# Projection of the Output Cost Arising from Low Labour Force Participation of Women in North Cyprus 

Demet Beton-Kalmaz*<br>European University of Lefke


#### Abstract

The relationship between gender inequality and economic growth has become one of the most interesting and debated issues both in the academic literature and the policy arena. The aim of this study is to investigate how gender inequalities in the labour force participation (LFP) in North Cyprus undermine the per capita output of the country. Thus, the study is designed to estimate the simulation of a possible increase in per capita GDP based on 2011 data generated by the catch up of north female labour force participation rates to the south for the year 2011. Different age categories for female labour force are considered for the measurement. The age categories distributed within the working age population including female labour force population between the ages 15 and over. The age categories are divided into 5 groups as including the female participants between the age from 15 to 24, 25 to 34, 35 to 44, 45 to 54, and 55 and over. Data used is obtained from the State Planning Organization (SPO) of North Cyprus government for North Cyprus and from the World Bank database for South Cyprus. The North Cyprus labour force participation rates are adjusted to the south as suggested by Bryant et. al. (2004). Parallel to the previous literature, it is found that female labour force participation (FLFP) rate has a positive impact on GDP in North Cyprus. There would have been a 4\% higher per capita GDP with the catch up of north to south FLFP rate which might be a substantial contribution towards decreasing the income gap between north and south.


Keywords: female, labour force participation, GDP, North Cyprus

[^0]Özgün Araștırma Makalesi
Makale gönderim tarihi: 6 Aralık, 2017
Makale kabul tarihi : 2 Temmuz, 2018

# Kuzey Kıbrıs'ta Kadının İşgücüne Düşük Katılımının Çıktı Maliyetinin Tahminlenmesi 

Demet Beton-Kalmaz<br>Lefke Avrupa Üniversitesi

## Öz

Toplumsal cinsiyet eșitsizliği ve ekonomik büyüme arasındaki ilișki, hem akademik literatürde hem de siyasi alandaki en ilgi çekici ve tartıșmalı konulardan biridir. Bu çalışmanın temel amacı, Kuzey Kıbrıs'ta işgücüne katılmadaki toplumsal cinsiyet eşitsizliğinin ülke ekonomisinin büyümesini ne derecede engellediğini ortaya koymaktır. Bu bağlamda, çalıșma 2011 yılında Kuzey Kıbrıs'taki kadın işgücüne katılım oranının Güney Kıbrıs'taki kadın işgücüne katılım oranını yakalaması durumunda kişi bașına düşen gayri safi yurtiçi hasılada meydana gelebilecek potansiyel artıșı ölçebilecek șekilde düzenlenmiştir. Ölçümler için farklı yaș grupları göz önünde bulundurulmuştur. Yaş grupları, 15 ve üzeri yașta çalışabilir nüfus içerisindeki kadın işgücü̈nden oluşmaktadır. Yaş grupları 10 yıllık yaş aralıkllarıyla 5 kategoriye ayrılmıștır. Kuzey Kıbrıs için kullanılan veriler Kuzey Kıbrıs Türk Cumhuriyeti Devlet Planlama Örgütü̈nden, Güney Kıbrıs içinse Dünya Bankası veri tabanından elde edilmiștir. Kuzey Kıbrıs kadın iş̧gücü katılımı Güney Kıbrıs kadın işgücü katılımına göre Bryant vd. (2004) önerisi doğrultusunda düzenlenmiştir. Önceki çallșmalara paralel olarak, kadın işgücü katılımının Kuzey Kıbrıs'n GSYiH'sı üzerinde pozitif etkisi olduğu ortaya konmuştur. Yapılan çalıșma sonucunda, Kuzey Kıbrıs'taki kadın iş̧ücüne katılım oranının Güney Kıbrıs'taki kadın işgücüne katılım oranını yakalaması durumunda kiși bașına düșen GSYiH'nın ayni yıl için \%4 oranında daha yüksek olabilme ihtimali olduğu ortaya çıkmıștır; ki bu da iki taraf arasındaki kiși başına düșen GSYiH farkının kapanması bakımından önemlidir.

