelerinin (en önemlisi evli kadınların kocaları) kararlarının dışsal olduğu varsayılarak modellenmiştir. Başka bir deyişle, kararlarının kadınların kararlarını etkilemediği varsayılmaktadır. Bu varsayım gevşetilebilir ve hanehalkı üyelerinin ortak kararları gelecekteki araştırmalarda modellenebilir. Gelecekteki çalışmalar, modeli erkeklerin de karar verme sürecini fayda fonksiyonuna ekleyerek genişletebilir. Erkek ve kadınlar için saat ve istihdam açısından ortak bir işgücü arzı kararı olarak modelleme yapılarak politikalar simüle edilebilir.

Statik mikrosimülasyon modelleri, bireylerin uzun dönemli yaşlanma, doğumlar, ölümler, evlilik, boşanma, emeklilik gibi demografik değişimlerini, ekonomik değişkenlerin dinamiklerini ve bireylerin davranışsal tepkilerini göz ardı etmektedir. Bunlar dinamik mikrosimülasyon modelleri ile sağalabilmektedir. Gelecek çalışmalarda tüm bu etkileri içeren dinamik mikrosimülasyon modellemeleri yapılabilir.

Ayrıca, ekonominin tüm ana sektörleri arasındaki etkileşimi (kamu sektörü ve çocuk bakımı ve yaşlı bakımı, eğitim vb. diğer ilgili sektörler) içeren yeni modeller kurularak politikaların Genel Denge etkilerinin de analiz edilebilmesi sağlanabilir.

APPENDIX I

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<u>**TEZİN ADI /** TITLE OF THE THESIS</u> (**İngilizce** / English): THE IMPACT OF SOCIAL POLICY ON FEMALE LABOR SUPPLY IN TURKEY

<u>**TEZİN TÜRÜ**</u> **/** <u>DEGREE</u>**:** **Yüksek Lisans** / Master ☐ **Doktora** / PhD ☒

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