Anahtar Kelimeler: kadın, iş̧ücüne katılım, GSYiH, Kuzey Kıbrıs

## Introduction

The relationship between gender inequality and economic growth has become one of the most interesting and debated issues both in the academic literature and the policy arena. According to the Global Gender Gap Report (Hausmann et al., 2009), inequalities exist between men and women in all countries over the world in four fundamental categories including economic participation and opportunity, educational attainment, political empowerment and health and survival. Even there have been considerable improvements in closing the gap between men and women in educational attainment and health categories, it still remains distinctively high in economic and political categories.

There are several studies in economics literature aiming to investigate the consequences of inequalities between men and women in labour market. Some of those studies concentrated on exploring the U-shaped female labour force function hypothesis which suggested that FLFP declines during the early stages of industrialization following a rise in female labour force participation (FLFP) after a certain level of development is reached (Tam, 2011; Tansel, 2002; Goldin, 1994; Khaliq et al., 2017; Kumari, 2018). Some of those studies are based on country specific time series analysis, while some used panel data for the confirmation of the U-shaped relationship between economic growth and FLFP based on macro data available. There are also studies examining the impact of FLFP changes on economic growth or per capita output (Gruen and Garbutt, 2003; Bloom et al., 2009; Verick, 2014; Bryant et al., 2004; Cavalcanti and Tavares, 2015). Furthermore, some studies combine two types of work mentioned above by using the estimation results of first to project next (Luci, 2009; Tsani et al., 2013). There are few studies concentrating on the position of women in labour market in North Cyprus; mostly carried either by using population census data (1996), or qualitative and quantitative surveys held by individual researchers and women NGOs (Aldemir, 2002; Aldemir, 2004; GüvenLisaniler 2010; Güven-Lisaniler and Uğural 2001) due to the lack of the time series data on labour market in North Cyprus since Households Labour Force Survey data became available only after 2004.

The aim of this study is to project how much the gender inequalities in the labour force participation (LFP) in North Cyprus undermines per capita GDP of the north compared to South Cyprus through evaluating the contribution of the potential higher FLFP on per capita GDP, thus closing the gap between per capita GDP of two regions on the island. Since the application of macro data in case of North Cyprus is not possible because of the unavailability of time series data for the long run, the projection is estimated by using micro data of 2011 as the micro data used is available only for that year. The method suggested by Bryant et al. (2004) is adjusted for the case of North Cyprus, sacrificing some realism in return for providing a relatively high degree of tractability and transparency.

This study is designed to calculate the effect of converged FLFP of north to south on per capita GDP of North Cyprus, which would in turn led the
convergence of per capita GDP inequalities in north and south parts of the island. The special political status of North Cyprus brings the importance of the economic convergence of two regions since the negotiations are still open to find a solution in the island. To my knowledge, such a study to project the potential increase in per capita GDP that would be brought from increased female employment and GDP per extra female employee and the associated increase in GDP has not been undertaken for the case of North Cyprus. To do so, the potential GDP is projected assuming a different higher FLP rates equal to FLFP rate of South Cyprus is experienced in the north instead of the actual rates for the year 2011. The macro data is obtained from the State Planning Organization (SPO) of North Cyprus government for North Cyprus and from the World Bank database for South Cyprus. The reason for concentrating only on FLFP is the huge gap between the rates of north and south at inter-regional level. This gap is not that noticeable for the MLFP. Furthermore, there is also a considerable in-regional gap existing between FLFP and MLFP in North Cyprus.As suggested by Tansel (2002) to achieve equity, which implies improved development potentials for the country through increased economic efficiency that would arise from the improved relative economic position of women, higher integration of female in labour market is needed. Under the conditions in North Cyprus both at inter-regional and in-regional aspects, this study aims to shed light on the importance of FLFP for the policy makers to promote FLFP in North Cyprus.

## Recent Figures of Labour Market in North Cyprus

Cyprus is a typical small island country being the third largest island in Mediterranean Sea. The island has been divided into two as north (Turkish Republic of North Cyprus, TRNC, since 1983) and south (Republic of Cyprus) since 1974 as a result of the political conflict between Turkish and Greek Cypriot communities. After 1974, Turkish Cypriots resettled in the north, either by leaving the enclaves that they had been living in the period 1963-74 and going back to their own villages which were now safe or moving into houses and villages abandoned by Greek Cypriots. Citizens who were originally from the south of the island evacuated their homes and moved to north, into houses and villages abandoned by Greek Cypriots. North Cyprus is located on the $3,355 \mathrm{~km}^{2}$ of the island. Total population of North Cyprus is estimated to be 326,158 for 2015. GDP for the same year is $3,744.7$ million US $\$$ while per capita GDP is 13,721 US $\$(S P O, 2016)$ being nearly half of South Cyprus which was 23,075 US \$ and below half of European Union (EU) average which was 32,197 US \$ (World Bank, 2018). North Cyprus economy is highly dependent on Turkey since it is only recognized by Turkey as an independent state. Furthermore, it is faced by international embargoes imposed by South Cyprus which limits economic growth and development of the country, stimulating the gap between per capita GDP of North and South Cyprus (Katircioglu, 2006; Balcilar et. al., 2017; Okumus et. al., 2005).

It has been a shortage of labour problem in North Cyprus, since the de facto partition of the island as north and south in 1974. Even though half of the total population is made up of women, they stay or are held out of the labour force. Although the governments came up with policies of overcoming the shortage by inviting labour to migrate from abroad, specifically from Turkey, women's participation could not been ascended. Women's participation in the labour force became visible during the Turkish Cypriot community's economic and socio-spatial re-structuring process. This spatial change has caused the breakdown of production relations and social division of labour, which brought the need for re-formation. Women's massive participation in the labour force takes place in this period. According to the latest Household Labour Force Survey (SPO, 2016), it is estimated that there are 245,828 people in the working age population consisting of 118,014 female and 127,814 of male population. So the 48 percent are women while the 52 percent are male of the working age population for 2016. LFP rate is 51.4 percent; being 39.5 for women and 62.5 percent for men and all of them are far below the world averages of 62.1, 48.9 and 75.3 percent respectively (World Bank, 2017). Figure 1 represents the LFP rates of total, men and women respectively in North Cyprus over the years between 2004 and 2016.

Figure 1. LFP rates of total, female and male in North Cyprus (2004-2016)


Source: HLFS, 2004-2016, State Planning Organization, Turkish Republic of North Cyprus.
LFP rates of both female and male in North Cyprus showed a declining trend over the years between 2004 and 2014 and started to increase in the last two years. Even there have been an increase in the last two years, it is still lower than the rate experienced in 2004. One thing to notice is that the difference between participation rates of females and males is striking, with females' participation rates falling behind almost half of the males' rates.

Figure 2 represents the unemployment rates of men and women respectively over the years between 2004 and 2016. As it can be seen in Figure 2, women unemployment rates has been higher than the unemployment rates of men over
the years under consideration, while the employment rates of women has been nearly half of the employment rates of male employment in North Cyprus as illustrated by Figure 3 below.

Figure 2. Unemployment rates (2004-2016) \%


Source: HLFS, 2004-2016, State Planning Organization, Turkish Republic of North Cyprus.
Figure 3. Employment rates (2004-2016) \%


Source: HLFS, 2004-2016, State Planning Organization, North Cyprus.
On the contrary to the increase of FLFP in most of the developed and developing countries over the last few decades (WB, 2018), the LFP rate among Turkish Cypriot women in North Cyprus has remained the same over the years from 2004 to 2014 at approximately 40 percent and in the last two years started to decrease even there have been considerable improvements in the skills of women workers indicated by their high levels of education. The increase in employment rates accompanied by the decrease in unemployment and LFP rates of females can be considered to appear as a result of the discouraged female labour leaving the labour market in North Cyprus as a result of the decline in desire to work because of several reasons either being supply or demand side driven.

In 2011, the overall LFP rate was 57.2 percent in the EU, 63.2 percent in South Cyprus and 49.8 percent in North Cyprus, while the male labour force participation (MLFP) rates in the EU, South Cyprus and North Cyprus was 64.7 percent, 70.7 percent and 62.1 percent respectively. FLFP rate in 2011 was 50.7 percent in the EU and 57.5 percent in South Cyprus, while in North Cyprus it was 38.7 percent, which was far below the FLFP rates in both the EU and South Cyprus in the same year. From 2011 to 2016, it has been very slight changes in LFP rates in all locations. Overall participation rates increased to 57.9 percent in the EU, and to 51.4 percent in North Cyprus, while it decreased to 61.3 percent in South Cyprus. MLFP rates was estimated to be 64.4 percent in the EU, 66.6 percent in South Cyprus and 62.5 percent in North Cyprus for 2016; while the FLFP rate in 2016 was 51 percent in the EU, 58 percent in South Cyprus and 39.5 percent in North Cyprus, which was far below South Cyprus and the EU. Although it has been decreases in overall and MLFP rates in some locations, there is a slight increase in FLFP rates in all locations. The information given is summarized in Table 1 below.

Table 1. GDP per capita and LFP Statistics

| Locations | European Union | South Cyprus | North Cyprus |
| :---: | :---: | :---: | :---: |
| GDP per capita (2015) | $\$ 32,197$ | $\$ 23,75$ | $\$ 13,721$ |
| LFPR (2011) | $57.2 \%$ | $63.2 \%$ | $49.8 \%$ |
| MLFPR (2011) | $64.7 \%$ | $70.7 \%$ | $62.1 \%$ |
| FLFPR (2011) | $50.7 \%$ | $57.7 \%$ | $38.7 \%$ |
| LFPR (2016) | $57.9 \%$ | $61.3 \%$ | $51.4 \%$ |
| MLFPR (2016) | $64.4 \%$ | $66.6 \%$ | $62.5 \%$ |
| FLFPR (2016) | $51 \%$ | $58 \%$ | $39.5 \%$ |

Source: State Planning Organization for North Cyprus and World Bank for the EU and South Cyprus figures.

When the overall and MLFP rates of South Cyprus and North Cyprus is compared, it is highly obvious that the gap between FLFP rates is considerably high at 18.5 point in 2016 while MLFP rates differ from each other at 4.1 points. The gap between the overall LFP rates in the south and north enlarges as a result of the very low FLFP rate in North Cyprus, which might be considered as being one of the main reasons generating the gap between income distribution of North and South Cyprus through undermining the per capita GDP in the north. The increase in FLFP in the north might create a substantial contribution towards decreasing the income gap between North and South Cyprus.

## Method and Main Assumptions

This paper aims to calculate possible increase in per capita output which is calculated as the increase in per capita GDP that might be generated by a hypothetical extra female participation in the labour market of North Cyprus.

Higher in per capita GDP is considered to be the extra output generated by an extra female employee due to higher female employment proportion to the hypothetical increase in FLFP rate. Increase in employment and the GDP generated by an extra female employee are calculated to be able to derive the total potential increase in GDP. The total increase in GDP for the year 2011 is investigated by using a higher set of rate of FLFP for the year under consideration. To do so, a simple method is set based on historical labour market indicators of North Cyprus and on the experiences of South Cyprus based on the age distribution of female employees. The FLFP rate in the north is considered to be equal to the FLFP rate in South Cyprus for age groups 25 to 34 and 35 to 44, since the highest FLFP rate of North Cyprus falls into those age groups equally. The adjustment of the FLFP rates for the other age groups carried by the proportional increase in the groups 25 to 34 and 35 to 44 . To be able to estimate the GDP per extra female employee, the difference between hours worked, levels of productivity arising from learning on the job, taxes used to fund employment policies, moving out of unmeasured production at home or at volunteer work are important to be considered (Bryant et. al., 2004; Waring, 1988). To make it simple and because of the lack of data, not all but only some of the elements on the list could be considered such as the different hours of work for each group and differences in productivity across the groups while the ratio of labour to capital is assumed to be unchanged.

## Data Description and Empirical Findings

In this section, the effect of higher FLFP on per capita GDP and the associated overall GDP is analysed by considering different age categories for female labour force and assuming the other factors affecting GDP growth remained the same for 2011. The age categories distributed within working age population including female labour force population between the ages 15 and over. The age categories are divided into 5 groups as including the female participants between the age from 15 to 24,25 to 34,35 to 44,45 to 54 , and 55 and over. The female participation rate of North Cyprus is set as adjusted to FLFP rate of South Cyprus for the same year. Only the female labour force participants are focused for this study as mentioned and reasoned in the introduction. The number of sample size for each group for the micro data includes 111, 317, 291, 169 and 28 for the age groups from 15 to 24,25 to 34,35 to 44,45 to 54 , and 55 and over respectively. Micro data is used to obtain the average working hours and average wages per hour worked of female workers for each age group.

FLFP rates in North and South Cyprus was 38.7 percent and 57.5 percent respectively, creating 18.8 points difference between two locations. The North Cyprus FLFP rates are adjusted to the south as suggested by Bryant et.al. (2004). In their study, Bryant et.al. (2004) increased the FLFP rates hypothetically in each group by the amount of the estimated difference in two locations considering two different scenarios. They created the first scenario as an increase considered only in a certain age group which included only 'young
women' while the second scenario is created by considering an 'overall' increase in female labour force falling in all age groups. Different from Bryant et.al. (2004), this study combines the two scenarios. The adjustment procedure followed by adjusting the highest FLFP age group by equating to the south FLFP rate and for the rest of the age groups FLFP rates are adjusted by taking the percentage increase in the highest scored group; otherwise there would have been an exaggerated FLFP rates especially in the last group. Thus, the hypothetical set of FLFP rates in North Cyprus entails 18,8 points increase for the age groups 25 to 34 and 35 to 44, since those groups has the highest FLFP rates at 57.5 percent each equally. For the other age groups, FLFP rates are adjusted as the percentage increase estimated in 25 to 34 and 35 to 44 age groups which entails a 33 percent increase in each group represented by Equation (1) as follows;

$$
\begin{equation*}
F L F P_{h r}=(1.33) * F L F P_{a r} \tag{1}
\end{equation*}
$$

where subscripts h and a stands for hypothetical and actual attached to FLFP respectively, while $r$ indicates the values are in percentages representing rate. The actual and hypothetical FLFP rates in 2011 are shown in Table 2.

Table 2 - FLFP Rates in North Cyprus 2011

| Age Groups | FLFP $_{\mathrm{a}} \%$ | FLFP $_{\mathrm{h}} \%$ |
| :--- | :--- | :--- |
| 15 to 24 | 25.3 | 33.7 |
| 25 to 34 | 57.5 | 76.3 |
| 35 to 44 | 57.5 | 76.3 |
| 45 to 54 | 37.3 | 49.6 |
| $55+$ | 11.5 | 15.3 |

Source: SPO and author's calculations.
First column of Table 2 gives the age group and the second column gives the FLFP rate related to the age group. The last column is created by adjusting the FLFP rate of north according to the FLFP rates of South Cyprus by applying Equation (1). The number of hypothetical extra female participants are calculated by multiplying the percentage increase in each group with the actual number of female labour force participants in each age group in 2011 to be able to estimate the extra number of employees arising from higher FLFP. To do so, Equation (2) is employed given as follows;

$$
\begin{equation*}
E x E m p=F L F P_{a} * 0,33 \text { * (1-UnEmp) } \tag{2}
\end{equation*}
$$

where ExEmp denotes the estimated number of extra employees arising from higher FLFP rate adjusted according to the unemployment rate, UnEmp, of the related year by excluding the number of unemployed labour force participants since they are considered not to generate GDP. The number of actual and hypothetical number of female labour force participants in each age group is represented by the second and third columns of Table 3 below. The numbers are not rounded since they are the hypothetical numbers that are generated. Number of extra female employees are adjusted according to the
unemployment rates of each age group and represented by the last column of Table 3 where the unemployment rates are given by the fourth column.

Table 3- Actual and Extra Number of Female Labour Force Participants

| Age <br> Groups | $N_{\text {Number of }}$ <br> LFP $_{\mathrm{a}}$ | Number of <br> FLFP $_{\mathrm{h}}$ | Unemployment rates <br> $\%$ | Extra <br> Employees |
| :--- | :--- | :--- | :--- | :--- |
| 15 to 24 | 5,281 | $1,742.73$ | 29 | $1,237.338$ |
| 25 to 34 | 12,950 | $4,273.5$ | 14 | $3,675.21$ |
| 35 to 44 | 10,677 | $3,523.41$ | 10 | $3,171.069$ |
| 45 to 54 | 5,833 | $1,924.89$ | 4 | $1,847.894$ |
| $55+$ | 1,325 | 437.25 | 2 | 428.505 |

Source: SPO and author's calculations.
To be able to estimate the potential increase in GDP that might arise from extra employees hired, the hours that the extra employees work and the value of output that they produce should be estimated. Therefore, it is assumed that the hours extra employees work is the same as the actual average which the employees work for the year under consideration. On the other hand, it is also assumed that the extra workers are willing to work with lower wages since they are new entrants to the labour market and have lower productivity or work experience. The hourly wages for the new entrants are estimated by taking the minimum wage of the workers for the related year and that wage is set for the lower wage earners group (age group 15 to 24). Than the rest of the hourly wages are adjusted for each age group according to the proportion of the first group that the minimum wage is set for which generates a 7 percent lower hourly wages for the extra employees as given by equation 3 below.

$$
\begin{equation*}
w_{h}=(1-0,07) w_{a} \tag{3}
\end{equation*}
$$

where wage is denoted by w . Minimum wage of the related year is obtained from the web page of the Ministry of Labour and Social Security of TRNC for 2011. The wages are given in local currency to be able to make it possible for comparison of the per capita GDPs of north and south values are diverted to US \$ by obtaining the average exchange rate of TL/ US \$ of 2011 from the Turkish Cypriot Chamber of Commerce. The reason is that the local currencies of South and North Cyprus are not the same. South uses euro as a local currency since it is a member of the EU while north uses Turkish Lira as a local currency.

Table 4 - Extra GDP Generated by Extra Female Employment

| Age Groups | $(H)$ Hours <br> worked/week | $\left(W_{a}\right)$ Hourly <br> wages | $\left(W_{\mathrm{h}}\right)$ Hourly wages <br> of Extra Employees | Output/ Extra <br> Employee | $\left(\mathrm{GDP}_{\mathrm{h}}\right)$ Extra <br> GDP |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 15 to 24 | 44.94 | 4.82 | 4.48 | $10,469.2224$ | $12,953,966.7$ |
| 25 to 34 | 44.04 | 6.36 | 5.91 | $13,534.3728$ | $49,741,662.3$ |
| 35 to 44 | 42.24 | 8.48 | 7.89 | $17,330.2272$ | $54,955,346.2$ |
| 45 to 54 | 42.17 | 8.42 | 7.83 | $17,169.9372$ | $31,728,223.9$ |
| $55+$ | 47.57 | 8.92 | 8.29 | $20,506.4756$ | $8,787,127.3$ |
| Total | - | - | - |  | $158,166,336$ |

Source: SPO and author's calculations.

The wage that is earned, hours worked by actual and the extra workers are given in Table 4 above. It is assumed that the average hours worked by the extra female workers are same as the actual workers. GDP per hour generated during a week by extra female workers are calculated by multiplying the working hours with the hourly wages for each group adjusted according to the minimum wage rate for the year under consideration of this study. The value found is multiplied by the number of extra female workers and by 52 , since there are 52 weeks in a year to find the total GDP that would be generated by extra female workers if North Cyprus FLFP rate catches up with that of the south as illustrated by Equation (4) below;

$$
\begin{equation*}
G D P_{h}=H * w_{h} * 52^{*} E x E m p \tag{4}
\end{equation*}
$$

where H denotes the average hours worked per week by each age group. The value of GDP that would be generated by each age group and in total are given in the last column of Table 4 above. Values are in US $\$$ and the values after the decimal is excluded to be able to make the numbers more feasible, so that the commas are used as a separator instead of a decimal indicator.

The total GDP for 2011 that would have been generated by extra female employment if FLFP rate had been as high as south was $158,166,336$ US $\$$. The actual GDP was $3,878,600,000$ US $\$$ and per capita GDP 15,403 US $\$$ in 2011 in North Cyprus. The FLFP rate of north adjusted to the rate of South Cyprus FLFP shows that per capita GDP of the north could have been 16,031 US \$ indicating 4 percent higher per capita GDP with the catch up of north to south FLFP rate for the related year.

## Conclusion

Cyprus has been divided into two since 1974. Turkish Cypriots live in the north while Greek Cypriots live in the south of the island. Thus, there are two different economies and two different labour markets in north and south. Per capita GDP of North Cyprus is nearly half of the south. In parallel to the lower per capita GDP of north, FLFP rate in the north is also noticeably lower than the FLFP rate of the south.

Previous studies related to different country cases showed that increased FLFP rate stimulates per capita GDP (IMF, 2012; UNESCAP, 2007; Mujahid \& Zafer, 2012; Denhgani \& Firouzjai, 2015). This study aims to answer the question how much the potential increase in GDP per capita of north would have been if North Cyprus FLFP rate is as high as the FLFP rate of south in 2011.
The results of the study suggests that higher FLFP would have generated 10,360 extra female employees and extra of $158,166,336$ US \$ GDP raising per capita GDP by 4\% percent in 2011 with the catch up of north to south FLFP rate, which would have been a substantial contribution towards decreasing the income gap between the north and south of the island.

It should be noted that the specifications made and the estimations in this study are static related to only one year. Even the productivity difference between the actual and potential extra employees are considered, the
calculations are based on certain percentage difference adjusted to the lower income group. However, it is possible for the extra employees to improve their productivity over time generating higher impact on per capita GDP. At the same time the existing actual employees also improve their productivity over time.

The highest impact on GDP generated by the 35 to 44 age group while the lowest falls to the 55+ age group. However, it is not easy to estimate the real change in output since women moving from unpaid work to paid work for this age group would yield either higher level of investment to catch the existing female workers productivity levels or remain at a lower level of productivity.
On the other hand, it is assumed that capital to labour ratio to be fixed in this study. New investment would be needed in order to maintain the capital to labour ratio if capital is fully utilized otherwise capital utilization can be increased. Furthermore, productivity of the extra female employees assumed to be lower calculated as fraction of the minimum wage adjustment which lowers the estimated potential increase in GDP per new employee arising from higher FLFP in North Cyprus. It should also be noted that this increase should not be considered as an increase in economic welfare or economic growth. However, this study is designed to project the potential increase of per capita GDP that might have been generated through higher FLFP in North Cyprus which can be considered as being an initial step to put forth the importance of higher FLFP rates for further research for researchers and policy design to increase FLFP in North Cyprus for policy makers.

The estimation results provides information for the policy makers by how much it is worth to spend on increasing FLFP rates in North Cyprus since it is one of the important government policies. On the other hand, not only the labour supply but also the labour demand to absorb additional supply of female labour should be taken into consideration for the policy designs. This paper estimates the impact of higher FLFP on per capita GDP in North Cyprus confirming that a potential increase in FLFP in the north might create a substantial contribution towards decreasing the income gap between North and South Cyprus.

## References

Aldemir Ö. (2002). Causes and the Results of Occupational Segregation in the TRNC Labor Market. Unpublished Master Thesis. Eastern Mediterranean University Library, Famagusta, North Cyprus.

Aldemir Ö. (2004). Gender-Based Horizontal and Vertical Occupational Segregation in 'Northern Cyprus'. Nicosia: Turkish Cypriot Association of University Women.

Balcilar M., Kutan A.M. \& Yaya M.E. (2017). Financial Integration in Small Islands: The Case of Cyprus. International Review of Economics and Finance, 47: 201-219.

Bloom D.E., Canning D., Fink G., \& Finlay J.E. (2009). Fertility, Female Labor Force Participation, and the Demographic Dividend. Journal of Economic Growth, 14: 79-101.

Bryant J., Jacobsen V., Bell M. \& Garrett D. (2004). Labour Force Participation and GDP in New Zealand. New Zealand Treasury Working Paper, 4 (7).

Cavalcanti T. \& Tavares J. (2015). The Output Cost of Gender Discrimination: A Model-based Macroeconomics Estimate. The Economic Journal, 126: 109-134.
Denghani A. \& Firouzjai M.A. (2015). The Effect of Female Workforce Participation on GDP in the OIC Member Countries. International Academic Journal of Organizational Behavior and Human Resource Management, 2(9): 22-32.

Khaliq A., Khan D., Akbar S., Hamayun M. \& Ullah B. (2017). Female Labor Market Participation and Economic Growth: The Case of Pakistan. Journal of Social Science Studies, 4 (2): 217-230.

Goldin C. (1994). The U-Shaped Female Labor Force Function in Economic Development and Economic History. NBER WP Series No.4707.

Gruen D. \& Garbutt M. (2003). The Output Implications of Higher Labour Force Participation, Treasury WP, 2003-02.

Güven-Lisaniler F. (2003). Assessing the Status of Women: A Step Towards Equality. Nicosia: Turkish Cypriot Association of University Women.

Güven-Lisaniler F. (2010). Contemporary Developments in the Labour Market Dynamics of North Cyprus: Exploring Gender Segmentation. In B.N. Ghosh, Global Governance, Labour Market Dynamics and Social Change. London: Wisdom House: 127-156.

Güven-Lisaniler F. \& Uğural S. (2001). Occupational Segregation: The Position of Women on the North Cyprus Labour Market. Kadin/Woman 2000, 2(1): 117-121.

Hausmann R., Tyson L.D. \& Zahidi S. (2009). The Global Gender Gap Report 2009. Geneva: World Economic Forum.

Hosgor A.G. \& Smiths J. (2008). Variation in Labor Market Participation of Married Women in Turkey. Women's Studies International Forum, 31(2): 104-117.

International Monetary Fund (IMF) (2012). Country Report No.12/208.
Katircioglu T.S. (2006). Causality Between Agriculture and Economic Growth in a Small Nation Under Political Isolation: A case from North Cyprus. International Journal of Social Economics, 33(4): 331-343.

Kumari R. (2018). Economic Growth, Disparity, and Determinants of Female Labor Force Participation: A Research Agenda. World Journal of Entrepreneurship, Management and Sustainable Development, 14(2): 138-152.

Luci A. (2009). Female Labour Market Participation and Economic Growth. International Journal of Innovation and Sustainable Development, 4(2/3): 97108.

Mujahid N. \& Zafar N. (2012). Economic Growth-Female Labour Force Participation Nexus: An Empirical Evidence for Pakistan. The Pakistan Development Review. 51(4): 565-586.

Okumus F., Altinay M. \& Arasli H. (2005). The Impact of Turkey’s Economic Crises of February 2001 on the Tourism Industry in Northern Cyprus. Tourism Management, 26: 95-104.

Psacharopoulos G. \& Tzannatos Z. (1989). Female Labor Force Participation: An International Perspective. The World Bank Research Observer, 4(2): 187-201.

Sanghi S., Srija A. \& Vijay S.S. (2015). Decline in Rural Female Labor Force Participation in India: A Relook into the Causes. The Journal for Decision Makers, 40(3): 255-268.

State Planning Organization (SPO) (2016a). The Final Results of TRNC General Population and Housing Unit Census. North Cyprus.

State Planning Organization (SPO) (2016b). Economic and Social Indicators.
Tam H. (2011). U-shaped Female Labor Participation with Economic Development: Some Panel Data Evidence. Economic Letters, 110(2): 140-142.
Tansel A. (2002). Economic Development and Female Labor Force Participation in Turkey: Time-series Evidence and Cross-province Estimates, ERC Working Papers in Economics, 1/5, Middle East Technical University, Turkey, 1-37.

Tsani S., Paroussos L., Fragiadakis C. \& Charalambidis L. (2013). Female Labor Force Participation and Economic Growth in the South Mediterranean Countries. Economic Letters, 120(2): 323-328.

United Nations Economic and Social Commission for Asia and Pacific (UNESCAP) (2007). Economic and Social Survey of Asia and the Pacific 2007.

Verick S. (2014). Female Labour Force Participation in Developing Countries, International Labour Organisation, IZA.

World Bank (2016). Labor force participation rate (modeled ILO estimate). http://data.World Bank.org/indicator/SL.TLF.CACT.FE.ZS


[^0]:    *Asst.Prof. Demet Beton- Kalmaz, Department of Economics, Faculty of Economics and Administrative Sciences, European University of Lefke, Lefke-North Cyprus. E-mail: demetkalmaz@eul.edu.tr. ORCID ID: 0000-0002-4407-5720.

